

SUSTAINABLE FINANCING MECHANISMS: PUBLIC SECTOR - PRIVATE SECTOR PARTNERSHIP

Proceedings of the Regional Conference on
Sustainable Financing Mechanisms for the
Prevention and Management of Marine Pollution:
Public Sector - Private Sector Partnership

Metro Manila, Philippines • 14-16 November 1996

Edited by:

S. Adrian Ross
Catalina S. Tejam
Rina Maria P. Rosales



**SUSTAINABLE FINANCING
MECHANISMS:
PUBLIC SECTOR - PRIVATE SECTOR
PARTNERSHIP**

**Proceedings of the Regional Conference on
Sustainable Financing Mechanisms for the
Prevention and Management of Marine Pollution:
Public Sector - Private Sector Partnership**

Metro Manila, Philippines • 14-16 November 1996

Edited by:

**S. Adrian Ross
Catalina S. Tejam
Rina Maria P. Rosales**

Organized by:

**Global Environment Facility (GEF)/
United Nations Development Programme (UNDP)/
International Maritime Organization (IMO)
Regional Programme for the Prevention and Management
of Marine Pollution in the East Asian Seas**

Coastal Management Center

**Department of Environment and
Natural Resources**

Sponsored by:

**GEF
UNDP
IMO
International Development Research Centre
Swedish International Development Agency
Danish Cooperation for Environment and Development**

Supported by:

**UNEP-COBSEA
Asian Development Bank**

Hosted by:

Government of the Republic of the Philippines

**SUSTAINABLE FINANCING MECHANISMS:
PUBLIC SECTOR - PRIVATE SECTOR PARTNERSHIP**

**Proceedings of the Regional Conference
on Sustainable Financing Mechanisms for the Prevention
and Management of Marine Pollution:**

Public Sector - Private Sector Partnership

Metro Manila, Philippines • 14-16 November 1996

1997

Published by the GEF/UNDP/IMO Regional Programme
for the Prevention and Management of Marine Pollution
in the East Asian Seas

Printed in Quezon City, Philippines

Editorial Supervision: Leticia Dizon, PhD

Layout and Production: Lilian Jimenez-Marfil

Cover Design and Artwork: Jonel Dulay

Text set in CG Omega and Book Antigua

Ross, S. Adrian, C.S. Tejam, and R.M.P. Rosales, Editors. Sustainable financing mechanisms: public sector - private sector partnership. **MPP-EAS Conference Proceedings No. 6**, 352 p. GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas. Quezon City, Philippines.

The contents of this publication do not imply, on the part of the Global Environment Facility, the United Nations Development Programme, the International Maritime Organization and its Programme Development and Management Office (PDMO) for the Marine Pollution Prevention and Management in the East Asian Seas, the expression of any position or opinion on the legal status of any country or territory, or its authority, or concerning the delimitation of its boundaries.

ISBN 971-91912-0-1



MISSION STATEMENT

The primary objective of the Global Environment Facility/United Nations Development Programme/International Maritime Organization Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas is to support the efforts of the eleven (11) participating governments in the East Asian region to prevent and manage marine pollution at the national and subregional levels on a long-term and self-reliant basis. The 11 participating countries are: Brunei Darussalam, Cambodia, Democratic People's Republic of Korea, Indonesia, Malaysia, People's Republic of China, Republic of the Philippines, Republic of Korea, Singapore, Thailand, and Vietnam. It is the Programme's vision that, through the concerted efforts of stakeholders to collectively address marine pollution arising from both land- and sea-based sources, adverse impacts of marine pollution can be prevented or minimized without compromising desired economic development.

The Programme framework is built upon innovative and effective schemes for marine pollution management, technical assistance in strategic maritime sectors of the region, and the identification and promotion of capacity-building and investment opportunities for public agencies and the private sector. Specific Programme strategies are:

- Develop and demonstrate workable models on marine pollution reduction/prevention and risk management;
- Assist countries in developing the necessary legislation and technical capability to implement international conventions related to marine pollution;
- Strengthen institutional capacity to manage marine and coastal areas;
- Develop a regional network of stations for marine pollution monitoring;
- Promote public awareness on and participation in the prevention and abatement of marine pollution;
- Facilitate standardization and intercalibration of sampling and analytical techniques and environment impact assessment procedures; and
- Promote sustainable financing mechanisms for activities requiring long-term commitments.

The implementation of these strategies and activities will result in appropriate and effective policy, management, and technological interventions at local, national, and regional levels, contributing to the ultimate goal of reducing marine pollution in both coastal and international waters, over the longer term.

Dr. Chua Thia-Eng
Regional Programme Manager
GEF/UNDP/IMO Regional Programme
for the Prevention and Management
of Marine Pollution in the East Asian Seas

Table of Contents

Mission Statement	iii
Table of Contents	v
Preface	ix
Acknowledgements	xi
List of Abbreviations	xiii

PART 1: SUMMARY REPORT OF THE CONFERENCE

SUMMARY REPORT OF THE CONFERENCE	1
ANNEXES	21
Annex 1: Conference Recommendations	22
Annex 2: List of Participants	31
Annex 3: Program of Activities	50
Annex 4: Opening Ceremonies	
Opening Remarks of Dr. Chua Thia-Eng	58
Opening Remarks of Dr. Anders Granlund	61
Opening Remarks of Sec. Victor O. Ramos	63
Opening Remarks of Ms. Sarah L. Timpson	65
Annex 5: Dinner Reception Speeches	
Remarks of Dr. Chua Thia-Eng	69
Partnership for a Sustainable Marine Environment	71
by: H.E. Fidel V. Ramos <i>President, Republic of the Philippines</i>	
Annex 6: Closing Ceremonies	
by: Hon. Delfin Ganapin, Jr. <i>Undersecretary, Department of Environment and Natural Resources</i>	75

PART 2: CONFERENCE PAPERS

SESSION 1: SHARING RESPONSIBILITIES	81
Marine Pollution Prevention and Management in the East Asian Seas: A Cutting Edge Programme of Participating East Asian Governments and GEF/UNDP/IMO Initiatives by: Chua Thia-Eng	82
Funding a Partnership for Safer Navigation and a Cleaner Environment in the Straits of Malacca: Some Preliminary Thoughts by: B.A. Hamzah and Mohd. Nizam Basiron	87
Banking on Community Capabilities for a Better Environment: A Wise Investment? by: Donna Z. Gasgonia	104
Poverty as a Threat to the Coastal Environment by: Sarah L. Timpson	108
SESSION 2: LINKAGES BETWEEN INDUSTRY AND THE PUBLIC SECTOR	121
Prevention is Better Than Cure—Better Charts and Safer Seas by: Adam Kerr	122
Cooperation in the Malacca Straits by: Teh Kong Leong	131
IMO/Industry Global Oil Spill Planning Initiative: An IPIECA Perspective by: John S. Lemlin	135
Maritime Traffic Safety Measures in Seto Inland Sea and the Pollution Management System in Japan by: Masayasu Sakaba	148
International Conventions on Liability and Compensation for Oil Pollution Damage by: Hideo Osuga	152
Liability for Oil Spill Damages: Issues, Methods, Examples, and Controversies by: Thomas A. Grigalunas, James J. Opaluch, and Jerry Diamantides	167
Driving Forces Towards Better Marine Environment and Safety: Considering Economics by: Hans Broberg	182

SESSION 3: CASE STUDIES: WASTE MANAGEMENT AND SOCIOECONOMIC BENEFITS	185
Privatization of Sewerage Services in Malaysia by: Lum Weng Kee	186
Waste Management in Hong Kong: Private Sector's Participation by: Benny Y.K. Wong	195
Waste Disposal Fee System in Xiamen by: Zeng Zijian	201
Socioeconomic Impact Assessment of Integrated Treatment of Marine Environmental Problems in the Western Sea Area of Xiamen by: Yao Lixin	206
Socioeconomic Benefits of Integrated Coastal Management and Environmental Management Programs: The Case of Clean Rivers, Marine Parks, and Fisheries by: Catalina S. Tejam	215
The Sustainable Benefits of Coastal Tourism Management in Thailand—Case Study: Ko Samui by: Pradech Phayakvichien	227
SESSION 4: BUSINESS OPPORTUNITIES	233
ECDIS and Sustainable Finance Mechanisms in the East Asian Seas by: Alex Macdonald	234
Economic Benefits from Operational Laser Bathymetry in Australia, 1993 to 1996 by: Mark Byron Wellington	244
Socioeconomic Implications of the Seafarer's Training and Certification by: Constantino L. Arcellana, Jr.	253
Integrated Management Strategies for Maritime and Industrial Wastes: Opportunities for Public Sector - Private Sector Partnership by: Bernard Fleet	258
Reaping Success from Waste Minimization: The Philippine Experience by: Marissa V. David	265
Financial Requirements to Sustain the Maintenance and Deployment of Oil Spill Equipment Stockpiles by: Shigeto Oguri	275

SESSION 5: FINANCING INVESTMENTS	281
Japanese Government's Experience on the Malacca Straits by: Sadatoshi Koike	282
Cargo Taxation as a Means of Funding Navigational and Pollution Management by: Cecil Dave M. Duncan	286
Operation of Private Port Reception Facilities: Port of Bremen by: Hans Jurgen Roos	296
The Establishment of a MARPOL Waste Oil Reception Facility for Bangkok and the Ports of the Eastern Seaboard of Thailand: Public Sector - Private Sector Partnership for Marine Pollution Prevention by: Neil Challis	314
SESSION 6: ENHANCING PUBLIC SECTOR - PRIVATE SECTOR PARTNERSHIP	321
Asian Development Bank Support for Public - Private Sector Investment in the Environment by: Robert J. Dobias	322
Management of Partnerships Between the Public and Private Sectors in Financing Environmental Activities: Policies on the Provision of Government Support Arrangements to Private Sector Participation in Water Infrastructure by: Eugenio Raymundo B. Inocentes III	332
Financial Mechanisms for Mobilizing In-Country and External Resources for Marine Pollution Prevention and Management by: Rina Maria P. Rosales	345

Preface

Principle 16 of the Rio Declaration on Environment and Development states, *“National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.”* Although there is little argument over the rationale behind this principle, the fact of the matter is that even in the developed world, employment of economic and market-based instruments as tools for discouraging inappropriate use of natural resources and reducing damage to the environment is relatively new, and not without criticism and failure. The direct transfer and potential for success of such instruments in the developing world is, at best, suspect, given the very different social, economic, and political conditions that exist between the two. This is not to say that the experience of the North cannot provide valuable insight into appropriate sustainable financial mechanisms for developing and newly developed countries. However, under conditions of rapid economic growth and a major rush for infrastructure development, as in the South East Asia region, the challenge for governments is to identify, modify, develop, and adopt mechanisms that integrate environmental and economic policies, thus ensuring development on a sustainable basis.

The GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas has embarked on an initiative to assist countries in the region to identify and adopt sustainable financing mechanisms for marine pollution programs. The early stages of the program involved the completion of a series of case studies, within and outside the region, to evaluate the successes and failures of economic instruments which were being applied and/or proposed in support of prevention and management of marine pollution. Shore reception of ship wastes, municipal sewerage, hazardous and non-hazardous waste management, oil spill response, marine pollution monitoring, training, and electronic navigational charts were among the various facilities and services examined to determine opportunities and benefits of public sector - private sector partnerships. Public sector-private sector partnership is viewed by the Regional Programme as a mechanism embodying a variety of institutional arrangements and financing schemes that combine the administrative, regulatory, and social responsibilities of government with the technical and business skills of the private sector.

The Regional Conference on Sustainable Financing Mechanisms for the Prevention and Management of Marine Pollution: Public Sector - Private Sector Partnership was designed as a venue for presentation of the outputs of the various case studies, and a forum for an exchange of views on approaches to building and strengthening partnerships between the two sectors. The conference objectives were to:

- explore opportunities for partnership;
- assess the case studies;

- discover possibilities for investment; and
- examine options for funding navigational safety and marine pollution management programs.

This publication contains a summary of the proceedings of the Conference, the conclusions and recommendations developed and adopted by the gathering, and the technical papers that were presented during the three-day event. The conclusions and recommendations focus on the roles and responsibilities of government, international agencies, donors, investors/lenders, and the private sector for promoting and advancing the environmental industry throughout the East Asian Seas. The GEF/UNDP/IMO Regional Programme was challenged to continue the development and adoption of public sector - private sector partnerships and to demonstrate practical applications of this approach in the East Asian region, particularly at the local level.

Overall, the Regional Conference delivered a clear message. Partnerships are not only viable, but essential, if economic growth and development are to be sustainable. The identification and assessment of marine pollution problems, and recognition of the constraints to resolving those problems, are important elements in the evolution of marine pollution programs. But too often in the developing world they are the focus of repeated effort. It is time for innovative thinking and collective action on the part of government and the private sector.

S. Adrian Ross
Conference Coordinator

Acknowledgements

Sincere appreciation and acknowledgement are due to a large number of individuals, organizations, and agencies that have contributed in a variety of ways to the success of the Regional Conference on Sustainable Financing Mechanisms for the Prevention and Management of Marine Pollution: Public Sector-Private Sector Partnership.

It is recalled that the original concept of the Conference was first discussed at a meeting held in May 1995 at the United Nations Development Programme (UNDP) office in New York. Ms. Joyce Yu, former UNDP Programme Officer, Regional Bureau for Asia and Pacific, was instrumental in organizing that first gathering and in shaping the strategy of public sector - private sector partnership within the Regional Programme. In addition, the encouragement and assistance of Mr. Kevin McGrath and Ms. Sarah Timpson, respectively, the former and the current UNDP Resident Representatives in Manila, during the preparation and implementation of the Conference are sincerely acknowledged.

The Conference itself could not have taken place were it not for the financial support provided by the International Development and Research Centre (IDRC), Swedish International Development Cooperation Agency (Sida), and the Danish Cooperation for Environment and Development (DANCED). The continuing support of Dr. Anders Granlund, Sida, to the planning and implementation of the Regional Conference, and to the Regional Programme in general, is highly appreciated. The Department of Environment and Natural Resources (DENR) of the Government of the Philippines hosted the event, and special thanks are extended to Secretary Victor Ramos (Conference Co-Chair), Undersecretary Antonio La Viña and Undersecretary Delfin Ganapin for the time and effort that they exerted to promote and to participate in the event. The Global Environment Facility (GEF), the United Nations Development Programme (UNDP), the International Maritime Organization (IMO), and the Coastal Management Center (CMC) co-sponsored the Conference and, in conjunction with a local Organizing Committee composed of representatives from the DENR, the Department of Foreign Affairs (DFA), the Philippine Coast Guard (PCG), and the Department of Labor and Employment (DOLE), planned, organized, and implemented the event with a high degree of efficiency. Gratitude is also extended to the United Nations Environment Programme - Coordinating Body on the Seas of East Asia (UNEP-COBSEA) and the Asian Development Bank (ADB) for their contributing efforts.

The Conference sessions were managed by some very capable Chairpersons. Special thanks are extended to Mr. Robert Jara, DENR, Philippines; Mr. Alex Macdonald, Strategic Ventures Corporation, Canada; Dr. B. A. Hamzah, Maritime Institute of Malaysia; Mr. Reinier Willems, Pilipinas Shell Petroleum, Philippines; and Mr. Brent Pyburn, East Asia Response, Ltd., Singapore.

Special thanks also go to Baxter Technologies (Malaysia), the Coordinating Council of the Philippine Assistance Program (CCPAP) BOT Center, the Embassy of Sweden/Swedish Trade Council, Eutech-Asia Software Consortium, the International Response Corporation/Babtie BMT Karl Nehlsen/PTC Bremen, Rope System-RO Clean International, the Urban Waste Expertise Programme-UWEP, the PG-ENRO/Batangas Bay Demonstration Project, and the Xiamen Demonstration Project for participating in the Conference Display. The exhibition highlighted the Conference theme—public sector - private sector partnership—and was well appreciated by all of the participants and guests to the Conference.

The quality of papers and presentations delivered during the Conference was of high standard, and those responsible deserve congratulations. The papers facilitated a flow of ideas and suggestions between speakers and participants during the plenary sessions, as well as during the formulation of the Conference conclusions and recommendations. This, in no small way, has provided insight and expectation of future opportunities for public sector - private sector partnerships in the region.

Finally, the tireless efforts of the Regional Programme Manager and Conference Co-Chair, Dr. Chua Thia-Eng, and the officers and staff of the Regional Programme Office, including Dr. Huming Yu, Mr. James Paw, Ms. Cory Guerrero, Ms. Cathy Tejam, Ms. Rina Rosales, and Ms. Deborah Villa throughout the formulation and implementation stages of the Regional Conference were an inspiration and had significant impact on the final results.

S. Adrian Ross
Conference Coordinator

List of Abbreviations

ADB	Asian Development Bank	DBO	design-build-operate
APCTT	Asian and Pacific Center for Technology Transfer	DENR	Department of Environment and Natural Resources (Philippines)
APEC	Asia-Pacific Economic Cooperation	DMCs	developing member countries
ARPEL	Asistencia Reciproca Petrolera Empresarial Latinoamerica	DOT	Department of Transport (South Africa)
BBDP	Batangas Bay Demonstration Project (Philippines)	DOT	develop-own-transfer
BCSD	Business Council for Sustainable Development	DSTO	Defense Science and Technology Organization
BLT	build-lease-transfer	DWR	deep water route
BOD	biological oxygen demand	EARL	East Asia Response Limited
BOO	build-own-operate	ECDIS	Electronic Chart Display and Information System
BOT	build-operate-transfer	ECC	environmental compliance certificate
BT	build-transfer	EEZ	exclusive economic zone
CAO	contract-add-operate	EIs	economic instruments
CBA	cost-benefit analysis	EMB	Environmental Management Bureau (Philippines)
CCIs	command-and-control instruments	ENC	electronic navigation chart; electronic nautical chart
CHS	Canadian Hydrographic Service	ENRAP III	Environment and Natural Resources Accounting Project III
CLC	International Convention on Civil Liability for Oil Pollution Damage	ESCAP	Economic Commission for Asia and the Pacific
CMC	Coastal Management Center	FAO	Food and Agriculture Organization of the United Nations
COBSEA	Coordinating Body on the Seas of East Asia	FPE	Foundation for the Philippine Environment
COLREG	Convention of the International Regulations for Prevention of Collisions at Sea	FSA	formal safety assessment
CRISTAL	Contract Regarding a Supplement to Tanker Liability for Oil Pollution	GEF	Global Environment Facility
CSL	Canada Steamship Lines	GIS	geographic information system
CVM	contingent valuation method	GNSS	Global Navigation Satellite System
DA	Department of Agriculture (Philippines)	GPS	global positioning system
DANCED	Danish Cooperation for Environment and Development	HDB	Housing Development Board

IATT	international air transport tax	IREDA	Indian Renewable Energy Development Agency, Ltd.
ICM	integrated coastal management	ISEL	Institute for Shipping Economics and Logistics (Bremen)
ICPD	International Conference on Population and Development	ISM	International Safety Management Code
ICC	International Chamber of Commerce	ISO	International Standards Organization
IDRC	International Development Research Centre	ITOPF	International Tanker Owners Pollution Federation
IEM	Industrial and Environmental Management Program (Thailand)	ITQs	individual transferable quotas
IEMP	Industrial Environmental Management Project (Philippines)	JEXIM	Japan Export-Import Bank
IFIs	international financial institutions	JICA	Japanese International Cooperation Agency
IHB	International Hydrographic Bureau	JMSA	Japanese Maritime Safety Agency
IHO	International Hydrographic Organization	LADS	Laser Airborne Depth Sounder
ILO	International Labor Organization	LGUs	local government units (Philippines)
IMC	International Marine Consultancy Pte. Ltd., (Singapore)	LLDA	Laguna Lake Development Authority (Philippines)
IMNC	Interim Maritime Navigation Committee (South Africa)	MARPOL	Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships
IMO	International Maritime Organization	MBIs	market-based instruments
INMARSAT	International Maritime Satellite Organization	MENAS	Middle East Navigation Aids Service
INTET	International Network for Transfer of Environmentally Sound Technologies (India)	MEP	marine environmental problem
IOPC	International Oil Pollution Compensation	MIMA	Maritime Institute of Malaysia
IPF	indicative planning figure	MOTC	Ministry of Transport and Communication (Thailand)
IPIECA	International Petroleum Industry Environmental Conservation Association	MPP-EAS	Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas
IPPS	Industrial Pollution Projection System	NDI	Nautical Data International, Inc.
IRC	International Response Corporation (Thailand)	NEDA	National Economic and Development Authority (Philippines)

NGOs	nongovernment organizations	ROO	rehabilitate-own-operate
NOAA	National Oceanic and Atmospheric Administration	ROT	rehabilitate-operate-transfer
NPC	National Power Corporation (Philippines)	RTSs	Refuse Transfer Stations
NRIPS	National/Regional Industry Prioritization Strategy	SEDCs	sustainable enterprise development centers
NTBs	non-tariff barriers	SEIA	social and economic impact assessment
OCIMF	Oil Companies International Marine Forum	SEZ	special economic zone
ODA	official development assistance	Sida	Swedish International Development Cooperation Agency
ODA	Overseas Development Administration of the United Kingdom	SOLAS	International Convention for the Safety of Life at Sea
OECD	Overseas Economic Cooperation Fund	STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
OPA	Oil Pollution Act	STS	ship-to-ship
OPRC	International Convention on Oil Pollution Preparedness, Response and Cooperation	TA	technical assistance
OSPAR	Oil Spill Preparedness and Response in the ASEAN Region Project	TAT	Tourism Authority of Thailand
OSRAP	Oil Spill Response Action Plan	TOVALOP	Tank Owners Voluntary Agreement concerning Liability for Oil Pollution
PG-ENRO	Provincial Government Environment and Natural Resource Office (Philippines)	TSP	total suspended particulate
PMA	pollution management appraisal	TSS	traffic separation scheme
POs	people's organizations	UKC	underkeel clearance
PSC	Port State Control	ULCCs	ultra large crude carriers
PSSD	Philippine Strategy for Sustainable Development	UNCED	United Nations Conference on Environment and Development
RAN	Royal Australian Navy	UNCLOS	United Nations Convention on the Law of the Sea
RLO	rehabilitate-lease-operate	UNCTAD	United Nations Conference on Trade and Development
ROCRAM	Red Operativa de Cooperacion Regional entre Autoridades Maritimas de Sudamerica, Mexico, Panama y Cuba	UNDP	United Nations Development Programme
ROI	return on investment	UNEP	United Nations Environment Programme
ROM	rehabilitate-own-manage	UNIDO	United Nations International Development Organization
		USAID	United States Agency for International Development
		UWEP	Urban Waste Expertise Programme (The Netherlands)

VLCCs	very large crude carriers	WECD	Worldwide Electronic Chart Database
VTs	vessel traffic service	WSA	Western Sea area (Xiamen)
WBSCD	World Business Council for Sustainable Development	WSSD	World Summit on Social Development
WDP	Waste Disposal Plan (Hong Kong)	WTO	World Tourism Organization
		WTP	willingness to pay

Part 1:

**SUMMARY REPORT
OF THE CONFERENCE**



**REGIONAL CONFERENCE ON SUSTAINABLE FINANCING MECHANISMS FOR THE
PREVENTION AND MANAGEMENT OF MARINE POLLUTION:
PUBLIC SECTOR - PRIVATE SECTOR PARTNERSHIP**
Metro Manila, Philippines • 14-16 November 1996

SUMMARY REPORT OF THE CONFERENCE

A. Introduction

- i. The Regional Conference on Sustainable Financing Mechanisms for the Prevention and Management of Marine Pollution: Public Sector - Private Sector Partnership was held at the Manila Galleria Suites, Manila, Philippines, from 14 to 16 November 1996. The Conference was hosted by the Department of Environment and Natural Resources of the Government of the Republic of the Philippines.
- ii. The Conference was co-sponsored by the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS), Coastal Management Center (CMC), the Department of Environment and Natural Resources of the Philippines (DENR), the Swedish International Development Cooperation Agency (Sida), the International Development Research Centre (IDRC), and the Danish Cooperation for Environment and Development (DANCED); and was supported by the Asian Development Bank (ADB) and the United Nations Environment Programme/Coordinating Body on the Seas of East Asia (UNEP/COBSEA).
- iii. An important feature of the Conference was an exhibit featuring various programs, technologies and services related to environmental management. Twelve booths provided venues for information exchange and networking opportunities. Exhibitors included Baxter Technologies, Malaysia; Karl Nehlsen—PTC Bremen, Germany; International Response Corporation (IRC)—Babtie BMT, Thailand; Eutech-Asia Software Consortium, Singapore; the Embassy of Sweden—Swedish Trade Council, Sweden; ROPE Systems RO-Clean International, Singapore; Urban Waste Expertise Programme (UWEP), The Netherlands; the Batangas Bay Demonstration Project (BBDP)—Provincial Government Environment and Natural Resource Office (PG-ENRO), Philippines; the Xiamen Demonstration Project, People's Republic of China; and the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS), Philippines.
- iv. The Conference was attended by representatives of the public and private sectors, and nongovernment agencies from the 10 participating countries of the GEF/UNDP/IMO Regional Programme, namely: Brunei Darussalam, Cambodia, Indonesia, Malaysia, the People's Republic of China, the Philippines, Republic

of Korea, Singapore, Thailand and Vietnam; and participants from 14 other countries; the Royal Danish Embassy; the Embassy of Sweden; the Embassy of France; the British Council; the Japanese International Cooperation Agency (JICA); Sida; IDRC; DANCED; the United Nations International Development Organization (UNIDO); and the United Nations Environment Programme (UNEP).

- v. Also represented at the Conference were the United Nations Development Programme (UNDP), Manila, and the International Maritime Organization (IMO) Programme and Management Office, Manila.
- vi. The Conference Recommendations are in Annex 1.
- vii. A full list of participants is in Annex 2.
- viii. A copy of the Conference Program is in Annex 3.

B. Opening Ceremonies

- i. Mr. Robert Jara, Division Chief, Department of Environment and Natural Resources (DENR), Philippines, served as Master of Ceremonies for the Opening Ceremonies.
- ii. Dr. Chua Thia-Eng, Regional Programme Manager, GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas, welcomed the participants to the Conference and provided an overview of the objectives of the Conference. The Conference was defined as a forum for the presentation and exchange of views to achieve the following objectives:
 - a) Explore the opportunities for public/private sector partnerships;
 - b) Assess case studies in sustainable financing of marine pollution;
 - c) Discover possibilities for investment in innovative technologies, research, facility management and support services; and
 - d) Examine options for funding navigational safety and marine pollution management programs, promoting partnership among government, industry, financial institutions and nongovernment organizations.
- iii. Dr. Anders Granlund, Senior Research Officer, Department of Research Cooperation - SAREC, Swedish International Development Cooperation Agency (Sida), also welcomed participants to the Conference, stressing the importance of the event to Sida, and their interest in development programs relevant to coastal zone management.
- iv. Ms. Sarah Timpson, Resident Representative of UNDP-Manila and UN Resident Coordinator addressed the Conference, placing emphasis on the importance of private sector involvement in marine pollution programs, the theme of partnership and the UNDP's concern for sustainable human development.

- v. The Secretary of the Department of Environment and Natural Resources, Honorable Victor O. Ramos, delivered the keynote address on behalf of the Government of the Republic of the Philippines. Secretary Ramos emphasized the importance of the GEF/UNDP/IMO Regional Programme to the Philippines and the countries in the East Asian Region. The Secretary exhorted participants to involve themselves actively in the Conference and in efforts at identifying sustainable means in preserving our marine environment.
- vi. The texts of the speeches made during the Opening Ceremonies are contained in Annex 4.

SESSION 1: SHARING RESPONSIBILITIES

1. The Honorable Victor O. Ramos, Secretary of the Philippine Department of Environment and Natural Resources, assumed the position of Chair for the first session.
2. The first speaker, Dr. Chua Thia-Eng, focused on "Marine Pollution Prevention and Management in the East Asian Seas: A Cutting Edge Programme of Participating East Asian Governments and GEF/UNDP/IMO Initiatives." Dr. Chua discussed issues on marine pollution in the region and the value of addressing the problem through integrated coastal management (ICM) applied at the local level, and cooperation among neighboring countries in the management of subregional seas and straits used for navigation. Dr. Chua outlined concrete activities and contributions that can be made by the public and private sectors, and the ways by which they may cooperate, bringing in other major players including UNDP, donor agencies, and nongovernment organizations (NGOs).
3. Dr. B.A. Hamzah, Director-General, Maritime Institute of Malaysia, presented what he termed an advocacy paper on "Funding a Partnership for Safer Navigation and a Cleaner Environment in the Malacca Straits: Some Preliminary Thoughts." Dr. Hamzah proposed the establishment of two trust funds in support of improved management of the Straits: one to cover navigational safety initiatives and another for marine pollution prevention and management; and enjoined all users and stakeholders of the Straits to take the challenge.
4. Atty. Donna V. Gasgonia, Executive Director, Foundation for the Philippine Environment (FPE), made a presentation on "Banking on Community Capabilities for a Better Environment: A Wise Investment?" Atty. Gasgonia stressed the significant role that community organizations play in protecting the environment, realized in efforts of the GEF/UNDP/IMO Regional Programme at the ICM demonstration sites and the coastal projects funded by the FPE. She also emphasized the social benefits of such programs, including job creation and enhancement of personal esteem.

5. The last speaker for the session, Ms. Sarah Timpson, spoke on “Poverty as a Threat to the Coastal Environment,” or the linkages between poverty and development vis-à-vis marine and coastal resources in the Asia Pacific. The speaker called for a shift of focus from individual to community entrepreneurship as the strategy toward sustainable human development.
6. At the Open Forum, several points were raised by the participants and by the speakers. With regard to the Straits of Malacca, it was acknowledged that the “user pays” principle is well-accepted, although mechanisms for the user to actually pay are still undefined. It was conducted that the best strategy is to seek contribution from all the stakeholders. Efforts need to be focused on ways of advancing international law, in order to reflect and serve the interests of littoral and user states.
7. The Chair summarized important points raised during the session, including:
 - a) adopting ICM practices at the local level as a means of addressing marine pollution prevention and management in coastal areas;
 - b) the need for an international forum to develop creative financial mechanisms for burden-sharing in the Straits of Malacca;
 - c) shared responsibility among all sectors of society at the local level for improved coastal and resource management; and
 - d) the potential contribution of improved environmental and resource management in solving the problem of poverty in coastal areas.

SESSION 2: LINKAGES BETWEEN INDUSTRY AND THE PUBLIC SECTOR

1. Mr. Alex Macdonald, President of Strategic Ventures Corporation in Canada, assumed the Chair for the second session. The Discussant for the first three presentations was Captain Kopong Bebe Arifin, Head of the MARPOL Combating Section, Directorate General of Sea Communication of Indonesia. Captain Raja Malik Saripulazan bin Raja Kamaruzaman, Deputy Director General for Marine Pollution, Marine Department of Peninsular Malaysia, assumed the role of Discussant for the next four presentations.
2. Mr. Adam Kerr, Director, International Hydrographic Bureau (IHB), Monaco, spoke on “Prevention is Better Than Cure—Better Charts and Safer Seas,” particularly on the work of IHB, and the navigational safety/marine pollution prevention benefits of satellite positioning and multibeam depth measuring systems as tools for navigation and vessel traffic management. The speaker related that recent efforts of IHB had been concentrated on the South China, Sea, due to the inadequacy and unsuitability of data amidst increasing vessel traffic and tonnage.

3. Mr. Teh Kong Leong, Director, Shipping, Maritime and Port Authority of Singapore, presented a paper on "Cooperation in the Malacca Straits." He examined the existing Revolving Fund which had been set up to support response to oil spill and pollution incidents. The speaker pointed out that many ship accidents have been caused by negligence, more than anything else. He emphasized that the latter issue can be addressed by improving implementation of the International Safety Management Code and the revised STCW Convention. He proposed that inspections be conducted in a more comprehensive manner, covering both operational aspects as well as the quality of ship crew.
4. Mr. John S. Lemlin, Secretary-General, International Petroleum Industry Environmental Conservation Association (IPIECA), United Kingdom, spoke on "IMO/Industry Global Oil Spill Planning Initiative: An IPIECA Perspective," introducing IPIECA's key obligations, objectives, and achievements to date. Mr. Lemlin cited IPIECA's involvement in international seminars on oil spill response, particularly in South Africa and Ghana. The speaker emphasized the need to build national capabilities, sustain partnerships, and establish funding support in oil spill contingency planning, especially in developing countries.
5. Captain K.B. Arifin summarized the major points raised by the speakers. The Discussant mentioned that the papers essentially focused on pollution prevention, contingency planning, oil spill response and compensation. Captain Arifin pointed out that national and regional programs exist for oil spill response, integrating the skills and resources of all users at identified stages. He stressed the need to strengthen such programs through capacity building and enhancing partnerships.
6. Thereafter, the floor was opened for questions. Discussion revolved around the subject of public sector - private sector partnerships, particularly on the issue of shared investments, risks and benefits. A question was raised on shared risks, particularly on who should take the initiative in oil spill response: government or the private sector. It was suggested that there are instances where actions should be initiated by government and others where the private sector takes the lead, each according to their comparative strengths. Mr. Lemlin commented that industry should take the first move; however, the different groups within the industrial sector have to be united first in order to face problems collectively. Mr. Teh mentioned that, in the case of Singapore, there was essentially no difficulty in seeking the help of the private sector. However, governments need to contribute national funds to gather essential data; e.g., vessel traffic for adequate charts in the South China Sea.
7. Mr. Masayasu Sakaba, Director, Maritime Disaster Prevention Division, Japanese Maritime Safety Agency, presented the Japanese experience with the Seto Inland Sea, where measures to ensure maritime safety and pollution management were implemented. Mr. Sakaba mentioned their institution of Port Regulations to supplement the basic rules for preventing collisions at sea, including special

traffic rules and signals for large ships, specialized carriers and unwieldy tows. In addition, they have established vessel traffic services in four centers to provide information, especially in congested areas.

8. Mr. Hideo Osuga, Legal Officer, International Oil Pollution Compensation (IOPC) Fund, United Kingdom, provided a unique presentation on the application and limits of liability based on the 1969 Civil Liability Convention and the 1971 Fund Convention. The speaker showed how public sector - private sector partnerships is evidenced by the oil industry responding positively to contributing to the IOPC Fund and governments taking on the risk of identifying contributors. The 1995 General IOPC Fund holds shares from 192 annual contributors amounting to £42 million. As of June 1996, there were 15 Member States identifying contributors to the fund and approving settlements of claims against the IOPC Fund.
9. Dr. Thomas A. Grigalunas, Professor, University of Rhode Island (URI), USA, looked at liability as an incentive-based policy for the protection of the marine environment. The speaker cited cases where economic valuation has enabled the estimation of legal compensation for damages. Dr. Grigalunas discussed particular cases, including the spill of 250,000 gallons of heavy oil which closed a section of New York harbor, causing damages in the form of lost service and vessel delays during the cleanup period. He also discussed the controversial court case involving the Exxon Valdez oil spill and the various damage claims and counterclaims concerning the value of fisheries.
10. The final speaker for the session, Dr. Hans Broberg, President, SSPA Maritime Consulting A.B., Sweden, drew attention to the problems caused by ineffective enforcement. The speaker proposed risk analysis as an economic incentive to ensure safety; e.g., providing a levy on ships based on type of cargo, rather than tonnage, in view of the risks posed by such cargo.
11. Captain Raja Malik Saripulazan bin Raja Kamaruzaman discussed the main points of the previous four presentations, outlining policy, economic incentives and liabilities as measures to ensure safety in navigation and to prevent pollution.
12. In the Open Forum, a word of caution was raised regarding the applicability and non-applicability of valuation methods for liability and compensation. The case of "intentional oil spills" caused by shipping companies in Brazil was explained. The lack of incentives or disincentives (i.e., regulation, enforcement/ fines) was identified as the reason for such incidents.
13. Chair Alex Macdonald wrapped up the discussion. The Chair stressed that true partnership involves shared responsibility between public and private sectors, which includes shared investment, shared risks and shared revenue. He concluded that prevention is certainly more cost-effective than cure, and steps need to be taken to evaluate and promote the avenue of incentive-based

prevention. Finally, compensation systems are required and work best when developed and implemented on a cooperative basis.

14. Participants re-convened for a Dinner Reception hosted by the DENR. The Keynote Address was delivered by His Excellency Fidel V. Ramos, President of the Republic of the Philippines. Mr. Robert Jara acted as the Master of Ceremonies for the event.
15. Dr. Chua Thia-Eng, Regional Programme Manager, GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas, delivered the Welcome Remarks, outlining the objectives of the Conference to the President.
16. Honorable Victor O. Ramos, Secretary of DENR, introduced the President to deliver the Keynote Address.
17. In his Keynote Address, the President aptly referred to the issue of marine pollution as "one of the less-appreciated but most pernicious and pervasive problems of our time." His Excellency conveyed his delight at the Conference objectives, considering the significance of marine pollution prevention and management to the Philippine archipelago and to the global economy in the light of the upcoming (November 1996) Asia-Pacific Economic Cooperation (APEC) Summit. The President highlighted the Philippines' efforts at environmental preservation and assured the Conference of the Philippine Government's commitment towards preserving ecological balance.
18. The texts of the speeches made during the Dinner Reception are contained in Annex 5.

SESSION 3: CASE STUDIES—WASTE MANAGEMENT AND SOCIOECONOMIC BENEFITS

1. Dr. B.A. Hamzah, Director-General, Maritime Institute of Malaysia, chaired Session 3. The Discussant for the first three presentations was Dr. Bernard Fleet, Director of Technology, Eutech Cybernetics Pte. Ltd., based in Singapore. Mr. Sixten Larsson of Swedeplan, Sweden assumed the role of Discussant for the final three presentations of the session.
2. Ir. Lum Weng Kee, Director-General, Sewerage Services Department, Malaysia, spoke on "Privatization of Sewerage Services in Malaysia," reviewing the development of sewerage services in Malaysia, the subsequent privatization by the Malaysian Federal Government and the post-privatization issues encountered. Lack of public awareness regarding the scope of services and financing model has led to complaints about profiteering and other charges, which could have been avoided with an intensive information campaign before the actual turn-over began.

3. Engineer Benny Y.K. Wong, Assistant Director, Environmental Protection Department, Hong Kong, presented a paper on "Waste Management in Hong Kong: Private Sector's Participation." Engr. Wong related how Hong Kong developed the Design-Build-Operate (DBO) contract approach and applied it successfully to a refuse transfer station in Kowloon bay. The DBO contract proved to be an attractive investment, as it provides long-term employment and apportions risks fairly between the client and the contractor. Engr. Wong attests that the system has helped address the issue of waste reduction and has contributed to the economy largely in the form of sustainable operations and economies of scale.
4. A paper on "Waste Disposal Fee System in Xiamen" was presented by Mr. Zeng Zijian of the Xiamen Environmental Monitoring Station, People's Republic of China. Mr. Zijian related Xiamen's 15 years' experience with its waste fee system, which proved to be an effective instrument in environmental management and protection. The waste fee formed part of a special environment fund, which was utilized to subsidize the treatment of pollutants and to help fund over 200 other projects.
5. After the three presentations, Dr. Bernard Fleet, outlined the points in each of the three papers. The Discussant noted that the cases of Malaysia and Hong Kong showed experiences in privatization, which have proven effective in varied degrees as a pollution prevention scheme, as well as a source of revenues. All three cases, including that of Xiamen, involve a fee system that acts as a deterrent to pollution while generating funds for operations and further investment.
6. In the Open Forum, Engr. Wong was asked to discuss further how the DBO contracts work. He explained that the contractor is responsible for financing, designing, constructing, and operating the facility for its lifetime. Other participants raised comments regarding the possibility of involving the informal sector in pollution prevention schemes, that fee systems in the treatment of domestic waste should consider the consumer's ability to pay or a government subsidy, in cases where operations costs are high.
7. Mr. Yao Lixin, Department of International Trade, Xiamen University, People's Republic of China, presented a very interesting case on the "Socioeconomic Impact Assessment of Integrated Treatment of Marine Environmental Problems in the Western Sea Area of Xiamen." The speaker showed an analytical framework applied to assess the viability of a marine environmental project in Xiamen. Using the framework, the study showed how it costs less to invest in the opening of a water barrier, that will reduce siltation and improve water quality near Xinglin and Maluan Towns today, than to mitigate damages to the environment in the future without the project.
8. A paper on "Socioeconomic Benefits of Integrated Coastal Management and Environmental Management Programs: The Case of Clean Rivers, Marine Parks and Fisheries" was presented by Ms. Catalina Tejam, Research Associate, GEF/

UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas, Philippines. The presentation concentrated on the successful implementation of the Singapore Clean Rivers Program; the Coral Reef Protection Strategy at Phuket, Thailand; and the Coastal Resource Management Program of Brunei Darussalam, particularly on the social and economic impacts of the programs, such as improvements in health, employment, income and productivity.

9. "The Sustainable Benefits of Coastal Tourism Management in Thailand—Case Study: Ko Samui" was presented by Mr. Pradech Phayakvichien, Deputy Governor for Planning and Development, Tourism Authority of Thailand. The paper examined the benefits accruing to Ko Samui and its local people, including improvements in standard of living, employment, and protection of coral reefs, that were derived from the tourism development plan and its implementation. Mr. Phayakvichien cautioned that tourism ventures need to take note of carrying capacity to control resource utilization and population pressure.
10. A short summary of three papers was provided by Mr. Sixten Larsson. The Discussant acknowledged that investments in environmental management programs to contain siltation, as the case in Xiamen, have long-term and sustainable benefits, compared to simply dredging, which is both costly and of short-term impact. These benefits were further illustrated in the following three case studies. Singapore's program addressed the problems of public health, loss of tourism potential, and national discipline, effecting sectoral improvements, as well in agriculture and housing. Thailand preserved its coral reefs and developed its tourism industry in Phuket; and Brunei sustained its fisheries resources. Tourism development in Thailand, particularly in Ko Samui, was further discussed. These cases seek to show how environmental and coastal management programs impact on the issues of pollution and environmental degradation, while addressing the issues of economic sustainability, food security, and welfare.
11. During the Open Forum, the topic of tourism development and/or ecotourism brought about a lively discussion. Participants from Sri Lanka, the Philippines and Indonesia recounted the experiences and issues on tourism development in their countries. The recurring concern was that tourism development without proper planning and zonation tends to contribute to degradation, rather than preservation and appreciation of the environment. Another point raised was the need to consider social costs, such as degradation of culture and values, in assessing tourism impacts.
12. Dr. Hamzah wrapped up the discussions. He noted that sewage management was important to public health, and that the former may be turned into a business enterprise even as the returns may be slow. The Malaysia, Hong Kong and Xiamen cases proved that privatization of environment management programs can work on a fee system. Likewise, new technologies for waste reduction can effectively

address environmental degradation, with the participation of informal organizations. Environmental management and ICM programs prove beneficial, as well as profitable, with costs recoverable in the long run. One viable program identified was ecotourism. Negative considerations were not too significant and may be mitigated.

SESSION 4: BUSINESS OPPORTUNITIES

1. Mr. Reinier Willems, President, Pilipinas Shell Petroleum Corporation, assumed the position of Chair for the fourth session. The Discussant for the first three presentations was Atty. Brenda V. Pimentel, Director of the Overseas Shipping Division, Maritime Industry Authority of the Philippines. Mr. Jim Sandquist, Vice President, SSPA Maritime Consulting A.B., Sweden, assumed the role of Discussant for the final papers.
2. The paper, "ECDIS and Sustainable Finance Mechanisms in the East Asian Seas," presented by Mr. Alex Macdonald, focused on the *Marine Electronic Highway* which is based on *eco-efficient* technologies and information systems. The technologies include geospatial databases, providing an information framework for pollution control, as well as environmental and resource management. Realization of the highway will result in significant increases in revenue for shippers and cargo owners because of improved navigational information, giving rise to a potential source of revenue which may in part offset infrastructure production costs. Public - private sector partnerships were suggested for the provision, training, and use of the information systems, as well as the marketing of generated data to various users involved in environmental and resource management programs.
3. "Economic Benefits from Operational Laser Bathymetry in Australia: 1993 to 1996," delivered by Mr. Mark Wellington, Business Development Manager, LADS Corporation Ltd., Australia, focused on the economic benefits offered to governments and industry by bathymetric survey technology, the Laser Airborne Depth Sounder (LADS). The key point of the paper was the relative cost effectiveness of the LADS technology and conventional sonar technology, effecting a reduction of pollution risk through prevention of shipping accidents, and an increase of shipping efficiencies, including the development of new maritime trade opportunities, by opening new shipping routes.
4. Captain Constantino L. Arcellana, Jr., General Manager, Mid-Ocean Ship Management Corporation, Philippines, made a presentation on "Socioeconomic Implications of the Seafarer Training and Certification," which focused on two areas: seafarer training and certification, as mandated by the STCW '95 convention. Capt. Arcellana stressed that one of the major problems is that more effort is given to regulation, rather than to training and certification. On the other hand, the thrust of safety of life at sea and prevention of marine pollution need to be reinforced in the interest of the safety and well-being of seafarers.

5. Atty. Brenda V. Pimentel summarized the three presentations. The Discussant observed that the papers covered a common objective of enhancing the safety of shipping and navigation and preventing marine pollution, especially those from marine accidents. Atty. Pimentel observed that benefits in the use and adoption of new technologies and standards in navigational tools are felt by both beneficiaries and direct users. Therefore, the burden of implementation should be shared. In fact, modern technologies in conducting hydrographic surveys and collecting navigational information, plus the development and training of STCW competent seafarers, can embolden the shipping community to further development. Atty. Pimentel pointed out specifically that the STCW '95 makes maritime education and training more expensive, and that the shipping community and the Flag States need to share the cost of educating and training the seafarers. The issue is most important to the shipboard labor supplying countries like the Philippines which have limited resources for training.
6. In the Open Forum, participants were particularly interested in the new technologies. One participant related the inability to use LADS technology in Japan, and sought clarifications on the technology's application. Mr. Wellington replied that the technology can be modified to suit specifications of a country. On the issue of seafarer training, everyone agreed to the need for upgrading human resource skills. One interesting point raised was the possibility of recruiting women as seafarers.
7. Dr. Bernard Fleet spoke on "Integrated Management Strategies for Maritime and Industrial Wastes: Opportunities for Public Sector - Private Sector Partnership." The speaker discussed the driving forces and strategies for operating integrated waste facilities, including markets for recycled oil and fuel. Dr. Fleet also identified criteria for sustainable management and financing, where the public sector ensures the protection of the public interest and the private sector ensures efficient and cost-effective operations.
8. Ms. Marissa David, Technical Operations Manager, PRC Environmental Management, Inc., Philippines, presented a paper on "Reaping Success from Waste Minimization: The Philippine Experience." She related the Philippine experience in industrial waste management through the Industrial Environment Management Project or IEMP, which proved that environmental investments in waste minimization can be economically feasible. Under the current pollution reduction initiatives component of the project, 143 entities from different industry groups all over the country were assisted in their waste minimization activities, including the development of good housekeeping practices and the improvement of treatment facilities.
9. Captain Shigeto Oguri of the International Marine Consultancy (IMC) Pte. Ltd., Singapore, spoke on "Financial Requirements to Sustain the Maintenance and Deployment of Oil Spill Equipment Stockpiles." The speaker pointed out that oil spill response preparation should be led by the oil and shipping industries, with overall direction provided by governments and UN agencies.

10. Mr. Jim Sandquist highlighted the points made by the speakers and gave further comments. On the first presentation, he raised the possibility of integrated waste management systems that will integrate treatment of maritime and industrial hazardous wastes. He suggested that opportunities should be explored to motivate industry to accept waste minimization as an enterprise. Finally, he agreed with the concept of a coordinating body against oil spills; but recommended a legal agreement where the role of the public and private sectors, and specific activities, are clearly defined.
11. During the Open Forum, it was suggested that IMO needs to be more cognizant of integrated reception and treatment facilities. Politics figured as a significant factor on the strength of involvement of the private sector, especially as port reception facilities involve burden-sharing. On the matter of waste minimization, concern was raised over the sustainability of the IEMP over its approved project life, possibly through the initiative of industry and funding agencies.
12. Mr. Willems wrapped up the session, stating that the opportunities for the industrial sector and government are clear under the principle of sustainable development. One area is seafarer training, as investment in human resources should not be neglected. Waste minimization and integrated waste management are further viable venues for investment, especially when coordinated by a support agency.

SESSION 5: FINANCING INVESTMENTS

1. Mr. Brent Pyburn, Chief Executive Officer of the East Asia Response Ltd., or EARL, presided over Session 5. Mr. Teh Kong Leong, Director for Shipping, Maritime and Port Authority of Singapore, served as Discussant.
2. The first speaker, Mr. Sadatoshi Koike of the Japanese Maritime Safety Agency, presented a paper entitled "Japanese Government's Experience on the Malacca Straits." The speaker noted that further work was needed to update the hydrographic surveys of the Straits and to construct an Electronic Chart Database. The Malacca Straits Council has undertaken a number of projects for the safety of navigation in the Straits. Future directions suggested included providing navigational aids and expansion of the Vessel Traffic Services (VTS) in the Straits. There is also a need to monitor and identify all users of the Straits.
3. A paper entitled "Cargo Taxation as a Means of Funding Navigational and Pollution Management" was presented by Captain Cecil Dave M. Duncan, Port Captain of the Port of Saldanha, South Africa. He noted that national policy in South Africa is undergoing massive change at this time, affecting the role of ports in navigational and pollution management in South Africa. Nevertheless, cargo taxation, specifically wharfage has proven to be a big source of revenue for the country's Port Authority, accounting for 47% of total revenues, which is

unique relative to other world ports. This, he cautioned, is a highly contentious topic, and extreme care will have to be exercised in choosing appropriate systems and structures for other ports.

4. Captain Hans Jurgen Roos, Harbour Master, Bremen Port Authority in Germany presented a paper entitled "Operation of Private Port Reception Facilities: Port of Bremen." The experience of the Port of Bremen has shown that leaving ship-generated waste management to the private sector does not adequately protect the environment. For a successful waste collection and disposal system to occur, two conditions must be met:
 - the port by-laws must reflect the demands on the ship; and
 - sufficient qualified personnel must be available within the port authority to monitor and enforce compliance with regulations.
5. A paper entitled "The Establishment of a MARPOL Waste Oil Reception Facility for Bangkok and the Ports of the Eastern Seaboard of Thailand" was presented by Mr. Neil Challis, Director of Strategic Planning and Development of the International Response Corporation. Mr. Challis addressed the question of how to make the establishment and operation of reception facilities commercially viable, given the relative ease with which ships can discharge waste illegally at sea. To minimize risks, he recommended the creation of a compulsory fee on ships when they call at ports, whether or not they discharge. This would encourage the ship to make use of the facilities, since a fee will automatically be paid.
6. Mr. Teh Kong Leong provided a brief discussion of the papers presented. He noted the following points:
 - the VTS is a very useful system in combating marine pollution;
 - in identifying users of the Straits, the "user" should be properly defined;
 - issues of cargo taxation should consider the effects on the competitiveness of ports; and
 - the issue on whether to use a charge system or fee system on ships has been discussed in many fora, but there has not been any clear answer.
7. During the Open Forum, the following points were raised:
 - the viability of providing waste oil facilities can be successful only if enforcement is strict and the process is not time consuming for ships;
 - the establishment of regional/subregional oil reception facilities may be viable; and
 - ships should pay a fee regardless of whether they use the facility or not.
8. The Chair summarized the points made during the open forum and reiterated the following points:

- the paying of dues is a contentious issue because port managers will not raise dues if other ports are not doing the same thing.
- the government should serve as a regulatory body of the port reception facility.

SESSION 6: ENHANCING PUBLIC SECTOR - PRIVATE SECTOR PARTNERSHIP

1. Ms. Sarah Timpson, Resident Representative of UNDP-Manila, acted as Chairperson for Session 6. Dr. Thomas Grigalunas, Professor at the University of Rhode Island, USA, served as Discussant.
2. The first paper entitled “Asian Development Bank Support for Public - Private Sector Investment in the Environment” was presented by Mr. Robert Dobias, Environmental Specialist, Environmental Unit, Asian Development Bank (ADB). Mr. Dobias explained that a study on the financing mechanisms in developing member countries’ (DMC) environmental programs and projects is being conducted by ADB. It aims to pave the way for financing priority environment projects through various modalities that would encourage environmental lending through both the public and private sectors.
3. Mr. Eugenio Inocentes, Director III, Public Investments Staff, National Economic and Development Authority (NEDA), Philippines, presented a paper on “Management of Partnerships Between the Public and Private Sectors in Financing Environmental Activities: Policies on the Provision of Government Support Arrangements to Private Sector Participation in Water Infrastructure.” The paper focused on how the government facilitates sustainable development activities through various financing options, such as the establishment of partnerships through the Build-Operate-Transfer (BOT) and variant schemes. In establishing partnerships, both the public and private sectors are able to recognize that environmental management is everybody’s concern as it affects goods and services, technologies and production patterns, and consumption behavior and long-term sustainability and profitability.
4. Ms. Rina Rosales, Research Associate, GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas, presented a paper entitled “Financial Mechanisms for Mobilizing In-Country and External Resources for Marine Pollution Prevention and Management.” The focus of the presentation was the effectiveness of the BOT schemes as a viable partnership arrangement between the government and the private sector in providing infrastructure requirements, using the energy sector as a case study. Recommendations for applying the BOT process in the marine pollution sector included:

- institutional clarity;
 - capability-building for government personnel;
 - strict enforcement of environmental regulations;
 - risk sharing arrangements; and
 - political will.
5. Dr. Thomas Grigalunas, Professor at the University Rhode Island, USA, provided a brief discussion of the three presentations.
6. During the Open Forum, questions were raised on the application of the BOT process in the Philippines:
- a question was raised on why the infrastructure had to be transferred back to the government after a certain period. It was explained that there are other variants of the BOT scheme, whereby the facility is completely owned by the proponent.
 - the length of period for the private sector's operation of the facility was questioned. It was clarified that the length of period was negotiated on a case-by-case basis, and there was no limit on the length of time the private sector could operate the facility.
 - the concern of the inclusion of environmental and social concerns in the BOT process was raised. The Philippine government is undertaking a number of projects that are addressing these issues. Furthermore, all environmentally critical BOT projects are subject to an Environmental Impact Assessment.
 - a recommendation was made that bankers needed to be more involved in financing environmental projects.
 - a question was raised on the possibility of using the BOT scheme for VTS projects in the Philippines. It was clarified that this was possible, although maritime safety as a function should still be primarily undertaken by the government.
 - the scope of privatization of government services was likewise pointed out. The Singapore experience showed that there was an unlimited range for privatization, such as from water systems to penal institutions.
 - hydrographic surveys are very important for combating marine pollution. Unfortunately, financing for such projects is difficult, given that banks look for quick returns on investment.
7. Ms. Timpson summarized the presentations and discussions during the Open Forum and noted the following:
- the need to find innovative mechanisms in order to ensure successful public sector - private sector partnerships in environmentally-sound investments.
 - the BOT scheme as a good case study of such a partnership, whereby the role of the private sector is technical know-how, efficiency, and the government ensures the public of safety, as well as favorable environment and social impacts.

PANEL SESSION: STRATEGIES AND APPROACHES FOR ACHIEVING PUBLIC SECTOR - PRIVATE SECTOR PARTNERSHIPS

1. The Panel Session was chaired by Dr. Chua Thia-Eng. The Panel reviewed and commented on the draft "Finding and Recommendations of the Conference" which had been prepared by the Secretariat.
2. Mr. Neil Anderson, Vice President, Nautical Data International Inc., Canada, pointed out that there is a need to clarify the complex issue of who pays for any service and how much it costs. The document needed a vision and concrete actions, complete with a timetable. He suggested that the Regional Programme take on this responsibility.
3. Atty. Raphael Lotilla, Deputy Director-General, National Economic and Development Authority (NEDA), Philippines, suggested the building of a framework for regional/subregional cooperation. There should be burden sharing among littoral/archipelagic states having rights of navigation. In the case of non-state entities, there is a need for parallel conventions and venues for them to participate in international conventions, e.g., Taiwan and Hong Kong should be involved and should share the burden of mitigating pollution. In other words, conventions need not be on a politico-geographic basis alone. Economic groupings, e.g., APEC, can be applied so as not to limit the number of participants in such conventions. Finally, he stressed the need to articulate a regional approach to include the business sector and NGOs. The latter have a comparative advantage in creating an impact at the local level, and this should be maximized.
4. Dr. Anders Granlund, Senior Research Officer, Department of Research Cooperation - SAREC, Swedish International Development Cooperation Agency (Sida), pointed out that within the context of public sector - private sector partnerships, the role of the donor changes. Donors have financial constraints. Hence, they should be more creative, efficient, flexible, and should take on a catalytic role by promoting partnerships and transforming knowledge-based plans to action-oriented plans. Donors should likewise work for governance of decentralized small-scale activities. Case study models may be useful towards standardizing environmental industry indicators. The gap between theoretical academic knowledge and concrete environmental plans should be narrowed. Donors should avoid redtape and bureaucracy and go through the proper process.
5. Mr. Jorge Reyes, Sustainable Development Advisor, UNDP-Manila, spoke on behalf of multilateral agencies, pointing out that UNDP's role has changed from a lending agency to a full-fledged partner of governments. This is a paradigm shift, with the focus shifting to people and sustainability of human resource and support. UNDP will continue to support programs in the area of capacity building at the national and local levels. It agreed in general and in principle to the role proposed and areas identified, and it supports the Conference resolution to strengthen the involvement of stakeholders in marine pollution prevention and

management. Finally, UNDP will utilize regional cooperation to address global issues, in the same manner that GEF addresses global activities. The latter is a limited facility in terms of the number of countries that have access to the Fund. In this regard, there is a need to have GEF look at helping leverage activities with respect to the private sector and for intergovernmental cooperation.

6. Honorable Hermilando Mandanas, Governor, Batangas Province, Philippines, talked in behalf of local governments. He pointed out that trade, instead of more aid, should be encouraged. If the private sector comes in, sustainable development can be achieved. However, the following requirements must be met:
 - integration of coastal communities and an integrated effort in terms of marine pollution mitigation and management;
 - raising local revenues/taxes, with a portion allocated for Batangas Bay and its improvement;
 - cooperation from donor agencies;
 - private sector investments to sustain revenues for development and to help communities build resources separate from their own;
 - endeavors that generate profit and protect the environment at the same time; and
 - real and immediate action.

7. The Chair summarized the comments made by the Panelists. Dr. Chua acknowledged that there is a need to come up with specific actions to be implemented based on the Conference and panel discussions, and the need for a timetable for the action plan. The issue of NGO involvement needs to be taken into account, as well as the suggestion for cooperation and the need to incorporate regional institutional mechanisms.

8. An Open Forum followed. The Chair asked for comments from the participants. The following points were raised:
 - focus on tripartite partnerships, to include the donor community;
 - include the concept of networking to make cooperation efforts more effective;
 - encourage national governments to adhere to international instruments, including the ratification of international conventions;
 - tap existing regional bodies, e.g., APEC, and develop a regional plan of action, formulated either by national governments or by the regional bodies themselves;
 - include the informal private sector in development of partnerships;
 - emphasize monitoring of wastes, in conjunction with capacity-building at the local level;
 - the GEF should not be viewed as a catalyst, but as a body that reacts to projects;
 - develop mechanisms to improve private sector access to GEF funds;
 - include the role of NGOs at the national and international levels;

- the Regional Programme should develop a timetable for implementing the recommendations of the Conference; and
- consider raising the document at the next APEC meeting in Canada.

C. Closing Ceremonies

1. Mr. Robert Jara, Division Chief, DENR, Philippines, served as Master of Ceremonies during the Closing Ceremonies.
2. Mr. S. Adrian Ross, Conference Coordinator, delivered the Closing Remarks in behalf of the Secretariat. He narrated how the idea of a Conference on sustainable financing mechanisms took seed in May 1995 during a meeting at the UNDP headquarters in New York. The idea was to provide a forum for an exchange of ideas and discussion of opportunities in the area of marine pollution prevention. This purpose was accomplished during the three-day Conference. Moreover, the results of the Conference have provided the Regional Programme with direction in promoting partnerships in marine pollution. Finally, Mr. Ross thanked the sponsors of the Conference, the supporters and the Secretariat for the success of the event.
3. Mr. Neil Anderson, who volunteered to speak in behalf of the participants, delivered a brief message. He noted that there was not much time allocated for speakers, but the time allocation for the open forum was enough which was not common in previous conferences he attended. The seats were full during the Open Forum, indicating a very lively discussion and keen interest in the presentations. Finally, he complemented the Secretariat for the way the event was organized.
4. The final Closing Remarks were provided by Undersecretary Delfin Ganapin of DENR, Philippines (Annex 6). An important message he conveyed was that whatever ideas on financing mechanisms are generated by the Conference, these should not be geared primarily towards making individual profits, but rather towards establishing genuine and sustainable partnerships for managing marine pollution. Furthermore, operationalizing policies is what is called for now, whereby action plans to protect the environment should be undertaken. One way is through developing public sector - private sector partnerships. Not only do they increase the number of available approaches, but they are also cost-effective and sustainable, and even provide profits in the end. As expected, the concept of partnership still needs some refinement. That is part of the work forthcoming after the Conference. Nevertheless, he advised countries not to wait for the perfect action plans on marine pollution prevention and management. Instead, everyone can start implementing clear and innovative approaches while plans are revised. Finally, he thanked the organizers and sponsors of the Conference.
5. Mr. Robert Jara officially closed the Conference at 1600 hours, 16 November 1996.

Annexes

ANNEX 1: Conference Recommendations

ANNEX 2: List of Participants

ANNEX 3: Program of Activities

ANNEX 4: Opening Ceremonies

CHUA THIA-ENG, Regional Programme Manager, GEF/UNDP/IMO
Regional Programme for the Prevention and Management of
Marine Pollution in the East Asian Seas, Philippines.

ANDERS GRANLUND, Senior Research Officer, Department of
Research Cooperation - SAREC and Swedish International
Development Cooperation Agency, Sweden.

VICTOR O. RAMOS, Secretary, Department of Environment and
Natural Resources, Philippines.

SARAH L. TIMPSON, Resident Representative, United Nations
Development Programme, Manila, Philippines.

ANNEX 5: Dinner Reception Speeches

CHUA THIA-ENG, Regional Programme Manager, GEF/UNDP/IMO
Regional Programme for the Prevention and Management of
Marine Pollution in the East Asian Seas, Philippines.

H.E. FIDEL V. RAMOS, President, Republic of the Philippines.

ANNEX 6: Closing Ceremonies

HON. DELFIN GANAPIN, JR., Undersecretary, Department of
Environment and Natural Resources, Philippines.

ANNEX 1:

CONFERENCE RECOMMENDATIONS

WHEREAS marine pollution prevention and management objectives and obligations are specified in global and regional conventions and agreements, including the United Nations Convention on the Law of the Sea (UNCLOS), International Maritime Organization (IMO) Conventions and the Regional Seas Agreements developed through United Nations Environment Programme (UNEP),

WHEREAS the global objectives and action programs to prevent and mitigate pollution of the oceans are outlined in Chapter 17, Agenda 21, as well as the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities, adopted by an Intergovernmental Conference in 1995,

RECOGNIZING the increasing environmental and socioeconomic impacts of marine pollution in the East Asian region,

RECOGNIZING ALSO that contamination of the marine environment is occurring as a result of land and sea-based activities throughout the region,

AWARE that marine pollution management is complicated in a region of such enormous geographical scope, highly populated coastal areas and contrasting political, economic, technical and institutional capacities,

REALIZING that the sectoral approach to controlling pollution is becoming less cost-effective and efficient as countries of the East Asia region develop,

AWARE that innovative and practical approaches and instruments are urgently needed, providing government, industry, the private sector and NGOs with the capacity and resources to plan, develop, implement and sustain pollution prevention and management in coastal and marine areas in a cooperative and integrated manner,

CONCLUDING that sustainable financing of marine pollution management in the East Asian Seas is a shared responsibility, requiring financial and human resource commitments by governments, international agencies, national and multilateral financial institutions, industry, the private sector¹, NGOs, academe and the general public;

CONCLUDING FURTHER that public sector - private sector partnerships embody cost-effective and efficient application of sectoral skills, resources and mandates within a cooperative framework, and are appropriate financial mechanisms for addressing two distinct but related management initiatives, namely;

¹ In this context, "private sector" includes industry, enterprises, firms, business, individuals and operations, which fulfill a market demand and provide goods and services to clients in the various sectors of the economy.

1. prevention and management of land-based pollution of marine and coastal areas through the application of integrated coastal management practices; and
2. environmental management of sub-regional sea areas and straits used for navigation; descriptions of which are provided in Attachment A.

RECOMMENDING that national and local governments, non-State entities, the private sector, regional bodies, international agencies and organizations, donor agencies, multilateral financial institutions and NGOs commit themselves to work cooperatively and in a complementary fashion by undertaking the following:

1. National governments and Non-State entities of the East-Asia region are urged to prepare Plans of Action which target marine pollution prevention and management on a national and regional basis, including the following initiatives:
 - .1 prevention and mitigation of marine pollution from land-based activities through the replication and extension of integrated coastal management practices at sites throughout the coastal area;
 - .2 development and coordination of environmental management plans of action between and among governments sharing territorial boundaries in subregional seas and straits used for navigation, including the implementation of joint and complementary marine pollution monitoring programs;
 - .3 ratification and implementation of relevant international instruments, such as MARPOL 73/78², the London Convention³, OPRC 1990⁴, STCW⁵, Fund PROT 1992⁶, CLC PROT 1992⁷, and the Tokyo Memorandum of Understanding;
 - .4 development of national coastal policies and innovative programs aimed at providing Local Governments with the authority and capabilities to manage local coastal areas by establishing new financing initiatives to support marine pollution policies and programs on a long-term and self-reliant basis;
 - .5 identification of social and economic impacts of marine pollution, such as loss of livelihood and revenues, damages to fisheries and mariculture, reduced tourist trade and the expenditures associated with cleaning up oil and chemical spills;
 - .6 identification and evaluation of the social and economic benefits derived from preventive and mitigate initiatives in marine pollution prevention and management and environmental management of subregional seas and straits used for navigation;
 - .7 application of new and innovative economic instruments for generating revenue and modifying the behavior of users and polluters of the marine environment, in combination with effective monitoring and enforcement of environmental regulations and controls;

² International Convention for the Prevention of Pollution from Ships 1973, as modified by the Protocol of 1978.

³ Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (as amended in 1996).

⁴ International Convention on Oil Pollution Preparedness, Response, and Cooperation, 1990.

⁵ International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers, 1978 (as amended in 1995).

⁶ Protocol of 1992 to amend the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971.

⁷ Protocol of 1992 to amend the International Convention on Civil Liability for Oil Pollution Damage, 1969.

- .8 provision of the necessary legal framework to enable partnerships with the private sector;
- .9 acceleration in the formation of public sector - private sector partnerships, through build-operate-transfer (BOT) and similar economic instruments, serving the public good, motivating the private sector, sharing derived benefits and revenues and linking marine and coastal resource management with economic development;
- .10 development of national and regional information infrastructures, based upon common data standards; supporting the transfer and sharing of information among countries of the region;
- .11 establishment of a regional marine electronic highway, serving the maritime transportation, resource management and environmental management sectors, incorporating new emerging precise navigation technologies;
- .12 development of technical assistance and financial incentive programs for the establishment of a sustainable national and regional environment industry, focusing on the advancement of small and medium-sized enterprises.

Local governments are invited too consider the following actions for preventing and controlling marine pollution in accordance with developmental priorities:

- .1 incorporation of integrated coastal management strategies and practices into local planning, economic development, land management, social and environmental services, and fiscal policies;
- .2 development and strengthening of institutional arrangements and information infrastructures, advancing integrated management of the coastal zone in key areas, such as enforcement of regulations and ordinances, licensing and permitting, networking among local governments and monitoring and evaluation of marine water quality;
- .3 implementation of users pay and polluters pay schemes, as well as other financial instruments, that are fair and equitable and reflect the true costs of coastal resources use and pollution management facilities and services at the local level;
- .4 development of partnerships with the private sector, both formal and informal, through contractual arrangements, BOT, joint ventures, or similar schemes, by generating proposals that are technically and financially sound, implementing competitive bidding procedures, clearly identifying procedures and requirements of government in project development and implementation, and serving as the focal point between project proponents and the public sector;
- .5 implementation of property and tenurial rights to sectors of the community, promoting and maintaining a sense of ownership and community responsibility for the protection and management of coastal resources and the environment;
- .6 enhancement of monitoring capacities in marine and coastal areas and strengthening of regulatory and economic instruments at the local level by forming partnerships and voluntary agreements with the private sector, NGOs, and the general public;

- .7 development of local job creation programs, supporting the prevention and management of marine pollution and sustainable development of coastal areas.
3. The United Nations Development Programme (UNDP) is invited to consider:
 - .1 expansion of its sustainable development efforts through country Indicative Planning Figures (IPF), encouraging National and Local Governments to develop the necessary integrative planning and management frameworks in marine pollution management, thereby creating employment and alleviating poverty in coastal areas;
 - .2 supporting the replication and extension of integrated coastal management practices throughout the coastal area, especially through capacity building at the national and local government levels and in the private sector;
 - .3 promotion of intergovernmental collaboration to control marine pollution in subregional seas and congested straits, using regional IPF to develop a Management Framework and Plan of Action for regional and global ocean issues, and promoting Technical Cooperation Among Developing Countries (TCDC) in the East Asian region;
 - .4 development of common data standards for a regional environmental information network, promoting the exchange and utilization of information on the marine environment at the local, national, and regional levels;
 - .5 participation in the development of co-financing programs to fund national and regional environmental information infrastructures and networks.
 4. The International Maritime Organization (IMO) and its Member States are entreated to consider the integrated marine pollution prevention and management strategies identified herein and to support the development and application of such approaches by adopting the following actions:
 - .1 exploration and demonstration of mechanisms for assessing costs incurred and benefits derived by users and beneficiaries of subregional seas and straits used for international navigation;
 - .2 formulation of financial schemes and mechanisms to be considered by littoral States and user States, in the establishment of cooperative, fair, and equitable cost-sharing systems supporting the development, operation, and management of facilities and aids to navigational safety and marine pollution prevention and management in subregional sea areas and straits used for international navigation;
 - .3 organization of a conference of the littoral States and user States of the Straits of Malacca and Singapore, reviewing alternative financial mechanisms for cost-sharing maritime safety and aids to navigation and prevention and management of marine pollution within the Straits;
 - .4 inclusion of the schedule and program of the international conference on the agenda of the Maritime Safety, Marine Environment Protection, and Legal Committees of the Organization.
 5. The Global Environment Facility (GEF), donor agencies, and multilateral banking institutions are invited to support the strategies and programs identified herein, by adopting the following actions:

- .1 strengthening the international waters and marine pollution components of programs within GEF, donor agencies, and multilateral banking institutions, by raising the profile of global oceans issues within their respective endeavors, supported by budgetary allocations which reflect the scope, significance and actions required to achieve national, regional and global objectives;
 - .2 provision of financial support to national and local governments and the private sector, within the framework of national economic programs and policies, to establish, develop, and extend marine pollution programs to individual countries and regionally, through capacity building initiatives, pre-investment studies, research, case studies on sustainable financing mechanisms, and the formulation of other related "software;"
 - .3 creation of innovative financial mechanisms which promote public sector - private sector initiatives in research, development and implementation, including grants for the development of detailed proposals for research and technical projects, soft loans for the advancement of new technologies and the start-up of small- and medium-sized enterprises and joint ventures in the commercialization of technologies and enterprises;
 - .4 establishment of bilateral and multilateral arrangements which serves as a leverage to private sector investment in facilities, equipment, services, and other "hardware" for marine pollution projects, and as an incentive to the development and strengthening of the environment industry in East Asia;
 - .5 participation in co-financing initiatives to develop subregional and regional environmental infrastructures for maritime safety and prevention and management of marine pollution.
6. The private sector is urged to support the development and implementation of local, national, and regional commitments to marine pollution prevention and management by undertaking the following actions:
- .1 early collaboration with local and national governments and regional bodies, developing new and innovative financial mechanisms and market-based instruments for the sustainability of maritime transportation, marine environment, and coastal resource management programs and initiatives;
 - .2 working at the local, national, and international level, developing and implementing processes, practices, and management frameworks which combine good business with sound environmental management;
 - .3 development of capabilities and capacities to provide hardware and related technical, scientific, and management services essential to the development and sustainability of marine pollution programs;
 - .4 voluntary participation and compliance with controls, policies, and economic instruments dedicated to sustainable development and use of marine and coastal resources;
 - .5 participation in the advancement of the environment industry in the East Asian region through joint ventures with national and local governments, pertinent sectors of industry, investors and financial institutions;

- .6 adoption of the informal private sector into a formalized marine pollution management system, incorporating available manpower and skills into the development and operation of environmentally-sound programs.
7. NGOs are invited to assist with the development and implementation of marine pollution programs at the local, national, and international levels, and to undertake the following actions at the local level:
 - .1 mobilization of communities through enhanced public awareness of sources of marine pollution, socioeconomic impacts on the local community, sustainable use of marine resources and the protection of cultural heritage and the coastal and marine ecosystem;
 - .2 implementation of community-based action programs, protecting and conserving coastal and marine resources, establishing community rights over fishing and critical habitats, such as coral reef areas, reducing waste generation and waste management abuses, and promoting economic rents and user fees that are fair and equitable among all sectors of the community;
 - .3 cooperation with the private sector and local government, developing employment programs in support of sustainable development and use of coastal areas.
8. The GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas and the Eleven Participating Countries of the East Asian region are urged to implement the following actions:
 - .1 continuation of the ongoing regional program, developing and strengthening local, national, and regional capacities in marine pollution prevention and management;
 - .2 demonstration of the application of appropriate financial mechanisms, promoting and establishing public sector - private sector partnerships in the East Asian region, and working cooperatively with the private sector, international agencies, multilateral financial institutions and NGOs to achieve this common objective;
 - .3 coordination and assistance in the development of an environmental information infrastructure and networking system for the region, by organizing workshops, encouraging the formulation of common data standards and coordinating co-financial initiatives;
 - .4 development of a timetable and action program, ensuring the viability and sustainability of the recommendations of the conference, strengthening of public sector - private sector partnerships and advancing marine pollution prevention and management programs throughout the East Asian Seas.

ADOPTED by consensus at the Regional Conference on Sustainable Financing Mechanisms, 16 November 1996, Manila, Philippines.

ATTACHMENT A:**A. CONTROL AND MANAGEMENT OF LAND-BASED SOURCES OF MARINE POLLUTION**

1. Integrated and coastal management (ICM) is a viable and proven alternative to traditional methods of planning and management in the coastal area, and provides a framework and practical tools to assist policymakers, planners, resource and environment managers and the private sector to understand and to meet the dual challenges of economic development and protection and conservation of the marine environment. ICM can be applied at all levels of government. However, **the strategy of applying ICM at the local level, and then proceeding to more ambitious provincial and national programs after sufficient experience and expertise have been developed, is practical and cost-effective.**
2. Elements of the ICM framework that require policy and/or technological interventions include:
 - land use planning and the establishment of functional zonation schemes waste management
 - sustainable use of coastal and marine resources
 - institutional and organizational strengthening conservation of biodiversity
 - monitoring of marine waters and coastal resources
 - evaluation of the extent and effectiveness of interventions
 - integrated enforcement of regulations and controls
 - public awareness and education
 - financial mechanisms and instruments promoting private sector cooperation and involvement
 - research and development of innovative solutions to marine pollution and resource conservation problems.
3. Public sector-private sector partnerships are of special significance in ICM programs and to local governments. Local governments normally have limited financial resources and technical know-how with which to undertake marine pollution projects of significant magnitude. Furthermore, the legal machinery is usually not adequate to provide the local government with the means or authority to generate income which adequately covers the cost of environmental programs. On the other hand, the private sector's dynamism, technical expertise, financial resources and entrepreneurial spirit offer local governments the option of ensuring that services and facilities are provided in a cost-effective and sustainable manner.
4. The role of national governments in the development and implementation of marine pollution programs includes several key functions, including:
 - *Facilitator*, by ensuring a national coastal policy, by delineating responsibility and authority to local governments, by developing and implementing programs to enhance the capabilities of local governments in planning, administering, monitoring and evaluating marine pollution programs, and by creating a climate for investment and partnership by the private sector, investors and donor agencies;

- *Regulator*, by developing and enforcing appropriate environmental regulations equally and fairly across all sectors of society, by conducting environmental assessment of all new and expanding facilities and operations which are anticipated to cause negative impact on the coastal and marine environment, and by controlling the pricing of the fees charged for access and usage of marine pollution prevention and management facilities and services;
- *Educator*, by ensuring that local governments, industry, the private sector and the general public are aware of the impacts of unsustainable use of the coastal environment, the benefits of integrated coastal management in avoiding and managing marine pollution, and the positive steps to be taken to change ongoing practices and activities which are detrimental to the coastal environment.

B. CONTROL AND MANAGEMENT OF MARINE POLLUTION IN SUBREGIONAL SEAS AND STRAITS USED FOR INTERNATIONAL NAVIGATION

1. Management of marine pollution from land-based and sea-based sources of pollution in subregional seas and straits used for international navigation involves intergovernmental collaboration between countries sharing territorial boundaries and the user States and beneficiaries of the marine and coastal environment.

Areas of collaboration include:

- navigational safety and the provision and maintenance of aids to navigation;
 - contingency plans, equipment and services to support sustainable maritime development in the subregion, to avoid, manage and respond to oil and chemical spills and accidental discharges from ships and offshore platforms;
 - monitoring and assessment of coastal and marine water quality and identification and evaluation of the state of living marine resources;
 - exchanging information on legal and economic instruments, water quality and resource management and assessment of the effectiveness of interventions to manage and control land-based and sea-based sources of pollution;
 - training and capacity building;
 - financing of joint or shared facilities, services, activities and programs;
 - production and networking of an electronic nautical chart database to enable precise navigation.
2. Pollution risk may be minimized in subregional seas and straits through the development of necessary legislation and technical capabilities to ratify and implement international conventions and protocols and regional agreements, such as those developed through IMO and the United Nations Environment Programme, as well as the United Nations Convention on the Law of the Sea. Harmonization of national regulations and codes of practice within the subregion is encouraged as a means of ensuring fair and equitable treatment of users and beneficiaries of the marine and coastal waters;

3. The provision of facilities, equipment and services for receiving, treating, storing, recovering, transporting and disposing of wastes from land-based and sea-based sources, on an individual, bilateral or subregional basis, represents an opportunity for public sector - private sector partnership in subregional seas programs. The private sector has the capacity to provide cost-effective, sustainable services and facilities for marine pollution management, and to internalize the cost of such operations.

4. International organizations and donor agencies, bilaterally and multilaterally, can mobilize and channel resources to promote cooperation among the countries sharing territorial boundaries and/or littoral States of Straits which are used for international navigation, to strengthen the capacity of research facilities for systematic observation of marine pollution, economic valuation of resources, evaluation of the effectiveness of management interventions and determination of socioeconomic benefits.

ANNEX 2:

LIST OF PARTICIPANTS

A

Abansi, Corazon L.

Officer-in-charge
Batangas Bay Demonstration Project
Environment & Natural Resources Office
ENRO Building, Provincial Capitol Complex,
Batangas City 4200
Philippines
Tel. (63) (912) 330-3001

Abdul Hamid, Hassan

Engineer
Drainage and Irrigation Department
29th Floor, Komtar, Penang 10000
Malaysia
Tel. (60-4) 650-5317
Fax (60-4) 261-3435

Abdullah, Muhd Segar

Marine Officer
Maritime and Port Authority of Singapore
460 Alexandra Road
18th Storey PSA Building
Singapore
Tel (65) 325-2478
Fax (65) 375-1743

Abraham, Arun

Senior Regional Program Officer
International Development Research Centre
30 Orange Grove Road
7th Floor, RELC Bldg. 258352
Singapore
Tel. (65) 235-1344
Fax (65) 235-1849
Email: AAbraham@idrc.org.sg

Acenas, Alberto

Marine Manager
Pilipinas Shell Petroleum Corporation
156 Valero St.
Salcedo Village, Makati City
Philippines
Tel. (63-2) 816-6262
Fax (63-2) 816-6292

Ahlgren, Peter

Counsellor
Embassy of Sweden
16th Floor, PCI Bank Towers II
Makati Ave. cor. dela Costa St., Makati City
Philippines
Tel. (63-2) 819-1951
Fax (63-2) 815-3002

Aloria, Maribel A.

Environment Monitoring Specialist
Environment & Natural Resources Office
ENRO Building, Provincial Capitol Complex,
Batangas City 4200
Philippines
Tel. (63) (912) 330-3001

Amorillo, Diosdado

Manager, Technical Services Division
Philippine Ports Authority - Southern
Mindanao
PPD-PDO-SM, Dacudao Avenue corner
A. Loyola St., Davao City 8000
Philippines
Tel. (63-82) 221-7810
Fax (63-82) 6-44-57

Anderson, Neil M.

Vice President
Nautical Data International Inc.
691 Richmond Road
Ottawa ONT K2A 0G6
Canada
Tel. (1-613) 798-1092
Fax (1-613) 722-5524
Email: anderson@ndi.nf.ca

Arcellana, Constantino L., Jr.

General Manager
Mid-Ocean Ship Management Corporation
2nd Floor N&M Bldg.
1184 Chino Roces St., Makati City
Philippines
Tel. (63-2) 895-7338/899-2268
Fax (63-2) 890-2305

Arifin, Kopong Bebe

Head, MARPOL Combating Section
Directorate General of Sea Communication
Jalan Merdeka Timur No. 5, Jakarta Pusat
Jakarta 10110
Indonesia
Tel. (62-21) 381-3009 extension 199
Fax (62-21) 385-7690

Asuque, Gilberto P.

Executive Officer, Maritime and Ocean
Affairs Unit
Department of Foreign Affairs
2330 Roxas Blvd., Pasay City
Philippines
Tel. (63-2) 834-3938/834-4930
Fax (63-2) 834-3300

Avila, Cristina M.

Officer
Build-Operate-Transfer (BOT) Center
Podium Level, Executive Tower Bldg., CB
Complex, Roxas Blvd., Manila
Philippines
Tel. (63-2) 526-2237
Fax (63-2) 525-7126
Email:bot@ccpap.admu.edu.ph

B

Baagoe, Ulla

Deputy Head of Mission
Royal Danish Embassy
6th Floor Dona Salustiana Tower
104 Paseo de Roxas, Legaspi Village
Makati City, Philippines
Tel. (63-2) 894-0086
Fax (63-2) 817-5729

Baharuddin

Chief of Finance Division
BAPEDAL
Arthaloqa Bld. 6th Floor, Jalan Jenderal
Sudirman No. 2
Jakarta, Indonesia
Tel. (62-21) 251-2526
Fax (62-21) 251-2526

Bailey, Kate

Director
British Council
10th Floor, Taipan Place Building
Emerald Avenue, Ortigas Center, Pasig City
Philippines
Tel. (63-2) 914-1011 to 14
Fax (63-2) 914-1020
Email: bc@kilaw.admu.edu.ph

Banzon, Susan P.

Analyst - Bataan Site
PNOC - Petrochemical Development Corp.
11th Floor, BA-Lepanto Building
Paseo de Roxas, Makati City, Philippines
Tel. (63-2) 892-1420
Fax (63-2) 892-0346

Bassig, Domingo P.

Department Manager
Philippine Ports Authority
3-F Marsman Building, South Harbor
Port Area, Manila 1018, Philippines
Tel. (63-2) 527-4857
Fax (63-2) 527-4748

Baxter, Jack

Executive Director
Baxter Technologies (Malaysia) Sdn. Bhd.
36 Jalan Selat, Butterworth, Penang 12000
Malaysia
Tel. (60-4) 331-4066
Fax (60-4) 331-4598
Email: hongkc@pc.jaring.my

Baylon, Ma. Lourdes

Executive Assistant
Department of Environment and Natural
Resources-Legal Service
32 Mahabagin St., Teachers' Village,
Diliman, Quezon City 1101, Philippines
Tel. (63-2) 927-9107/926-3011
Fax (63-2) 927-9107

Bella, Ricardo Rodrigo

Vice President-Maintenance
Transpacific Towage, Inc.
2444-A Taft Avenue, Manila, Philippines
Tel. (63-2) 525-9117 to 21
Fax (63-2) 521-8003/521-2216

Bernal, Hernando A.

Marine Supt.
Lorenzo Shipping Corporation
Birch Tree Plaza
825 Muelle de la Industria, Manila
Philippines
Tel. (63-2) 245-7481
Fax (63-2) 244-6849

Bo, Trieu Van

Senior Officer
Ministry of Transport and Communication
c/o National Environment Agency (NEA)
39 Tran Hung Dao St., Hanoi
Vietnam
Tel. (84-4) 822-8750
Fax (84-4) 825-1518

Brabante, Angelita

Division Chief
Environmental Management Bureau-
Department of Environment and Natural
Resources
Room 404 Topaz Building
99-101 Kamias Road, Quezon City
Philippines
Tel.(63-2) 928-3773/928-3675
Fax (63-2) 924-7540

Broberg, Hans

President
SSPA Maritime Consulting A.B.
P.O. Box 24001
S-400 22 Göteborg
Sweden
Tel. (46-31) 639-500
Fax (46-31) 639-624
Email: hans_broberg@SSPA.SE

Brookes, Arlene

VSO Volunteer-Tambuyog
Voluntary Service Overseas
VSO Philippines Field Office
P.O. Box 10251
1112 Broadway, New Manila
Quezon City
Philippines
Tel. (63-2) 722-6033
Fax (63-2) 722-5746

C**Calzada, Ernesto**

Manager
Rope System
509 Camba corner Jabonelos St.
Binondo, Manila 1006
Philippines
Tel. (63-2) 242-3883
Fax (63-2) 242-3882/245-6618

Camat, Rafael Jr.

Director, Project Design and Packaging
Service, FASPO
DENR-Foreign Assisted and Special Projects
Office
Visayas Avenue, Diliman, Quezon City
1100
Philippines
Fax (63-2) 928-0970

Can Nguyen Duc

Head of Oil Spill Combating Team
Center for Safety and Environment
JV Vietsovpetro
95A Le Loi St., Vung Tau 84-064
Vietnam
Tel. (84-64) 839-871 ext. 3470
Fax (84-64) 839-857

Carmona, Yvonne B.

Municipal Mayor
LGU - Nasipit, Agusan del Norte
Nasipit, Agusan del Norte
Tel. (08552) 630-99
Fax (08552) 630-99

Castillo, Bienvenido C.

Municipal Mayor
Municipal Government of Bauan
Bauan, Batangas Province 4201
Philippines
Tel. (63-43) 727-1253
Fax (63-43) 727-1004

Challis, Neil

Director of Strategic Planning and
Development (Asia)
International Response Corporation
c/o BMT (Asia) Co., Ltd., Thai CC Tower
20th Floor, 889 S. Sathorn Road
Sathorn, Bangkok 10120
Thailand
Tel. (66-2) 210-1702/3
Fax (66-2) 210-0704

Chen Guoqiang

Office of the Executive Committee of the
Xiamen Demonstration Project
158 Xiaoxue Road
Xiamen 361001
China
Fax (86-592) 511-3741

Chen Kuo-Quan

President and CEO
China Port Consultants, Inc.
No. 57, 13F-2
Fu-Hsing North Road, Taipei 105
Taiwan
Tel. (886-2) 781-9920
Fax (886-2) 781-9692

Chen Lu

Economist
Economic Institute of Xiamen
Planning Commission
Zhenye Building
Hubinbei Road, Xiamen 361012
China
Tel. (86-592) 511-1196
Fax (86-592) 505-1102

Chin Samouth

Technical Advisor of Director General
Ministry of Environment
MOE, 48 Samdech Preah Sihanouk,
Tonle Bassac, Chamkamon
Phnom Penh, Cambodia
Tel. (855) 721-297

Colliander, Christen

Sales Manager
SPOT Asia Pte. Ltd.
73 Amoy Street
Singapore 069892
Tel (65) 227-5582
Fax (65) 227-6231
Email: col@pacific.net.sg

Colotte, Ralph

Commercial Attache
Embassy of France
Rufino Pacific Tower
Units 34 A&B, 6784 Ayala Avenue
Makati City, Metro Manila, Philippines
Tel. (632) 811-1001 to 14
Fax (632) 811-1033

D**Damu, Sebastian Sujang**

Assistant Director
State Planning Unit
14th Floor, Wisma Bapa Malaysia, Petra
Jaya, Kuching 93502
Malaysia
Tel. (60-82) 492-270
Fax (60-82) 440-506

David, Marissa V.

Technical Operations Manager
PRC Environmental Management, Inc.
9/F JMT Corporate Cond.
ADB Avenue, Pasig City
Philippines
Tel. (63-2) 634-1617 to 21
Fax (63-2) 634-1622
Email: iemp@gaia.psdn.org

Deocadiz, Ella

Environmental Management Bureau-
Department of Environment and Natural
Resources
Room 404 Topaz Building
99-101 Kamias Road, Quezon City
Philippines
Tel.(63-2) 928-3773/928-3675
Fax (63-2) 924-7540

Din, Zubir

Associate Professor
Universiti Sains Malaysia
Penang 11900
Malaysia
Tel. (60-4) 860-2103
Fax (60-4) 657-2960
Email: zubir@nsm.my

Dobias, Robert J.

Environment Specialist
Environmental Unit
Asian Development Bank
ADB Avenue, Pasig City, Philippines
Tel. (63-2) 632-4444
Fax (63-2) 636-2444

Dong Pham Van

Accountant V
Department of Finance and Accounting
JV Vietsovpetro
95A Le Loi St., Vung Tau 84-064, Vietnam
Tel. (84-64) 839-871 ext. 3470
Fax (84-64) 839-857

Duncan, Cecil Dave M.

Port Captain
Port of Saldanha Bay
P.O. Box 477, Saldanha 7395
South Africa
Tel. (27-2281) 357-454
Fax (27-2281) 357-427

E**Edin, Peggy Ronin**

Planning Officer
Land & Survey Department
8th Floor, Wisma Negeri, Jalan Simpang
Tiga, Kuching 93576
Malaysia
Tel. (60-82) 244-111
Fax (60-82) 424-311

Ekberg, Per

Swedish Maritime Administration
Sweden
Tel. (46-11) 19-13-72
Fax (46-11) 10-19-49

El-Habr, Habib

Interim Coordinator
UNEP-EAS/RCU
UN Building 10th Floor, Rajadamnun Act.
Bangkok 10200
Thailand
Tel. (66-2) 288-1860
Fax (66-2) 267-8008
Email: habr.unescap@un.org

Elizalde, Winfred

Port Manager
Philippine Ports Authority - PMO
Pulupandan
PPA, PMO-Pulupandan
P.O. Box 7
Bacolod City, Negros Occidental 6100
Philippines
Tel. (63) (912) 515-1802
Fax (63-34) 435-3839

Estigoy, Evelyn L.

Provincial Govt. Env't. & Nat. Resources
Officer
Environment and Natural Resources Office
ENRO Bldg., Provincial Capitol Complex,
Batangas City 4200
Philippines
Tel. (63-43) 723-2468/(912) 330-3001

F**Fajardo, Lorna O.**

Executive Officer
Maritime Training Council-Department of
Labor and Employment
POEA Building, EDSA corner Ortigas
Avenue, Mandaluyong City
Philippines
Tel. (63-2) 722-1150
Fax (63-2) 722-1164

Fleet, Bernard**Fleet, Nilima (Mrs.)**

Director of Technology
Eutech Cybernetics Pte. Ltd.
#04/21, 55 Ayer Rajah Crescent 139949
Singapore
Tel. (65) 778-7995
Fax (65) 777-4186
Email: belima@cyberway.com.sg

G**Ganapin, Delfin J.**

Undersecretary
 Department of Environment and Natural Resources
 DENR Compound
 Visayas Avenue, Quezon City
 Philippines
 Tel. (63-2) 926-5595
 Fax (63-2) 928-4969

Gao Guangsheng

Division of Environmental Protection
 State Commission of Planning
 1 Fuxingmenwai Avenue
 Beijing 100860
 China
 Tel. (86-1) 803-3499/862-7283
 Fax (86-1) 803-3515

Gasgonia, Donna Z.

Executive Director
 Foundation for the Philippine Environment
 77 Matahimik Street
 Teachers' Village, Quezon City
 Philippines
 Tel. (63-2) 927-9403
 Fax (63-2) 922-3022
 Email: fpe@gaia.psdn.org

Gonzales, Eleanore

Account Officer
 Land Bank of the Philippines
 313 Sen. Gil Puyat Ave. Extension, Makati
 City
 Philippines
 Tel. (63-2) 844-5267
 Fax (63-2) 817-4619

Gonzales, Pacifico B.

EHS
 Caltex Philippines, Inc.
 6750 Ayala Avenue Makati City
 Philippines
 Tel. (63-2) 841-1666
 Fax (63-2) 813-6078

Granlund, Anders

Senior Research Officer
 Department of Research Cooperation - SAREC
 Swedish International Development Cooperation Agency
 S 105 25, Stockholm, Sweden
 Tel. (46-8) 698-5356
 Fax (46-8) 698-5656
 Email: anders.granlund@sida.se

Green, Stuart

Technical Officer
 Voluntary Service Overseas-VSO Philippine Field Office
 P.O. Box 2440, Quezon City Central Post Office, Philippines
 Tel. (63-2) 411-2871
 Fax (63-2) 411-4455
 Email: bidek@mozcom.com

Greenwood, George

The Steamship Mutua Underwriting Association
 Aquatical House, 39 Bell Lane
 London E1 7LU
 Tel. (0171) 247-5490 / 895-8490 Ext. 117

Grigalunas, Thomas A.

Professor
 Department of Resource Economics
 University of Rhode Island
 319 Lippitt Hall
 Kingston, Rhode Island 02881-0814
 USA
 Tel. (1-401) 874-2471
 Fax (1-401) 782-4766
 Email: grig@uriacc.uri.edu

H**Hallstrom, Per**

Project Manager
 EXPORTRADET
 Swedish Trade Council
 Box 5513, SE-114 85, Stockholm
 Sweden
 Tel. (46-8) 783-8665
 Fax (46-8) 662-9093

Hamzah, B.A.

Director-General
 Maritime Institute of Malaysia
 16th Floor Wisma Sime Darby, Jalan Raja
 Laut, Kuala Lumpur 50350
 Malaysia
 Tel. (60-3) 293-3252
 Fax (60-3) 293-3044
 Email: hamzah@mima.gov.my

Hasan, Ir. Djuhair

Department Head
 Office for Shipping, Maritime and Port, Dit.
 BPPKA, Pertamina (Indonesian State Owned
 Oil Co.) Annex Building, 2nd Floor, Jalan
 Merdeka Timur 1A, Jakarta 10110
 Indonesia
 Tel. (62-21) 381-6838
 Fax (62-21) 381-6626

Hashim, Philip I.

Assistant Manager
 Development Bank of the Philippines
 Sen. Gil J. Puyat Ave., Makati City
 Philippines
 Tel. (63-2) 812-8088 / 817-0473
 Fax (63-2) 815-1517

Hassan, Abdul Razak

Principal Assistant Director
 Economic Planning Unit State of Johor
 2nd Floor, Bangunan Sultan Ibarahim
 Jalan Bukit Timbalan
 80000 Johor Bahru, Malaysia
 Tel. (60-7) 223-7344
 Fax (60-7) 223-5253

Hem Saroeun

Chief of Department of Sihanoukville
 Ministry of Environment
 Sangkat 3, Khann Mitha Pheap, Sihanoukville
 Cambodia
 Fax (855) 237-27844

Hemelaar, Alexander E.M.

UWEP Project Leader - WASTE
 Crabethstr.38F, 2805 PK Gouda
 The Netherlands
 Tel. (31-182) 522-625
 Fax (31-182) 584-885
 Email: LHemelaar.waste@nld.toolnet.org

Hong Khay Chai

Managing Director
 Baxter Technologies (Malaysia) Sdn. Bhd.
 36 Jalan Selat, Butterworth, Penang, 12000
 Malaysia
 Tel. (60-4) 331-4066
 Fax (60-4) 331-4598
 Email: hongkc@pc.jaring.my

Huy Quang Vo

Chief Accountant, Exploration Division
 JV Vietsovpetro
 95A Le Loi St., Vung Tau 84-064, Vietnam
 Tel. (84-64) 839-871 ext. 3461
 Fax (84-64) 839-857

I**Ibrahim, Rosnani**

Deputy Director-General
 Department of Environment
 12th Floor, Wisma Sime Darby, Jalan Raja
 Laut
 50662 Kuala Lumpur
 Malaysia
 Tel. (60-3) 294-7844
 Fax (60-3) 293-1480
 Email: hri@jas.sains.my

Ignacio, Clarissa

Acting Division Manager
 Philippine Ports Authority
 Marsman Building, South Harbor
 Port Area, Manila, Philippines
 Tel. (63-2) 527-8356 loc. 291
 Fax (63-2) 527-4748

Inocentes, Eugenio Raymundo B. III

Director III
 Public Investment Staff
 National Economic and Development
 Authority
 NEDA sa Pasig Bldg., Amber Avenue, Pasig
 City
 Philippines
 Tel. (63-2) 631-0945 to 54

J

Jaensson, Lars

Managing Director
SAAB Comsitech Far East Sdn. Bhd.
Ground Floor, Block B, Kompleks Pejabat
Damansara
Jalan Dungun, Bukit Damansara
Kuala Lumpur 50490
Malaysia
Tel. (60-3) 252-1161
Fax (60-3) 252-1163
Email: saab@mol.net.my

Jara, Robert

Division Chief
Department of Environment and Natural
Resources, Visayas Avenue, Diliman,
Quezon City, Philippines
Tel. (63-2) 929-6626
Fax (63-2) 928-4969

Juliano, Rogelio

Executive Director
Coastal Management Center
2603-D Tektite Towers I, Ortigas Center
Pasig City, Philippines
Tel. (63-2) 635-5065/635-4217
Fax (63-2) 635-7416
Email: cmc@cnl.net

K

Kamaruzaman, Raja Malik Saripulazan bin Raja

Deputy Director General for Marine
Pollution
Marine Department of Peninsular Malaysia
P.O. Box 12, Fort Klang, 42007 Selangor
Malaysia
Tel. (60-3) 368-6616
Fax (60-3) 368-5289

Kanpittaya, Sirasa

Senior Economist
Loan Policy and Management Division
Fiscal Policy Office, Ministry of Finance
Rama VI Road, Bangkok 10400
Thailand
Tel. (66-2) 273-9020 ext. 3424/3425
Fax (66-2) 273-9144

Keowsawetabhan, Narong

Senior Economist
Loan Policy and Management Division
Fiscal Policy Office, Ministry of Finance
Rama VI Road, Bangkok 10400
Thailand
Tel. (66-2) 273-9020 ext. 3421-22
Fax (66-2) 273-9168

Kerr, Adam J.

Director
International Hydrographic Bureau
4 Quai Antoine Ie., BP 445
Monaco MC98011
Principality of Monaco
Tel. (377) 9310-8100
Fax (377) 9325-2003
Email: ihb@unice.fr

Khan Samboeurn

Head
Coastal Environmental Geology Unit
Department of Geology and Mines
Ministry of Industry, Mines and Energy
Phnom Penh
Cambodia
Tel. (855) 015-914-187
Fax (855) 2327-840

Kohonen, Markku

UNIDO Country Director
United Nations Industrial Development
Organization
2nd Floor, NEDA sa Makati Bldg., 106
Amorsolo St., Legaspi Village
Makati City
Philippines
Tel. (63-2) 892-2560/892-0611 local 277
Fax (63-2) 892-2560
Email: markku.kohonen@nygate.undp.org

Koike, Sadatoshi

Chief
Section for International Regulation and IMO
Affairs
Japanese Maritime Safety Agency
1-3 Kasumigaseki 2 Chome, Chiyoda-ku
Tokyo 100, Japan
Tel. (81-3) 3591-9802
Fax (81-3) 3580-8778
Email: s-koike@ar.aix.or.jp

Kwon Moon Sang

Director
Marine Policy Center
Korea Ocean Research and Dev. Institute
1270 Sadong, Ansan, Keonggi-Do
Republic of Korea
Tel. (82-345) 400-6350
Fax (82-345) 408-5824

Kwong, Lewis

RO-Clean Singapore
c/o Rope System
509 Camba corner Jabonelas St.
Binondo, Manila 1006
Philippines
Tel. (63-2) 242-3883
Fax (63-2) 242-3882 / 245-6618

L**Lam Wai-Ming**

Senior Marine Officer
Port Operations, Marine Department
Hong Kong Government
Rm. 2304, 23/F, Harbour Bldg., 38 Pier
Road, Central, Hong Kong
Tel. (852) 2852-4454
Fax (852) 2545-1535

Lansing, Michael Francisco

Planning Officer, Integrated Coastal Zone
Management
Department of Town and Regional Planning
Menaca SDB, Wisma Tun Fuad Stephens,
Kota Kinabalu, Sabah 88646
Malaysia
Tel. (60-88) 218-249
Fax (60-88) 222-556

Lapid, Danilo

UWEP Regional Coordinator
Center for Advanced Philosophical Studies
(CAPS) Rm. 8 Maya Bldg., 678 EDSA, Cubao
Quezon City 1109
Philippines
Tel. (63-2) 912-3608
Fax (63-2) 912-3479
Email: lapids@misa.irf.ph.net

Larson, Sixten

Director
Swedeplan
Box 22053, S-10422 Stockholm, Sweden
Tel. (46-8) 692-0400
Fax (46-8) 654-4629

Lasmarias, Noela

Environment Advisor
Phil.-Canada Cooperation Office
11/F Allied Bank Center, Ayala Avenue
Makati City, Philippines
Tel. (63-2) 819-1547
Fax (63-2) 819-1177
Email: pccocida@mnl.sequel.net

Lee Jihyun

Research Scientist
Marine Policy Center
Korea Ocean Research and Dev. Institute
1270 Sadong, Ansan, Keonggi-Do
Republic of Korea
Tel. (82-345) 400-6364
Fax (82-345) 408-5824
Email: jihlee@sari.kordi.re.kr

Lemlin, John S.

Secretary-General
International Petroleum Industry
Environmental Conservation Association
(IPIECA)
2nd Floor, Monmouth House
87/93 Westbourne Grove, London W2 4UL
United Kingdom
Tel. (44-171) 221-2026
Fax (44-171) 229-4948
Email: ipieca@gn.apc.org

Leycano, Manuel E., Jr.

Provincial Treasurer
Province of Laguna
P.T.O. Sta. Cruz, Laguna
Tel. (092) 808-1107

Li Xiaoming

Dept. of Marine Management
State Oceanic Administration
1 Fuxingmenwai Avenue, Beijing 100860
China
Tel. (86-1) 803-3499/862-7283
Fax (86-1) 803-3515

Liao, Teresita Pamela

Senior Environmental Mgt. Specialist
Environmental Management Bureau
99-101 Topaz Bldg., Kamias Road
Quezon City, Philippines
Tel. (63-2) 928-3773
Fax (63-2) 635-7418

Locilla, Raphael P.M.

Deputy Director-General
National Economic and Dev. Authority
NEDA sa Pasig Bldg.
Amber Avenue, Pasig City
Philippines
Tel. (63-2) 633-6011

Lumentah, Capt. Henky

Senior Staff
Directorate of Sea and Coast Guard
Directorate General of Sea Communication
Jl. Merdeka Timur 5, Jakarta
Indonesia
Tel. (62-21) 345-1364 / 351-2161
Fax (62-21) 384-4492

Lum Weng Kee

Director-General
Sewerage Services Department
LG Floor, Wisma Damansaka, Jalan
Semantan, Kuala Lumpur 50490
Malaysia
Tel. (60-3) 252-5521
Fax (60-3) 256-2609

Luo Gaolai

Division Chief
Office of Foreign Economic Cooperation
National Environment Protection Agency
China

M**Macdonald, Alex**

President
Strategic Ventures Corporation
225 Eglinton Street, Fredericton, New
Brunswick E3B 2W2
Canada
Tel. (1-506) 452-8883
Fax (1-506) 457-0507
Email: svccda@nbnet.nb.ca

Madamba, Alexander

Chief, Safety Staff
Philippine Ports Authority
PDO Manila Bldg., South Harbor
Port Area, Manila
Philippines
Tel. (63-2) 527-7601 ext. 232
Fax (63-2) 527-4421

Magner, Jorgen

Danish EPA
Strandgade 29
1401 Copenhagen K
Denmark
Tel. (45-32) 660-100
Fax (45-32) 660-479
Email: mst@mst.mst.dk

Maksum, Azhar

UWEP Researcher
Jln. Plamboyan
Pondok Batuan, Gg. Arjuna 3, T. Sari
Medan, Sumatra Utara
Indonesia
Tel. (62-61) 815-368
Fax (62-61) 814-545

Mandanas, Hermilando

Governor
Provincial Government of Batangas
Batangas City, Philippines
Tel. (63-43) 723-1905 / 723-1068
Fax (63-43) 723-1338

Marquez, Reynaldo

Philippine Institute of Petroleum, Inc.
Unit 201, Centrum II
150 Valero St., Salcedo Village, Makati City
Philippines
Tel. (63-2) 817-4723/817-4750
Fax (63-2) 810-8208

Matanguihan, Josefina S.

Environment Management Specialist
Environment and Natural Resources Office
ENRO Bldg., Provincial Capitol Complex
Batangas City 4200
Philippines
Tel. (63-912) 330-3001

Mercado, Cerez L.

Community Development Officer III
 Environment and Natural Resources Office
 ENRO Bldg., Provincial Capitol Complex
 Batangas City 4200
 Philippines
 Tel. (63-912) 330-3001/(63-43) 723-2468
 Fax (63-43) 723-1597

Moreno, Albert M.

Provincial ENRO
 Provincial Government of Bulacan
 Capitol Bldg., Malolos, Bulacan
 Philippines
 Tel. (63-97) 791-0209 Ext. 213
 Fax (63-97) 791-1605

N**Narawi, Ahmat**

Senior Manager, Marine Services
 Bintulu Port Sdn. Bhd.
 Lot 15 Block 20 Kemena Land District
 12th Mile, Tanjung Kidurong Road
 P.O. Box 996, 97008 Bintulu, Sarawak
 Malaysia
 Tel (60-86) 251-001 to 7
 Fax (60-86) 253-597

Nasution, Dr. Mulia

Director of State Budget II
 Directorate General of Budget
 Jalan Lapangan Banteng Timur No. 2-4
 Jakarta, Indonesia
 Tel. (62-21) 384-9670
 Fax (62-21) 386-4786

Ninh, Pham Van

Director
 Center on Marine Environmental Researches
 National Environment Agency (NEA)
 39 Tran Hung Dao St., Hanoi, Vietnam
 Tel. (84-4) 822-8750
 Fax (84-4) 825-1518

O**de Ocampo, Vicente Y., Jr.**

VP for Government Relations
 Herma Shipping and Transport Corporation
 94 Scout Rallos St., Kamuning
 Quezon City, Philippines
 Tel. (63-2) 922-3421
 Fax (63-2) 924-2861

Oguri, Shigeto

International Marine Consultancy
 (IMC) Pte. Ltd.
 12 Kensington Park Drive #19-01
 Singapore 557325
 Tel. (65) 282-4473/9616-4310
 Fax (65) 282-4474
 Email: imcoguri@singnet.com.sg

Okubo, Yasuhiro

JICA
 Philippines

Osuga, Hideo

Legal Officer
 International Oil Pollution Compensation
 Fund
 4 Albert Embankment, London SE1 7SR, UK
 Tel. (44-171) 582-2606
 Fax (44-171) 735-0326

Ote, Leonardo M.

Division Manager
 Environmental and External Relations
 Division
 PNOG-Energy Development Corporation
 Merritt Road, Fort Bonifacio, Makati City
 Philippines
 Tel. (63-2) 819-1648
 Fax (63-2) 815-2747

P**Paquiz, Ernesto J.**

Director
 National Operations Center for Oil Pollution
 Philippine Coast Guard
 Farola Compound, Binondo, Manila
 Philippines
 Tel. (63-2) 527-8373/243-0463
 Fax (63-2) 243-0474

Parulan, Dionisio

BBCI/Philpesta
Manila, Philippines
Tel. (63-2) 521-3101 local 350
Fax (63-2) 582-810

Peñalosa, Angel

Manager, Manning and Recruitment Div.
Malayan Towage & Salvage Corporation
3/F Erechem Building
Herrera corner Salcedo Sts.,
Legaspi Village, Makati City
Philippines
Tel. (63-2) 892-1058/892-6616
Fax (63-2) 815-3517/818-1128/815-2293

Peralta, Renato

Sr. Board Member
Provincial Government of Ilocos Norte
Provincial Capitol, Laoag City
Ilocos Norte 2900
Philippines
Tel. (63-772) 1211
Fax (63-772) 1772

Phayakvichien, Pradech

Deputy Governor for Planning and
Development
Tourism Authority of Thailand
372 Bamrung Muang Road, Bangkok 10100
Thailand
Tel. (66-2) 226-0100
Fax (66-2) 226-0100
Email: tal@cs.ait.ac.th

Phu, Do Thi

Senior Officer
Ministry of Finance
c/o National Environment Agency (NEA)
39 Tran Hung Dao St., Hanoi
Vietnam
Tel. (84-4) 822-8750
Fax (84-4) 825-1518

Phuoc Nguyen Cao

Economist
JV Vietsovpetro
95A Le Loi St., Vung Tau 84-064
Vietnam
Tel. (84-64) 839-871
Fax (84-64) 839-857

Phuong Sothy

Ministry of Environment
No. 48, Samdech Preah Sihanouk,
Tonle Bassac, Chamcarmon, Phonm Penh
Cambodia
Tel. (855) 234-27-844
Fax (855) 237-21-073

Pianzin, Timothy Maurice

Economic Planner
Department of Town and Regional Planning
Block B, 3rd Floor, Wisma Tun Fuad
Stephens, Karamuning, Kota Kinabalu
Sabah 88646, Malaysia
Tel. (60-88) 222-031
Fax (60-88) 222-557

Pich Sam Ang

Deputy Director
Ministry of Environment
No. 48, Samdech Preah Sihanouk,
Tonle Bassac, Chamcarmon, Phonm Penh
Cambodia
Tel. (855) 23-721-073
Fax (855) 23-721-073

Pilar, Urbano

National Coordinator
Coastal Environment Program
Dept. of Environment and Natural Resources
Visayas Ave., Quezon City
Philippines
Tel. (63-2) 920-2211
Fax (63-2) 926-9712

Pimentel, Brenda

Director, Overseas Shipping Office
Maritime Industry Authority
5th Floor, PPL Building, United Nations
Ave., Manila
Philippines
Tel. (63-2) 521-9526
Fax (63-2) 521-9526

Plata, Valeriano R.

Consultant
San Miguel Stevedoring
Aplaya, Bauan, Batangas 4201
Philippines
Tel. (63-43) 727-1072
Fax (63-43) 727-1004

Poernomo, Sidik

Director for Programme Development
Environmental Impact Management Agency
(Bapedal)
Arthaloka Bld. 6th Floor, Jalan Jenderal
Sudirman No. 2, Jakarta
Indonesia
Tel. (62-21) 251-2526
Fax (62-21) 251-2526

Pulmano, Felix

System Engineer
Maritime System Technology B.V.
Solex Express Phils., Inc.
Room 302 Velco Center Bldg.
13th cor. Chicago Sts., Gate IV South Harbor
Port Area, Manila
Philippines
Tel. (63-2) 528-0054
Fax (63-2) 528-0054
Email: fpulmona@pw.net

Punchaoren, Pornthip

Chief, Water Quality Research and
Development Section
Environmental Research and Training Center
Dept. of Environmental Quality Promotion
Technopolis Tambon Klong 5
Amphoe Klong Luang, Pathumthani 12120
Thailand
Tel. (66-2) 577-11367
Fax (66-2) 577-1138

Purvis, John

VSO Volunteer-Labrador
Voluntary Service Overseas-VSO Philippines
Field Office
P.O. Box 10251
1112 Broadway, New Manila, Quezon City
Philippines
Tel. (63-2) 722-6033
Fax (63-2) 722-5746

Pyburn, Brent

Chief Executive Officer
East Asia Response Ltd.
2 Jalan Samulan 2262
Singapore
Tel. (65) 266-1566
Fax (65) 266-2312
Email: earl1222@singnet.com.sg

R**Ramos, Victor O.**

Secretary
Department of Environment and Natural
Resources
DENR Compound, Visayas Avenue
Quezon City, Philippines
Tel. (63-2) 99-06-91 to 93
Fax (63-2) 920-4352

Ravago, Edgardo

HRD Manager/Safety Officer
Transpacific Towage, Inc.
2444-A Taft Avenue, Malate, Manila
Philippines
Tel. (63-2) 525-9117 to 21
Fax (63-2) 521-8003/521-2216

Ren Jun

Office of the Executive Committee of the
Xiamen Demonstration Project
158 Xiaoxue Road
Xiamen 361001, China
Fax (86-592) 511-3741

Reyes, Jorge

Sustainable Development Advisor
UNDP-Manila
NEDA sa Makati Bldg., Amorsolo St.
Legaspi Village, Makati City
Philippines
Tel. (63-2) 892-0611
Fax (63-2) 816-4061

Rivera, Eduardo Q.

VP Operation
Manila Bay Waste Management Corporation
009 Lamao Blvd., Lamao
Lima, Bataan
Philippines
Cell. (0912) 330-4786

Roa, Francisco M.

Operations Manager
PNOC-Petrochemical Development Corp.
11th Floor, BA-Lepanto Bldg., Paseo de
Roxas, Makati City
Philippines
Tel. (63-2) 892-0278
Fax (63-2) 892-0346

Roberto, Lourdes

Chief, Marketing and Licensing Services
Port District of Luzon
Philippine Ports Authority
No. 164 13th Street, Port Area, Manila
Philippines
Tel. (63-2) 527-8036 to 39/ 527-9761 to 62
Fax (63-2) 527-2432

Romson, Cecilia

Consultant
IOC
c/o SPM Consultants
Kammakargatan 9a, 11140 Stockholm
Sweden
Tel. (46-8) 24-0050
Fax (46-8) 21-1121
Email: partners@spm.consult.se

Roos, Hans Jurgen

Harbour Master
Bremen Port Authority
Hafenstrasse 66, Bremen 28217
Germany
Tel. (49-421) 361-8271
Fax (49-421) 361-8387

Rubio, Enrico

Philippine Business for the Environment
G/F DAP Bldg., San Miguel Avenue
Pasig City 1605
Philippines
Tel. (63-2) 635-2650 to 51
Fax (63-2) 631-5714
Email: ctem@mnl.cyb-live.com

S

Saavedra, Francisco B. A.

DLLS
Department of Environment
and Natural Resources
DENR Building, Visayas Avenue
Quezon City
Philippines
Tel. (63-2) 927-9107
Fax (63-2) 920-4352
Email: denr-legal@gaia.psd.org

Sakaba, Masayasu

Director
Maritime Disaster Prevention Division
Japanese Maritime Safety Agency
1-3 Kasumigaseki 2 Chome, Chiyoda-ku
Tokyo 100
Japan
Tel. (81-3) 3591-9802
Fax (81-3) 3580-8778

Sanchez, Euprepio, Jr.

Acting Manager, ESD
Philippine Ports Authority
Port Area, Cagayan de Oro City
Philippines
Tel. (63-88-22) 723-290
Fax (63-88-22) 725-114

Sandquist, Jim

Vice President
SSPA Maritime Consulting AB
P.O. Box 24001
S-400 22 Göteborg
Sweden
Tel. (46-31) 639-500
Fax (46-31) 639-624
Email: jpostmaster@sspa.se

Sangcad, Mangutara

Harbor Master, Chief Marine Operation
Philippine Ports Authority
PNR Bldg., Ground Floor, Muelle de San
Francisco, Port Area, Manila
Philippines

Sawal, Peter

Assistant Controller
Natural Resources & Environment Board
18th Floor, Wisma Sumber Alam, Kuching
93050, Malaysia
Tel. (60-82) 447-488
Fax (60-82) 448-254

Sebek, Viktor

Executive Director
Advisory Committee on Protection of the Sea
11 Dartmouth Street, London SW1H9BN
United Kingdom
Tel. (44-171) 799-3033
Fax (44-171) 799-2933
Email: 101651.3601@compuserve.com

Sinh, Nguyen Ngoc

Director-General
National Environment Agency (NEA)
39 Tran Hung Dao St., Hanoi
Vietnam
Tel. (84-4) 822-8750
Fax (84-4) 825-1518

Sirivajakul, Chuwit

Tourism Planning Officer
Tourism Authority of Thailand
372 Bamrung Muang Road, Bangkok
Thailand
Tel. (66-2) 222-0834
Fax (66-2) 222-0834/224-6221
Email: tat@cs.ait.ac.th

Solda, Telesforo

Vice President, Marine Dept.
W G & A Philippines
Pier 10 North Harbor, Manila 1084
Philippines
Tel. (63-2) 274-829/251-1631 local 240
Fax (63-2) 251-1642

Soponkanabhorn, Piyanan

Chief, Transportation Section
Office of Environmental Policy and Planning
60/1 SOI Pibulwatana 7
Rama 6 Road, Bangkok 10400
Thailand
Tel. (66-2) 279-9703
Fax (66-2) 278-5469

Sudariyono, Drs.

Deputy Assistant Minister
Ministry of State for Environment
Jalan Merdeka Barat 15, Jakarta
Indonesia
Tel. (62-21) 384-6122
Fax (62-21) 384-6031
Email: dariyono@iamenlh.menlh.go.id

Sutarjo, Ignatius

Head, Office for Environmental Protection,
Dit. BPPKA
Pertamina (State-Owned Oil Company)
Annex Building, 4th Floor, Jalan Merdeka
Timur No. 1A, Jakarta 10110, Indonesia
Tel. (62-21) 381-6838
Fax (62-21) 381-6626

T**Tamit, Martinah Haji**

Environmental Officer
Environment Unit, Ministry of Development
Bandar Seri Begnoan 1190
Brunei Darussalam
Tel. (6732) 383-911
Fax (6732) 38298/380033

Tan, Enrique Kp.

Chief Executive Officer
Petroleum Technology & Research Corp.
2612 Old Panaderos St., Sta. Ana, Manila
Philippines
Tel. (63-2) 522-4569
Fax (63-2) 521-4235

Tan, Howard Henry

Senior Vice-President
Petroleum Technology & Research Corp.
2613 Old Panaderos St., Sta. Ana, Manila
Philippines
Tel. (63-2) 522-4569
Fax (63-2) 521-4235

Tanglao, Concepcion

Staff, Technical Services and Planning
PNOC-Petrochemical Development
Corporation
11/F BA-Lepanto Bldg., 8747 Paseo de Roxas
St., Makati City
Philippines
Tel. (63-2) 892-0295
Fax (63-2) 892-0346

Taruc, Rafaelito H.

Environmental Unit
Board of Investments
Sen. Gil Puyat Avenue, Makati City
Philippines
Tel. (63-2) 897-6682
Fax (63-2) 895-3981

Teh Kong Leong

Director for Shipping
Maritime & Port Authority of Singapore
1 Maritime Square #09-66 0409
Singapore
Tel. (65) 375-6201
Fax (65) 375-6231

Timpson, Sarah

Resident Representative
UNDP-Manila
NEDA sa Makati Bldg., Amorsolo St.,
Legaspi Village
Makati City
Philippines
Tel. (63-2) 892-0611
Fax (63-2) 816-4061

Tolin, Francisco

Assistant General Manager, OPNS
Philippine Ports Authority
Marsman Building, South Harbor
Port Area, Manila
Philippines
Tel. (63-2) 527-4726
Fax (63-2) 527-4726

U

Uji, Gima

Senior Manager, Health, Safety and
Environment
Bintulu Port Sdn. Bhd.
Lot 15 Block 20
Kemena Land District, 12th Mile, Tanjung
Kidurong Road
P.O. Box 996, 97008 Bintulu, Sarawak
Malaysia
Tel (60-86) 251-001 to 7
Fax (60-86) 253-597

Ung Phy Run

Deputy Director General
Ministry of Environment
MOE, 48 Samdech Preah Sihanouk,
Tonle Bassac, Chamkamon, Phnom Penh
Cambodia
Tel. (855) 721-297

V

Valdez, Carolina

Environmental Analyst
Municipal Government of Bauan
Bauan, Batangas 4201
Philippines
Tel. (63-43) 727-1242
Fax (63-43) 727-1004

Vinuya, Ernesto G.

VP for Safety and Technical Training
Herma Shipping and Transport Corporation
c/o HSTC, 94 Scout Rallos, Kamuning
Quezon City, Philippines
Tel. (63-2) 922-3421

W

Wardoyo, Krisno

Director of State-Owned Company Division
Ministry of Tourism, Post and
Telecommunication
Jalan Merdeka Barat No. 17, Jakarta
Indonesia
Tel. (62-21) 383-8630
Fax (62-21) 384-0185

Weerasekera, Dhanapala

Chairman
Marine Pollution Prevention Authority Sri
Lanka
Harbour Masters Building Commissariate
Street
Colombo 01
Sri Lanka
Tel. (941) 347-480
Fax (941) 347-480

Wellington, Mark Byron

Business Development Manager
LADS Corporation Ltd.
Vision Systems Bldg.
Second Ave., Tech Pk., The Levels, Adelaide
5095, Australia
Tel. (61) 300-4447
Fax (61) 359-7528
Email: markw@vsi.com.au

Willems, Reinier

President
Pilipinas Shell Petroleum Corporation
156 Valero St., Salcedo Village, Makati City
Philippines
Tel. (63-2) 816-6166
Fax (63-2) 818-3583

Wong, Benny Y.K.

Assistant Director
Environmental Protection Department
28/F, Southorn Centre
130 Hennessy Road, Wan Chai
Hong Kong
Tel. (852) 2835-1003
Fax (852) 2834-5648

Y

Yao Lixin

Lecturer
Department of International Trade
Xiamen University, Xiamen 361005
People's Republic of China
Tel. (86-592) 509-9052
Fax (86-592) 511-3740/41

Z

Zeng Zijian

Environmental Protection Bureau
Xiamen
People's Republic of China

Zhang Zhaofeng

Dept. of Finance
State Oceanic Administration
1 Fuxingmenwai Avenue, Beijing 100860
China
Tel. (86-1) 803-3499/862-7283
Fax (86-1) 803-3515

Zin, Mohamad Yazi Md.

Deputy Director
Economic Planning Unit
State of Pulau Pinang
25th Floor, Kompleks Tun Abdul Razak
10503 Pulau Pinang
Malaysia
Tel. (60-4) 262-1957
Fax (60-4) 221-8618

THE SECRETARIAT

GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas

DENR Compound, Visayas Avenue, Diliman, Quezon City, Philippines

Tel. (63-2) 926-9712 / 929-6626/920-2211 Ext. 2102

Fax (63-2) 926-9712

Email: imo@klink.com.ph

Chua, Thia-Eng

Regional Programme Manager

Ross, Stephen Adrian

Senior Programme Officer

Yu Huming

Technical Adviser

Jacinto, Gil

Coordinator, Marine Pollution Monitoring and Information Management Network

Almario, Amado, Jr.

Driver

Artienda, Cornelio

Training Officer

Bernas, Nancy

Technical Programme Assistant

Bernad, Stella Regina

Assistant Legal Network Coordinator

Bersamina, Ma. Concepcion

Utility

Chua, Ming Ming

Clerk

Dela Paz, Catalino

Computer Programmer

Dela Peña, Maryann

Finance Assistant

Dulay, Jonel

Technical Drawing Specialist

Fabunan, Alexis

GIS Assistant

Fornoles, Olive

Secretary

Guerrero, Socorro

Head of Administration and Finance

Hernandez, Antonio Jr.

Financial Assistant

Jimenez-Marfil, Lillian A.

Publications Coordinator

Mandac, Eden

Programme Management Assistant

Naeg, Erdito

Copy Editor

Natarajan, Ramanathan

Research Associate

Paw, James

Technical Programme Officer

Reyes, Michael
Research Associate

Son, Nguyen Minh
Intern

Robles, Noel
GIS Specialist

Tejam, Catalina S.
Research Associate

Rosales, Rina Maria P.
Research Associate

Villa, Deborah M.
Technical Editorial Assistant

Coastal Management Center

2603-D Tektite Towers 1, Ortigas Center, Pasig City, Philippines

Tel. (63-2) 635-5065 / 635-4217

Fax (63-2) 635-4216

Email: cmc@cml.net

De Silva, Ranjith
Technical Director

Pura, Leo
Research Associate

Robil, Cristina
Technical Assistant

ANNEX 3:

PROGRAM OF ACTIVITIES

THURSDAY, 14 NOVEMBER 1996

8:00 - 9:00	Registration	
9:00 - 10:00	OPENING CEREMONIES	
	Remarks	<p>DR. CHUA THIA-ENG <i>Regional Programme Manager</i> GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas</p> <p>DR. ANDERS GRANLUND <i>Senior Research Officer</i> Department of Research Cooperation - SAREC Swedish International Development and Cooperation Agency</p> <p>MS. SARAH TIMPSON <i>Resident Representative</i> United Nations Development Programme - Manila</p>
	Keynote	<p>HONORABLE VICTOR O. RAMOS <i>Secretary</i> Department of Environment and Natural Resources (DENR), Philippines</p>
10:00 - 10:20	Coffee Break	
	Photo Session:	Speakers, Chairpersons, Discussants
	Master of Ceremonies	<p>MR. ROBERT JARA <i>Division Chief</i> DENR, Philippines</p>

SESSION 1 SHARING RESPONSIBILITIES

	Chair:	<p>HONORABLE VICTOR O. RAMOS <i>Secretary</i> DENR, Philippines</p>
10:20 - 10:40	Marine Pollution Prevention and Management in the East Asian Seas: A Cutting Edge Programme of Participating East Asian Governments and GEF/UNDP/IMO Initiatives	<p>DR. CHUA THIA-ENG <i>Regional Programme Manager</i> GEF/UNDP/IMO Regional Programme</p>

10:40 - 11:00	Funding a Partnership for Safer Navigation and a Cleaner Environment in the Straits of Malacca: Some Preliminary Thoughts	DR. B.A. HAMZAH <i>Director-General</i> <i>Maritime Institute of Malaysia</i>
11:00 - 11:20	Banking on Community Capabilities for a Better Environment: A Wise Investment?	ATTY. DONNA Z. GASCONIA <i>Executive Director</i> Foundation for the Philippine Environment
11:20 - 11:40	Poverty as a Threat to the Coastal Environment	MS. SARAH TIMPSON <i>Resident Representative</i> <i>UNDP-Manila</i>
11:40 - 12:10	Open Forum	
12:10 - 12:15	Wrap-up of Session 1	Chair
12:15 - 1:30	LUNCH	

SESSION 2 LINKAGES BETWEEN INDUSTRY AND THE PUBLIC SECTOR

	Chair:	MR. ALEX MACDONALD <i>President</i> <i>Strategic Ventures Corporation, Canada</i>
	Discussants:	CAPTAIN KOPONG BEBE ARIFIN <i>Head</i> <i>Marpol Combating Section,</i> <i>Directorate General of Sea Communication, Indonesia</i>
		CAPTAIN RAJA MALIK SARIPU-LAZAN BIN RAJA KAMARUZAMAN <i>Deputy Director General for Marine Pollution</i> <i>Marine Department of Peninsular Malaysia</i>
1:30 - 1:50	Prevention is Better Than Cure—Better Charts and Safer Seas	MR. ADAM KERR <i>Director</i> <i>International Hydrographic Bureau, Monaco</i>
1:50 - 2:10	Cooperation in the Malacca Straits	MR. TEH KONG LEONG <i>Director for Shipping,</i> <i>Maritime and Port Authority of Singapore</i>

2:10 - 2:30	IMO/Industry Global Oil Spill Planning Initiative: An IPIECA Perspective	MR. JOHN S. LEMLIN <i>Secretary-General</i> International Petroleum Industry Environmental Conservation Association, UK
2:30 - 2:35	Discussion	CAPTAIN ARIFIN
2:35 - 3:05	Open Forum	
3:05 - 3:30	Coffee Break	
3:30 - 3:50	Maritime Traffic Safety Measures in Seto Inland Sea and the Pollution Management System in Japan	MR. MASAYASU SAKABA <i>Director</i> Maritime Disaster Prevention Division, Japanese Maritime Safety Agency
3:50 - 4:10	International Conventions on Liability and Compensation for Oil Pollution Damage	MR. HIDEO OSUGA <i>Legal Officer</i> International Oil Pollution Compensation Fund, UK
4:10 - 4:30	Liability for Oil Spill Damages: Issues, Methods, Examples, and Controversies	DR. THOMAS A. GRIGALUNAS <i>Professor</i> University of Rhode Island, USA
4:30 - 4:50	Driving Forces Towards Better Marine Environment and Safety: Considering Economics	DR. HANS BROBERG <i>President</i> SSPA Maritime Consulting A.B., Sweden
4:50 - 4:55	Discussion	CAPTAIN RAJA MALIK SARIPULAZAN BIN RAJA KAMARUZAMAN
4:55 - 5:25	Open Forum	
5:25 - 5:35	Wrap-up of Session 2	Chair
7:00 - 9:00	Dinner hosted by DENR	
	KEYNOTE ADDRESS	H.E. FIDEL V. RAMOS <i>President</i> Republic of the Philippines

FRIDAY, 15 NOVEMBER 1996

SESSION 3 CASE STUDIES: WASTE MANAGEMENT AND SOCIOECONOMIC BENEFITS		
	Chair:	DR. B.A. HAMZAH <i>Director-General</i> Maritime Institute of Malaysia
	Discussants:	DR. BERNARD FLEET <i>Director of Technology</i> Eutech Cybernetics Pte. Ltd., Singapore
		MR. SIXTEN LARSSON Swedeplan, Sweden
8:00 - 8:20	Privatization of Sewerage Services in Malaysia	IR. LUM WENG KEI <i>Director-General</i> Sewerage Services Department, Malaysia
8:20 - 8:40	Waste Management in Hong Kong: Private Sector's Participation	ENGINEER BENNY Y.K. WONG <i>Assistant Director</i> Environmental Protection Department, Hong Kong
8:40 - 9:00	Waste Disposal Fee System in Xiamen	MR. ZENG ZIJIAN Xiamen Environmental Monitoring Station, P.R.C.
9:00 - 9:05	Discussion	DR. BERNARD FLEET
9:05 - 9:35	Open Forum	
9:35 - 10:00	Coffee Break	
10:00 - 10:20	Socioeconomic Impact Assessment of Integrated Treatment of Marine Environmental Problems in the Western Sea Area of Xiamen	MR. YAO LI XIN <i>Lecturer</i> Department of International Trade, Xiamen University, P.R.C.
10:20 - 10:40	Socioeconomic Benefits of Integrated Coastal Management and Environmental Management Programs: The Case of Clean Rivers, Marine Parks, and Fisheries	MS. CATALINA S. TEJAM <i>Research Associate</i> GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas

10:40 - 11:00	The Sustainable Benefits of Coastal Tourism Management in Thailand—Case Study: Ko Samui	MR. PRADECH PHAYAKVICHIEH <i>Deputy Governor for Planning and Development</i> Tourism Authority of Thailand
11:00 - 11:05	Discussion	MR. SIXTEN LARSSON
11:05 - 11:35	Open Forum	
11:35 - 11:45	Wrap-up of Session 3	Chair
11:45 - 1:00	LUNCH	

SESSION 4 BUSINESS OPPORTUNITIES

	Chair:	MR. REINIER WILLEMS <i>President</i> Pilipinas Shell Petroleum Corporation, Philippines
	Discussants:	ATTY. BRENDA V. PIMENTEL <i>Director</i> Overseas Shipping Division, Maritime Industry Authority, Philippines
		MR. JIM SANDQUIST <i>President</i> SSPA Maritime Consulting A.B., Sweden
1:00 - 1:20	ECDIS and Sustainable Finance Mechanisms in the East Asian Seas	MR. ALEX MACDONALD <i>President</i> Strategic Ventures Corporation, Canada
1:20 - 1:40	Economic Benefits from Operational Laser Bathymetry in Australia, 1993 to 1996	MR. MARK WELLINGTON <i>Business Development Manager</i> LADS Corporation Ltd., Australia
1:40 - 2:00	Socioeconomic Implications of the Seafarer Training and Certification	CAPT. CONSTANTINO ARCELLANA, JR. <i>General Manager</i> Mid-Ocean Ship Management Corporation, Philippines
2:00 - 2:05	Discussion	ATTY. BRENDA PIMENTEL
2:05 - 2:35	Open Forum	
2:35 - 3:00	Coffee Break	

3:00 - 3:20	Integrated Management Strategies for Maritime and Industrial Wastes: Opportunities for Public Sector-Private Sector Partnership	DR. BERNARD FLEET <i>Director of Technology</i> Eutech Cybernetics Pte. Ltd., Singapore
3:20 - 3:40	Reaping Success from Waste Minimization: The Philippine Experience	MS. MARISSA DAVID <i>Technical Operations Manager</i> PRC Environmental Management, Inc., Philippines
3:40 - 4:00	Financial Requirements to Sustain the Maintenance and Deployment of Oil Spill Equipment Stockpiles	CAPTAIN SHIGETO OGURI International Marine Consultancy (IMC) Pte. Ltd., Singapore
4:00 - 4:05	Discussion	MR. JIM SANDQUIST
4:05 - 4:35	Open Forum	
4:35 - 4:45	Wrap-up of Session 4	Chair

SATURDAY, 16 NOVEMBER 1996**SESSION 5 FINANCING INVESTMENTS**

	Chair:	MR. BRENI PYBURN <i>Chief Executive Officer</i> East Asia Response, Ltd., Singapore
	Discussant:	MR. TEH KONG LEONG <i>Director</i> Shipping, Maritime and Port Authority of Singapore
8:00 - 8:20	Japanese Government's Experience on the Malacca Straits	MR. SADATOSHI KOIKE <i>Chief</i> Section for International Regulation and IMO Affairs, Japanese Maritime Safety Agency
8:20 - 8:40	Cargo Taxation as a Means of Funding Navigational and Pollution Management	CAPT. CECH DAVE M. DUNCAN <i>Port Captain</i> Port of Saldanha, South Africa
8:40 - 9:00	Operation of Private Port Reception Facilities: Port of Bremen	CAPTAIN HANS JURGEN ROOS <i>Harbour Master</i> Bremen Port Authority, Germany

9:00 - 9:20	The Establishment of a MARPOL Waste Oil Reception Facility for Bangkok and the Ports of Thailand: Public Sector - Private Sector Partnership for Marine Pollution Prevention	MR. NEIL CHALLIS <i>Director</i> Strategic Planning and Development International Response Corporation, Thailand
9:20 - 9:25	Discussion	MR. TEH KONG LEONG
9:25 - 9:55	Open Forum	
9:55 - 10:05	Wrap-up of Session 5	Chair
10:05 - 10:30	Coffee Break	

SESSION 6 ENHANCING PUBLIC SECTOR - PRIVATE SECTOR PARTNERSHIPS

	Chair:	MS. SARAH TIMPSON <i>Resident Representative</i> UNDP-Manila
	Discussant:	DR. THOMAS GRIGALUNAS <i>Professor</i> University of Rhode Island, USA
10:30 - 10:50	Asian Development Bank Support for Public Sector - Private Sector Investment in the Environmental Industry	MR. ROBERT DOBIAS <i>Environmental Specialist</i> Asian Development Bank, Philippines
10:50 - 11:10	Management of Partnerships Between the Public and Private Sectors in Financing Environmental Activities: Policies on the Provision of Government Support Arrangements to Private Sector Participation in Water Infrastructure	MR. EUGENIO RAYMUNDO B. INOCENTES III <i>Assistant Director III</i> Public Investments Staff, National Economic and Development Authority, Philippines
11:10 - 11:30	Financial Mechanisms for Mobilizing In-Country and External Resources for Marine Pollution Prevention and Management	MS. RINA ROSALES <i>Research Associate</i> GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas
11:30 - 11:35	Discussion	DR. THOMAS A. GRIGALUNAS
11:35 - 12:05	Open Forum	

12:05 - 12:15 Wrap-up of Session 6 Chair

12:15 - 1:30 LUNCH

SESSION 7 PANEL SESSION/OPEN FORUM

1.30 - 3:30 **Theme: Strategies and Approaches for Achieving Public Sector-Private Sector Partnerships**

Chair: **DR. CHUA THIA-ENG**
Regional Programme Manager
GEF/UNDP/IMO Regional Programme

Panelists: **MR. NEIL ANDERSON**
Vice President
Nautical Data International Inc., Canada

ATTY. RAPHAEL P.M. LOTILLA
Deputy Director-General
National Economic and Development Authority, Philippines

DR. ANDERS GRANLUND
Senior Research Officer
Department of Research Cooperation - SAREC / Swedish International Development and Cooperation Agency

MR. JORGE REYES
Sustainable Development Advisor
UNDP - Manila

HONORABLE HERMILANDO MANDANAS
Governor
Batangas Province, Philippines

3:30 - 4:00 **CLOSING CEREMONIES**
Remarks

MR. S. ADRIAN ROSS
Senior Programme Officer
GEF/UNDP/IMO Programme Office

REPRESENTATIVE OF THE CONFERENCE PARTICIPANTS

HONORABLE DELFIN GANAPIN
Undersecretary
DENR, Philippines

Master of Ceremonies **MR. ROBERT JARA**
Division Chief
DENR, Philippines

ANNEX 4:**OPENING CEREMONIES****Chua Thia-Eng***Regional Programme Manager**GEF/UNDP/IMO Regional Programme for the Prevention
and Management of Marine Pollution in the East Asian Seas**DENR Compound, Visayas Avenue, Diliman
Quezon City, Philippines*

Honorable Secretary Victor Ramos of the Department of Environment and Natural Resources, Ms. Sarah Timpson, Resident Representative of UNDP Manila, Dr. Anders Granlund, Representative from the Swedish International Development Cooperation Agency, Distinguished Guests, Ladies and Gentlemen,

On behalf of the organizers of this conference, I welcome you to the Philippines.

The global ocean is one of our most sacred trusts, providing the planet we live on with many of the basic elements that we need in order to maintain our existence. The ocean provides us with food and habitat, livelihood, and employment, transportation and recreation, minerals and energy, and other needs. It is a dynamic life support system for the many creatures that we share space with on Mother Earth.

The concern on oceans and seas figured prominently in Agenda 21 with an entire chapter, Chapter 17, being devoted to objectives such as integrated management of coastal areas, marine environment protection, and sustainable use of living marine resources. This set of objectives being achieved through regional, national, and local actions, was outlined in Chapter 17, which, more than any other document,

underscores the basic theme of this Conference.

This Conference, although physically distant from Rio, the site of the Earth Summit, is clearly an offshoot of that event. The primary objectives of this Conference are: one, to ensure that the global principles of the Earth Summit are put into action by developing and incorporating pragmatic, cost-effective approaches to capacity building and marine pollution management; and, two, to entail commitments of the public and private sectors for support of marine pollution and management on a sustainable and long-term basis.

We are all aware that the East Asian economy is perhaps the world's fastest growing economy and is predicted to accelerate further towards the 21st century. Maritime trade activities will dramatically increase and will be accompanied by heightened domestic activities of the region's population, 60% of which is concentrated in the coastal areas and is expected to increase in the next decade. This situation of rapid coastal urbanization and increasing maritime trades in the region will add environmental stress to the fragile ecosystems, many of which have reached the upper limit of their thresholds to maintain their functional integrity. Despite the fact that a large part

of economic activities takes place in the coastal and marine areas, many of the coastal inhabitants are still living below the poverty line. Existing conventional sectoral approaches in addressing the issues of environmental degradation are no longer adequate and effective to cope with the conflicts and problems in the coastal and marine areas in the region.

In a region characterized by diverse socioeconomic, cultural, political, and ecological characteristics, effective solutions to the environmental issues require a holistic, integrated, and pragmatic approach for the application of dynamic planning and management mechanisms which will involve both the public and the private sectors. Pragmatic programs or plans of action at local, national, and regional or subregional levels are urgently needed to map up proactive and reactive measures which include setting up appropriate institutional arrangements, harmonizing legislation, allocation of use rights, improvement of monitoring protocols, implementation of international conventions, and improvement of law enforcement.

Marine pollution is the product of human activities on both land and sea, the solution of which requires long-term political and financial commitments. To achieve these commitments, there is a need to convince the political leaders and the business managers that marine pollution prevention and management also provide tremendous investment opportunities, creating employment and generating revenues. Marine pollution prevention and management will become a major part of an emerging environmental industry which is expected to occupy an important role in the stage of economic development in the region.

Maritime activities can be sustained by addressing the adverse environmental impacts they created. Oil and chemical spills, toxic algal blooms, fish kills, bacterial contamination of recreational beaches, and destruction of critical habitats, to cite a few concrete examples, are some of the environmental concerns that can no longer be ignored.

Marine pollution prevention and management are excellent opportunities for building partnerships between the public and private sectors, as well as cooperation among donors, international agencies, and littoral and user States. We envision the public - private sector partnerships to work this way. The private sector's dynamic management capabilities, technical expertise, and entrepreneurial spirit supplement the political commitments, legal and management framework of the public sector. The enormous task of working together to prevent and manage marine pollution will eventually reward us with a safe and vibrant marine environment which is our immeasurable legacy for the next generation.

Ladies and Gentlemen,

The purpose of this Conference is to create a forum for the exchange of ideas, experiences and knowledge on the issues or problems I have mentioned. We are very glad that this Conference received very enthusiastic responses, and in attendance are more than 200 participants from 26 nations. The next three days will have exciting debates and discussions on these issues to collectively explore means on how to strengthen this partnership. It is through this spirit of partnership that we have today a significant number of representatives from the private sector

who will certainly interact with representatives from the finance, planning, environment, maritime affairs, and local governments. Through this Conference, such partnership will be further enhanced through closer collaboration and cooperation manifested by collective social responsibilities.

Before I conclude, I thank the co-sponsors of this conference, namely, the Swedish International Development and Cooperation Agency (Sida), the International Development Research Centre (IDRC), the Danish Cooperation for Environment and Development (DANCED),

and the Department of Environment and Natural Resources of the Philippines (DENR). I also thank the Asian Development Bank (ADB) and the United Nations Environment Programme/Coordinating Body on the Seas of East Asia (UNEP/COBSEA) for their support and the Coastal Management Center and the Department of Environment and Natural Resources for co-organizing this conference. Last but not the least, I will request you to join me in thanking the Government of the Philippines for generously hosting this conference in Manila.

Thank you and good morning.

Anders Granlund

Senior Research Officer

*Department of Research Cooperation - SAREC
Swedish International Development Cooperation Agency
S 105 25, Stockholm, Sweden*

Honourable Secretary, Distinguished Participants, Ladies and Gentlemen,

On behalf of the Swedish International Development Cooperation Agency (Sida) and as one of the co-sponsors of this regional conference, I wish, first of all, to take the opportunity to thank the Government of the Republic of the Philippines for its generous offer to host this important conference, and for the excellent arrangements made for the meeting.

I am very glad to see so many participants from countries of the region present at the Conference. Again, as a representative of one of the co-sponsors of the Conference, I wish to express our deep gratitude to you for taking time and effort to attend this Conference. Your presence demonstrates the importance of the issue and your sincere determination to deal with it.

It is of great interest for Sida to be here and take part in the discussions on how to explore the opportunities for public - private sector partnership, a theme we very much would like to promote in our future environment programs. To find ways to preserve and use our natural resources in a sustainable manner is one of the most urgent and formidable tasks facing mankind. And if we can find these within public - private partnership, I think we have a dynamic opportunity to solve some of the crucial tasks for the marine environment.

When looking at these new perspectives in ongoing case studies in sustainable financing of marine pollution, we at Sida feel that we would like to promote the awareness building and actions towards activities where we could discover possibilities for investment in innovative technologies, research facility management, and support services. That is one of the reasons for us co-sponsoring this Conference.

To develop sustainable ways of using natural resources in general, as well as coastal resources in particular, presents a dual challenge. First, it is in many areas a race against time, requiring an ability and determination to act upon what we already know and have agreed to do. Secondly, it requires new and innovative ways of dealing with the problems facing us. These problems often transgress national boundaries. They transgress the often narrow sectors in which we are used to view development. They transgress the traditional boundaries between academic disciplines. Hence, there is a need to increase cooperation, regionally and globally, there is a need to address the issues of development in an integrated way, and there is a need for multidisciplinary approaches in research.

I think we really should take the opportunity to use this Conference as a platform for promoting partnership among government, industry, financial institutions, research institutions and nongovernment organizations.

We can see from the international arena that a growing number of bilateral and international donor organizations now are cooperating with the countries of the region in the field of coastal zone management. In order to utilize this support in an efficient manner it is, of course, important that the donor organizations, in cooperation and consultation with the Governments of the region, increase their efforts to coordinate their activities. I hope that the Conference will also provide an opportunity to address the question of how the donors can cooperate more effectively with the developing countries in the continued development of sustainable integrated coastal zone management.

A significant part of Sweden's development assistance to the region, relevant to coastal zone management, has, so far, been focused on these issues. Support has been provided to the strengthening of research capacity and to research cooperation through regional and international networks, as well as to development programs for the coastal environment. Many of the researchers involved in these programs have also played an important and constructive role in promoting a wider cooperation with regard to integrated coastal management, including issues other than research. The researchers have also shown a not-so-common readiness to join hands in multidisciplinary research projects, including both natural and social scientists. The research capacity and networks, thus created, can be an important asset for both the public and private sectors in their continued efforts to develop integrated coastal zone management. Consequently, the continued strengthening of national research capacities and regional research

networks, would most certainly prove to be an important ingredient in these efforts.

Sida attaches great importance to issues related to sustainable use of natural resources in its development cooperation. A strategy and an action plan for cooperation in this area was recently approved by the Swedish Government. Within this larger field of cooperation, one of the areas which will be given special attention is the preservation and sustainable development of marine resources and coastal areas. A strategy document is presently being prepared to guide increased efforts in this area. This document will also include guidelines for assessment of all development cooperation projects which may have an impact on coastal zones in order to assure that such projects are designed in a way which do not have a detrimental impact on the coastal environment.

Sweden has for a number of years been a partner in the regional efforts towards preservation, and sustainable use of coastal areas. I would like to specially highlight the cooperation with IMO-UNDP in Southeast Asia, a collaboration that has been of great value for Sida in a truly win-win fashion. We look forward to continuing that partnership. The ultimate responsibility and ownership, however, for the continued efforts towards a sustainable development of coastal areas rest, of course, in the countries of the coastal regions. The cooperation has so far also been conducted in that spirit. The broad representation at this meeting bodes well for the future.

Let me conclude by wishing you a fruitful and constructive Conference and success in your continued efforts to address the issues before us on the agenda.

Thank you.

Victor O. Ramos

Secretary

Department of Environment and Natural Resources

Visayas Avenue, Diliman

Quezon City, Philippines

Ms. Sarah Timpson, Resident Representative, UNDP Manila, Dr. Chua Thia-Eng, Regional Programme Manager of the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas, Dr. Anders Granlund, Senior Research Officer, Department of Research Cooperation—SAREC, Swedish International Development Agency, (Other Philippine Government/DENR Officials), Friends, Ladies and Gentlemen ... Good morning.

On behalf of the Department of Environment and Natural Resources, I would like to welcome all the delegates to the Regional Conference on Sustainable Financing Mechanisms for the Prevention and Management of Marine Pollution: Public Sector - Private Sector Partnership. It is indeed a great honor for us to host this Regional Conference for it parallels the increasing regional and international responsibilities of the Philippines in the protection of the seas and the marine environment.

Furthermore, this Conference is being held at an opportune time of accelerated interest of the Filipino people in the immensity, the richness, and inestimable diversity of our coastal and marine resources. After all, we have ten times more marine waters than land area and we fall right in the center of the "coral triangle" of the region. As a state party to the United Nations Convention on the Law of the Sea, our territorial and attendant environmental responsibilities have encouraged us to prioritize the protection

of the marine environment. The Philippine Cabinet, as early as 1994, has adopted a national marine policy that addresses not only the management of the marine economy and maritime security but also emphasizes the protection of the marine environment.

These are the very reasons for our strong lobby to host the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas and our continuing commitment to support its activities especially its pilot project in Batangas Bay. We are confident that the Programme will produce for us and for the Region the practical guides and examples on how to proceed and succeed in integrated coastal zone management.

This Conference is of an added and important value to us, our many country partners coming, as it is after an "APEC Experts Meeting on Innovative Approaches to Sustainable Development". This APEC Experts Meeting led to the recommendation to strengthen the use of market-based instruments and private sector involvement in the pursuit of sustainable development in the Asia-Pacific region. This recommendation was eventually incorporated in the declaration on sustainable development of the APEC Ministerial Meeting on Sustainable Development and would eventually be translated into operational plans for joint efforts in the upcoming APEC Ministerial Meeting on the Environment to be hosted by Canada early next year.

There is thus little need to convince us that sustainable financing and public-private sector partnership are of utmost importance in integrated coastal zone management. The level of needs for both environmental rehabilitation and pollution prevention in marine and coastal ecosystems and the growing complexity of pressures make single group approaches grossly inadequate, inutile and eventually unsustainable.

Several years ago, in another regional coastal management conference in Singapore, it was already pointed out that to reach the level of Singapore's cleanup and waste management, many countries in the region will have to spend not just at the level of hundreds of millions of dollars but in billions. We are indeed convinced that sustainable financing is an important factor if not the most important.

What are still needed now, however, are practical approaches or mechanisms which, though shown to have succeeded

in another country's context, can nonetheless be adapted to our particular situations. Looking at the list of expert presentors, exhibitors, and participants to this conference, I am more than confident that we can achieve this objective. I enjoin all to be most active in this endeavor in the next three days as we are actually in a race against time. In truth, we are already very late in these efforts in many areas in the Philippines and in the region.

May I also enjoin all the participants coming as we all are from different countries, institutions, and corporations, to actively identify, even to start initial negotiations, on possible partnerships or joint efforts. The one major difference between terrestrial environmental management vis-à-vis marine environmental management is that the marine environment, because of its more dynamic nature, is an environment shared by all of us. We all eventually suffer its pollution no matter where that pollution started from.

Sarah L. Timpson

Resident Representative

*United Nations Development Programme - Manila
NEDA sa Makati Bldg., Amoroso St., Legaspi Village
Makati City, Philippines*

Honorable Secretary Victor Ramos of the Department of Environment and Natural Resources, Distinguished Delegates from the East Asian Region, Colleagues from the International Development Community, Fellow Environmental Advocates from the Civil Society, Our Partners from the Private Sector and Governments, Ladies and Gentlemen, a pleasant good morning.

As some of you may know, I arrived here in the Philippines only a month ago. I came from another coastal zone—Manhattan, in New York, where I spent a number of years. I lived there in an apartment looking out over the East River. It was beautiful from a distance, but up close the realities of pollution were all too evident. And I often asked myself by what right human beings have so unthinkingly used whatever body of water happens to be closest to them as the dumping ground for all of our waste. The situation has become so serious that no one can any longer ignore it.

This gathering of experts and concerned stakeholders is timely and significant in the light of the growing concern over the deteriorating condition of the coastal and marine environment globally and regionally—a situation calling for collective and decisive action from all concerned sectors.

International Context

At the international level, we have made significant progress in terms of basic agreements to address transboundary

environmental problems. However, these should serve not as ends but as means—means for a process that will lead to more concrete action at the regional and national levels.

Need for Collaborative Action

We are all here today because we believe that marine environmental protection is an area where a concerted effort is necessary. We recognize that no amount of financial resources will solve the problems if they are not properly spent and if individual efforts are implemented without reference to one another. Coordination of programs and activities through partnerships can lead to synergistic action and optimize the scant financial resources available.

The regional nature of this conference testifies to the fact that marine pollution prevention and management cannot be confined to the national boundaries of each of the East Asian countries. It requires country partnership. We all recognize that solutions to environmental problems that transcend the national boundaries must be based on common principles and rules of cooperation agreed among concerned states. But by partnership, we must move beyond cooperation among countries. We must seek partnerships between groups of actors and stakeholders: private sector, donors, nongovernment organizations, the scientific community, and most of all, the inhabitants of the coastal areas concerned.

Partnership with the Private Sector

The private sector is increasingly recognized as a potentially positive partner. It can provide some of the needed environmental services and infrastructures which were traditionally under the jurisdiction of public authorities. In some countries, water supply and sanitation, waste collection and disposal, waste recycling, and other related services have been privatized. You will hear about some of these experiences in the course of this Conference.

Governments may collaborate with the private sector to promote technological innovations that use resources more efficiently or minimize harmful substances and reduce residuals, providing the necessary incentives for industries to pursue environmentally-sound and efficient technologies. Zero-waste technologies would complement the traditional end-of-pipe approach to waste management. The key to increased sustainability is not necessarily to produce less but to produce differently.

Linked to this, the private and public sectors could collaborate in industrial estates or growth centers, where industries are strategically located. These growth centers represent industrial systems which could be managed to mimic natural ecosystems so that industrial by-products of one industry are absorbed or utilized by other industries within the system.

This emerging field, known as industrial ecology, aims to complement the command and control approach to industrial pollution control and water management. In place of our normal linear approach to production, industrial ecology takes its cue from the closed loops inherent in natural ecosystems

where waste produced by one is consumed by another. It offers a way to reduce the historically antagonistic tradeoff between economic activity and environmental health. It recognizes that the economic system is part of the natural system and not the other way around.

Partnership with Research Institutions and the Academe

Much of the forward thinking and the ground-breaking insights on these matters originates in the scientific community. We must provide support for their research in order to better understand the problems and opportunities of the marine environment. We must facilitate partnerships between them and other stakeholders in order to apply technological breakthroughs in practical action.

Partnership with Civil Society

Partnerships with nongovernment organizations are other essential components to strategies for the prevention and management of marine pollution. Development without the integration of social and environmental concerns will never be sustainable. Governments may be responsible for ensuring that social and environmental concerns are integrated within the framework of the market economy to promote human development, but NGOs serve as intermediary, keeping the pressure on government to put these concerns to the fore and giving people a voice and an opportunity to articulate their needs and preferences. In the last few years, NGOs and people's organizations have been among the major forces in advocating environmentally-sound development and achieving changes in relevant policies and practices, and finally,

partnerships with coastal communities. They are usually the ones with the greatest stake in preventing degradation—indeed their lives often depend on it. Given the tools, they can be among the most effective agents of change.

Vision of Sustainable Human Development (SHD)

At UNDP, a new vision of development has emerged, which is characterized as people-centered, equitable and socially and environmentally sustainable. We have called this vision sustainable human development. Sustainable human development or SHD is development that: (1) generates economic growth and distributes its benefits equitably; (2) regenerates the environment rather than destroys it; (3) empowers people rather than marginalizes them; and (4) gives priority to the poor, enlarging their choices and opportunities and providing for their participation in decisions affecting them. When people get bogged down in definitions of SHD, I remind them that what it really represents is a point of reference against which all development should be measured. Very simply two questions should be asked before embarking on any development activity. What will be the impact on the poor? What will be the impact on the environment? If the answer to either is negative, then that development activity will be neither human nor sustainable.

Poverty-Environment Linkage: An SHD Issue

What is the implication of SHD for the marine environment? First, it requires us to turn our attention to numbers of people living in coastal areas and relying on

marine resources for their subsistence. Poverty in these coastal zones, whether urban or rural, remains high. Poor people are often both the victims and agents of environmental degradation. As victims, the poor often lack water supply and sanitation facilities, are exposed to all kinds of pollutants, and see their primary source of subsistence livelihoods appropriated and destroyed. Addressing pollution from land-based activities would lessen the impact of environmental degradation on their lives. As agents, marginal farmers are often obliged to clear trees which held back the soil and marginal fisherfolk in the rural areas are obliged to continue fishing in already overexploited areas in order to provide for their subsistence needs. Helping them find alternative means of sustainable livelihoods could lessen these pressures. Giving them an opportunity to participate in devising solutions would ensure their support and collaboration in implementation.

Collaboration for Capacity Building and Integrated Coastal Management

Another area of SHD attention which is largely in line with UNDP's thrust is capacity building for marine pollution prevention. In fact, the Regional Programme on Marine Pollution Prevention for the East Asian seas, which has brought us together here today and which is being implemented by UNDP with funding from the Global Environment Facility (GEF) and executed by the International Maritime Organization (IMO), is primarily aimed at capacity building in the 11 participating countries over the entire gamut of marine environmental management. It particularly focuses on integrated coastal management, which has been demonstrated to be a highly

effective method for fostering sustainable management practices.

Challenge for All Concerned

This conference presents major challenges for all of us. A challenge to come up with innovative solutions to address both environmental degradation and poverty alleviation in coastal areas. A challenge to forge concrete linkages and cooperation among the various actors of development. A challenge to optimize existing financial resources for the implementation of joint programs and projects on marine pollution prevention.

Based on the case studies and successful models of environmental management which you will learn about, I urge you to identify concrete areas of cooperation among donor agencies, private sector, governments, civil society and the scientific community to share responsibilities for making development truly sustainable.

Concluding Note

In concluding, I thank the IMO and the Programme Development Management Office of the Regional Programme for an excellent job of organizing and conducting this Conference. I thank the Government of the Philippines Department of Environment and Natural Resources for hosting the Regional Programme and this Conference. I also thank the cooperators, sponsors, and supporters of this Conference for a noble initiative to start up a model partnership within an undertaking like this. And I thank all of you for participating in this Conference. I wish all of you fruitful sessions addressing the many challenges of building partnerships among a multitude of stakeholders.

Thank you and good day.

ANNEX 5:

Chua Thia-Eng

*Regional Programme Manager
GEF/UNDP/IMO Regional Programme for the Prevention
and Management of Marine Pollution in the East Asian Seas
DENR Compound, Visayas Avenue, Diliman
Quezon City, Philippines*

His Excellency, President Fidel V. Ramos, Honorable Secretary Victor Ramos of the Department of Environment and Natural Resources, Ms. Sarah Timpson, Resident Representative, United Nations Development Programme, Manila, Mr. Reinier Willems, President, Pilipinas Shell Corporation, Honourable Guests, Ladies and Gentlemen, Good evening.

On behalf of the organizers of this conference, I extend our warmest welcome to our honored guest, President Fidel V. Ramos, who is here with us this evening to grace this special occasion. I also wish to extend our warm welcome to our distinguished guests and participants who came from various parts of the country and abroad.

For the information of Mr. President and our honored guests, let me say a few words about the background and objectives of this Conference. As you are all aware, marine pollution poses serious threats to human and environmental health and results in serious losses to the economies and livelihood of many coastal nations in the world today. It is a major obstacle to sustainable development of the coastal and marine areas. In view of this situation, the 1992 Earth Summit, the Washington Declaration on Land-based Pollution, the United Nations Convention on the Law of the Sea (UNCLOS) and other international

conventions were designed to respond to these growing threats.

With the strong national and international commitments in place, it is now essential that these are translated into concrete, effective plans of action at the local, national, and regional levels. Marine pollution is the product of human activities, the effective solution of which requires a comprehensive and integrated planning and management approach by all levels of the government and all sectors of the society. There is no single technological solution to solve this global issue. However, there is a way forward. Marine pollution from land-based sources can be addressed at the local level, applying integrated coastal management approaches through well coordinated policy, management, and technological interventions over a long term and on a sustainable manner. On the other hand, marine pollution from sea-based activities requires a subregional approach through appropriate port state control, implementation of international conventions and protocols, and improvement of navigational safety. These, however, require financial resources and technical know-how. Traditionally, pollution control and mitigation are looked upon as the sole function and responsibility of the public sector. This perception is changing. The role of the private sector is now recognized and

will be further enhanced towards the 21st century as the region is moving towards a heightened maritime economy.

This Conference is therefore designed as a forum for the presentation and exchange of views and approaches to building and strengthening partnerships between the public and the private sectors. The Conference will explore how the affected sectors can combine their skills, technologies, and resources for mutual benefit. Such partnerships will take advantage of the private sector's dynamism, technical expertise, financial resources, and entrepreneurial spirit and will build upon the public sector's contribution to social responsibility, technical support, regulatory control, legal framework, and political commitment.

The environment industry is presently the fastest growing industry in the world. The potential for development of the environment industry in East Asia is unmatched by any other region in the world. The challenge that we face is to develop an industry that best serves and

benefits the countries of the region, in concert with sustainable economic and developmental goals.

Mr. President, during the next two days of the Conference, participants shall explore the opportunities for public - private sector partnership, assess case studies in sustainable financing of marine pollution, and discover possibilities for investment in innovative technologies, research, management and support services. They will also examine options for funding navigational safety, marine pollution management, seafarers' training, and promote partnership among government, industry, financial institutions, and nongovernment organizations.

Mr. President, you have been known among the world leaders who put emphasis on environmental concerns of the same importance as economic growth. We admire your long-term vision and we look forward to your guidance and advice in reducing marine pollution not only for the waters of the Philippines but for Asia and the oceans of the world at large.

Thank you and good evening.

PARTNERSHIP FOR A SUSTAINABLE MARINE ENVIRONMENT

His Excellency Fidel V. Ramos

President

Republic of the Philippines

Introduction

Today we address one of the less-appreciated but most pernicious and pervasive problems of our time: that of marine pollution and the systematic degradation and destruction of the earth's waters and the life in them.

You have chosen the right place—the Philippines—to discuss this problem on the eve of another vital meeting, the Asia-Pacific Economic Cooperation (APEC) Leaders' Summit which we will be hosting ten days from now.

As an archipelagic nation highly dependent on the sea—but also as a newly industrializing economy on the verge of unprecedented growth—the Philippines is both vulnerable to and deeply concerned with, marine pollution and its disastrous consequences.

There can be no doubt that fighting marine pollution and preserving our ecological balance deserves our highest priority, and the concerted response of all our nations. As residents and therefore as stewards and guardians of the world's most economically dynamic region, those of us in Asia and the Pacific must be chiefly responsible for the health and the cleanliness of our waterways and oceans, if we value the future of the planet and the quality of life of our peoples.

This meeting must look back and build on what we have done so far collectively and individually—to achieve this end.

The Law of the Sea

The United Nations Convention on the Law of the Sea (UNCLOS) is perhaps one of the strongest comprehensive environmental treaties in existence. Part XII, Articles 192-237, establishes a legal framework for the protection and preservation of the marine environment, by addressing all sources of marine pollution, such as pollution from vessels, seabed activities, ocean dumping, and land-based sources. The convention promotes the continuing improvement of the health of the world's oceans.

This concern was amplified during the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992, where it was recognized that "the marine environment—including the oceans and all seas and adjacent coastal areas—forms an integrated whole and is an essential component of the global life support system and a positive asset that presents opportunities for sustainable development."

The actions required from nations are set forth in Chapter 17 of Agenda 21—the protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas and

coastal areas and the protection, rational use and development of their living resources.

These agreements have led to renewed efforts and initiatives among nations to find innovative ways of dealing with marine pollution.

Environmental Initiatives

When I met with other leaders of APEC at Blake Island in Seattle three years ago, I called for a discussion of debt-for-environment or debt-for-nature swaps as a doable financing scheme for environmental protection. This resulted in the convening of an Experts' Meeting on Innovative Approaches to Environmentally Sustainable Development—a meeting which strongly recommended the adoption of an action program that would promote some creativity to our sustainable development in member-economies.

Among these new approaches are:

- 1) Introducing an environment and natural resources accounting regime into the system of national income accounts;
- 2) Using market-based instruments;
- 3) Sharing information and expertise to promote, adapt and adopt innovative approaches to sustainable development;
- 4) Applying participative systems in the planning, determining, and carrying out innovative approaches to environment and natural resource management;
- 5) Building up the capacities of environment and natural resource users and managers in planning, determining and implementing innovative approaches for sustainable development; and
- 6) Complementing market-based instruments with regulatory measures to ensure the optimal use of resources.

The Experts' Meeting was followed by a meeting in Manila earlier this year of APEC Ministers on sustainable development, which resulted in the formulation of a declaration and an action program in the following areas: sustainable cities, cleaner production, clean technology, and sustainability of the marine environment.

Concerning the issue of sustainability of the marine environment, a strategy was drawn up and adopted by the Ministers which called for the development of an action plan to cover the following elements:

- 1) Integrated approaches to coastal management;
- 2) Prevention, reduction and control of marine pollution;
- 3) Sustainable management of marine resources;
- 4) Research, exchange of information, technology and expertise;
- 5) Capacity-building, education, and training; and
- 6) Public- and private-sector participation and partnership.

The Environment Ministers agreed that these actions would be guided by a set of basic principles.

They likewise undertook to promote, as a priority measure, stronger partnerships between their public and private sectors, as well as enhanced the ability of APEC to add value to ongoing activities.

They also emphasized the need to recognize the diverse stages of economic

development of APEC economies. They resolved to support local empowerment, to share innovative approaches to the problem—including undertakings based on incentives—and to enhance their capacity through human resource development, information sharing and technology exchange.

This action program, when carried out, will move APEC from vision to action on the environmental front, ensuring that the waters which connect the members of our vast Asia-Pacific community are as clean and clear as we can make them.

The National Marine Policy

The Philippines, as a signatory to the UNCLOS and Agenda 21, has recognized the need to strengthen its capability to carry out the provisions of the convention and has drawn up a National Marine Policy. We are carrying out this policy through a reinforced cabinet committee on maritime and ocean affairs.

The National Marine Policy calls for a shift in our development policy toward emphasizing the Philippines' status as an archipelagic state. It recognizes the urgent development needs and demands of mobilizing marine resources in the service of economic growth.

The Philippines, which has more water than land had previously focused its development on land-based activities. But that discarded development model must now give way to one that reflects our character as an archipelagic nation.

The National Marine Policy addresses many important issues which include the extent of the national territory; the management of our marine economy; the

protection of our marine environment; and maritime security.

As regards our marine environment, for example, our policy is to ensure that our marine and coastal resources are properly managed and protected against any threats of pollution from marine and land-based sources.

We hope to be able to do this through the following means:

- 1) The development and management of coastal resources through an integrated framework for managing coastal zones;
- 2) The exploration, development and management of offshore and oceanic resources through the principle of sustainable development;
- 3) The development of local and international joint ventures in the rational development of oceanic and offshore resources;
- 4) The adoption of the "polluter pays" principle in ensuring the protection of the marine environment;
- 5) The maintenance of high-quality maritime schools to maintain the Philippines' world competitiveness in the maritime labor market;
- 6) The development and enhancement of a national marine consciousness through a viable education program; and
- 7) The development of a marine research program.

It is our hope that with the implementation of these programs, the Philippines will be fully capable of protecting the total marine environment and preserving the precious Philippine ecological balance which is unique in the world.

To ensure that the National Marine Policy is carried out properly, the Philippine Council on Sustainable Development—in its formulation of the Philippine Agenda 21—has called for the periodic review of the national marine policy to harmonize it with the UNCLOS, as well as other international conventions and national and local policies.

Recently, I issued a Presidential Order calling for the operationalization of the Philippine Agenda 21, which has become our national framework for sustainable development.

Supporting International Programs

In keeping with our regional commitments, we have strongly participated in international and regional programs to ensure for future generations a clean and sustainable marine environment.

The Philippines has taken an active role in the International Coral Reef Initiative (ICRI)—a measure that calls for a global, regional and subregional action program to protect coral reefs and associated ecosystems. The ICRI calls for actions which were formulated here in Dumaguete City in 1994, and I am glad to note that we have made significant progress since. Regional strategies have been devised for the Americas, the Caribbean, the Mediterranean, and East Asian seas. These strategies must now be reviewed and considered by other nations, which must then devise their own national program for implementation.

The Philippines hosts the Programme Office of the Global Environment Facility/United Nations Development Program/International Maritime Organization (GEF/UNDP/IMO) Regional Programme for the

Prevention and Management of Marine Pollution in the East Asian Seas. This is apart from the fact that one of the demonstration sites for this regional program is located in Batangas Bay.

The demonstration site in Batangas Bay is a good example of how the public and private sectors can work more effectively as partners in fighting marine pollution. The partnership involves a tripartite memorandum of agreement to manage marine pollution through the implementation of an integrated approach to coastal zone management.

Closing

This Conference on Sustainable Financing Mechanisms for the Prevention and Management of Marine Pollution is another vital means for achieving the desired level of public-private partnership.

I hope that by the end of this three-day Conference you will have been able to identify concrete areas where our public and private sectors can work together against the common enemy—pollution and degradation—which starts in the minds and hands of uncaring and selfish people.

Those priority areas of action must cover the sharing of resources, the identification of investment packages, the enhancement of navigational safety, the development of more and better marine pollution management activities. Above all, we must effect the transformation of the attitudes and behavior of people positively towards our God-given blessings that abound in mother nature, but which are now under threat from all sides by human greed and human neglect. Thank you and *mabuhay!*

ANNEX 6 :**CLOSING REMARKS****Hon. Delfin Ganapin, Jr.***Undersecretary**Department of Environment and Natural Resources**Visayas Avenue, Quezon City, Philippines***Friends and participants:**

Allow me to greet you in these Closing Ceremonies in this manner: *"Isang maganda at makalikasang hapon sa inyong lahat."* I have greeted you in Filipino, my native language, and the greeting simply meant not only a very good afternoon, but also an environmental or ecological afternoon to all of you.

When I joined the government bureaucracy, I made an oath that I will always remind myself, in this manner, of my duties to my country and its people. In the complexity of the problems that we face daily, the difficulties that we have to hurdle, and the political intricacies that we must deal with, it is so easy to get lost and to be discouraged. This is definitely the type of situation we face and we'll continuously deal with in our efforts at integrated coastal zone management. We must therefore constantly remind ourselves that we are not doing our work, such as this three-day Conference, simply for ourselves, but for many others. I'm sure that participants from the other countries came here with that kind of a commitment.

With such a framework, whatever ideas on financing we may have gathered from this Conference and the possible

mechanisms to implement them, will not be geared towards individual or just sectoral profits at the expense of others, which has caused our problems in the first place; but will, in the end, be supportive of genuine partnerships; in the end, making such mechanisms sustainable.

I actually find myself in a very awkward position in these Closing Ceremonies, because we started with Secretary Ramos and the President of the Philippines in the Opening. And usually we call on Secretary Ramos and the President whenever we want commitment at the very top policy level. But when I looked at perhaps the devious means by which the organizers have organized this Conference, perhaps they are saying a message here. Because in the Philippine bureaucracy, when we move from policy to operational action, that is the time they call the Undersecretaries. And so perhaps the message that Dr. Chua wants to send here is now we've passed the period of policy discussions. We're now into the operational action part.

These three days have been a reiteration of the fact that for marine pollution to be prevented, and the already existing degradation to be corrected, we have to get into coastal zone management in a wholistic and integrated manner. And being so, we

have to get the participation of both the public and the private sectors at various levels: from the community and NGOs, to the local government units, to national government agencies, international donor partners, and the private business community.

We've also realized that with benefits come responsibility, and with common access comes sharing. The time of the free lunch is over. The concept of borrowing the resource from our children has never been more true than today when the intensity of use of coastal resources makes every unit of use of that resource a sort of taking from future reserves. We have to pay back our debts to nature and the future generations as fast as we can, and with appropriate interest at that; or else, suffer the ecological and economic bankruptcies that we now see in already highly degraded areas.

The best news from this Conference however, is that we can make such financial and ecological payments. This Conference has shown that our capabilities for this is enhanced through public sector-private sector partnerships. Public-private partnerships do not only result in the pooling and increase of unavailable resources, but that it also leads to cost-effective approaches and creates more sustainable approaches. In the cases presented, it was shown to even create profits at the end of the day. Thus, while in truth we are required by circumstances to create these partnerships or else, such partnerships are desirable and feasible. It is sort of a shotgun wedding to one we are madly in love with, or at least should be madly in love with.

In the final analysis, however, it is not the courtship or the wedding that is important. It is the actual living together

that makes difficulties: that is the more important. I got the feeling that listening to the last session, that the public sector-private sector partnership still needs some refinement and more proactive efforts at smoothing differences. User fees, for example, are still a contentious issue that can cause a divorce before even a marriage can be made.

Too often, very successful conferences are just that—successful conferences. Without follow-up and actual operationalization of the ideas generated by such conferences, we would actually be worse off. Warnings have actually been made, that such conferences could create a sense of accomplishment such that participants would tend to relax in their actual on-the-ground efforts. I hope that this is not the case for this group. I remember that on the first day, there was already an agreement on an IMO follow-up assignment on one of the major issues in this Conference. I see it in Item 4.3 of the Conference recommendations.

Having hosted this Conference and made the warming, we in the Philippines cannot but take the lead in making sure that the necessary, practical, and feasible ideas generated in this Conference will be translated and transformed into relevant policies, projects, and standard operating procedures. We note the recommendations of this Conference urging us to develop a national plan of action, with ten critical elements. May I add however, that we should not wait for the completed and perfect plan. In the process of developing such a national plan of action, we should immediately act on urgent problems and implement already clearly feasible innovative approaches. The presence of Secretary Ramos, and especially that of President Ramos, who uncharacteristically

stayed with the core group of us for quite a long time, even got, in his words, his own alcohol, to toast and spread his friendship to us, convey the importance we in the Philippines put on marine pollution prevention and management, and the commitment we have to pursue on our objectives on this.

I noted that there was a suggestion that instead of using the words "urge" or "invited to" that we should convert it to "shall". The presence of President Ramos I think can make us, at least here in the Philippines, convert it later on into the words or into the terms "shall", perhaps with an Executive Order. I hope that those that come from other countries will try to do the same with their own governments. I know that you are also as committed as us here in the Philippines, hearing the passion with which you conveyed your ideas and suggestions.

May I join in thanking the sponsors and organizers of this successful Conference. May I again read them, because I think it is very important for us not to forget who these sponsors and organizers are: the UNDP, the IMO, the Coastal Management Center, the Swedish International Development Cooperation

Agency, the International Development Research Centre, the Danish Cooperation for Environment and Development, the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas, and my own agency the DENR, and also supporters, such as the UNEP/COBSEA and ADB. Of course this Conference would have been another one of those things were it not for the excellent ideas from the presentors, made more rich by our active participants and exhibitors. Special mention should be made of the inspiring efforts that Dr. Chua Thia-Eng and his group coordinated by Stephen Adrian Ross have made to organize and manage this Conference. I think gone are the panic and the fear that you have had that this Conference might not be able to meet expectations. We have met more than our expectations.

To all of you, the Government of the Philippines is indebted. And as dictated by our culture and practice, allow me to say "Mabuhay" which is one word that connotes long, happy, successful life to you all. Mabuhay to our coastal and marine ecosystems, mabuhay to you all. Thank you and good day.

Part 2:

CONFERENCE PAPERS



Session I

Sharing Responsibilities

CHUA THIA-ENG, Regional Programme Manager, GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas, Philippines.

"Marine pollution prevention and management in the East Asian Seas: a cutting edge Programme of participating East Asian governments and GEF/UNDP/IMO initiatives."

B.A. HAMZAH, Director General and MOHD. NIZAM BASIRON, Senior Analyst of the Center for Coastal Environment; Maritime Institute of Malaysia, Malaysia.

"Funding a partnership for safer navigation and a cleaner environment in the Straits of Malacca: some preliminary thoughts."

DONNA Z. GASGONIA, Executive Director, Foundation for the Philippine Environment, Philippines.

"Banking on community capabilities for a better environment: a wise investment?"

SARAH L. TIMPSON, Resident Representative, UNDP-Manila.

"Poverty as a threat to the coastal environment."

MARINE POLLUTION PREVENTION AND MANAGEMENT IN THE EAST ASIAN SEAS: A CUTTING EDGE PROGRAMME OF PARTICIPATING EAST ASIAN GOVERNMENTS AND GEF/UNDP/IMO INITIATIVES

Chua Thia-Eng

Regional Programme Manager

*GEF/UNDP/IMO Regional Programme for the Prevention
and Management of Marine Pollution in the East Asian Seas
DENR Compound, Visayas Avenue, Diliman
Quezon City, Philippines*

CHUA, T.-E. 1997. Marine pollution prevention and management in the East Asian Seas: a cutting edge Programme of participating East Asian governments and GEF/UNDP/IMO initiatives, p. 82-86. *In* S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

The Regional Programme for Marine Pollution Prevention and Management in the East Asian Seas (MPP-EAS) was established in 1994 to assist participating governments in controlling and managing marine pollution in the East Asian Seas region.

Application of Integrated Coastal Management System for Land-based Pollution Control and Management

The Programme's vision is for land-based pollution to be effectively addressed at the local level with the full participation of local governments and stakeholders. The Programme has demonstrated the feasibility and effectiveness of the integrated coastal management (ICM) system at the local level with its adoption at two demonstration sites, one in Batangas Bay in the Philippines and another in Xiamen in the People's Republic of China. The ICM planning and management framework enables effective policy, management and technological interventions to address locally-based pollution problems in the coastal areas.

Through the Programme, the working models of Batangas Bay and Xiamen and the prepared ICM guidelines of "good

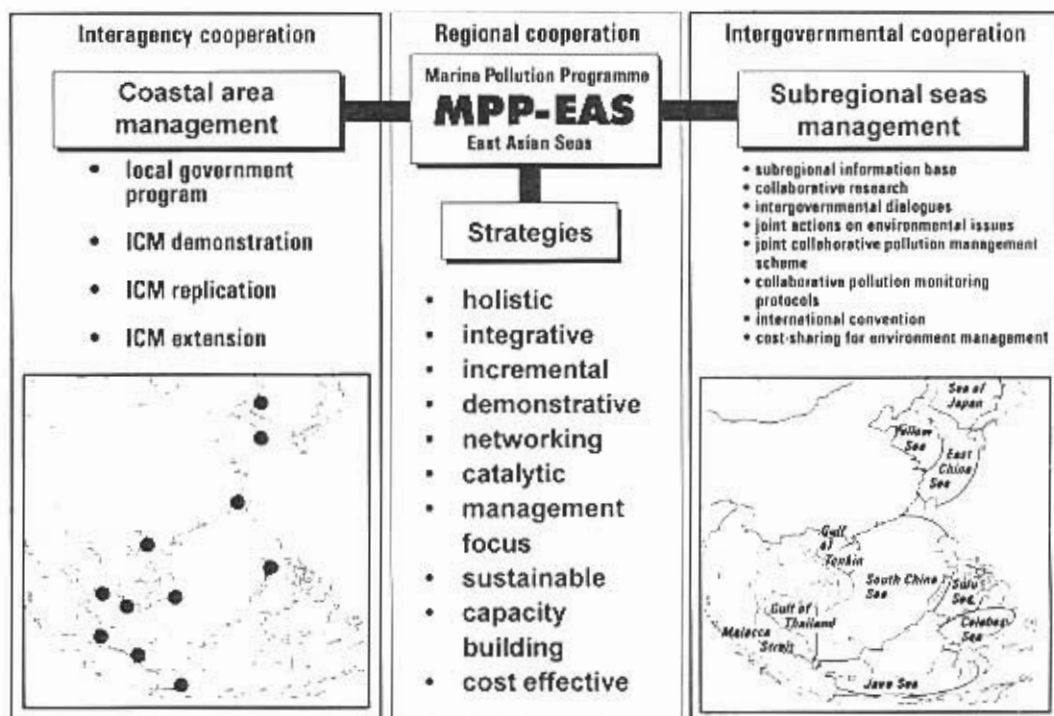
practices" will help local, as well as national, governments to apply and/or replicate the integrative mechanisms in other coastal areas. In fact, additional ICM demonstration and parallel sites in China, Philippines, South Korea, and Vietnam are being developed in order to further strengthen the regional capacity to plan and manage coastal areas (*Figure 1*).

Pollution Control in Subregional Seas and International Straits

The Straits of Malacca was chosen as the Programme's test site to demonstrate the success of existing efforts in resolving problems regarding navigational safety and control of marine pollution at a subregional level. The Programme believes that pollution risk management in subregional seas should be addressed through intergovernmental collaboration of littoral and user States. The Malacca Straits model involving three littoral States could then be modified and used for the control of marine pollution in other straits and subregional seas (*Figure 1*).

Because of the complexity of pollution management in a region characterized by

Figure 1. National and regional cooperation for reducing marine pollution in the East Asian Seas



diverse socioeconomic, political, cultural and ecological features, including a vast geographical scope, the Programme activities are guided by the following strategies: demonstrative, catalytic, incremental, innovative, cost-effective, enabling, and sustainable. The Programme believes that with the gradual increase of ICM practices throughout the region, and the adoption of a subregional sea management approach in the Gulf of Thailand, Gulf of Tonkin, Yellow Sea, Japan Sea, and Sulu Sea, marine pollution problems in coastal waters and the open sea in the East Asian region could be effectively controlled.

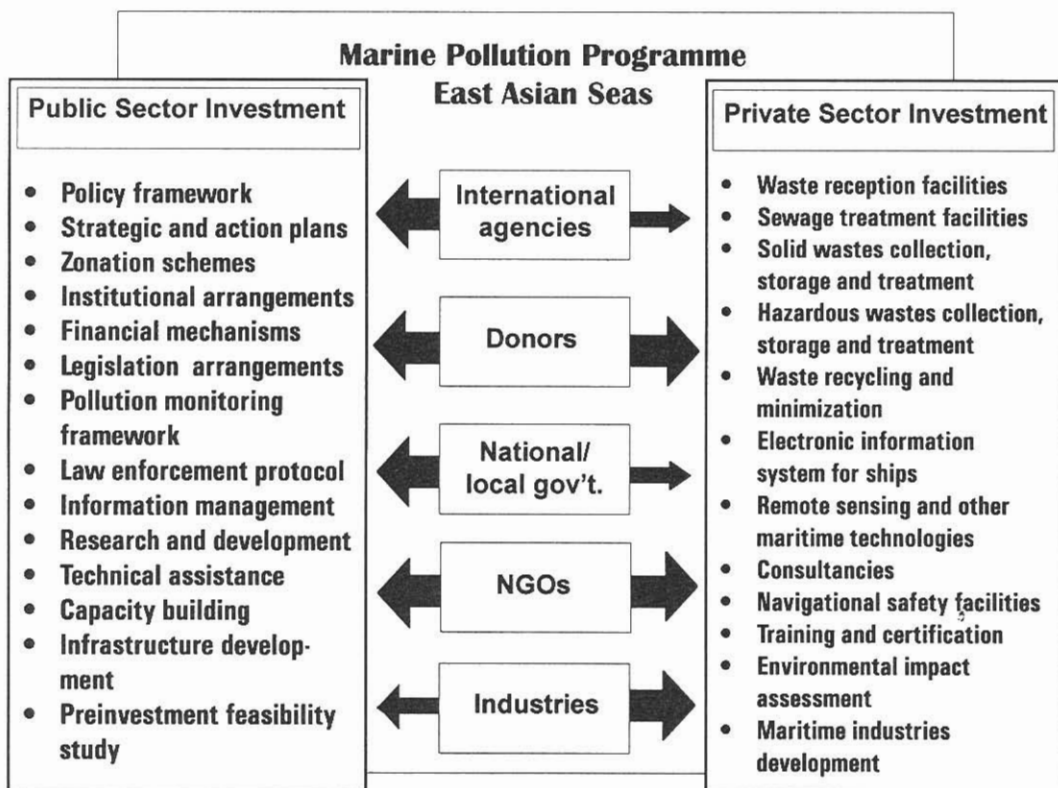
Enabling activities form a major focus of the Programme through its established networks of specialized programs and

institutions throughout the region, such as the legal, monitoring and ICM networks. The demonstration sites established by the Programme serve as training laboratories for coastal planners, managers, socio-economists, natural scientists, and other required expertise.

Public Sector and Private Sector Partnership

A significant feature of the Programme is the creation of the public sector and private sector partnerships (*Figure 2*). The establishment of the coastal management and the subregional sea management program provides a host of opportunities in which both the public and private sectors play significant roles. The public sector provides the "software" such as

Figure 2. Public sector - private sector partnership and international support for marine pollution prevention and management in the East Asian Seas



policy, management and action plans, pre-investment feasibility, human resource development, and technical assistance, whereas the private sector contributes in the form of "hardware" investment such as waste collection, storage and treatment, sustainable maritime industry development, and environmental industry development. The emergence and strengthening of environmental industries will create a strong voice in favor of environmental protection in the conventional business communities.

Opportunities for International Agencies, Donors, NGOs, and Industries

The Programme framework provides immense opportunities for cooperation

and collaboration. More importantly, it allows effective use of the pool of resources to achieve a common goal in the management and protection of coastal areas. Opportunities are being created for joint or individual efforts of international agencies, donors, NGOs, industries, and governments at national and local levels (*Figure 3*).

Linkage with Major International Agenda

The Regional Programme is a cutting edge initiative of eleven East Asian countries with the joint efforts of the Global Environment Facility (GEF), the United Nations Development Programme (UNDP), and the International Maritime Organization (IMO). Its objectives and integrative

approach in coastal and marine area management are direct responses to Chapter 17 of Agenda 21 of the 1992 United Nations Conference on Environment and Development. In fact, the ICM practice is considered a blueprint for sustainable development at the local level.

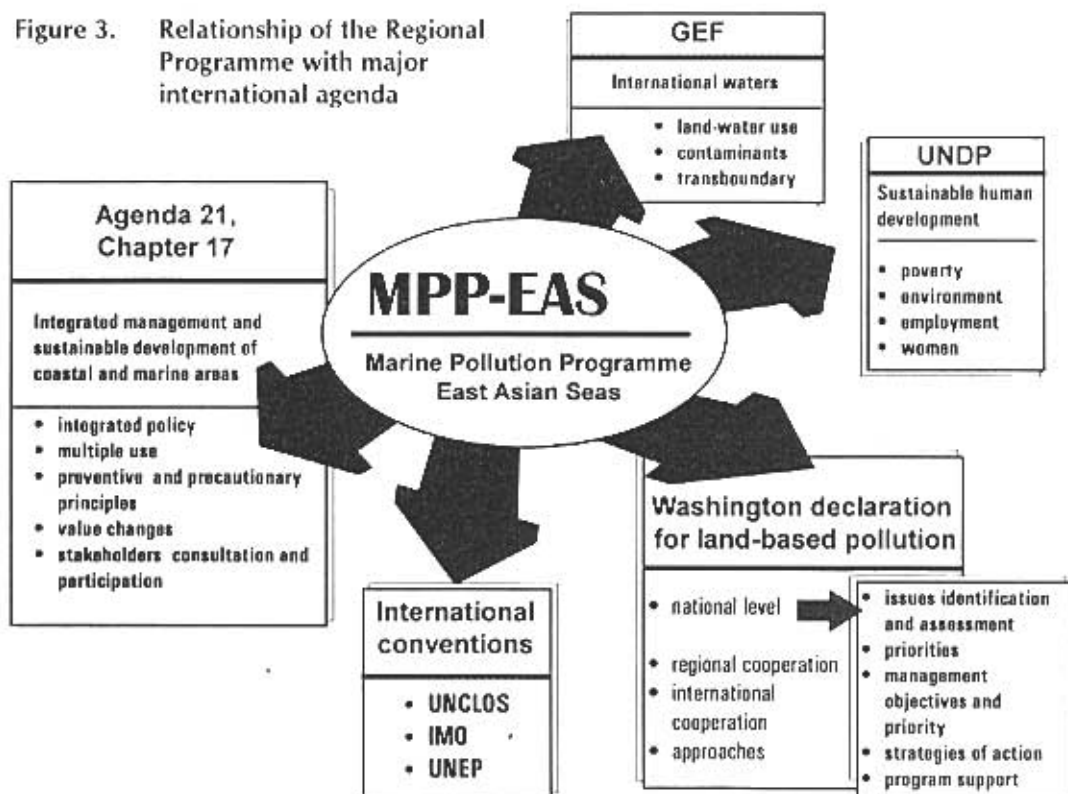
The objectives, approaches, strategies, and coverage of the Programme include most of the key recommendations in the 1995 Washington Declaration for land-based pollution. The Programme activities also match the new GEF portfolio for international waters which include land and sea use, contaminants and transboundary issues. A substantial part of the Programme activities gears towards ratification of IMO conventions and the implementation of the relevant provisions of the UN Convention on the Law of the Sea (Figure 3).

Pooling of Resources and Regional Cooperation

Donors, international agencies, governments, nongovernment organizations (NGOs) and the private sector are urged to pool their resources towards this worthwhile Programme initiative. They can collectively demonstrate to the world that coastal and marine environments and their resources can be effectively protected using the ICM and the subregional sea management approaches so that sustainable development can be better ensured. Such collaboration can take place in the following suggested modes:

- National governments assist their local governments in establishing and implementing ICM programs through national coastal policy, and

Figure 3. Relationship of the Regional Programme with major international agenda



- technical and financial support, where possible; on the other hand, local governments incorporate integrative coastal planning and management within their regular regional development programs;
- b) UNDP expands its sustainable human development efforts through its country indicative planning figure (IPF) by encouraging national and local governments to develop the necessary integrative planning and management framework (or national "ICM software"), thereby creating employment and alleviating poverty in the coastal areas; and by strengthening the capacity of the local governments in the development of new ICM demonstration and parallel sites. UNDP can further promote intergovernmental collaboration to control marine pollution in subregional seas and congested straits using its regional IPF to develop a regional management framework (or regional "software") and technical cooperation between developing countries; and
- c) Donors and multilateral banking institutions assist local and national governments in establishing, demonstrating, replicating, and extending ICM programs throughout the countries within the region (the ICM software) or in specific subregional sea programs (the regional software). This can be done by providing assistance in capacity building, in pre-investment feasibility, research, and other technical assistance. More importantly, these institutions can contribute significantly through bilateral or regional mechanisms by supporting hardware requirements, such as setting up Build-Operate-Transfer (BOT) or Build-Own-Operate (BOO) marine pollution projects, and the development of environmental industries.
- d) The private sector can take advantage of national political commitments in the development and management framework through ICM and subregional seas projects and programs by incorporating treatment facilities for discharges, complying with discharge standards, investing in pollution-related BOT and BOO projects, and assisting in creating viable environmental industries.
- e) NGOs can find a functional niche within the ICM program especially in community mobilization, public awareness, social equity, and protection of cultural heritage and ecosystems.

FUNDING A PARTNERSHIP FOR SAFER NAVIGATION AND A CLEANER ENVIRONMENT IN THE STRAITS OF MALACCA: SOME PRELIMINARY THOUGHTS¹

B.A. Hamzah

Director-General

Maritime Institute of Malaysia (MIMA)

and

Mohd. Nizam Basiron

Senior Analyst

Centre for Coastal Development

Marine Environment and Resources, MIMA

16th Floor Wisma Sime Darby

Jalan Raja Laut, Kuala Lumpur 5035, Malaysia

HAMZAH, B.A. and M.N.BASIRON. 1997. Funding a partnership for safer navigation and a cleaner environment in the Straits of Malacca: some preliminary thoughts, p. 87-103. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) *Sustainable financing mechanisms: public sector - private sector partnership*. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction—A Profile of the Straits of Malacca

The Straits of Malacca is one of the busiest waterways in the world. At approximately 500 miles, it is also the longest strait used for international navigation (Atlas of the World, 1993). In 1994, 31,755 ships were observed passing through the Straits of Malacca, off the One Fathom Bank lighthouse. In the same year, 122,600 vessels called at ports along the Straits of Malacca (various sources quoted by Raja Malik, 1996). The two figures above reflect not only the heavy volume of traffic using the Straits, but also the importance of the Straits of Malacca (which connects the Indian Ocean to the South China Sea and is the shortest route between the Persian Gulf and East Asian countries) to international trade, a crucial contribution to the process of trade globalization and regional economic development.

The Straits of Malacca is also well endowed with natural resources. For example, 58.6% of all fisheries landings in Peninsular Malaysia in 1994 originated from the Straits (Department of Fisheries, 1995), while in Indonesia, fish catch from the Straits is second only to the fishery landing of the north coast of Java (Matsubroto and Naamin, 1988). The Straits also borders large expanses of mangroves in Peninsular Malaysia, Aceh, North Sumatra and Riau. There are also a number of coral reefs in the Straits in the waters of Malaysia and Indonesia. The sites in Malaysia include the islands around Pulau Langkawi and Pulau Paya, Pulau Pangkor and the Pulau Sembilan group of islands, as well as areas off Tanjung Tuan (Ridzwan et al., 1994).

Apart from environmental endowments, the Straits of Malacca also plays an important role in the economy of the littoral States. Taking Malaysia as an

¹ The views expressed in this paper are those of the authors and do not reflect the views of the organization they represent.

example, the Straits borders the country's most industrialized and most heavily populated area—the west coast of Peninsular Malaysia. In his review of the importance of the Straits of Malacca to the Malaysian economy, Naidu (1993) identifies three factors which made the Straits of Malacca an important facet of the Malaysian economy:

- a) Malaysia's dependence on maritime transport facilities as the mode of transportation for imports and exports—apart from high value electronic and electrical goods, most of Malaysia's exports and imports are carried by sea. Ninety-five percent of Malaysia's external trade valued at RM112.4 billion are carried by sea, the majority of which pass through the Straits of Malacca (Kenney, 1996);
- b) Economic concentration—the western corridor of Peninsular Malaysia produces around 70% of the national output, and is home to 65% of Malaysia's population; and
- c) Related closely to Malaysia's dependence on maritime transport is the fact that the country's major ports are located along the Straits of Malacca, namely, Port Klang, Penang Port and Lumut. Johore Port, which is not geographically located on the Straits, also services a large amount of traffic through the Straits. Specialized ports serving the petroleum and petrochemical industries are also located along the Straits (e.g., Sungai Udang and Port Dickson).

The present uses of the Straits of Malacca and development in adjacent coastal areas have exerted tremendous

pressures on the environment of the Straits. Marine pollution from land-based and sea-based activities is a major problem and has contributed to the decline in the marine water quality in the Straits. Oil and grease, sediment, solid waste, municipal sewage, and industrial discharges are major pollutants. Pollution from land-based activities is a chronic problem and may actually worsen as development activities intensify and population in coastal areas increases. At the same time, incidents of vessel-based pollution regularly occur in the Straits, with 14 incidents reported in 1994. These incidents resulted from discharges of oil sludge and oily water from leakages and tank cleaning activities (Department of Environment, 1995).

More frightening than discharges from shipping operations is the possibility of a major oil spill occurring in the Straits of Malacca. Given the semi-enclosed nature of the Straits, a major spill would be catastrophic to the socioeconomy of the communities living by the Straits, not to mention the damages to the ecosystems mentioned above. Such a possibility should not be discounted since tanker traffic (chemical and petroleum) made up 30% of all traffic observed passing the One Fathom Bank in 1994, a breakdown of which is given in *Table 1*. Moreover, many accidents have occurred in the past (*see Table 2*).

The Straits of Malacca can best be described as a multiple-use strait, serving both the international community (as a strait used for international navigation), as well as communities of the littoral States. Such a situation, with its inherent conflicts, problems, and opportunities, provides for an engaging discussion on how the different stakeholders can work together to ensure

Table 1. Types of ships observed passing through the Straits of Malacca at One Fathom Bank (1994)

Type of vessel	Number
Conventional cargo	11,620
Tanker	9,688
Container	5,244
Fishing crafts	1,622
Tug and tow	1,579
RoRo	1,130
Passenger	440
Military vessels	252
Patrol crafts	172
Submarines	4
Total	31,755

the maintenance of the marine environment in the Straits of Malacca. It is the intention of this paper to examine an important, yet contentious, but also necessary issue of cooperation in the Straits of Malacca, i.e., international cooperation, more specifically the issue of funding for environmental management and navigational safety. The examination is based on the hypothesis that there are common grounds for cooperation between the stakeholders concerned, either on a government-to-government basis or as private sector initiatives. These common grounds can be analyzed within the context of the utilitarian needs of stakeholders and their altruistic aspirations for the Straits of Malacca. Besides, the need for cooperation is quite pressing from the perspective of the Strait States especially Malaysia.

Straits of Malacca—Needs and Interests of Users and of Littoral States

Needs and Interests of User States

Traditionally, the Straits of Malacca has always been viewed within a strategic security framework aimed at ensuring principally the free movement of military, and secondly, that of commercial sea

transportation. This has been articulated strongly by an official of the United States Defense Department:

Nations which depend on their merchant marine and navies for economic and national security nations—such as the United States, the United Kingdom, and the Soviet Union, among others—can be strangled by having access to oceans limited or delayed when passing through narrow international straits. Submerged passage of submarines, overflight of aircraft, and freedom

Table 2. Reported casualties in the Straits of Malacca by type of vessel (1978-1994)

Type of vessel	Number
General cargo	253
Tanker	98
Bulk carrier	32
Fishing vessel	21
Container ship	14
Liquefied gas tanker	8
Tug	7
Ore carrier	6
Unknown	4
Ferry	3
Landing craft	3
Passenger	3
RoRo cargo vessel	3
Supply ship	3
Tug/supply ship	3
Vehicles carrier	3
Livestock carrier	2
Aggregate carrier	1
Barge carrier	1
Cable layer	1
Crane pontoon	1
Destroyer	1
Drilling ship	1
Hopper/dredges	1
Processing tanker	1
Refrigerated cargo vessel	1
Utility vessel	1
Total	476

from restriction generally disappear. To the extent they would continue to exist, these rights would depend on the good graces of the coastal states bordering the straits in question. Such a result would be unacceptable to any country with global interests, a global foreign policy, a large merchant marine and a large navy and airforce (Leifer, 1984; see also Hamzah, 1995)

With the end of the cold war, the focus of user States' concerns have shifted from one which is military in nature to one which is related to the creation of a global economy.

The economic importance of the Straits of Malacca has not diminished over time. This is reflected in the higher tonnage carried through in the Straits. Some 283,123,559 tons of oil were transported from the Middle East and Africa through the Straits for the first nine months of last year. The total movement of tankers through the Straits during that period involved 2,441 voyages more than 60% above 200,000 dwt. The economic value of the Straits of Malacca to its users should not be understated for the following reasons:

- a) The Straits is the shortest route from the Indian Ocean to the China Sea. Very large crude carriers (VLCCs), en route from the Persian Gulf to Japan, would save approximately 1,000 miles or 3 days sailing time using the Straits of Malacca as opposed to the Lombok Straits; and
- b) VLCCs traveling from South Africa using the Straits of Malacca would save 200 miles using the Straits of Malacca compared to the Sunda Straits (Raja Malik, 1996). By using the Straits of Malacca, for example, the Japanese petroleum industry saves up to US\$340 million annually.²

Added to that, there is now a greater concern for the protection of the seas and all of its riches. The concern manifested in the 1982 United Nations Convention on the Law of the Sea (UNCLOS) was further reiterated at the 1992 United Nations Conference on Environment and Development (UNCED), resulting in an agreement to protect oceans, all seas, including semi-enclosed seas, coastal areas, and associated living resources as embodied in the Chapter 17 of Agenda 21.

Needs and Interests of Littoral States

As far as economic and security matters are concerned, the needs and interests of coastal States over the Straits of Malacca are relatively similar to that of the user countries. As owners of the Straits, the littoral States' interests are more broad-based and more prominent. Because of this, they have more stakes than other users. Should anything untoward happen in the Straits, for example, other users can by-pass it, albeit at a cost. On the other hand, the Strait States have no other option. They have to live with it. If anything, the Malacca Straits has become the lifeline in the economy of the littoral States (especially that of Malaysia and Singapore), and as such it is in their best

² Raja Malik (1996) noted that monetary gain is not the only reason for vessels using the Straits of Malacca. Singapore provides excellent support facilities for vessels as well as cheap bunker. Vessels will also benefit from travelling through the Straits of Malacca which has been better surveyed, outfitted with reliable navigational aid and well policed. See also Morisugi et al. (1992).

interest to ensure that the Straits of Malacca remains open at all times.

However, unlike the user States, the needs and interests of the Strait States in the Straits of Malacca extend beyond economics and security. As their lifeline, the Straits plays an important role in the socioeconomic fabric of local communities whose livelihood is closely tied to the Straits. There are, for example, 139 fishing villages along the West Coast of Peninsular Malaysia, and the Malacca Straits fisheries directly support 30,744 fishermen or nearly 70% of all Peninsular Malaysia fishermen. Total marine fish landings from the Malaysian side of the Straits of Malacca in 1994 amounted to 460,302 metric tons (valued at RM1.1 billion) as opposed to only 280,605 metric tons of marine fish landed on the East Coast of Peninsular Malaysia. Besides a large marine fishery sector, the Straits also hosts numerous aquaculture and mariculture ventures which include fish cages as well as cockle, mussel, and oyster beds. In 1994, the value of aquaculture and mariculture products from the Straits of Malacca area amounted to RM214.4 million. As such, the Malaysian fisheries sector may lose up to RM1.2 billion should a major pollution incident occur in the Straits of Malacca, not to mention the social costs to fishing communities.

Apart from being the main source of fish of the Peninsular Malaysian population, the Straits of Malacca is also known for its tourism attractions. Tourism centers dot the length of the Straits, from Langkawi at the northern entry to the Straits of Malacca in the south. An oil spill can have disastrous effects on the tourism industry. The tourism industry of Langkawi, for example, was affected by the spills from the Nagasaki Spirit incident.

The sentiment of the littoral States (Malaysia in particular) is best summarized by a speech delivered by the then Attorney General Tan Sri Abdul Kadir Yusof before the United Nations, who emphasized environmental considerations as the main reason for Malaysia's concern over international traffic in the Straits of Malacca:

"... one of our fears is a very real and urgent one. It is the fear of damage to the marine environment caused by pollution and accident. This fear is accentuated by the fact that the Strait of Malacca is shallow and virtually a closed sea that is heavily used by commercial shipping. Need I explain that simply by the daily use of the Straits, damage is already being caused to our marine environment? One shudders to think of a major oil spill occurring in the Straits. Who bears the cost for such damage?" (Leifer, 1978).

Common Areas for Cooperation and Assistance

The concerns of both the littoral States and the international community are real and have been continuously articulated in the media and in international fora. At the same time, both parties have also been active in promoting navigational safety and environmental management in the Straits of Malacca and, to a limited extent, some assistance has been received from user States (most notably Japan). Nonetheless, there are still many areas for more cooperation between the littoral States and those who use the Straits of Malacca. The opportunities for the international community to assist in the safekeeping of the Straits of Malacca are always present. The discussions above

have pointed to two important areas where cooperative effort could be established, and assistance can be provided by the international community to littoral States. They are: (a) navigational safety aspects; and (b) marine environmental management.

Improving Navigational Safety in the Straits of Malacca

The present navigation regime in the Straits of Malacca consists primarily of the traffic separation schemes (TSSs) off the One Fathom Bank and Tanjung Piai (at the entrance of the Strait of Singapore).³ Outside of these areas, vessels are permitted to draw their own course. This, including the present and expected congestion, as well as natural limitations,⁴ makes navigation in the Straits difficult at the best of times (Raja Malik, 1996). From 1978 to 1994, a total of 476 casualties were reported in the Straits of Malacca (Table 2) involving all types of vessels, with an average of 30 casualties per year or more than twice a month (Lloyd's Maritime Information Services, 1994). These casualties include more than 50 incidents resulting in oil spills (Table 3). To date, the total costs to Malaysia in cleaning up these spills have added up to more than RM7.7 million.

The prospect of any maritime casualty occurring in the Straits of Malacca causes great consternation and anxiety to littoral States. In order to minimize accidents, the Strait States have invested in various

precautionary measures including providing aids to navigation. Malaysia, for example, has invested a total of RM52 million to install 256 navigational aids in the Straits including lightbuoys, beacons and others.⁵ This excludes the cost for putting a vessel traffic management system (VTMS) which is estimated to cost more than RM100 million when completed. Recurrent costs such as maintenance and operational costs are normally included within the annual operational budgets of the numerous agencies involved in the Straits of Malacca (e.g., the Marine Department of Peninsular Malaysia, the Marine Police, the Light Dues Board, the Royal Malaysian Navy, Port Authorities, etc.), and the cumulative figure including replacement cost may be higher than the "once-off" costs of acquiring and installing these aids to navigation in the first place.

There are opportunities for States to cooperate in improving navigational safety—a fact well recognized within Article 43 of the United Nations Convention on the Law of the Sea (UNCLOS). The framework for cooperation is also established under this Article which reads:

"User States and States bordering a strait should by agreement cooperate: (a) in the establishment and maintenance of necessary navigational and safety aids or other improvements in aid of international navigation and (b) for the prevention, reduction and control of pollution from ships."

³ A decision has been reached at IMO in 1996 to connect the two TSSs.

⁴ These limitations include natural limitations, such as narrow channels, strong tidal streams, shifting sandwaves, underkeel clearance, poor visibility during frequent rain squalls and haze, and other hazards to navigation such as crossing traffic, presence of wrecks and obstructions, and presence of fishing vessels and accouterments.

⁵ Some of the others costs incurred by Malaysia include the cost of hydrographic surveys and communications costs. In a study conducted by MIMA, the total cost to Malaysia is estimated at RM100 million a year with an annual operating cost of approximately RM25 million. Income from light dues as demonstrated fails to cover the cost incurred.

And, no doubt the need for cooperation is well recognized by members of the user community. Japan, for example, has continuously contributed to improving navigational safety in the Straits of Malacca. Total Japanese contribution to the littoral States from 1963 to 1993 amounted to ¥1.424 billion for the survey of the Straits of Malacca and ¥400 million to the Strait of Malacca Revolving Fund (see Table 4).⁶ The question then is not so much of convincing user States of the value of cooperation in the Straits of Malacca. Rather, it is more of finding an acceptable, non-discriminatory funding mechanism for establishing a cooperative arrangement.

Protection of the Marine Environment of the Straits of Malacca and Adjoining Coastal Areas

Chapter 17 of Agenda 21 outlines a number of program areas which are of relevance to protecting the marine environment in the Straits of Malacca. These areas are: (a) integrated management and sustainable use of coastal and marine areas, including exclusive economic zones; (b) marine environmental protection from land-based activities and sea-based activities (including those from shipping, ports, dumping, and offshore oil and gas platforms); and (c) sustainable use and conservation of marine living resources under national jurisdiction.

Underlying each of these program areas are important foundations which are necessary for achieving the objectives of Chapter 17, such as international and regional cooperation and coordination and the provision of "new and additional"

funding. It is estimated at the United Nations Conference on Environment and Development (UNCED) that, globally, the three program areas of Chapter 17 would require an additional US\$310 million from the international community (including US\$200 million for the prevention of marine pollution from land-based and sea-based sources) as grants or on concessional basis.

Apart from managing pollution from land-based sources, the primary source of pollution in the Straits, marine environmental management in the Straits of Malacca consists of the following elements: (a) maintaining a high degree of preparedness to counter or combat actual or potential oil spills; (b) sustained programming of activities to minimize and prevent pollution from human activities on land; (c) continued surveillance, monitoring, and enforcement of regulations for the control of vessel-based pollution (Baziron, 1995); and (d) damage repair and compensation cost.

To accomplish all of the above requires an adequate budget. international funding (almost exclusively from Japanese sources) has been received only for oil spill preparedness and response activities. The Petroleum Association of Japan has provided over US\$10 million for establishing the Oil Spill Prevention and Response (OSPAR) Project for ASEAN, of which about US\$2 million was allocated to Malaysia (Razif, 1995).

The subject of additional international funding for environmental protection is contentious, to say the least, and remains unresolved a few years after UNCED.

⁶ While the contribution from Japan should not go unnoticed, the total contributions are considered minimal compared to the US\$340 million and the slightly less than US\$1 billion savings made by the Japanese petroleum industry and her bulk trade, respectively (see Morisugi et al., 1992).

Table 3. Oil spill incidents in the Straits of Malacca, 1975 to 1994

No.	Date	Location	Causal	Vessel	Quantity	Clean up Cost (RM)
1	1975	Buffalo Bank	Accident	MV Showa Maru	7,700 tons	1,250,000.00
2	24 Jul 76	102° 56' 01° 32' N	Accident	MV Diego Silang	5,500 tons	2,661,639.00
3	16 May 77	Tanjung King	Pipeline rupture	MV Asian Guardian	60 tons	22,676.00
4	13 Oct 78	102° 09' 02° 13'	Oily water discharge	MV Putra Satria	5-10 gal	120.00
5	20 Jan 80	Port Klang Authority, Wharf 2	Pipe leaking	Tomahine Maru	2-3 drums	0.00
6	20 Sept 81	Port Dickson, Shell Refinery	Valve leaking	MT Ocean Treasure	1,037 mt	0.00
7	21 Oct 81	Port Klang Authority, South Port Wharf 1	Wrong open valve	MV Petro Mewah	200 gal	0.00
8	22 Apr 82	Malacca Port	Operational discharge	MV King Bird	Unknown	0.00
9	20 Dec 82	Tanjung Piai to Tanjung Bin	Indiscriminate dumping	Unknown	Unknown	0.00
10	29 May 84	Port Klang Authority	Leaking	Dumb Barge SLC 144 C	400 bbls or 1,350 gal	0.00
11	02 Jan 86	Pulau Jerejak (East)	Unknown	None	A few oil patches	0.00
12	23 Jun 86	Port Klang Authority, Wharf 2	Shore line hose break	Tomoe	1 ton	0.00
13	01 Jul 86	Terendak (3-4 miles away), Malacca	Unknown	None	None	0.00
14	09 Jul 86	1° 42' 3 N, 102° 45.5' E	Collision	Bright Duke and Pantas	Unknown	0.00
15	26 Jul 86	Penang, Esso Depot	Pipe leaking	None	Less than 2 barrels	0.00
16	08 Aug 86	Telok Intan, Shell Installation	Pipe leaking	None	None	0.00
17	29 Dec 86	Pulau Sembilan	Tank leaking	Sarina	None	0.00
18	11 Jun 87	Gelang Patah	Spillage on cleaning	MT Angel	None	31,880.00
19	22 Jul 87	Helen Mar Reef (Indonesian waters)	Aground	MT El-Hani	None	14,137.00
20	18 Nov 87	Kuala Sungai Baru Beach, Melaka, (10 miles away)	Oil mixed from vessel	Anti Taras	200 tons	0.00
21	17 Dec 87	Port Dickson, Esso Jelly	None	Hasnah 10	None	0.00
22	14 Jan 88	Pulau Pinang Port Authority	Unknown	None	200 sq ft	0.00
23	18 Jan 88	Tanjung Piai	Tanker cleaning	Tongkang Eastern Bright	None	36,702.00
24	25 Jan 88	Kuala Selangor (nearby)	Unknown	None	None	0.00
25	23 Mar 88	Port Klang Authority, Esso Chemical Plant	Unknown	None	None	0.00
26	16 Mar 88	Straits of Malacca	Unknown	MV Ninika	None	5,365.00
27	06 Jun 88	Straits of Malacca	Unknown	None	None	0.00
28	03 Aug 88	Port Klang Authority, Wharf 8	Unknown	None	None	0.00
29	10 Nov 88	Langkawi, Kedah Cement	Leaking	None	None	0.00
30	11 Jul 89	Port Dickson, Shell Refinery	Unknown	None	Half drum	0.00
31	15 Oct 89	Port Dickson, Esso Refinery	Overflow during transfer	Petro Visa	80 liters	0.00
32	18 Oct 89	Port Dickson, Shell Refinery	Pipe leaking	None	18 gal	0.00

continued...

Table 3. (continued...)

No.	Date	Location	Causal	Vessel	Quantity	Clean up Cost (RM)
33	04 Dec 89	Port Dickson, Shel Refinery	Overflow		200 tons	0.00
34	06 Dec 89	Langkawi, Kuah	Ballast tank	Soon Hock II		0.00
35	16 Aug 90	Johor (South West)	Tanker cleaning	MT Happy Giant	4,000 mt	
36	25 Sep 90	Pulau Pinang near LLN Station				0.00
37	14 Jan 91	Port Klang Authority, near Kapar Power Generator	Unknown			0.00
38	05 Sep 91	Lat: 47.5' Long: 100 22.4' E	Spillage	MV Sea Glory		0.00
39	26 Oct 91	Off Pengerang	Tanker cleaning	MV Al Nisr Al Arabi	300 mt	0.00
40	25 Sep 92	12 nm from Tanjung Tojor, 01TOT	Unknown	Safarina Enajam	Unknown	0.00
41	20 Jun 92	Tiram Kimia Depot, Port Klang	Vessel exploded	Chong Hong III	Unknown	0.00
42	20 Aug 92	Pulau Undan, 02T 06' 00N	Unknown	None	None	0.00
43	23 Aug 92	Nearby Port Dickson	Collision	MV Royal Pacific vs. Tersh 51	Unknown	0.00
44	20 Sep 92	31 nm East of Ujung Temiang	Collision	Nagasaki Spirit vs. Ocean Blessing	13,000 tons	3,690,093.00
45	11 Jan 93	Off Tanjung Piai at Pulau Karimum	Tanker cleaning	Sanadaj II	4,000 mt	
46	28 May 93	Main entrance South Port (Port Klang)	Collision	MT Gloria	1 tons	0.00
47	16 Jun 93	Port Dickson, Esso Refinery	Overflow during transfer			0.00
48	29 Jun 93	Tanjung Kling, Malacca	Unknown			0.00
49	29 Jun 93	3 nm South of Tg. Sepal, 02d 37' 00"N	Unknown			0.00
50	29 Jun 93	Port Dickson/Pulau Arang	Oily water discharge	Budi Salu Port Klang		0.00
51	06 Jul 93	1 km from Pulau Jarak	Unknown			0.00
52	27 Jul 93	Port Dickson, Esso Refinery	Gasoline leaked out of the vent		5 liters	0.00
53	20 Aug 93	South Basin (Penang Port)	Oily water discharge	Ocean (Taiwan Fisheries Boat)	Unknown	0.00
54	30 Aug 93	1 53' N, 102 27' 30" E to 2 07' N, 102 12' 30" E	Unknown		Unknown	0.00
55	03 May 94	27 nm from P. Kendi (05 05' 00"N, 99' 44' 00" E)	Indiscriminate dumping	Unknown	Unknown	0.00
56	09 May 94	8 nm from P. Kukup	Collision	MT Ming Wisdom vs. MT Damansara	265.80 ml. Jet oil	
57	19 May 94	23 10' 00" N, 101 48' 00" E	Oily water discharge	MT Petro Vista	Unknown	0.00
58	20 Sep 94	(03 49.9' N, 100' 22 1 E)	Indiscriminate dumping	Power Venture I	Unknown	0.00
			TOTAL			7,712,612

Source: Adapted from the Department of Environment (undated)

Moreover, given global economic trends, it would not be unreasonable to assume that less foreign aid will be available for the protection of the marine environment in the Straits of Malacca.

Who Pays ...

Given the funding scenario described above, where, apart from Japan, no other user State has contributed to navigational safety in the Straits of Malacca, and where there is now less prospect for overseas development aid for environmental protection, what then are the options for the Strait States in financing navigational safety and environmental management in the Straits of Malacca? Again, while the question of environmental management is closely linked to the question of navigational safety, it would be

expedient to examine the two separately.

User Pays

For a community which is looking for options of sharing the burden of ensuring that the Straits of Malacca is safe for navigation, making the users of the Straits pay for its upkeep is indeed an attractive option, albeit not a new one.⁷ Whenever vessels transiting the Straits of Malacca call at ports in Malaysia, Singapore or Indonesia, port charges (inclusive of light dues and other navigational services) are levied on them. From 1984 to 1993, the Light Dues Board of Malaysia collected a total of RM75 million in light dues. However, the contention is how to make transiting vessels who use the services in the Straits pay. In addition, the other concern is whether the

Table 4. Japanese Contribution to Navigational Safety and Prevention of Pollution in the Strait of Malacca

Project	Fiscal	Year Amount (million yen)
Hydrographic survey	68-78	
Production of common datum charts	76-82	359
Tidal and current studies	76-79	646
Removal of shipwreck	72-78	1,435
Dredging works in the Straits of Singapore	79	1,001
Installation of aids to navigation	68-93	2,166
Cooperation in the maintenance of aids to navigation	70-93	1,358
Donation of buoy tender to the Government of Malaysia	75-76	52
OSPAR Cooperation	90-93	210
Donation of oil skimming vessel to the Government of Singapore	73	502
Donation of revolving fund	80	400
Other international cooperation by Malacca Strait Council	68-93	420
Total		9,973

Comments: This does not include the running costs of Malacca Strait Council and the personal expenses officials involved in the project. At the present exchange rate the amount is equivalent to US\$92.8 million.

Source: Mr. Akio Ono, Ministry of Transport, Japan

⁷ For four centuries before 1857, Denmark used to collect transit dues (known as sound dues) on ships transiting through the Danish Straits. This practice was discontinued on 14 March 1857 (see Scovazzi, T. Forms of cooperation between bordering States and User States. In B.A. Hamzah (ed.) *The Straits of Malacca*. Kuala Lumpur, forthcoming).

dues collected from vessels calling at ports are sufficient to support the costs of operating and maintaining navigational aids in the Straits of Malacca. It is widely accepted that, in Malaysia at least, light dues collections are never enough. The method of collecting light dues needs to be revised to facilitate greater revenues. There are existing examples where reform of light dues collection machinery has resulted in greater revenues:

- a) In the United Kingdom, the 1993 reforms of the light dues capture mechanism resulted in a revenue collection of £26.5 million. The reforms included the privatization of light dues collection from the HM Customs and Excise to the Institute of Chartered Shipbrokers. At the same time, a flexible method of calculating light dues was put into place, taking into account pre-decided costs of providing navigational aids and making special exemptions to frequent users.
- b) Alternatively, a regional arrangement along the lines of the Middle East Navigation Aids Service (MENAS) could be established, provided there is an agreement among all three littoral States over the method of dues collection and disbursement (Marlow, 1995). Under MENAS, all vessels entering the Gulf area and permanently based and engaged in trade within the Gulf Area are liable for payment of MENAS Navigation Aids Dues.

However, the issue of establishing a burden-sharing mechanism in the Straits of Malacca should not be confined to those who pay light dues. Instead, it should address the majority (over 70% of

tankers) of the vessels which transit the Straits of Malacca and benefit from the services in the Straits, yet do not pay any dues. The question should also be examined within the context of the principle agreed at UNCED that States have common but differentiated responsibilities for sustainable development. Before any form of burden-sharing arrangement is established in the Straits of Malacca, all the beneficiaries of the Straits of Malacca should first be consulted, so that such a regime when in place does not appear to discriminate any one and is consistent with international practice.

A cursory examination of users of the Straits of Malacca would show that these include private entities like shipping companies, cargo owners, insurance brokers, salvage operators, as well as other stakeholders, coastal communities, and nation states. Such a broad categorization does not lend itself to the notion of apportioning responsibilities.

Nonetheless, Marlow (1995) suggested that a cost-benefit analysis (CBA) could be a starting point in identifying all concerned parties. The CBA can be carried out based on a number of general principles:

- a) Identification of all relevant communities, i.e., beneficiaries and stakeholders;
- b) Grouping of costs and benefits;
- c) Valuation of costs and benefits;
- d) Calculation of an appropriate rate of discount; and
- e) Identification of relevant limitations.

Such an analysis, however, is constrained by a number of externalities

associated with intangible services provided in the Straits of Malacca, such as environmental services, aesthetic qualities and certain social benefits. Marlow (1995) also stressed that the results of such a CBA would probably be imprecise but would still be useful for the purpose of comparing the value of costs and the value of benefits.

In examining the application of user pays policies in the Straits of Malacca, it is also necessary to analyze the willingness to pay among users concerned. Insofar as the international shipping community is concerned, there is no shortage of willingness to support efforts to enhance navigational safety in the Straits of Malacca. This is illustrated by the 1993 draft statement of the Oil Companies International Maritime Forum to the International Maritime Organization (IMO) calling for the separation of traffic in difficult parts of the Straits, as well as an extension of the existing traffic separation scheme (TSS). At the same time, the offer of cooperation is not without conditions (e.g., the Tanker Owner's Federation, INTERTANKO, indicated that the willingness to pay higher dues should be reciprocated by the littoral States through the revision of rates and the promise that littoral States will not discriminate against its members) (Marlow, 1995).

The above points serve only to highlight the well-known pitfall in any effort to apply user pays policies; the maxim of "user pays, user says" still applies. Here, the littoral States have to decide the extent that they would allow their already limited control over the Straits of Malacca to be taken over by or shared with members of the international community. In working out a fine balance between the controlling interest

of the Strait States and other users, the interests of the former as owner of the Straits must remain paramount or dominant.

For What?

The 'wish-list' of activities which need to be carried out to improve navigational safety and protect the marine environment in the Straits of Malacca is an extensive one. It ranges from updating charts and carrying out hydrographic surveys to establishing an environmental monitoring system for the Straits of Malacca (for a sample 'wish-list', see *Table 5*). Not all of the activities on the 'wish-list' will receive financing from external sources and littoral States may have to continue funding many of these activities. However, the situation should not develop into a 'subsidy' from the littoral States to the international community. Nor should the situation encourage a free-ride syndrome. Therefore, the littoral States should decide on a priority list of projects which require urgent funding, and those which can be carried out on a regional basis (thus facilitating a cost-sharing arrangement).

The littoral States should send a clear message calling for international cooperation in the Straits of Malacca. This will emphasize the need for international measures to implement generally acceptable principles in environmental management (e.g., the precautionary principle which so far has only been translated into the placement of oil spill control equipment and navigational aids along the Straits of Malacca). The scope for application of the precautionary principle, however, is much wider, encompassing matters such as data collection and analysis, and risk assessment studies. The wide range of activities to be

Table 5. Possible projects in the Straits of Malacca requiring external funding

a) Environment and Pollution Projects

- water quality monitoring;
- effective oil pollution preparedness and strategies for Malacca Straits;
- assets building and deployment;
- capacity building inclusive of training and technical knowhow;
- oil spill trajectory modelling;
- finger printing of oil and sludge;
- ship-based pollution sewerage study;
- reception facilities for fishing vessels, oil, and garbage;
- a study on marine pollution risks in the Malacca Straits;
- research and production of maps on protected areas in the Straits;
- maps of marine parks and resources (e.g., fishing grounds) in the Straits vulnerable to oil spills;
- develop a database on physical, biological, and economic resources in the Malacca Strait. The purpose of this project is to produce database on oil pollution risk in the Malacca Straits; and
- develop a regional marine pollution, surveillance, and information management system.

Any project scheme that will enhance national and regional oil spill prevention and response (OSPAR) capability.

b) Navigational Safety

- navigational aids;
- updating of charts and hydrographic surveys;
- currents and tidal study;
- surveillance project;
- search and rescue (SAR) including global maritime distress and safety system;
- vessel traffic management schemes: radars, command, and control equipment;
- wreck removal; and
- Straits of Malacca navigational information system, alternative route study e.g., landbridge concept.

funded in the Straits of Malacca to make it safe for navigation would naturally require a substantial amount of funds, and preferably should come from the relevant stakeholders or beneficiaries. However, one of the main questions to be resolved is how to collect and disburse funds for use in the Straits of Malacca.

And How?

There are a number of options available to Strait States should they decide to request greater participation of members of the international community in the safekeeping of the Straits of Malacca. Before discussing these principles, it is important to underline several prerequisites which preferably have to be put in place before such an activity can be undertaken:

- a) There has to be an agreement among the littoral States as to the mechanism for collecting and disbursing the funds collected for services rendered. There are foreseeable problems in getting an agreement from littoral States on the collection of new funds as the process may not be easily reconcilable with the economic aims or policies of one or more of the littoral States. The failure to get a consensus may lead to unilateral actions on the part of some;
- b) There has to be a commitment among littoral States to maintain and, where needed, improve on the quality and quantity of navigational aids in the Straits of Malacca. It is important to note that over 200 miles of the main navigational channel in the Straits of Malacca passes through the 12-mile territorial sea of Malaysia;

- c) The funds to be collected (from users) or to be made available (by donor countries and agencies) for upkeeping navigational safety and the maritime environment management in the Straits of Malacca should be "above-and-beyond" what is already being collected or donated for such activities in the Straits of Malacca. This will ensure that new funds are available to undertake projects which would facilitate the implementation of the precautionary protective principle in international law;
 - d) The International Maritime Organization (IMO) and some other relevant competent organizations would have to be consulted on any initiative to introduce charges for services in the Straits of Malacca. In this regard, the process of obtaining IMO's support and support from other agencies is perhaps as important as the actual support itself. As such, the process would involve extensive consultation with all parties concerned and can be used to gauge the willingness to pay among users;
 - e) In establishing such a mechanism, it is important that the littoral States base their revenue collection system on a 'cost-recovery' basis or an equitable compensatory mechanism as well as on an insurance policy. Littoral States should not be making or even be seen to be making profits out of international navigation in the Straits of Malacca;
 - f) The charges should be consistent with international practice and should be applied on a non-discriminatory mode; and
 - g) Extensive consultation with the stakeholders should be held, including the process of hearing out their views. Without their support, it may not possible to put the funding system into effect.
- Once these prerequisites are in place, littoral States can then proceed to examine a number of options available to them for the purpose of recovering the costs of providing services to the users of the Straits of Malacca and an insurance policy in the event of some mishaps.
- One of the options for doing this is to establish separate funds to support the two main areas for cooperation in the Straits of Malacca, namely safety of navigation and environmental management. The most obvious advantage to such an arrangement is that it will establish the capacity to fund a wider range of activities not presently covered by existing schemes, such as the Strait of Malacca Revolving Fund and the liability conventions subscribed to by users of the Straits. One important advantage of such an arrangement is that it will expedite precautionary measures aimed at preventing pollution in the Straits of Malacca while ensuring that funds continue to be made available for improving navigational safety. In addition, different user parties can be requested to subscribe to the fund which is most appropriate to them, e.g., the private sector (through service charges) and countries which benefit most from international navigation in the Straits of Malacca can contribute to the navigational safety fund, while other interested parties can contribute to the environmental protection fund.

The other option is to expand the scope of the existing Strait of Malacca Revolving Fund to include some of the activities mentioned above. This will no doubt require some modifications to the operations of the Revolving Fund. These modifications would include the establishment of a permanent secretariat or office for the Revolving Fund to administer the moneys collected. In turn, this will improve the mechanism for replenishing the Revolving Fund after funds are disbursed, thereby broadening the scope for using the fund, e.g., to include non-oil spill cleanup activities, and accommodating new donors to the Revolving Fund.

Most importantly, in order to finance the activities mentioned, more capital needs to be deposited with the Revolving Fund. An arbitrary figure of US\$25 million has been mentioned as a possible start-up fund for an expanded Strait of Malacca Revolving Fund (Hamzah, 1995a, 1995b).⁸

Any proposal for an equitable funding regime in the Straits of Malacca could also consider some of the ideas, concepts, and recommendations made in the Report of Lord Donaldson's Inquiry into the Prevention of Pollution from Merchant Shipping, entitled "Safer Ships and Cleaner Seas" (bearing in mind the questions associated with the status of the Straits of Malacca as a strait used for international navigation). The report which was prepared after the Braer Incident in 1993 examines many of the questions related to pollution prevention at sea, and discussed at great length the

question of who should pay for pollution prevention and navigational safety. The Report espouses the "polluter pays" and "user pays" principles and introduces new ideas, such as making potential polluters pay for costs not covered under existing compensatory regimes such as the IOPC Fund. At the same time, the Report also recommends the establishment of a 'counter-pollution fund' to cover activities such as an emergency towing facility and establishment of counter pollution capacity and purchase of cleanup equipment. The Report, however, recognizes that there will be objections to and difficulties in establishing new funds.

A Cooperative Arrangement for Environmental Management

The question of funding environmental management efforts in the Straits of Malacca is not as contentious as that of making users pay for navigating the Straits. In fact, the Straits of Malacca has benefited significantly from environmental research efforts conducted through bilateral or multilateral cooperative arrangements. These cooperative efforts include the ASEAN-Australia Project on Living Coastal Resources and the ASEAN-Canada Project on Prevention of Pollution.⁹ The major difference between the management of navigational safety in the Straits of Malacca and that of environmental management is perhaps the former requires a more intensive consultative process involving external parties, e.g., the international shipping community, with strong economic and bargaining powers, as opposed to the latter which involves

⁸ Under the Oil Pollution Act 1990 (OPA 90), the United States has established a USD 1 billion Oil Liability Trust Fund for the purpose of paying for oil spill cleanup activities.

⁹ The activities in the Straits of Malacca are carried out as parts of bigger regional cooperative programmes, and to date there is no specific programs or project for the Straits of Malacca.

primarily domestic stakeholders, e.g., the local communities. This factor has in many ways influenced the nature upon which environmental management or improvement projects are negotiated, designed, and implemented.

A 'Trust Fund'¹⁰ could be established to fund environmental management projects or safety activities in the Straits of Malacca. Contributions to the Fund should be on a voluntary basis, which could be accepted from both government, as well as members of the private sector.

Conclusions—Framework for Improving Navigational Safety in the Straits of Malacca

It is clear that establishing a cooperative arrangement in enhancing navigational safety in the Straits of Malacca requires a more complex framework or arrangement compared to environmental improvement or management projects. Most importantly, any effort towards it would need the consent and cooperation of the Strait States and other stakeholders or beneficiaries, as well as the blessing of relevant international organizations such as IMO.

Secondly, the agreement of major economic beneficiaries of international navigation in the Straits of Malacca, i.e. the shipping community, cargo owners and user States, needs to be secured before any new financial initiative is to be introduced. Once an agreement is obtained, fundamental questions as to how new funds are to be collected, managed, and disbursed need to be resolved. There are many options

and examples for doing this. One relevant example is the existing Strait of Malacca Revolving Fund established by the Japanese Government in 1981 through the Malacca Strait Council for oil spill control purposes. Similar funds can be created for managing moneys or dues collected for the purposes of improving navigational safety and conducting subsequent upgrading of navigational aids in the Straits of Malacca. Alternatively, the role of the Revolving Fund and its Governing Council could be expanded to undertake activities to deal with other concerns as well. Trust Fund mechanisms can also be introduced.

Fundamentally, the question of fund collection (whether in the form of revised or increased light dues or port charges, expansion of the Strait of Malacca Revolving Fund, or establishment of new funds) should not be seen as the "be-all and end-all" of the effort to improve navigational safety in the Straits of Malacca. The financing portion of navigational safety should be looked at within the context of the existing global framework of managing navigation, environmental management, global economics, a compensatory regime and an insurance policy mechanism. These are the elements which are crucial in determining the most important component of any financing initiative. It should further be reflective of the willingness to pay, and should be underpinned by generally accepted principles in environmental management such as the user pays principle, the polluter pays principle, and the precautionary principle or protective principles in international law.

¹⁰ "Many international organizations like IMO, FAO, IOC and UNEP (to name some) have their own Trust Fund (Lennox Hinds Unpublished Paper)

References

- Akio, O. 1995. Japan's contribution to the safety of navigation and pollution mitigation efforts in the Straits of Malacca and Singapore. Paper presented at the Workshop on the Strait of Malacca, Maritime Institute of Malaysia (MIMA), 24-25 January 1995, Kuala Lumpur, Malaysia.
- Basiron, M.N. 1995. Managing marine pollution in the Straits of Malacca. Tropical Asia Newsletter, CRMP, Colombo.
- Department of Environment. 1995. Environmental quality report, 1994. Department of Environment, Kuala Lumpur, Malaysia.
- Department of Fisheries. 1995. Fisheries annual statistics, 1994. Department of Fisheries, Kuala Lumpur, Malaysia.
- Hamzah, B.A., Editor. 1995a. Managing the Straits of Malacca. Maritime Institute of Malaysia (MIMA), Kuala Lumpur.
- Hamzah, B.A. 1995b. Navigational safety and environmental protection in the Straits of Malacca: the need for global funding. Paper presented at the Law of the Sea Institute Meeting on Sustainable Development and Preservation of the Oceans: the Challenges of UNCLOS and Agenda 21, 18-23 June 1995, Bali, Indonesia.
- Kenny, J.H. 1996. An analysis of possible threats to shipping in key Southeast Asian sea lanes. Center for Naval Analyses Occasional Paper, Center for Naval Analyses, Alexandria.
- Leifer, M. 1984. International Straits of the world: Malacca, Singapore and Indonesia. Sijthoff and Noordhoff, Alphen van den Rijn.
- Lloyd's Maritime Information Services. 1994. APEX database on maritime casualties. LMS, London.
- Marlow, P.B. 1995. Financing Straits management. Paper presented at the Workshop on the Straits of Malacca, 24-25 January 1995, Maritime Institute of Malaysia (MIMA), Kuala Lumpur, Malaysia.
- Martosubroto and Naamin. 1984. 1988. Fisheries of the Malacca Strait with special reference to the environment, p. 225-237. In P.R. Burbridge, Roesoebiono, H. Dirschl and B. Patton (eds.) Proceedings of the Symposium on Environmental Research and Coastal Zone Management in the Strait of Malacca, 11-13 November 1985, Medan, Indonesia.
- Morisugi, H., J.B. Marsh and N. Miyatake. 1992. Economic value of the Malacca Strait. In J.B. Marsh (ed.) Resources and environment in Asia's marine sector. Taylor and Francis. New York.
- Naidu, G. 1993. Economic overview and the future of the Malacca Strait as a commercial waterway. Paper presented at the National Conference on the Strait of Malacca, 11 November 1993, Maritime Institute of Malaysia (MIMA), Kuala Lumpur, Malaysia.
- Raja Malik, K. 1996. Navigational safety in the Strait of Malacca. Paper presented at the Conference on Navigational Safety and Control of Pollution in the Straits of Malacca and Singapore, 2-3 September 1996, Institute for Policy Studies and the International Maritime Organization, Singapore.
- Razif, A. 1995. Funding the Strait of Malacca: the Japanese contribution. Paper presented at the Workshop on the Strait of Malacca, 24 - 25 January 1995, Maritime Institute of Malaysia (MIMA), Kuala Lumpur, Malaysia.
- Ridzwan, A.R., M.I.H. Mohamed and F. Abdullah. 1994. Impact of development on Pulau Layang-Layang Coral Reefs. Paper presented at the ASEAN-Australia Third Symposium on Living Resources, 16-20 May 1994, Chulalongkorn University, Bangkok.
- Safer Ships, Cleaner Seas. 1994. Report of the Lord Donaldson's Inquiry into the Prevention of Pollution from Merchant Shipping. Her Majesty's Stationary Office, London.

BANKING ON COMMUNITY CAPABILITIES FOR A BETTER ENVIRONMENT: A WISE INVESTMENT?

Donna Z. Gasgonia

Executive Director

Foundation for the Philippine Environment

77 Matahimik Street

Teachers' Village, Quezon City

Philippines

GASGONIA, D.Z. 1997. Banking on community capabilities for a better environment: a wise investment?, p. 104-107. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**, MPP-EAS Conference Proceedings No. 6, 352 p.

Banking on Community Capabilities for a Better Environment

There have been international pronouncements about the need to recognize the significant role of local communities in protecting, conserving, and developing the environment. Local policies, laws, and regulations emphasize community participation in every aspect of project and program development from planning and implementation to monitoring and evaluation. Documents related to the Regional Programme for Marine Pollution Prevention and Management in the East Asian Seas are no exception. The Programme strategies include the promotion of public awareness on and participation in the abatement of marine pollution. The strategies for capacity building in the participating countries stress the need to develop the necessary facilities to undertake marine pollution prevention and management activities, especially at the local level. The network of local governments for integrated coastal management (ICM) demonstration sites ensures political commitments at a level of regular interaction with communities. These reflect the Programme's recognition of the significant role of local communities in marine pollution prevention and management.

The 1994-1995 Bi-Annual Report of the Programme Development and Management Office noted that: *"the perception of most policy makers and environmental managers is that prevention and mitigation of marine pollution problems is a costly exercise requiring considerable investment from the public purse."* This is especially true if communities are not considered partners by the government but mere implementors of packaged projects.

The Programme seeks to change the general perception of the public and industry that marine pollution management is the sole responsibility of government. To do this, it identified these strategies:

- a) There is a need to have strong political commitment and public understanding of the gravity of the problems which threaten sustainable development;
- b) The role of addressing marine pollution problems need not necessarily be the full responsibility of the government; this role should be shared with industry and other stakeholders;
- c) Pollution prevention and management constitute a

substantial percentage of the growing environment industry; it should be promoted as an investment opportunity for the private sector.

It is further stated in the 1994-1995 Bi-Annual Report that the Programme hopes to develop a sustainable financing element which will document successful case studies and experiences. This Conference is a step towards that objective.

The first two strategies pose a question to governments. Even if governments succeed in increasing public understanding of the gravity of marine pollution, there is no assurance that nongovernment organizations/people's organizations (NGOs/POs) and community stakeholders will share the responsibility of addressing it. As long as governments do not fully recognize the rights of coastal communities to marine resources and the seas, there will be very few takers.

The basic question is why would communities make an effort, spend time and money to prevent marine pollution and effectively manage marine ecosystems if at any time the government can choose to recognize the rights of others, particularly the right to benefit from marine resources?

In order to encourage community and NGO/PO participation in marine pollution prevention and management, it is imperative for governments to first recognize the rights of local communities in relation to marine resources. They have the right to benefit, develop, and determine the development of those resources. Furthermore, the right to

benefit is not a privilege that is under the control of governments. Neither does this right have an expiration period. The right belongs to them so long as they exercise that right responsibly and justly. Once their right is recognized, investments can come in.

Resource management agreements that include protection, conservation, and development that will ensure sustainable harvests already exist in different forms. The government only has to make a unified move towards that end, without any exceptions. This is what funding institutions or investment companies look for before any funds are committed and released.

Investments on communities do not entail high risks, rather are considered wise. A community that has a long-term security tenure over marine resources will always consider the sustainability thereof because its future generation depends on them. The resources are its food source, its bank, its common property, its life. It will be the first to oppose any moves that will threaten the richness of the marine resources in its immediate environment, particularly those that are pollutive, destructive, or dangerously extractive. If the investment depends solely on the sustainable development of the marine environment, there can be no better partner than the community. In fact, the community is not only the better partner, it is the only partner for sustainable investments in the marine environment.

With this premise, the next step is to determine the capability of the community as a partner in investment. Given a long-term perspective, the community can plan for this. However, like any major investment or undertaking,

someone has to shoulder the huge expense of the preparatory activities to gear up the community for its long-term development. These preparatory activities consist of the setting of vision-mission goals, basic orientation particularly in terms of laws, rules and regulations pertaining to the environment, and financial systems. On the technical side, someone has to shoulder the cost of a marine resource inventory to form the initial database for the future project.

Most communities do not have the required capital to undertake preparatory activities. Some of the activities that do not require cash outlay are undertaken on a voluntary basis. The disadvantage of voluntary work is that it is done during the free time of individuals so as not to interfere with their regular work. As such, it takes quite a long time to come up with substantial results, or, if time is sacrificed, the result may not be comprehensive enough to form the basis of a good project plan.

This situation is easy to see. It is known to everybody. The question that remains is: who can address this problem? The Foundation for the Philippine Environment or FPE is one answer.

An environmental endowment fund was created to be administered by the FPE in 1992 to provide financial assistance to nongovernment organizations (NGOs) and people's organizations (POs) engaged in natural resources management and environmental protection. The Fund allows communities and NGOs/POs to embark on sustainable activities that would have otherwise been beyond their existing financial capabilities. The Fund recognizes the importance of preparatory activities to start communities in the process of envisioning and planning for their future.

The Philippine Environmental Endowment Fund being managed by FPE is relatively substantial. It is a welcome boost for Philippine communities and NGOs/POs. Now, they can look forward to a source of funding assistance in perpetuity. Thus, development elsewhere in the world that may shift funding away from the Philippines or East Asia would no longer be as debilitating as before.

A fund for this part of the world is expected. Remaining tropical forests, natural resources, and marine resources are located in this region. The vast marine resources located here command global attention. The link between marine resources and climate change is highly significant in East Asia.

The coastlines in East Asia provide the major factor in marine resource pollution prevention and management. These coastlines are where coastal communities live. The communities are the sources of the required human intervention to prevent and manage pollution of marine resources.

The Philippine Environmental Fund builds on this intervention. Moreover, it reflects and is in itself an expression of NGO, albeit, private sector, capability to address environmental issues. The fund is managed by FPE, an NGO. Its board of trustees is overwhelmingly composed of representatives of NGOs. There is only one representative from the government either from the Central Bank or from the Department of Finance. Nevertheless, the Fund was established through major decisions by two governments, the Philippine government and the United States government. This simply proves that the governments and NGOs of the Philippines and the United States have a sincere belief in the private sector,

especially communities and community-based NGOs/POs, in making sustainable development a reality.

The Fund allows NGOs/POs, particularly local organizations, to undertake environmental investments. Prior to its establishment, these groups had to settle for development assistance from donors, a source that is growing smaller in real monetary value through time. Furthermore, they seldom qualify for bank loans.

Based on the needs of NGOs/POs for a fund source, FPE was set up to be a grant-maker, a fund facilitator and a catalyst for cooperation. Its primary mandate is to provide grants to NGOs/POs involved in biodiversity conservation. As a fund facilitator, it manages the Fund to offset inflation, its minimum goal. It further seeks to generate more funds for NGOs/POs. It has fostered GO (government organization)-NGO/PO cooperation because of its ability to infuse substantial funds where needed to create a positive environmental impact.

FPE is pursuing a more aggressive financing scheme for its NGO/PO partners in view of its experience for the past three years. There are success stories to tell that hopefully will spread through the media. FPE intends to prove and inform the general public that investing in community capabilities is not only noble, but economically viable as well.

A general review of FPE's coastal community partners reveals that their primary concern is to enforce laws to protect the marine environment from illegal exploitation and pollution. Their second concern is to establish a database

of marine resources found in their immediate environment. What these show is that when communities have developed an awareness about the marine environment, they look to government policies, laws, and regulations and are willing to participate in the enforcement of these laws. They also want to establish a database to find out the present value of their marine wealth. By knowing the state of the marine resources before they start a project, they will be able to assess their activities through time as these affect the same assets. All of this is premised on the recognition of their right to benefit from the marine resources in their area.

Conclusion

From the point of view of a funding agency like FPE, grant funds are considered to be investments in communities to undertake environmental projects that promote sustainable development. Thus, the key factor is the tenure aspect and the right of the local communities to benefit from the resources in their environment. Without tenure and security in accessing marine resources exclusively, the project success will be uncertain. Corollary to this, without the involvement of the community, especially when tenure is in the hands of other entities outside of the community, no amount of rhetoric can make a project succeed.

Any funding institution will not invest in a project with a risky future. Moreover, FPE holds public funds and is ultimately accountable to the Filipino people. It cannot disburse funds unwisely or knowing fully well that the activities will not be sustainable nor will they achieve the desired impact of biodiversity conservation.

POVERTY AS A THREAT TO THE COASTAL ENVIRONMENT

Sarah L. Timpson

Resident Representative

United Nations Development Programme-Manila

NEDA sa Makati Bldg., Amorsolo St.

Legaspi Village, Makati City

Philippines

TIMPSON, S.L. 1997. Poverty as a threat to the coastal environment, p. 108-119. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

The Asia-Pacific region which comprises 58% of the global population and over 23% of the total world land area encompasses a vast and diverse range of ecosystems. Among others, more than two-thirds of the world's coral reefs and one-third of the world's total mangrove areas are located in the area. The marine and coastal ecosystems of the region provide a major resource base to the region's economies. Thus, for Asia and the Pacific, the coastal zone is most vital ecologically and economically.

Unfortunately, excessive pressures are now being placed on the environment and natural systems of the region. Three trends have contributed most directly to this situation. One trend is the doubling of the region's population in the last 35 years. Another is the near tripling of economic output in the last 20 years, based in large measure on processes with deleterious effects on natural capital. Finally and perhaps more critically is the persistence of pervasive poverty. These factors combine to create an impending "tragedy of the commons" in the coastal countries of the Asia-Pacific region.

It is estimated that the number of people in the region whose basic needs

remain unmet is larger now than at any time in history. Over 800 million or nearly three-fourths of the world's people living in absolute poverty are located in the region, their incomes and consumption rates falling below nationally defined poverty lines.

This paper examines the dynamics of poverty and environment in the coastal zone in the region and the approaches required for their sustainable management and development for the benefit of the people living within them now and in the future.

Coastal Environment Trend Situation Analysis

It would be useful to start with a brief review of the current situation from a global perspective.

The concept of the coastal zone as an ecosystem is analytical and provides a holistic perspective of the resources it contains, their interrelationships, use, and management. The definition of a coastal zone is fraught with difficulties, but a clear idea can be obtained by simply enumerating its possible components: river deltas, marshes, mangroves, sand beaches, rock beaches, seagrass beds, coral reefs, tidal flats, mudflats, fishponds, lagoons, and islands.

Coastal areas comprise complex and specialized ecosystems which provide a significant proportion of food production. More than 100 million people directly or indirectly depend on fisheries for their livelihood. Worldwide, 95% of all marine fish harvests is derived from coastal waters. Coastal wetlands, such as marshes and mangroves, serve as spawning grounds for many aquatic species, as well as habitat for waterfowl and other wildlife. In addition, they filter out many waterborne pollutants and provide extensive flood protection. Coastal areas also support a variety of activities other than fishing. They support tourism, recreation, and transportation. Oil and gas development have been well-established in coastal areas for some 100 years, leading to increased activities there to support energy development.

The fishing industry directly or indirectly employs some 200 million people worldwide. About 950 million people depend on fish as their primary source of protein. Of the total global fish harvest of 101 million metric tons in 1993, 78% was caught by the marine fishing fleet (while the rest was caught inland and by aquaculture). The increase in fishing activity has led to overexploitation of the marine stocks. The Food and Agriculture Organization (FAO) of UN has estimated that more than two-thirds of the world's marine fish stocks are being fished beyond their maximum productivity. In 6 out of 11 major Atlantic and Pacific fishing regions, more than 60% of all commercial fish stocks have been depleted or are being fished to their limits. About 70% of the world's fish stocks are being strained up to and beyond their ability to sustain commercial quantities of fish. One ship equipped with high tech trawl fishers and their trailing nets of up to at least a kilometer long is capable of hauling 400 tons of fish in a single gup (Time, October

1996). Already more than 100,000 jobs worldwide have been lost due to declining yields of the world's fishing areas, and this number is expected to skyrocket in the future.

Land-based sources of pollution account for over 70% of marine pollution throughout the world. These land-based sources come mainly in the form of sewage, industrial wastes, and agricultural runoffs. Pollutants from these are comprised not only of solid waste and wastewater discharge but contain toxic and hazardous materials such as heavy metals, high organics, synthetics, nutrients, and pathogens (Koe and Aziz, 1995).

Coastal areas are also vulnerable to the impacts of climate change and the associated accelerated sea level rise. Wetlands are likely to be threatened, coastal erosion will increase, and coastal resources, populations and economies will be adversely affected (World Coast Conference Report, 1993). This has been the subject of international debate and negotiations which resulted in the UN Framework Convention on Climate Change and the subsequent Conferences of Parties.

The latest UN-ESCAP Review of the State of Environment in Asia and the Pacific (1995) reveals the critical state of the coastal environment in the region. The most serious problems are in the coastal areas where a large majority of the region's population is concentrated. Of the 75 largest cities in the world, nearly half are in the Asia and the Pacific region, and more than half of these are situated on or very near the coast.

Poverty and Environment Nexus in Asia Pacific

At last year's Regional Ministerial Conference on Environment and Develop-

ment held in Bangkok, poverty was placed in the agenda for discussion. The UNDP commissioned a paper as its contribution to the discussion. The paper provides insights into the regional poverty situation and the poverty-environment interactions. It would be useful to go over the relevant observations of the paper as follows:

Regional Poverty Profile

While experiencing a long period of high economic growth, the Asia-Pacific region suffers from pervasive poverty. The largest concentrations are in South Asia (520 million) and in Indochina, with persistent pockets in other countries of the region.

At least 15 Asian countries—Afghanistan, Bangladesh, Bhutan, India, Indonesia, Laos, Maldives, Myanmar, Nepal, Pakistan, Papua New Guinea, the Philippines, Sri Lanka, Thailand, and Vietnam—had a rate of absolute poverty greater than a quarter of the population (UNDP Human Development Report, 1994). Some other countries, for which complete figures are not available, would also fall into this category, including Cambodia, Mongolia, and some island states. In the world, the highest incidence of poverty is in South Asia (over 40%). In East Asia and the Pacific, while the average is lower (10%), a number of countries have a high incidence. The average for the East Asian subregion is pulled down by the large weight of China, which despite the low relative share of poverty (9%), houses over 100 million people in absolute poverty. Seven countries in the region—India, China, Bangladesh, Indonesia, Vietnam, the Philippines, and Pakistan, accounted for over 700 million of the one billion poor people in the world in 1992. The bulk of the region's poor population is located in

the rural areas. But, urban poverty remains high in South Asia, as well as in some countries in Southeast Asia, and is growing with increasing rural to urban migration.

Although the incidence of poverty has been declining since 1980, the total numbers have increased in many countries. With a few exceptions, the decline in incidence is linked to a high overall rate of economic growth, but the linkage is not inevitable. It depends on policy interventions. For example, Thailand registered an increase in the incidence of poverty, despite a very high rate of economic growth. On the other hand, Malaysia with a high growth rate, has enacted policies ensuring more equitable participation in the benefits of improved economic activities.

It should be noted that poverty is not merely a matter of incomes which are too low to meet basic subsistence needs. It is, above all, a symptom of imbedded structural imbalances, which manifest themselves in all aspects of human existence. As such, poverty is highly correlated with "marginalization", vulnerability, powerlessness, isolation, and other economic, political, social and cultural dimensions of deprivation. In addition to low incomes, poverty is reflected in malnutrition, poor health, low literacy levels, and inadequate housing and living conditions, and limited or no access to basic infrastructure or services. It is further compounded by people's lack of access to land, credit, technology, and other productive assets and resources needed to generate income. It is also compounded by a lack of access to agricultural research and extension services, training, and markets. And, more often than not, people in poverty are deprived of political rights or power to

make their collective voices heard; nor can they expect fair treatment from the judicial system. In other words, they have almost no ability to influence decisions which directly affect their lives.

Inequality and mass poverty can erode political stability and good governance. In addition, poverty is often accompanied by the weakness of institutions for collective decision-making, which prevents poor communities from protecting their natural environment through collective action. The intensification of poverty further weakens such institutions.

The Interaction Between Poverty and Environment

Besides its intrinsic problems, as an affront to human dignity and well being, poverty is also an obstacle to sustainable development. Research and analysis have shown the mutually reinforcing nature of poverty and local-level environmental degradation.

The significant relationship between environmental degradation and the persistence of poverty is recognized widely. On the one hand, environmental degradation deprives the poor of the sources of livelihood, it limits their access to "free" resources (food, fuel, and fodder), imposes additional burden on poor households, particularly women and children who spend their time on collection of natural resources, and have no means of remedying the human and social costs of environmental pollution. On the other hand, poverty forces many households to place increasing reliance on common resources without considering proper management, thus endangering their basis of survival.

The political weakness associated with poverty makes it difficult for the poor to protect individual property rights, let alone collective or communal rights. On the other hand, environmental degradation often intensifies conflict, which further undermines the strength of protective arrangements.

In sum, a complex of problems reinforce one another, and cannot be addressed in isolation. Environmental degradation causes poverty, which in turn causes degradation; environmental degradation causes conflict, which destroys institutions, and undermines the ability of the weak to defend themselves and their livelihoods.

Poverty causes political weakness, which can be exploited by the powerful to further deprive the poor of their sources of subsistence. The obvious implication, that poverty eradication and environmental conservation have to be addressed jointly, is enshrined in virtually all international agreements on social and environmental issues. Agenda 21, United Nations Conference on Environment and Development (UNCED), World Summit on Social Development (WSSD), International Conference on Population and Development (ICPD), and other international agreements have all brought out the need for joint action on these fronts.

Political Economy of the Coastal Zone: The Philippine Case

It may be useful to take a concrete case to illustrate the interconnections of poverty, population, and environment within the dynamics of the coastal zone. Let us take the Philippine case.

The coastal zone has the highest population density in the Philippines. The 8 major cities, including Metro Manila and Metro Cebu, as well as the 10,000 coastal barangays (villages), attest to this reality. In fact, with 7,112 islands, the entire Philippines could be considered a coastal zone, with 82% of the provinces being coastal.

Who then are the key or major players in the dynamics of the coastal zone? Everyone is a potential user, as the coastal zone partakes of the nature of the commons. But we could identify some of the primary stakeholders.

- a) artisanal fishers - they are those whose main occupation is municipal fishing, although they could be farmers during the rainy season;
- b) coastal entrepreneurs - these include the fishpond, commercial fishing fleet, and resort operators and the oil and minerals extractors;
- c) coastal industries - those situated in the coastal zone that utilize the water bodies as dumps for their wastes;
- d) coastal municipal governments - they attempt to derive income from coastal zone resources;
- e) tourists, whose presence may stress the resources in a variety of ways; and
- f) environmental advocates - composed mostly of coastal zone-oriented NGOs and people's organizations that champion the maintenance of ecological integrity.

Presently, there is scarcity of data to indicate who among these actors obtain

the most benefits from the coastal zone. Furthermore, the costs and benefits of some uses like waste disposal are not easily quantifiable.

What are the driving forces behind the depletion of marine resources? Artisanal fisherfolk are often blamed.

It is true that the artisanal fishermen have grown in numbers and remain among the poorest in Philippine society. A 1990 survey of the Department of Agriculture (DA) classified 370,000 households with an average income below the poverty line as dependent on municipal fishing. Philippine fishery experts are now of the view that fishing activities in municipal waters have reached the limits of sustainability. It is estimated that the total sustainable catch is anywhere between 1.45 and 1.85 million tons per year while the present annual catch is already 1.7 million tons.

Despite declining stocks, these fisherfolk continue to fish. One major reason is the loss of livelihood opportunities in the coastal zone due to private appropriation of formerly commonly held mangrove areas and private beaches with tourism potential. It has been estimated that about 200,000 hectares of the original 450,000 hectares of mangroves were effectively privatized through long-term lease. Had these been managed by the communities, the income from aquaculture could have substantially added to the fishermen's income. Needless to say, the cutting of mangroves in swamps could only have detrimental effects on the productivity and economy of municipal fishing.

Practically all the beautiful islands and beaches in the country, especially those

in La Union, Batangas, Cavite, Cebu, and Palawan, are already leased to entrepreneurs. In this situation, artisanal fishermen virtually have no stake in the income and their access to some fishing areas has been restricted.

However, the fisherfolk are more the victims than the agents of degradation. The poverty of artisanal fishermen is further exploited by coastal entrepreneurs who encourage illegal fishing activities, such as dynamite or blast fishing and use of cyanide. These entrepreneurs claim an inordinate share of the catch. These two activities have been responsible for the destruction of coral reefs and deterioration of fishery stock leading to further reduction in the catch per unit effort of fisherfolk. Studies indicate that the Philippine reefs are in a state worse than the average condition of reefs in the Pacific area. Sedimentation resulting from forest denudation and pollution also contribute to coral reef destruction. We could go on for pages enumerating a litany of exploitative practices which further immiserate the subsistence fisherfolk.

The almost unlimited access to mangroves have allowed expanding communities to use them as easy sources of firewood. Unscrupulous politicians and local officials were able to obtain long-term fishpond leases over both logged and virgin mangrove areas. Over 90% of fishponds are former mangrove areas. The rapid decline of mangrove areas in the country is attributable to conversion to fishponds and firewood extraction.

The uncontrolled growth of coastal industries is another culprit. Since coastal waters serve as the ultimate sink for wastes, toxic and hazardous chemicals

from these industries wreak havoc on coastal fisheries and aquaculture. The unregulated use of coastal waters by industry who pay nothing for this "service" means that it is the artisanal fishers who ultimately suffer. Even when "pollution pays," taxes absorb the costs of pollution, proceeds do not go to the fisherfolk—a phenomenon which reflects one of the most inequitable conditions in the political economy of the Philippines.

Given the contradicting interests of the coastal zone stakeholders, the inherent ecological complexity of the area, and the associated population pressures, the establishment of an integrated management regime is an evident imperative. But this has not yet been widely recognized. Both national government agencies and local government units compete for the implementation of their own narrowly defined plans and limited visions. Even scientific researchers who study the problems of the coastal zone are restricted by their rigid specializations in assessing the coastal zone situation.

The prospects for the poor population in the coastal zone are indeed grim. There are no massive measures being pursued to absorb excess labor or provide sustainable alternative livelihood in the fishing communities. The ineffective enforcement of fishery laws abet the continued plunder of municipal fishing grounds by local and foreign commercial fishing fleet operators, to the grave detriment of the resource and the artisanal fishers.

The "tragedy of the commons" is an imminent reality in the Philippine coastal zone, a situation replicated in the other coastal countries of the Asia-Pacific region.

Human Development Implications

With the specter of declining fish stocks, brought about by environmental degradation and overexploitation of marine resources, fishers not only in this region but all over the world are now concerned for the future as they expend more effort for less catch or are taken out from their livelihood outright. Without a radical change in fisheries management, increasing environmental deterioration and human damage will continue. Fish harvests will decline further and millions of fishers will be out of jobs. Furthermore, people in coastal areas, not to mention the rest of the low-income population, depend on fish in their diet for overall protein intake and any decline in fish supplies will have a severe nutritional impact on the poor.

The social and economic impacts of this worsening situation are enormous. While marine fishing accounts for about 1% of the income generated globally, in coastal and island regions, fishing is of great importance. In Southeast Asia, more than 5 million people are full-time fishers contributing some US\$6.6 billion toward the region's aggregate national incomes.

Hard times in marine fishing specifically have adverse impacts on coastal communities and cultures where fishing is a social mainstay. Small-scale fisherfolk—who get the least support from governments—constitute the base of community and cultural diversity along the world's coasts. In developing countries, local consumers of fish depend on small-scale fishers who are their primary suppliers. The irony is that when fish enters the commercial market, it is no longer available to low-income consumers and subsistence cultures.

Another important point to note is that open access makes fishing the employer of last resort. Those who lose their land or otherwise fail to obtain livelihood by other means can always try their luck at fishing. The alternative for coastal fishing communities is marine aquaculture but this brings its own problems as well. First, it is tied to the commercial sector which engenders competition and fuels consolidation to large capital intensive fish farms to the detriment of small-scale fish farms. The needy people who currently depend on marine fisheries are not in a position to reap the many benefits of fish farming which undoubtedly offer possibilities for maintaining fish supplies for inland markets and privileged consumers. Secondly, marine aquaculture is also a major cause of coastal habitat destruction, especially mangroves which undermines marine fisheries. Half of the world's mangroves have been destroyed. One of the major reasons why mangrove forests are cut down is to make way for shrimp ponds. Thirdly, shrimp farming and other forms of marine aquaculture have contributed to coastal water pollution, saltwater intrusion into the land, the introduction of alien species and new diseases, and the loss of genetic diversity in wild populations.

On the other hand, freshwater aquaculture appears to have more promise than marine farming in terms of feeding needy people while protecting the environment. For one, freshwater fish farming produces less expensive species, such as carp and tilapia, which the lower-income people are more likely to afford. Also, fish farmers have developed integrated fish-crop and livestock farming systems which utilize wastes instead of causing pollution, thus creating symbiotic relationships with agriculture and livestock activities.

The employment and social implications of controlling overfishing are also dire. In addressing the problem of excess capacity in the fishing industry, countries will face the question of which sector to favor: large-scale industrial fishers, medium-scale, or small-scale, community-based fisherfolk with each sector having almost the same capacity to bring in fish. Reducing the large-scale fishing industry by half translates into eliminating some 100,000 jobs. For the medium-scale fishing industry, this means eliminating 500,000 jobs. For the small-scale fishing industry, this would eliminate 7 to 10 million jobs. With the current trend of industrialization and large-scale fishing vessels, the entire small-scale fishing sector could be wiped out, which on a global basis would cost some 14 to 20 million jobs.

Sustainable Human Developments for the Coastal Zone

In the face of the dire problems that now threaten all of humankind, including degradation of life-supporting ecosystems, such as the coastal zone and mass poverty in developing countries, the international community organized a cycle of world summits starting with the 1992 Rio Summit on environment and development, followed in succession by Cairo on population, Copenhagen on social development, Beijing on women, Istanbul on sustainable cities and culminating with the Food Summit in Rome. All these summits have one important thing in common: they are all attempts to find new ways of dealing with global problems of declining quality of life, poverty, population, and environment. For many of the participants in these summits, nothing less than an entirely new vision and strategy of

development will do. Evidently, and as the case of the coastal and marine environments clearly shows, the earth cannot withstand the magnitude of pillage wreaked by current levels of production and consumption under the world economy.

The alternative that all the summits have been pressing for is sustainable development. The central insight is that development must not only produce wealth but ecological and social health as well. In order to emphasize its people centeredness, UNDP prefers to label the idea as sustainable human development. As we have seen, the coastal zone problems are intertwined with poverty and therefore essentially are "people problems" which must be addressed with appropriate sustainable human development approaches. Agenda 21 adopted in Rio provides the basic principle that underlines these approaches.

Chapter 17 of the Agenda 21 underlines that the marine environment, including the oceans and all seas and adjacent coastal areas, forms an integrated whole that is an essential component of the global life-support system and a positive asset that presents opportunities for sustainable development. Agenda 21 calls on all nations to reduce degradation of the marine environment so as to maintain and improve its life-support and productive capacities. Specifically, it enjoins states to improve the living standards of coastal dwellers, particularly in developing countries, so people can help protect the coastal and marine environment.

Certain requisites need to be met in order to move toward sustainable human development in the coastal zones.

Need for Integrated Approach

In order to bring about the type of management called for in Agenda 21 and in order to address poverty alleviation and employment creation along with environment regeneration and protection, there is a need to move beyond conventional approaches towards new forms and concepts of management. The tools that are required to enable sustainable community-based management of catchments and coastal zones as integrated units are very different from conventional sectoral management approaches.

In terms of protection of the coastal and marine aquatic environments, sustainable management involves:

- a) applying prevention, precautionary and anticipatory approaches so as to avoid degradation of the marine environment, as well as to reduce the risk of long-term or irreversible adverse effects upon it;
- b) ensuring prior assessment of activities that may have significant adverse impacts upon the marine environment;
- c) integrating protection of the marine environment into relevant general environmental, social, and economic development policies;
- d) developing economic incentives to apply ecologically efficient and cleaner technologies and other means consistent with the internalization of environmental costs.

Developing Better Policies and Strategies

A set of interrelated policies and strategies is also necessary to promote

sustainable management of the coastal and marine environment. This would include the:

- 1) Development of a comprehensive, continuing and adaptive program of action within the framework of integrated coastal area management.

Sustainable use of the coastal and marine environment depends on the maintenance of ecosystem health, public health, food security, and economic and social benefits including cultural values. Integrated coastal area management has been demonstrated to be a highly effective method for fostering sustainable management practices.

- 2) Development of strategies related to water contamination.

Like the atmosphere, water has often been used automatically and unthinkingly as a convenient "sink." As we have seen, land-based sources are the main causes of coastal pollution. Strategies and policies are needed for sound sewage and waste management, and to prevent harmful runoff from agriculture, forestry, mining, construction, and transportation. These measures should include a system of pollution charges or user taxation based on the polluter/user pays principle.

- 3) Creation of a policy environment that promotes sustainable coastal and marine environmental management.

In this area, the role of international governance needs to be

emphasized and what is required is a more rigorous enforcement of international agreements, such as the UN Convention on the Law of the Sea (UNCLOS), the Straddling Stocks Agreement, the FAO Code of Conduct for Responsible Fisheries and the Global Plan of Action for the Protection of the Marine Environment from Land-based Activities.

- 4) Strengthening, and where necessary, creating new international and regional cooperative arrangements and mechanisms to support effective action, strategies, and programs to address land-based impacts on the marine environment.

These institutional arrangements and reforms are crucial for successful actions. This is especially true where a number of countries have coasts in the same marine and coastal areas, most notably in enclosed or semi-enclosed seas. Such cooperation allows for more accurate identification and assessment of the problems in specific geographic areas. Such cooperation also strengthens regional and national capacity building and offers an important avenue for harmonizing and adjusting circumstances.

The Coastal Community: Key to Effective Coastal and Marine Environment Management

To advance toward clean oceans and healthy fisheries, governments and fishers will have to go beyond current management regimes characterized by

political paralysis. *Government oversight coupled with community-based management may offer the optimal solution.* Local management backed by government authority would provide the parties most involved the needed power to regulate fisheries for the good of the local economy and the ecology that supports it.

The fundamental principles of fishery management were evolved over millennia by traditional cultures dependent on fish for food. For example, in traditional Pacific Island and Southeast Asian coastal cultures, limited access was an essential element of productivity maintenance for coral reef fisheries which are highly susceptible to overfishing. Violation of rules on overfishing could lead to social ostracism by the community or even death. It should be noted that restrictions imposed still comprise the foundations of fisheries management but the basic ingredient currently lacking is local community-based control.

The good examples of successful management involve a *high level of fisher and community involvement*. A common example cited is that of Maine in the United States where the lobster fishers developed their own effective system of limited access without any government involvement. An example closer to home is Japan which manages its coastal fisheries under a two-tiered system with roots in village customary law of the feudal era where higher levels of government set guidelines under the National Fishery Law but local communities work out detailed regulations for their respective coastal areas.

Another critical factor for successful management is enforcement. If a management system provides fishers with

a strong sense of ownership, they will have greater incentive for a long-term stewardship of fishery resources. In a community-based fishery, self-policing is feasible if the community is closely knit and has an understanding of the local ecology.

Likewise, community-based resources management is feasible given appropriate guidance and technical support. Apo Island in the Central Visayas of the Philippines is one pilot area that worked in terms of having the community manage reef resources themselves. To date, the local management committee maintains a sanctuary which boasts of a rehabilitated reef. All fishermen in the area understand the reef's function and contribution to the fish stocks that abound around the island. They also have a flourishing tourism industry that contributes additional income to the islanders. In Molocaboc Island in the Visayas Sea, the rock mound technology was introduced to the locals. The technology entails the catching of serranid fry that were seeded in "rock mounds." The fishermen's incomes were augmented through their quarterly harvests of about 800 pesos per rock mound. In Masinloc and Oyon Bays, Zambales, the concept of protected areas was introduced through the National Integrated Protected Areas approach. To date, the Protected Areas Management Board contributes to the municipality by monitoring the activities related to the construction of the Napocor Coal-Fired Power Plant. They translate to their constituents the requirements for water quality, the meaning of rehabilitation and protection and what gains they would have in the future.

These examples project a brighter future for coastal environments, showing that protection and related community-based mariculture activities are feasible in the

Philippines. Small-scale empowerment pilot activities could be duplicated in several other sites in the country, creating a network of protected areas, conservation and mariculture sites which consequently would cover the whole country.

Market-based Incentive

Production sharing through market-based systems also creates a long-term interest in fishery. An example of this would be the individual transferable quotas (ITQs) system practiced in such countries as the USA and New Zealand. In the ITQ system, each fishing boat owner receives a share in the annual catch which they could buy, sell, or lease like property. Being transferable fishing rights, market forces can play the role of resource allocation, which in theory should lead to economic efficiency.

Vital Role of Government

In the ultimate analysis, fisheries are part of the public domain and governments are duty bound to maintain them for future generations. Thus, government's part is essential whether it is a more direct or active regulation or enforcing the right of a community to restrict outsiders and manage its own fisheries. In the Philippines, the government allows local communities long-term contracts (usually 25 years) to manage the adjacent coastline. With the backing of government authority, a number of communities have rehabilitated large hectareage of mangroves, created no-fishing zones, and restricted fishing which invariably yielded increases in the sustainable fish catch. Without government backing, it is easy for commercial fishers to encroach on the communities' territory.

Conclusion

All the foregoing policy and strategy considerations to address the impending crisis of the coastal commons require the creative application of sustainable human development principles.

Sustainable human development is a forward looking approach which calls for a shift of focus from individual entrepreneurship, the heart of 18th and 19th century capitalism, to the community, which should be the heart of 21st century capitalism. The entire community becomes the entrepreneur, guided not only by market forces but by moral precepts. This can address and resolve the ecology and equity issues at once. People who live within the ecosystem have a natural stake in it and are bound to care for it. And, more importantly, people who take part in their own development get to share in the fruits of that development.

References

- Koe, Lawrence and M.A. Aziz. 1995. Suggested approach to control marine pollution from land-based sources. Paper presented during the Asia-Pacific Regional Conference on Prevention of Marine Pollution from Land and Sea Sources, December 1995, Singapore.
- Time Magazine. 1996. Global agenda: treasures of the sea. 28 October 1996.
- United Nations Conference on Environment and Development, Agenda 21 Chapter 17, 1992. UNCED, Switzerland.
- United Nations Economic and Social Commission for Asia and the Pacific. 1995. Review of the state of the environment in the Asia and the Pacific, November 1995, Bangkok.
- World Coast Conference, The Netherlands, 1993. Conference Report—Preparing to Meet the Coastal Challenges of the 21st Century, Intergovernmental Panel on Climate Change, April 1994.

Session 2

Linkages Between Industry and the Public Sector

ADAM J. KERR, Director, International Hydrographic Bureau,
Monaco.

"Prevention is better than cure—better charts and safer seas."

TEH KONG LEONG, Director, Marine Department, Maritime
and Port Authority of Singapore, Singapore.

"Cooperation in the Malacca Straits."

JOHN S. LEMLIN, General Secretary, International Petroleum
Industry Environmental Conservation Association, UK.

*"IMO/industry global oil spill planning initiative : an IPIECA
perspective."*

MASAYASU SAKABA, Director, Maritime Prevention Disaster
Division, Japanese Maritime Safety Agency, Japan.

*"Maritime traffic safety measures in Seto Inland Sea and
the pollution management system in Japan."*

HIDEO OSUGA, Legal Officer, International Oil Pollution
Compensation Fund, UK.

*"International conventions on liability and compensation
for oil pollution damage."*

THOMAS GRIGALUNAS, JAMES J. OPALUCH, and JERRY
DIAMANTIDES, Department of Environmental and Natural
Resource Economics, University of Rhode Island, Kingston, RI, USA.

*"Liability for oil spill damages: issues, methods, examples,
and controversies."*

HANS BROBERG, President, SSPA Maritime Consulting AB, Sweden.

*"Driving forces towards better marine environment and safety:
considering economics."*

PREVENTION IS BETTER THAN CURE— BETTER CHARTS AND SAFER SEAS

Adam J. Kerr

Director

International Hydrographic Bureau

4 Quai Antoine 1e

BP 445, Monaco MC 98011

Principality of Monaco

KERR, A.J. 1997. Prevention is better than cure—better charts and safer seas, p. 122-130. *In* S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

No one will disagree that prevention is better than cure and that measures taken to prevent pollution from occurring deserve prime attention. Therefore, it is essential that preventive measures are financially supported.

It may be difficult to see the relation between accurate, up-to-date charts and the prevention of marine pollution. The importance of making charts available is frequently taken for granted, as shown in the International Hydrographic Bureau (1991) study reporting that the overall status of hydrographic surveying and nautical charting worldwide ranges from poor to fair. The report also stated that of the nearly 100 million km² of waters studied, only 29% can be considered adequately surveyed, 22% required re-surveying and 49% can be described as inadequately surveyed or not surveyed. A comparison across regions showed that East Asia does not merit the lowest rating, however certain East Asian waters, particularly the South China Sea, had charts of very poor quality that deserve immediate attention. Olson (1994) outlined the pattern of marine traffic in the South China Sea. He concluded that "much of the South China Sea remained poorly represented on nautical charts as

a result of cursory, inaccurate or non-existent surveys" and that "numbers and tonnages of vessels transiting the South China Sea, increases in port traffic, increases in size of regional fleets, and the presence of many natural physical hazards to shipping indicate a need for up-to-date charts based on accurate hydrographic information."

Hydrography and Charts

Compiling nautical charts and surveys have traditionally been a task of governments. The major Hydrographic Offices of the world were formed about two hundred years ago, as world trading powers—such as France, the United States, and the United Kingdom—found them essential to support merchant and naval activities with charts and other navigational aids to ensure the safety of their vessels (Ritchie, 1991). These offices are responsible for existing charts of all oceans and seas, mostly completed during the last century. Nevertheless, in spite of efforts at re-surveying critical areas and updating charts, a few charts remained inadequate to the needs of modern shipping. This inadequacy poses a potential danger to shipping and contributes to economic inefficiency, as ships are unable to enter certain ports and channels leading them to incur higher navigation costs than necessary.

After the Second World War, changes in marine technology brought with them greater responsibility to provide charts. The introduction of flags of convenience changed the relationship between hydrographic capabilities and the flag state. Developing countries assumed the responsibility of charting their own waters. In view of these developments, even as excursions of survey vessels into foreign waters became less frequent, certain countries—such as the United States, United Kingdom and Russia—have continued to provide a worldwide series of charts for international shipping. Other countries—such as Japan and France—provide limited regional coverage, while other coastal states surveyed and charted only waters within their national boundaries. As agreed at the International Hydrographic Organization (IHO), the data collected was circulated among Hydrographic Offices.

Developments were not limited to administration. The types of ship changed tremendously, affecting the adequacy of charts. Many charts produced in the last century until the middle of this century were designed to satisfy the needs of relatively small ships. Until 1950, the largest ships of the merchant fleets and the major warships had the same draught of about 12 m (Pasquay, 1986). The most significant change occurred with the introduction of the VLCC (very large crude carrier) in the 1960s (Ritchie, 1980). These vessels typically weigh 250,000 dwt, but may be as heavy as 500,000 dwt, with draughts exceeding 20 m. Another change occurred with the container vessel, which currently dominates cargo transport. Such vessels, though smaller than VLCCs and drawing less water, are usually larger than typical cargo vessels, and run at speeds in excess of 20 knots. In addition, container handling requirements

effected a total change in port facilities. Another recent development was the introduction of high speed ferries which travelled at approximately 50 knots. Speed, rather than draught, had become a greater concern to those who produced navigational charts and provided other aids to navigation. Due to strong competition, ship operators and owners expected their vessels to travel in waters with limited underkeel clearance (Haslam, 1985). This imposed considerable pressure on Hydrographic Offices to ensure the accuracy and quality of their charts.

Fortunately, in the face of these new challenges, Hydrographic Offices have been able to apply new technology. Some of the most important technical developments have been in precise satellite positioning systems (La Chapelle et al., 1992) and multi-beam acoustic depth measuring systems (Kerr, 1990). Moreover, computer digital technology has been applied in surveys, with charts created in digital form and shown on video displays (Axelsson and Sunberg, 1992).

The latest technology proved to be more accurate than past manual methods, allowing areas to be surveyed more rapidly than in the past; however, it also incurred more costs than the methods previously used. To date, the most expensive part of any hydrographic operation is the marine platform, the ships and launches needed to carry the instruments. Large survey vessels today cost over US\$50 million, even as they move at a slow pace, with few having speeds above 15 knots. Although the use of multi-beam acoustic systems has dramatically increased the rate of surveying, it is still time consuming and expensive to survey large areas of the

oceans. Attempts had been made to use aircraft; but the latter showed limited success, except in shallow water with depths of less than 50 m, and is extremely expensive (Institute of Policy Studies, 1996).

Critical Problems of Navigation in East Asia

A recent Conference in Singapore discussed problems in relation to the Malacca Straits (Chia, 1996). Dr. Chia Lin Sien discussed the importance of the Straits of Malacca and Singapore and the navigational issues involved (Saishoji, 1996). The Straits provide a route where underkeel clearance is extremely critical. Agreement has been reached that the largest VLCCs should not use the Straits but instead must pass through the Lombok/Makassar Straits, adding three days and at least US\$80,000 more to their voyage. Vessels that are allowed to pass through the Malacca Straits are required to have an underkeel clearance of 3.5 m. At about this time, surveys of certain critical areas are being conducted with funding support from the Japanese International Cooperation Agency (JICA) (Nandan, 1996). However, Nandan proposes more detailed and frequent surveys, as will be discussed further in this paper. The statistics of shipping accidents in this narrow and congested waterway are increasing, such that measures to prevent such accidents should be strongly supported.

In East Asia, we note the heavy volume of traffic that passes through the Indonesian and Philippine archipelagos as vessels travel between Australia and Japan. Measures are now being taken in Indonesia to identify archipelagic sea lanes and to have them surveyed and charted to modern standards through a contracted Norwegian company. The

Philippine situation does not appear as favorable, with several serious shipping accidents in recent years within its waters.

In the South China Sea, the extremely poor quality of the charts and the increasing maritime traffic have been acknowledged, but nothing has yet been done to improve the situation. The situation is aggravated by the failure of the adjacent countries to settle the sovereignty claims of various island groups, and compounded by the increasing interest in the potential existence of hydrocarbons. The latter may effect an eventual increase in number of production facilities and the level of maritime activity, as already occurs in Vietnamese waters.

Strategies for Financing Hydrographic Work

Like public works, hydrographic surveying and the production of charts have traditionally been the responsibility of governments. In most cases, the funds for these activities are provided by the government, even as certain countries collect dues from visiting vessels to pay for lighting or other navigational aids. The United Kingdom imposes light dues which contribute to the upkeep of lighthouses and other aids to navigation. Similarly, Sweden funds its hydrographic programs and pays for lighthouse services from such dues. The problem of this strategy lies in the fact that collections are possible only when vessels actually call at ports of the country from which the services are provided. In the case of the Malacca Straits, a large percentage of vessels plying the route never stop at either Malaysia, Indonesia, or Singapore, thus there has been little opportunity to collect dues. The same situation although less evident exists in Philippine and Indonesian waters.

In this consideration, it is necessary to distinguish between different legal regimes existing under the Convention of the Law of the Sea. The Straits of Malacca is considered as international waters and is governed by Part III of the Convention, which contains articles manifesting the consensus that was reached between coastal states and international shipping powers. The former intended to protect their sovereign rights as littoral States, while the latter wished to secure unhindered passage for their ships (Institute of Policy Studies, 1996). Article 43 was particularly unclear on this matter and was discussed at length in a recent Conference in Singapore (Anderson, 1996). The article states that both user States and states bordering a strait should agree to cooperate in providing navigational aids and services. Unfortunately, like many articles of the Convention, it fails to provide specifics on such questions as: Who are the users? What does cooperate mean? Does it include financial cooperation? What does services refer to? In this context, does it include hydrographic services?

In these deliberations, while there may be sympathy for the coastal States, there remains strong resistance from the international shipping community to the idea of tolls, considering the possibility that a precedent set for one strait may become the rule for all.

Archipelagic sea lanes, as recently designated by Indonesia, follow a different regime (Article 53). In this situation, the archipelagic state encourages ships passing through its waters to follow their designated routes. Though not explicitly stated, this appears to infer an obligation on the part of the archipelagic state to ensure that ships plying the sea lanes are

safe, or guided by adequately charted and marked routes. Unlike the international strait where littoral States are obliged to provide services imposed upon them by international law, the archipelagic state takes this obligation upon itself by designating the sea lanes.

In the case of Economic Zones not classified under either of the first two categories discussed above, the Convention provides for innocent passage of the Territorial Sea under Article 17. Article 26 states that no charges may be levied upon foreign ships passing through the Territorial Sea, except for specific services rendered to the ship. Again the types of service are not precisely defined though some interpret (Anderson, 1996) them as involving pilotage or towing, rather than general aids to navigation. Nothing further is mentioned about charges to ships with respect to the rest of the Exclusive Economic Zone as described in Part V of the Convention.

In summary, it appears that little sympathy can be found in the Convention for international trading vessels to pay for any part of the services they may enjoy while passing through the waters of a coastal state. It has been proposed, e.g., by the International Convention on Oil Pollution, Preparedness, Response, and Cooperation, that before vessels in transit could be subject to charges, there should be an international agreement following the terms of Article 43 and perhaps modelled on the arrangements for air traffic control services adopted by the International Civil Aviation Organization. In fact, at the International Convention for the Safety of Life at Sea (SOLAS), we find that discussions are currently underway at the International Maritime Organization (IMO) to amend Chapter V of the

Convention to require all states to provide hydrographic services. The "user pays" policy promoted by several western governments within their own national domain appears to be inapplicable to international shipping.

What possibilities exist for a more equitable sharing of these international costs? In the aftermath of serious shipping accidents, particularly those that have resulted in major pollution, financial arrangements have been established to cover the costs of the damage and cleanup at subsequent accidents (Lundberg, 1995); but funds are often unavailable to pay for preventing accidents, such as improved aids to navigation. At present, contribution for these activities depends on the goodwill of rich countries. Most of the assistance provided is directed towards infrastructure building and training. Less financial support is provided directly for improving the services. The JICA support in the Straits of Malacca and in Fiji is one example of assistance for the latter.

If the improvement of services should be seen by international shipping as a contribution to their economic prosperity, rather than just another imposed tax, the shipping industry should be encouraged to contribute financially. We can demonstrate the idea using a few specific examples. By locating and surveying a deep water route through the Barrier Reef, the Australian Hydrographic Service was able to significantly shorten the route of ships going from the east coast of Australia to East Asia. In Canada, the development of electronic chart technology applied in the St. Lawrence River enabled ships to work throughout the winter when normally ice would inhibit their passage at night. These are clear examples of economic benefits to the shipping

industry. Unfortunately, such gains to shipping are difficult to quantify, and there appears to be no mechanism through which the shipping companies can plough back part of their gains to the organization providing the services.

The need for international financing mechanisms appears most essential with regard to the provision of satellite positioning services. Such services are becoming more essential to marine and air transport, as well as to the monitoring of terrestrial traffic. The global positioning system (GPS) provided by the US military and its Russian equivalent GLONASS are services offered free of charge. While users of the technology enjoy such free service, there is considerable concern over the fact that the system remains firmly under the control of the two countries and that they both reserve the right to stop providing the service any time they please. Although the likelihood of the latter happening is becoming increasingly remote especially with increasing use by civil aviation the possibility still poses a great concern to many agencies, particularly those within the European Union that are anxious for a reliable means of monitoring movements of vessels carrying dangerous or noxious cargoes. The possibility of setting up a commercial satellite system has been discussed, but steps have not yet been taken to realize this plan. Discussing the need for a Civilian Global Navigation Satellite System (GNSS), Olof Lundberg, Director General of INMARSAT—the International Maritime Satellite Organization—stressed that the capital and possibly the operating costs of such a system would have to be paid for by major users (Gooding, 1992). The establishment of an international financial regime will not be easy, as the users are not restricted

to the marine sector. In fact, the marine users may be a minority. The aviation industry shall most possibly take the lead in the development of international funding for the system.

Differential monitoring of the satellite positioning system is a method of enhancing accuracy to a level that may be safely used in port approaches and harbors. As a marine service, the system is being applied by most developed countries. For general navigation, there are no costs to the users.

With the introduction of satellite positioning systems, navigators can now locate themselves with greater accuracy than the surveys from which the charts were compiled. Hydrographic Offices have been much criticized for the relative inaccuracy of their charts. The rectification of the latter requires considerable work and more surveys should be carried out (Gold, 1985).

Further regarding navigational services, we note the development of vessel traffic services (VTS) around the world. At the moment, these VTS are usually restricted to harbor approaches, as it is in the port's interest to ensure that ships make a safe and expeditious approach. Thus, it is logical to assume that the ports themselves will finance the VTS. On the other hand, the use of the services is increasingly being extended seawards, and such a system is currently being introduced at the Malacca Straits. Undoubtedly, the availability of the system will enhance safety and reduce the risk of groundings, collisions, and the possibility of pollution, but the cost will be borne by the littoral States. It has been suggested that new maritime systems such as VTS may provide the impetus needed

for a broad-based international maritime transportation convention (Pianc, 1985).

Again on the matter of services that actually contribute to the economy of ship operation, the case of the Malacca Straits provides a good example. It was noted earlier that the underkeel clearance of ships passing the Malacca Straits has been regulated at 3.5 m. Tidal range in the Straits, in the order of 1.6 to 3.7 m, allows ships to transit the channel with the help of additional depth provided by high tide over areas specified by the charts. Underkeel clearance is calculated on the basis of several parameters, including characteristics of the environment and that of the ship. 'Gross underkeel clearance' has been defined in the Report of the Working Group of ICORELS as the (theoretical) margin between the nominal channel bed level and the keel of a vessel as measured when stationary in calm water from the water reference level. Ship factors to consider include the actual draught of the ship, any changes in draught caused by salinity, or the attitude of the ship in terms of squat and settlement. Environmental factors include the depth of water shown on the chart, the predicted tidal height, and the variance that may exist in any of the measurements. Uncertainties in measuring the bottom relief may not only directly affect the stated depth but may also affect the attitude of the ship. Parts of the Malacca Straits are reported to contain large sand waves, without clear information on its dynamics and frequency. Since the parts of the Straits were last surveyed over 20 years ago, some degree of uncertainty must exist with regard to the precise depth, which contributes to the uncertainty in defining underkeel clearance allowance. Predicted tides are also prone to error and in parts

of the world where clearances are critical it is a common practice to report real time tides directly to the ships.

In order to encourage ships with the deepest draught possible and, therefore, the greatest cargo carrying capacity to enter their ports, port authorities in certain parts of the world are now considering total and systematic surveys of the seabed, as well as making real-time tide reporting available. Such measures minimize the uncertainty element of the parameters contributing to underkeel clearance. At the moment, endeavors assisted by JICA aim at surveying certain shoal areas along the proposed traffic routes, starting with the assumption that sea floor measurement remains as it was when last surveyed in the 1970s. Based on experience in other parts of the world, particularly at the Dover Straits where large sand waves also exist, it was deemed necessary to carefully study the dynamics of strait features. This requires total sea floor surveys carried out at intervals, in order to observe any differences. Tidal prediction is also an area for examination and in parts of the world where underkeel clearance is critical, such as the Elbe and St. Lawrence Rivers, real-time tele-metered reporting systems were found to be most effective.

The technology that puts together all this information for presentation to navigators onboard and to vessel traffic monitoring systems is called the electronic chart. This would require that all the environmental data be translated in digital form. Ships with cargo considering underkeel clearance to be critical should be equipped with the Electronic Chart Display and Information Systems (ECDIS).

At present, carrying such equipment is not required under SOLAS, but this may become a requirement of future regulatory

regimes for specific areas such as the Straits of Malacca and Singapore. For high speed vessels, such as container ships and fast ferries, it is advisable for them to carry the above equipment. In any case, the provision of digital data becomes the responsibility of the littoral States. Fortunately, Singapore has already taken steps to provide this type of data and other states in the region are encouraged to do the same.

So far, our discussion focused on the needs of navigators plying the Straits of Malacca and Singapore. But how does this affect the financial regime? It has already been noted that, under UNCLOS, there appears to be no legal requirement to impose financial costs on users. It is suggested however that improved navigational services contribute to safety, as well as economic efficiency of marine transportation. Even as the present underkeel clearance requirement of 3.5 m has been subject to intense debate, it definitely deserves a re-examination. Olson (1994) showed that gross underkeel clearance may vary at 7% of the draught in maneuvering and mooring areas, and 20% of the draught in the open sea. Considering a maximum draught of 23 m in the Straits area, this would mean a 1.6 m and 4.6 m underkeel clearance, respectively. The Malacca Straits is neither classified in the former nor the latter categories, such that we can only consider the open sea of the Straits to be very protected and that the actual underkeel clearance for vessel passage may be decreased. However, if the uncertainty of the depth could be minimized, the clearance may be reduced by several decimeters, allowing greater carrying capacity for large vessels. This would require a financial arrangement that would transfer part of the increased revenue back to the littoral States, so that they could

provide the services that would allow greater tolerance. In the long run, this would lead to safer navigation.

The Straits of Malacca and Singapore present a relatively catchy situation. This is not the case for the South China Sea. The very serious shortcomings of the charts have already been stressed. In addition to the difficulties caused by the sovereignty disputes on the Spratleys and other islands, most of the coastal states surrounding the South China Sea have enough problems with surveying and charting the waters around their coasts. Over 25 years ago, the International Hydrographic Organization first proposed to the Economic Commission for Asia and the Pacific (ESCAP) and to the United Nations Development Programme (UNDP) in the Region that the coastal states conduct a cooperative survey funded by UNDP. Such action apparently requires complete support from all the coastal states involved, but this has not materialized. Unlike the Malacca Straits where Japan came in to provide financial support, countries around the South China Sea do not admit that a problem exists. They contend that all ships follow a route through the deeper water westwards of the charted shallow and unsurveyed areas. It is difficult to say if the latter is justifiable or merely an effort at avoiding potential sovereignty disputes. The Olson (1994) Report states that a substantial volume of traffic passes along the north coast of Sarawak, through the Palawan Channel and north of the dangerous ground on the route between Singapore and Manila. Added to this, we must consider the ever increasing activity of the oil and gas companies, particularly off Vietnam and in the Gulf of Thailand. Most marine accidents do not occur if ships are able to maintain their regular courses. However,

should a typhoon or other natural cause drive them out of the well trodden paths, the probability of accidents substantially increase.

Conclusion

This paper has developed little regarding solutions to the financial dilemma that faces the maritime community. Countries with large international shipping interests expect that marine services in the form of charts and navigation aids will be made available to them at little or no cost. Existing conventions appear to emphasize this fact. UNCLOS does not encourage users to pay for these services although in the case of international straits, an agreement to cooperate is expected. Anticipated amendments to SOLAS tend to emphasize the responsibility of coastal states to provide navigational services, presumably out of their own budgets. Shipping tonnage is rapidly increasing in East Asia and except in critical areas, countries continue to use charts compiled from surveys carried out in the last century. Even if electronic charts come into being, they will be primarily the product of digitizing the information shown on these old paper charts.

The only possible immediate source of payment for services seems to be from voluntary mechanisms, such as that unilaterally provided by Japan. In the long term, a completely new regime should be considered, where ship owners and operators may contribute to assuming the cost of services providing for their safety and prosperity. Such services are increasingly becoming influential globally and regionally, and deserve a similarly far reaching system of compensation. Various authors have suggested that it is time to

develop a new maritime regime to pay for services, such as VTS and GNSS. Although the idea of tolls in international straits is strongly contested, it is time that the maritime community rethink the idea. A regime is needed to provide equitable burden-sharing covering both users and coastal states in all oceans and seas of the world. A failure to develop such a financial strategy will result in the reactive approach which unfortunately is the system under which maritime conventions and regulations have been formulated in recent years.

References

- Anderson, D. 1996. *In Proceedings of the Conference on Navigational Safety and Control of Pollution in the Straits of Malacca and Singapore*. Institute of Policy Studies and International Maritime Organization.
- Axelsson, R. and P. Sunberg. 1992. The use of airborne laser in hydrographic surveys. *In Proceedings Hydrographic Symposium XIV (2) International Hydrographic Conference*, 4-15 May 1992.
- Chia, L.S. 1996. The importance of the Straits of Malacca and Singapore. *In Proceedings of the Conference on Navigational Safety and Control of Pollution in the Straits of Malacca and Singapore*. Institute of Policy Studies and International Maritime Organization.
- Gold, E. 1985. Vessel traffic services - the new law of the sea. *J. Navigation* 38(1):71-76.
- Gooding, N.R. 1992. NAVSTAR GPS - charting aspects. *J. Navigation* 45(3):344-351.
- Haslam, D.W. 1985. Why a hydrographic office? *Int. Hydrogr. Rev.* 62(1):7-16.
- Institute of Policy Studies. 1996. Straits of Malacca and Singapore. Modalities of International Co-operation, 2-3 September 1996.
- International Hydrographic Bureau. 1991. Status of hydrographic surveying and charting worldwide. 1st ed. [January 1991] Spec. Publ. No. 55, 94 p.
- Kerr, A.J. 1990. Status report on activities of IMO and IHO concerning the electronic chart. *Int. Hydrogr. Rev.* 68(2):7-16.
- La Chapelle, G., A. Kielland, and M. Casey. 1992. GPS for marine navigation and hydrography. *Int. Hydrogr. Rev.* 69(1):43-69.
- Lundberg, O. 1995. Civil GNSS. The INMARSAT vision for the 21st Century. *J. Navigation* 48(2):166-179.
- Nandan, N. 1996. Introduction to the provisions of straits used for international navigation in the 1982 UNCLOS. *In Proceedings of the Conference on Navigational Safety and Control of Pollution in the Straits of Malacca and Singapore*. Institute of Policy Studies and International Maritime Organization.
- Olson H.F. 1994 Marine traffic in the South China Sea. International Hydrographic Bureau. 35 p.
- Pasquay, J.N. 1986. Hydrographic requirements for modern shipping. *J. Navigation* 39(3):341-348.
- Pienc. 1985. Underkeel clearance for large ships in maritime fairway with hard bottom. Permanent International Association of Navigation Congresses. Supplement to Bull. No. 51, 25 p.
- Ritchie, G.S. 1980. Navigation and society. *J. Navigation* 33(1):1-10.
- Ritchie, G.S. 1991. The history of hydrography—an enlightened era, 1660-1800. *Int. Hydrogr. Rev.* 68(1):7-20.
- Saishoji, K. 1996. Japan's Contribution to Safe Navigation in the Straits of Malacca and Singapore. Institute of Policy Studies and International Maritime Organization.

COOPERATION IN THE MALACCA STRAITS

Teh Kong Leong

Director for Shipping

Maritime and Port Industry Authority

1 Maritime Square #09-66 0409

Singapore

TEH, K.L. 1997. Cooperation in the Straits of Malacca, p. 131-134. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

In respect of marine pollution from ships, there are three main areas that we should look at: prevention, combat, and compensation. In all these areas, various schemes have been developed, and these may be categorized into international, regional, and national.

International Marine Pollution Schemes

There are a host of relevant international conventions which have been developed by the International Maritime Organization (IMO). For prevention of pollution from ships, there are SOLAS '74, MARPOL 73/78, Load Lines '66, COLREG '72, and the London Convention '72. For combating pollution, there is the OPRC '92; and for compensation, there are the CLC and Fund Conventions and their Protocols. The status of acceptance of these instruments by the three littoral States of the Malacca Straits is shown in *Table 1*.

There also exists a routing system in the Malacca Straits which was adopted by the IMO in 1977 and implemented in 1981. The system consists of three traffic separation schemes—one at the One Fathom Bank area; one in the Singapore Strait; and the third off Pedra Branca, and a set of rules for vessels transiting the Strait. Details of the scheme are given in Rule 10 of

the International Regulations for Preventing Collisions at Sea, 1972, as amended on 19 November 1981 by IMO Assembly resolution A.464(XII), on 19 November 1987 by Assembly resolution A.626(15) and on 19 October 1989 by Assembly resolution A.678(16). The scheme was only implemented after joint hydrographic surveys had been carried out; some shoals had been cropped; and certain critical aids to navigation installed or upgraded. These projects were carried out with support from Japan.

Regional Marine Pollution Schemes

For more than two decades, the Tripartite Technical Experts Group (TTEG) has been working on measures to improve safety of navigation in the Malacca Strait. More recently, its ambit was expanded to include the prevention of pollution from ships. The TTEG, which comprises officials of Indonesia, Malaysia, and Singapore, reports to the Senior Officials Meeting (SOM). Apart from the routing system, the TTEG has also worked on issues like tidal and current studies, common datum charts, joint hydrographic surveys, and aids to navigation.

With a donation of 400 million yen in 1981 from Japanese nongovernment interests, a Revolving Fund was established for the Straits of Malacca and Singapore. The purpose of the Fund is to

Table 1. Status of acceptance of international conventions by the three littoral States of the Malacca Straits

No.	Status of Convention	Indonesia	Malaysia	Singapore
1	International Convention for the Safety of Life at Sea, 1974 (SOLAS 1974)	1981	1984	1981
2	Convention of the International Regulations for Preventing Collisions at Sea, 1972 (COLREG 1972)	1979	1980	1977
3	International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78)	1987	(1997)	1991
4	International Convention on Load Line (LL 1966)	1977	1971	1971
5	International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC 1969)	1978	1995	1981
6	Protocol to the International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC PROT 1976)	--	--	1982
7	Protocol of 1992 to amend the International Convention on Civil Liability for Oil Pollution Damage	--	--	--
8	International Convention on the Establishment of an International Fund of Compensation for Oil Pollution Damage, 1971 (Fund 1971)	1978	1995	--
9	Protocol to the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 (FUND PROT 1976)	--	--	--
10	Protocol of 1992 to amend the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 (FUND PROT 1992)	--	--	--
11	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW 1978)	1987	1992	1988
12	Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (LC 1972)	--	--	--
13	International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990 (OPRC1990)	--	--	--

provide advances for combating oil pollution from ships. The advances are repaid when compensation is received. So far, advances have been made in connection with the *Nagasaki Spirit / Ocean Blessing* incident. Under the Revolving Fund Committee (which looks after the Fund), a Standard Operating Procedure for Combating Oil Pollution Incidents in the Straits was drawn up. This is a contingency plan subscribed to by Indonesia, Malaysia, and Singapore. Three

major exercises have so far been carried out to test its effectiveness.

At the ASEAN level, there have been two significant developments. With Japanese assistance, ASEAN adopted the Oil Spill Response Action Plan (OSRAP), and embarked on the Oil Spill Preparedness and Response in the ASEAN Region (OSPAR) project. The latter involved the provision by Japan of oil pollution cleanup equipment, and regular meetings to discuss management issues.

The private sector has also made significant contributions. East Asia Response Limited (EARL) was set up by some major oil companies to establish, maintain and operate oil spill combating equipment. EARL is primarily based in Singapore, but its operations cover a wide area. It also provides relevant training. The Petroleum Association of Japan has established equipment bases in key locations. It is also important to bear in mind the role of the salvage industry, which very often plays the key role in tackling pollution incidents.

Ports in the Asia-Pacific region are paying closer attention to visiting ships. Under the MOU on Port State Control (PSC), PSC inspectors inspect foreign ships for deficiencies under the various international conventions. Ships with serious defects may be detained. By the year 2000, it is expected that 50% of the ships operating in the region will be inspected annually.

National Marine Pollution Schemes

National systems include contingency plans, equipment stockpiles (both public and private), and organizations for dealing with pollution incidents. There may also be surveillance capability in terms of radars, aircraft, and vessels. Under the MARPOL Convention, countries are to set up adequate reception facilities. However, it is well accepted that these are inadequate in many parts of the world.

The Challenges

Prevention is better than cure. However, it also seems to be more difficult. Despite the host of international requirements covering practically every aspect, including ship design, cons-

truction, equipment, operation, manning and training, accidents continue to occur. These in turn lead to more requirements. Some contend that it is a vicious cycle! But, overall, the situation has actually improved, with fewer casualties and less operational pollution of the sea by ships.

The situation is far from perfect. One explanation for the seemingly unsatisfactory state of affairs is that enforcement/implementation of the various requirements is weak. This can only be part of the answer. If we look at some of the significant incidents over the years, we will find many cases where the primary cause was negligence, and where highly qualified and experienced personnel, and very reputable companies were involved. The "human factor" has been cited many times.

There may be all sorts of equipment available, but the crucial factor for success in combating pollution incidents is cooperation. This is even more critical when many different agencies, and from different countries, are involved.

Future Directions

The implementation of the International Safety Management Code from 1 July 1998 should result in significant improvements in the way ships are managed. Coupled with the revised Standards of Training, Certification and Watchkeeping for Seafarers (STCW) Convention, which comes into force on 1 February 1997, we have a strong package of measures to tackle the "human factor". At the same time, the IMO's Working Group on the Human Element continues to look into other relevant issues, and it is expected that countries will be making contributions to these efforts. One of these will be the US which has initiated a comprehensive study on the subject.

A proposal for new routing measures (including amendments to the existing traffic separation schemes) was submitted to the IMO in 1995. A joint hydrographic survey and confirmation of reported wrecks and shoals started in October 1996. Its results could have an impact on the proposal which is to be further discussed at the IMO. These measures, when implemented, should improve safety.

Port State Control will not only be targeting more ships. Inspections will be more comprehensive, covering also operational aspects and the quality and adequacy of ships' crews. With similar activities in other regions in the world, there will practically be no escape for substandard ships.

IMO/INDUSTRY GLOBAL OIL SPILL PLANNING INITIATIVE: AN IPIECA PERSPECTIVE

John S. Lemlin

Secretary-General

International Petroleum Industry Environmental Conservation Association
2nd Floor, Monmouth House, 87/93 Westbourne Grove, London W2 4UL
United Kingdom

LEMLIN, J.S. 1997. IMO/Industry global oil spill planning initiative: an IPIECA perspective, p. 135-147. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) *Sustainable financing mechanisms: public sector-private sector partnership*, MPP-EAS Conference Proceedings No. 6, 352 p.

"The Global Initiative may be defined as an umbrella for various mechanisms by which IMO and industry cooperate to support national implementation of the OPRC Convention."

The International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC Convention) in the Context of International Environmental Conventions

A series of major oil pollution incidents in 1989-90, of which the *Exxon Valdez* was the most publicized, created a sense of public outrage which encouraged immediate government action in concerned countries. Many international agencies, including those within the United Nations, identified actions which would require financing from both government and industry. Accordingly, initiatives were taken by the United Nations' International Maritime Organization (IMO). National delegates to the IMO from over 130 countries engaged in intensive debate over a period of some 18 months, resulting in the International Convention on Oil Pollution Preparedness, Response and Co-operation of 1990, which was negotiated at almost unprecedented speed and has been subsequently ratified.

The provisions of the Convention are extensive. Central to the Convention, and to the issues to which it responds, are the following requirements of Article 6:

"(1) Each party shall establish a national system for responding promptly and effectively to oil pollution incidents. This system shall include as a minimum:

- a) the designation of:
 - i) the competent national authority or authorities with responsibility for oil pollution preparedness and response;
 - ii) the national operational contact point or points, which shall be responsible for the receipt and transmission of oil pollution reports as referred to in Article 4; and
 - iii) an authority which is entitled to act on behalf of the State to request assistance or to decide to render the assistance requested;
- b) a national contingency plan for preparedness and response which includes the organisational relationship of the various bodies involved, whether public or private, taking into account guidelines developed by the Organization.

- (2) In addition, each Party within its capabilities either individually or through bilateral or multilateral cooperation and, as appropriate, in cooperation with the oil and shipping industries, port authorities and other relevant entities, shall establish:
- a) a minimum level of pre-positioned oil spill combating equipment, commensurate with the risk involved, and programs for its use;
 - b) a program of exercises for oil pollution response organizations and training of relevant personnel;
 - c) detailed plans and communication capabilities for responding to an oil pollution incident. Such capabilities should be continuously available; and
 - d) a mechanism or arrangement to coordinate the response to an oil pollution incident with, if appropriate, the capabilities to mobilize the necessary resources.
- (3) Each Party shall ensure that current information is provided to the Organization, directly or through the relevant regional organization of arrangements concerning:
- a) the location, telecommunication data and, if applicable, areas of responsibility of authorities and entities referred to in paragraph (1)a;
 - b) information concerning pollution response equipment and expertise in disciplines related to oil pollution response and marine salvage which may be made available to other States, upon request; and
 - c) its national contingency plan.

Within the same timeframe, three other international conventions were being negotiated under the United Nations Environment Programme (UNEP). There was the Convention on Climate Change and the Convention on Biodiversity which joined the already mature negotiations on the Vienna Convention regarding ozone layer depletion. The latter has become better known by reference to its first protocol, the Montreal Protocol, under which commitments were forged to limit the use of chlorofluorocarbons. All four conventions were presented to the United Nations Conference on Environment and Development (UNCED) 1992 in Rio de Janeiro; and received the widespread, if not unanimous, endorsement of the nations represented at that Conference.

The OPRC Convention was unique in one key aspect which continues to be a crucial element in its progress. It remains an unfunded Convention; thus, it cannot, within the rules created by the UNCED Conference, draw from its insignificant budget—in the region of US\$2 billion—allocated to the Global Environment Facility. These funds aim at supporting developing countries' research and development activities designed to meet the goals of the three aforementioned conventions.

The Role of Industry in the Convention Negotiations

Negotiators at the OPRC Convention may regret the non-allocation of funding provisions for its implementation. On the other hand, one significant decision is to include an obligation which makes the convention different from the other international environmental conventions. This is spelled out clearly within Article 6, with the key phrase highlighted below:

....In addition, each Party within its capabilities either individually or through bilateral or multilateral cooperation and, as appropriate, in cooperation with the oil and shipping industries, port authorities and other relevant entities, shall establish....

The oil industry was represented throughout the negotiations with the observer/NGO status of industry associations, such as the Oil Companies International Marine Forum (OCIMF) and the Oil Industry International Exploration and Production Forum (E&P Forum). The involvement of the International Tanker Owners Pollution Federation, Ltd. (ITOPF) provided a bridge between oil and shipping interests, while shipping interests were represented through organizations such as the International Chamber of Commerce (ICC) and International Association of Independent Tanker Owners (Intertanko). IPIECA was not involved then, nor has it been working with IMO except as an organization with accredited NGO status.

What is IPIECA?

The International Petroleum Industry Environmental Conservation Association (IPIECA) was formed in 1974. Its formation was a direct result of the international communities' decision to create UNEP. UNEP was tasked with managing environmental issues of global significance. IPIECA's task, on behalf of the international oil industry, paralleled that of UNEP. Thus, IPIECA became the vehicle through which the oil industry's participation can be manifested in international discussions on global environment issues. Its current membership includes 21 of the major

international oil companies owned by the private and public sectors. Membership also includes many other associations formed by the industry to serve its specific needs at the national, regional, and international levels, including Shell, BP, Exxon, Saudi Aramco, Petronas, Pertamina, PDVSA, and industry associations or institutes of Australia, Japan, Europe, and America. IPIECA has gained formal NGO status at the United Nations.

By 1989, IPIECA was participating significantly in activities regarding the climate change issue. An established but less developed idea concerned oil spill preparedness and response. IPIECA was faced with the questions: (a) What should be the oil industry response to the challenge set before it in Article 6 of the OPRC Convention? and (b) How could any proposed response be most effectively delivered?

The Role of IPIECA in Addressing the Obligation of the Oil Industry Under the OPRC Convention

The IPIECA Oil Spill Working Group activity in 1989 was limited to very few members. Faced with this new challenge, the first step was to encourage broader participation by convening a workshop in October 1989 in Edinburgh, Scotland, represented by all IPIECA members and involving about 60 experts from oil spill response centers worldwide. The workshop was tasked to determine: (a) What should the contribution of IPIECA be in addressing the obligations placed on the oil industry within Article 6 of the OPRC Convention? (b) How could an international contribution through IPIECA catalyze and help to sustain national oil industry activity? The group acknowledged

the importance of IPIECA as the primary conduit of industry support, due to its members' involvement in national, regional, and local oil spill response arrangements.

Previous to the workshop, the oil industry was receiving a growing number of requests from international, regional, and national agencies to finance and support efforts at conducting more oil spill response training, while recognizing that the prime task must be to identify the causes and to minimize the potential for oil pollution incidents. While the latter challenge lay fairly with OCIMF and E&P Forum, it was to the IPIECA Oil Spill Working Group that all such requests for training in OSR were channelled for consideration within the framework of the broader remit it had been given.

With this remit, we observe the genesis of the Global Initiative. It was not until 1995, however, that what had become a robust and continuing partnership with the IMO was established with a joint IMO/IPIECA Secretariat paper that was presented to the 37th IMO Marine Environment Protection Committee (MEPC).

What Were the Key Outputs from the IPIECA Edinburgh Workshop?

The workshop was unanimous in its agreement that the oil industry must individually and collectively assign highest priority to steps designed to reduce the risk of oil pollution incidents of varied magnitude. The mandate for such endeavor lies with the associations led by OCIMF. Nevertheless, the industry has to prepare for the possibility of oil spills, including major marine pollution

incidents, occurring in the future. More credible and effective oil spill response arrangements (from the management, technical and cost viewpoints) had to be created with priority being given to the geographical areas at greatest risk.

The opportunity presented by the workshop to exchange and test opinions on a wide range of issues, ideas, and technical developments was itself recognized to be of great value, as it encouraged broad-based involvement in the IPIECA Oil Spill Working Group to continue, quite undiminished albeit with a changing cast of players. Deliberations resolved that the importance of communicating a strong and consistent view on a preferred strategy was essential, if industry were to work in partnership with IMO and national governments, as envisaged within the OPRC framework.

This recommendation was manifested in the decision to begin the IPIECA report series with a volume which clearly sets out an international oil industry perspective on such matters as the approaches to the development of contingency plans; the key elements that any national, regional, or local plan must recognize; and the necessary linkages that had to be integrated into plans designed to serve different purposes. The report was entitled "A Guide to Contingency Planning for Oil Spills on Water",¹ with several thousand copies distributed worldwide. Above all, the report stressed the need for partnerships between government and industry.

The workshop also identified a need for new documentation which would provide the readership with a technically

¹ A Guide to Contingency Planning for Oil Spills on Water, IPIECA Report Series, Volume 2

impeccable, but reader-friendly understanding of the many environmental issues raised by oil pollution. This recommendation was addressed through seven volumes to date in the IPIECA report series, each concerned with impacts of and response options available, set in the context of net environmental benefit analysis. This series, managed on behalf of the IPIECA Oil Spill Working Group by Dr. Jennifer Baker, has attracted worldwide acclaim and is foreseen to continue into the future. It has succeeded in providing managers in government and industry with clear messages regarding the factors they need to recognize and the balances they must strike in determining response strategies for any specific incident and location.

The two most recent volumes published in 1996 have been produced jointly with IMO and have thus been additionally strengthened by the parallel peer review of IMO-MEPC government representatives and oil industry and academic experts. They provide one measure of the strength of the partnership developed between the two organizations since they first worked together in 1990. A measure of the success of the entire report series is shown by the publication of several volumes in French, Spanish, Italian, and Japanese, and two volumes in Chinese.

The workshop made two other important recommendations. The first was that IPIECA should attempt to collate oil spill related research and development activities worldwide; thereby facilitating interactions between research groups addressing related problems at the government agency, industry, and academic institution levels. This was recognized to be a huge task, and the

subsequently created IMO International Oil Spill Research and Development Forum, which first met in June 1992 and again in May 1995, was readily recognized as the more appropriate vehicle for the task. Therefore, these particular recommendations are yet in progress.

The other workshop recommendation was for the oil industry to contribute to education and training programs in cooperation with IMO. But any program undertaken: (a) must take place within the clearly identifiable and understood context of needs defined by a national contingency planning process; (b) must address with equal importance all the elements that are vital to effective contingency planning, including assessment of risk, evaluation of possible response options, definition of individual responsibilities within a clearly understood management structure, identification of manpower skills and material resources to implement any agreed response strategy, and training and exercises; and (c) must be provided in a form and under conditions which provide long-term sustainable benefits.

Through the implementation of the last recommendation, IPIECA began its dialogue with IMO, aimed at reaching agreement on means by which the industry should respond to the opportunity presented in Article 6 of the OPRC Convention at the international level.

Genesis of the IMO/IPIECA Industry Partnership

IPIECA has been the recipient of a multitude of requests for international agencies to provide both expert and financial help for what was colloquially referred to as "Oil Spill Training". Taken

at face value, there are those who would argue that the last thing the industry needed was training in how to spill oil!

While recognizing and accepting the need for education and training in oil spill preparedness and response, IPIECA needed to establish its unique contribution which: (a) met its self-imposed criteria; (b) recognized that many individual companies would be undertaking training programs at the national, regional, and international levels; (c) would be accepted as a credible contribution at the industry and government level; and (d) responded to the specific needs of the OPRC Convention.

The starting point was a commitment to work exclusively with IMO to inform all the other agencies that approached IPIECA. The reasons were threefold. First, IPIECA could not sustain a multitude of activities with several organizations. Second, IMO was accepted internationally as the prime forum for debate relating to marine pollution and protection. Third, IMO had an established program of education and training, and had specifically asked the oil industry to cooperate in the context of the OPRC.

Developing a Common View on an Approach to Education and Training: The International Seminar Program

Discussions between IPIECA and IMO were conducted over several months, during which a joint review was undertaken on the effectiveness and sustainability of education and training programs in the past, creating improvements in oil spill response capabilities. The *Torrey Canyon* and the *Amoco Cadiz* incidents in the 1960s and the late 1970s, respectively, were but two

of the events identified. The latter event was recognized to have catalyzed major research, development, and education/training programs in which governments, industry, and international agencies had each played roles. Many millions of dollars and thousands of man hours had been expended. Why then, in the early 1990s do we ask if effective, tried and tested, and fully sustainable response arrangements are not already in place? They clearly were not, with the exception of certain international centers, a few mature arrangements for key Northern European areas, and within a very few developing countries. Certainly, the demands placed on industry in North America as a result of the *Exxon Valdez* incident clearly communicated the lack of confidence in existing arrangements by government and industry in that part of the world. However, the task of the OPRC Convention is primarily to address the needs of developing coastal states. The findings of a joint analysis show that despite extensive investment in education and training programs by government and industry, only 10-15% long-term retention could be established, due to the following issues:

- a) top-down management commitment had not been secured from national government or industry at the outset;
- b) rarely did education/training programs involve working partnerships between government and industry;
- c) training was often undertaken outside the context of a clearly defined oil spill response (OSR) contingency planning program and involving facilities which had no well-defined role in a carefully considered response strategy;

- d) training was often undertaken because equipment had already been procured as a first step in developing oil spill preparedness, and training for the use of the equipment was seen to be obviously the next necessary step; and
- e) oil spill preparedness ranked low among national priorities, and priority for sustaining an activity was related inversely to the timing of the last training or donor consultant's visit.

government, industry and all others who share the risk and responsibility which requires: (a) An assessment of the risks and economic, social and ecological impacts; (b) The development of credible response strategies; (c) A clear definition and allocation of responsibilities; and (d) A commitment by government and industry to exercising, maintaining and updating contingency arrangements.

Each seminar program was designed to stimulate and encourage a flow of information between delegates. The international input was designed primarily to create a basis for helping the delegates to understand, in measurable terms, the status of their current preparedness and the steps that would have to be taken before they could realistically claim to have an effective, tested, and sustainable contingency plan which responded to a careful assessment of the involved risks.

The program placed great emphasis on governments taking the lead in defining responsibilities, but working with industry and other groups to ensure that they were allocated in a manner by which all the involved parties were fully committed.

The program of seminars began in Jakarta, Indonesia towards the end of 1991 for the ASEAN countries and concluded in November 1994 in Hong Kong for NE Asia and the Pacific Islands. The ASEAN countries were invited to share their experience regarding developments since 1991 at that final meeting. In between, the seminars were conducted in Cairo for the Mediterranean, in Caracas for Latin and Central America, in Gabon for East and West Africa, in Bahrain for the Gulf States, and in Caracas for the Caribbean.

In this light, IPIECA representing the oil industry proposed a program for international seminars which addressed the above concerns. This should generate, as its prime output, a commitment by government and industry at the senior and national levels to cooperate in pursuit of the goals of the OPRC Convention for their countries. The seminar program would: (a) cover the regions of the world with seas experiencing significant oil transshipment; (b) be paid for by the IPIECA membership and other industry donors of which ITOPF was a noted contributor; (c) bring together senior government officials and industry managers whose key responsibility aimed at crisis management, including oil spill preparedness and response; and (d) delegate to IMO the prime responsibility for encouraging and facilitating senior government participation, and to IPIECA the role of ensuring senior industry managers' participation.

The key messages for the program to be delivered jointly by the group of IMO and industry specialists were:

Effective Contingency Planning is a cooperative process involving

In all, over 1,000 delegates from nearly 100 countries participated. As part of joint efforts to secure sustainable follow-up on the Seminar Program, the prime theme of this seminar "Working Together" was captured in a video film now produced in English, French, Spanish, and Chinese. It was filmed primarily in Curaçao during the meeting there.

Post Seminar Activity—A Second Phase of the Global Initiative

Early during preparations for the Seminar Program, it was hoped that the Program itself would be a sufficient catalyst for sustainable national programs. As the program moved along, part of which involved maintaining contact with countries that had already been involved, it became apparent that a second phase of activity, targeted at the individual country level was likely to become necessary. That is not to deny the obvious and measurable successes that have been achieved, of which three are of special note:

- a) At the 1991 Seminar in Jakarta, it proved impossible to achieve the objective of a single joint government/industry presentation of national activity from any of the ASEAN countries. Three years later, at the Hong Kong Seminar, four of these countries agreed to joint presentations describing partnerships of national activity.
- b) The Caracas Seminar in 1992 provided an opportunity to review the significant but mostly separate initiatives of government and industry in the Latin American countries. Governments were in fact cooperating within the framework of the ROCRAM (Red Operativa de Cooperacion Regional entre Autoridades

Maritimas de Sudamerica, Mexico, Panama y Cuba) agreements to which industry was not a party. By 1994, during the Curaçao Seminar, IPIECA/IMO/ROCRAM and ARPEL (or Asistencia Reciproca Petrolera Empresarial Latinoamericana), an umbrella organization for the oil industry in Latin America) met to consider needs and opportunities for collective action. A joint ARPEL/ROCRAM agreement is now at the final stage of negotiation.

- c) Just over a year after the Curaçao (Netherlands Antilles) meeting, the government of The Netherlands announced financial and experienced manpower support for a new coordination center for Oil Spill Preparedness in the Caribbean. Known as REMPEITC, the new facility has a resource base which will enable it to respond effectively to needs identified by the individual island states. Dialogue with IMO and IPIECA has begun to explore ways by which the post Seminar phase of the Global Initiative can provide support for their activity. One immediate and most encouraging development took place on the island of St. Eustatius, at which a planned Saudi Aramco desk top exercise was used as the basis for integrating a cooperative government/industry exercise. Tier 1 capability at Statia Terminal on the island was deployed as part of the exercise.

In spite of this evidence of success, it remains that in many of the developing countries, economic capacity is very limited and that involved government agencies are unable to allocate scarce funds to pursue their involvement in

national oil spill preparedness programs without external donor support. Therefore, throughout 1994 and 1995, discussions between IMO and IPIECA have explored mechanisms through which national programs, especially in the smaller, less affluent developed countries, could progress. This joint evaluation culminated in the joint report to the 37th MEPC² referred to earlier in this paper and in which the title Global Initiative was made public for the first time. It focused initial efforts on Africa and a first demonstration was attempted in the latter months of 1995 and during 1996 with a focal point meeting involving most of the African coastal states, and including South Africa for the first time. The demonstration was given financial support to involve government agencies through generous grants from the World Bank - Global Environment Facility (GEF) and the United Kingdom Overseas Development Agency (UK ODA).

EVOLUTION OF THE GLOBAL INITIATIVE DEMONSTRATION IN AFRICA

The funding commitment by GEF and UK ODA was augmented by professional staff commitments from ITOPI, CFDR, and the South African Oil Industry Association for active participation in the African program. This program was developed by IMO and IPIECA with the involvement of all the above identified groups that planned three phases of activities from the 4th quarter of 1995 until the end of 1996.

- a) Visits to three countries during which workshops involving government,

local industry, and a visiting IMO/Industry international team which conducted a structured examination of needs and opportunities. The discussions also introduced the concept of a national project manager to assume the responsibility for developing, managing, and securing donor financial support for national project activities designed to establish tried and tested sustainable OSR contingency plans. Côte d'Ivoire, Ghana, and Tanzania were the three countries selected.

- b) An international workshop in Cape Town³ co-hosted by the South African government and industry managers from as many coastal African states as possible. The structure of this workshop drew on experience from the Seminar Program, the three country visits and from the portfolio of African experiences that lay within the IMO/Industry team. At the workshop the goals of the meeting were:
- to obtain an indication of the priorities governments and industry are prepared to assign to sustainable oil spill preparedness and response;
 - to determine the appropriateness of the assistance and support offered under the Global Initiative and to identify suitable modification to meet the range of national requirements in the African region;
 - to ensure that national delegates, international agencies and potential donors have a common view of what is needed for the successful

² IMO MEPC 37/15/9/1 Technical Co-operation Activities Relating to Marine Pollution Preparedness and Response.

³ IMO MEPC 38/15/7 Report of the IMO/IPIECA Oil Spill Planning Meeting, 12-15 March 1996, Cape Town, South Africa.

development and application of the Global Initiative support of national programs.

The program comprised a session describing the internationally preferred approach to contingency planning; a session in which the South African Industry and Government in partnership described the evolution of response capabilities in their country and its accessibility to other countries in Africa; and a third and key workshop in which small groups of delegates working with experienced facilitators worked to define needs and opportunities in their countries. The workshop sessions were requested to give special emphasis to difficulties and barriers that need to be overcome before significant progress can be achieved. They were also invited to provide an active assessment of the value, or lack of benefit, of previous external missions to their countries.

- c) Follow-up missions to a range of African countries through which the design emerging from the first two phases of activity involved:
- putting into action in several African countries a tangible response to the needs and opportunities identified;
 - exploring the relevance of the African experience for the other regions of the world for which the Global Initiative was conceived to help.

the Global Initiative was no exception to that paradigm. What then were the lessons learned? While they may be expressed in different ways by the various involved players, the key points that emerged were:

- a) The national and environmental priorities of developing countries do not necessarily coincide with those identified by developed countries and international agencies. Fresh food and water in abundant supply and operational sanitation often are a long way ahead of oil spill contingency planning when it comes to allocation of scarce resources.
- b) Infrastructure and available managerial and communication systems are often less mature and sophisticated than OECD country counterparts. Progress is therefore hard-won and it is quite inappropriate to make judgements on progress based on criteria external to a country.
- c) When defining the oil industry within a country, it is important to recognize and include all of the elements involved—i.e., the state oil company, private national oil interests, as well as the obvious international oil companies.
- d) There is considerable disenchantment among many on the international programs that were designed to create a structured basis from which regional environmental programs should be launched, but which have become talking shops with no capacity for measurable action on the ground.
- e) There was little point in new missions of experts to countries if

Lessons Learned from the Completed Phases of the African Demonstration

Hindsight is a precious gift and with the benefit of that wisdom oftentimes one would choose an alternative approach to that first selected. The demonstration of

- they did not possess the means—usually, financial—to carry forward recommendations emerging from the visit. The ministries of the developed world would appear to have offices lined with shelves upon which sit the paper recommendations of consultants waiting for resources to facilitate their implementation.
- f) It is important to recognize that where technical expertise is being offered, its value is limited if it merely serves to address and resolve the problem at hand. Of much greater and sustainable benefit would be the sharing of that expertise in a way which builds national capacity. Every opportunity should therefore be taken to ensure the involvement of centers of expertise and academia in such visits.
 - g) Given the limited resources available to the governments of many developing countries and their priorities, if international industry wishes to work in partnership with governments it will have to take the initiative in forging a comprehensive basis for industry partnership in the country, and in encouraging and making resources available to facilitate partnership between the industrial sector and government agencies. Resources should include energy, expertise, and available materials and equipment.
 - h) The challenges of acquiring donor support for project activity can be daunting and may well be beyond the capacity of the under-resourced national agencies in many developing countries. Securing donor support be it from international agencies such as the World Bank, GEF, or from individual donor countries requires considerable expertise and energy. For the process to be effective, it is vital to understand the geographic areas that are of interest to donors, what particular technical capacity donor agencies are motivated to offer and the reasons and areas within that matrix where it is practical to submit a proposal relating to oil spill contingency planning for Country "A". These challenges can only be met through the ready and sustained availability of suitable experienced personnel serving the Global Initiative centrally.
 - i) That while the concepts that lie behind the IMO/Industry Global Initiative have received warm endorsement from government and industry and initial expressions of financial support, it clearly has to demonstrate its claimed capacity to deliver real, tangible and sustainable benefits in pursuit of the goals of the OPRC Convention. And further, it has to demonstrate that its unique feature of partnership between industry and international agencies, and industry and governments is the key factor in achieving success. It is unrealistic to believe that substantial incremental funding will come forward without that demonstration. The demonstration has to be achieved within the scope of already committed, but very limited financial and manpower resources.
- The capacity to drive forward the Global Initiative while taking full account of the issues raised in the first two phases of the demonstration requires that three

critical factors be satisfied: (a) resources deployed centrally on behalf of the Global Initiative must represent a marriage of IMO, government and industry experience; (b) there must be a mechanism for motivating industry at the national level to work cooperatively in pursuit of partnerships with government; and (c) government and industry working in partnership at the national level must evolve procedures which allow contingency planning processes to move forward according to existing limited national resources. These procedures must also involve a joint appreciation of the needs and opportunities which require external assistance to be facilitated through the central Global Initiative team.

Where to from Here— The Next Six Months

The wisdom from hindsight summarized in the previous paragraphs did not develop from a single blinding flow of inspiration. It flows from discussions involving many people who have been involved in and associated with the Global Initiative from its very beginning in 1990. It has involved many cycles of discussion, the writing of perhaps far too many papers and undoubtedly has taken much longer than many of us would have hoped. Not the least among those disappointed with the duration of the review process will be the many government and industry representatives that participated in the visit to Côte d'Ivoire, Ghana, Tanzania and all the delegates to the Cape Town workshops. It is that last disappointment that we now address as priority.

We now agree on what we must do during the next six months to provide a credible demonstration of the Global Initiative capacity to deliver. We have

achieved a common vision of how that will be carried forward. There is also a common belief that if this process works it will provide the framework for an ongoing Global Initiative strategy which will serve African countries and other developing countries where coastlines and waterways are at serious risk from oil pollution over the next five-year period. It has been agreed that:

- a) IMO and IPIECA have identified resources which can be maintained centrally at a level of experience and availability commensurate with the needs identified for the next six months. That resource combines extensive experience of oil spill contingency planning, knowledge of international and industry practices, a close appreciation of the operation of international agencies, extensive experience of working with African countries, and a good appreciation of the needs and interests of potential donor agencies. That resource is now in place and at work.
- b) IPIECA has launched a program which hopes to encourage companies at the national level to enter into cooperative partnerships with industries in other countries as a precursor to forging new linkages with key concerned government agencies. The program necessarily has to be mindful of existing relationships and of the need to respect commercial and political sensitivities. Given these qualifications, individual IPIECA members have been invited to nominate countries for which they are prepared to initiate creating a working industry and government

- partnership, but not necessarily be the lead player for industry after partnerships are created.
- c) Based on the assessment of the Cape Town workshops and post Cape Town events during the three country visits, industry and government in several African countries are currently being invited to communicate needs and opportunities they have jointly identified to move forward, but require support beyond their combined national resources.
 - d) The Global Initiative team in London will use that information and determine which needs and opportunities can be immediately satisfied within the scope of existing financial resources or within the scope of government or industry resources that are known to be accessible to the Global Initiative, e.g., expertise. Their second task will be to work closely with the national partnership to transform needs beyond the capacity of existing resources into project proposals which are fully aligned with the priorities and interests of potential donor agencies, and to facilitate implementation of the project.
 - e) To create a pool of knowledge regarding industry's capacity to serve immediate needs, arrangements being set up through which the Global Initiative team in London will have forward access to details of industry financed training courses, exercises, conferences, and publications, which have a capacity to serve needs identified by African countries. A parallel initiative regarding government and government agency activities is also underway. The Global Initiative responsibility will be to match capacities to address needs.
 - f) There already exists a huge portfolio of internationally sponsored project activities for work within developing countries, including many African countries. It will be a further responsibility of the Global Initiative team to explore the potential that lies within these projects to serve the needs of the OPRC Convention. Examples have already been identified by agencies, such as the World Bank.

Conclusion

It is our hope that, in the next six months, the program of work just described will ensure that resources currently available to the Global Initiative will produce outputs in several African countries, and will be judged by those countries to be of the kind that fully satisfies the expectations raised by the Global Initiative Cape Town discussions. Further, that several African countries will have seen measurable progress and possible closure of negotiations towards donor sponsorship for new project activities in their countries. And finally, that the donors that have provided the funding by which the Global Initiative has thus far been operational—i.e., the World Bank, Global Environment Facility, the United Kingdom ODA, French Government, and the international oil industry—can conclude that their monies have been as well spent as they expected, as in the case for funds used to conduct the Cape Town meeting. In our joint efforts to secure all these goals in the next six months, I have great confidence that their support for ongoing efforts, and that of new donors will be forthcoming.

MARITIME TRAFFIC SAFETY MEASURES IN SETO INLAND SEA AND THE POLLUTION MANAGEMENT SYSTEM IN JAPAN

Masayasu Sakaba

Director

Maritime Disaster Prevention Division

Japanese Maritime Safety Agency

1-3 Kasumigaseki 2 Chome

Chiyoda-ku, Tokyo 100

Japan

SAKABA, M. 1997. Maritime traffic safety measures in Seto Inland Sea and the pollution management system in Japan, p. 148-151. *In* S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Japan is an archipelagic state consisting of four main islands and quite a number of small islands. Seto Inland Sea is located between the three main islands of Honshu, Shikoku, and Kyushu with about 3,000 big and small islands. In this consideration, the Japanese Maritime Safety Agency (JMSA) has established different routing systems to ensure maritime traffic safety in that area.

Basic Laws and Regulations for Maritime Traffic Safety

Basic regulations to ensure safe ship traffic are provided in the Law for Preventing Collisions at Sea. It prescribes basic maritime traffic rules and contains the same requirements as those of the International Regulations for Preventing Collisions at Sea, 1972. In addition to this law, Japan established two special laws, the Maritime Traffic Safety Law and the Port Regulations Law, applied to particularly congested areas.

Maritime Traffic Safety Law

The Maritime Traffic Safety Law was instituted as a special law appended to the Law for Preventing Collisions at Sea, because the basic maritime traffic rules alone of the latter law cannot adequately

ensure the safety of ship traffic in heavily congested areas such as Tokyo Bay, Ise Bay, and the Seto Inland Sea.

Port Regulations Law

Within ports and harbors, where numerous ships incessantly pass in and out of a confined sea area and cargoes are handled, there is a high incidence of accidents. In addition, an accident has a great possibility of creating an enormous impact on ship traffic, cargo handling, and other work operations. The Port Regulations Law was also instituted as a special law appended to the Law for Preventing Collisions at Sea. The Port Regulations Law applies to ports and harbors where there are many ships entering and departing and, along with prescribing special traffic rules within such ports and harbors, regulates construction, work operations, fishing, and other activities. As of August 1996, this special law applied to 503 ports and harbors including those in the Seto Inland Sea.

Requirements in the Seto Inland Sea

With regard to the Seto Inland Sea, the Maritime Traffic Safety Law contains special requirements applied to those areas, including: (a) designation of traffic

routes for vessels longer than or more than 50 m in length; (b) requirements to keep out of the way of other vessels; (c) giving priority to huge vessels; and (d) a special requirement to exhibit white light for sailing vessels of less than 7 m in length and vessels under oars, among others. There are also reporting requirements for huge vessels, vessels of 25,000 gross tons or more carrying liquefied gas, vessels towing or pushing a long object, and vessels carrying dangerous cargo. Such vessels have to notify the appropriate Traffic Advisory Service Center before entry into the traffic routes.

Maritime Traffic Information System

Vessel Traffic Service (VTS)

The Seto Inland Sea Maritime Traffic Information System consists of four Traffic Advisory Service Centers or "Vessel Traffic Service (VTS) Centers" which provide marine information and manage vessel traffic flows inclusively to support navigational safety in congested areas. These include:

- a) *Bisan Seto Traffic Advisory Service Center*. This center for the Bisan sea area targets the sea areas of Mizushima, Marugame, and Uko. In addition to providing information and regulating passage, it takes into consideration the special nature of the sea areas concerned and provides information using light signal boards.
- b) *Kanmon Strait Traffic Advisory Service Center*. This center for the Kanmon sea area targets the sea areas of Mutsure, Oseto, and Hesaki-Hinoyama. In addition to providing information, it regulates

passage within ports and harbors in accordance with the Port Regulations Law.

- c) *Osaka Wan Traffic Advisory Service Center*, for Osaka Bay, targets the Akashi Strait sea area, provides information, and regulates passage in accordance with the Maritime Traffic Safety Law.
- d) *Kurushima Traffic Advisory Service Center* is scheduled to be operational for the Kurushima sea area in 1997. Preparation and construction of the facility began in 1994.

Safety Measures for Large Projects

Bridge construction in the Seto Inland Sea areas has resulted in heavy ship traffic. Work on the Akashi Strait Bridge section of the Honshu-Shikoku Bridge began in May 1988; and on the Kurushima Bridge section of the Honshu-Shikoku Bridge in September 1990.

Since there is a good possibility that the construction of structures for these projects will have a great impact on maritime traffic and other matters, it is necessary to establish traffic regulations, safe passage measures, and disaster preparedness and response measures for the periods during and following the completion of construction. It is for this reason that JMSA directs project operators and other parties concerned to conduct studies related to maritime traffic safety through the cooperation of maritime disaster prevention organizations, such as the Japan Maritime Disaster Prevention Association, regarding navigational safety measures and other matters from the planning stage of these projects. In addition, JMSA has instructed taking such

measures as stationing lookout ships, establishing information control systems, installing various navigational aid facilities, and instituting disaster preparedness and response systems, based on the results of the aforementioned studies.

Pollution Management System

As there is no special pollution management system which is applied only to the Seto Inland Sea, the general pollution management system in Japan is described.

Law Relating to the Prevention of Marine Pollution and Maritime Disaster

During the ten-year period from 1965, the dramatic growth of Japan's production capability, brought about by the boom in the economy, and the accompanying massive consumption of resources caused pollution and related problems in regions throughout the country, in turn creating problems for the Japanese society. The National Diet adopted the Law Relating to the Prevention of Marine Pollution and Maritime Disaster as one of the 14 pollution-related bills proposed at its 1970 session, known as the "pollution session." Monitoring of marine pollution and enforcement of laws pertaining to it are now among JMSA's principal duties.

As a result of various efforts, the number of confirmed cases and other indicators of marine pollution have declined. One action relates to the Law Relating to the Prevention of Marine Pollution and Maritime Disaster, to deter the causes of continued worsening of marine pollution. Thereafter, measures and other actions to combat oil spills were steadily implemented, learning from the lessons of large-scale oil spills and other such incidents that occur repeatedly. Also,

regulations and other laws regarding the discharge of oil were strengthened successively to respond to advances and other changes in efforts to protect the marine environment by the International Maritime Organization (IMO) and related organizations. Furthermore, other conceivable factors contributing to the declining trend of pollution incidents are JMSA's surveillance and law enforcement efforts and the enhanced awareness of marine pollution prevention by people involved in maritime affairs, as a result of educational activities. Meanwhile, although oil pollution, the main cause of marine pollution is decreasing, pollution due to other causes (e.g., waste material, hazardous substances, industrial waste water) has doubled, from 154 cases in 1973 to around 300 cases a year in 1996. Subsequently, every year other causes account for an increasing share of all marine pollution.

Measures to Combat Pollution Incidents

To combat pollution incidents, JMSA stores equipment for the removal of oil spills at all its major offices throughout the nation, to properly respond to oil spill accidents and promotes the installation of equipment in accordance with the Law Relating to the Prevention of Marine Pollution and Maritime Disaster.

The Maritime Disaster Prevention Center, on orders of the JMSA, carries out studies related to removal techniques, as well as sets up an advisory group composed of people of knowledge and experience to advise the center on emergency disaster response. In addition, the center conducts a course on noxious substances and educates and trains the crew members of chemical tankers, the personnel of enterprises involved in disaster preparedness, response and treatment, and other parties concerned.

Because oil spill accidents and fires caused by large tankers present the danger of developing into major disasters, JMSA instructs that there be strict enforcement of advanced consultations when handling cargo, installation of disaster response equipment, and stationing of lookout vessels at the berths for oil tankers of 50,000 gross tons and upwards and liquefied gas tankers of 25,000 gross tons and upwards. In addition, JMSA provides guidance on structural plans in consideration of maritime safety and disaster prevention, when constructing berths for oil tankers of 100,000 gross tons and upwards and liquefied gas tankers of 25,000 gross tons and upwards.

Implementation of the 1990 OPRC Convention

In 1989, a large-scale oil spill accident involving a large tanker occurred in an Alaskan bay. Because of this, in 1990, the International Maritime Organization (IMO) adopted the International Convention on Oil Pollution Preparedness, Response and Cooperation (1990 OPRC Convention). The objective of this convention is to minimize the negative impact of large-scale oil spills upon the marine environment. Consequently, it endeavors to strengthen the system for oil spill removal in all countries and to establish a system for international cooperation. Japan actively participated in the preparation of this convention from the beginning. To facilitate accession to this convention, the Law Relating to the Prevention of Marine Pollution and Maritime Disaster was amended in May 1995, in order to institute necessary domestic laws.

The revised law further strengthens quick and proper responses to oil

pollution accidents by requiring business operators to have a manual for appropriate emergency response procedures on hand and by expanding the sea area for which JMSA must prepare an action plan related to oil spill removal measures.

Establishment of a National Strike Team

JMSA established the National Strike Team, which is composed of experts in oil spill control, removal and handling, on 1 April 1995. This task force is under the jurisdiction of the 3rd Regional JMSA Headquarters located in Yokohama. Using advanced specialized knowledge and skills, the Team carries out the following tasks:

- a) Measures to control and remove oil and other such hazardous substances discharged at sea, including extinguishing maritime fires that result from the spillage of oil and other such hazardous substances, as well as directing, recommending, and coordinating measures related to extinguishing such maritime fires;
- b) Study and training programs and training exercises related to the control and removal of marine pollution and the prevention of disasters at sea; and
- c) Technological support related to maritime disaster preparedness and response measures and international cooperation operations related to education, training, and other such activities.

JMSA endeavors to strengthen the National Strike Team, and to respond unerringly to maritime disasters through efforts such as promptly deploying the Team when an oil spill accident occurs anywhere in the waters surrounding Japan, including the Seto Inland Sea.

INTERNATIONAL CONVENTIONS ON LIABILITY AND COMPENSATION FOR OIL POLLUTION DAMAGE

Hideo Osuga

Legal Officer

International Oil Pollution Compensation Fund

4 Albert Embankment, London SE1 7SR

United Kingdom

OSUGA, H. 1997. International conventions on liability and compensation fund, p. 152-166. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

The *Torrey Canyon* incident off the English coast in March 1967 resulted in an oil spill causing pollution damage of an extent previously unknown. This incident made the world aware of the need for international regimes of liability and compensation for pollution damage caused by oil spills from tankers. Following the *Torrey Canyon* disaster, the International Maritime Organization (IMO) convened a Diplomatic Conference in Brussels in 1969, which adopted the International Convention on Civil Liability for Oil Pollution Damage (Civil Liability Convention, CLC). This Convention lays down the principle of strict liability for ship owners and provides for a system of compulsory insurance.

The 1969 Conference noted, however, that the Civil Liability Convention regime was inadequate as it might not provide full compensation to victims of pollution damage and recognized the need for a scheme providing supplementary compensation. After further deliberations within IMO, a Diplomatic Conference was convened in Brussels in 1971. This Conference adopted the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (Fund Convention). The Fund Convention set up an international organization, the International Oil Pollution

Compensation Fund (IOPC Fund), to administer the system of compensation created by that Convention. The Civil Liability Convention entered into force in 1975 and the Fund Convention in 1978.

The International Oil Pollution Compensation Fund (IOPC Fund) was established in October 1978. It is the only worldwide intergovernmental organization which pays compensation to "victims who have suffered pollution damage". It also relieves the ship owners of part of the financial burden imposed on them by the Civil Liability Convention. As of 1 September 1996, the Civil Liability Convention had 96 Contracting States, and the Fund Convention 70 Contracting States. Both the Civil Liability Convention and the Fund Convention have been amended by Protocols in 1976, 1984 and 1992. The 1976 amendments were of a technical nature. The 1984 and 1992 Protocols imply fundamental amendments to the Conventions.

The 1992 Protocols entered into force on 30 May 1996. The International Oil Pollution Compensation Fund, 1992 (1992 Fund) was established by the 1992 Protocol to the Fund Convention with nine Member States in June 1996. The IOPC Fund (1971 Fund) and 1992 Fund have the same secretariat to operate closely together in the transitional period until the 1971 Fund ceases to operate.

1969 Civil Liability Convention

The 1969 Civil Liability Convention forms the basic structure on which the regimes of liability and compensation for oil pollution damage from ships are based. The following are the fundamental elements of the Civil Liability Convention regime.

Scope of Application

The 1969 Civil Liability Convention applies to oil pollution damage resulting from spills from laden tankers and suffered in the territory (including the territorial sea) of a Contracting State. The only criterion for its applicability is, therefore, where the damage occurred. The flag State of the tanker and the nationality of the ship owner are irrelevant for determining the scope of application of the Civil Liability Convention. The Civil Liability Convention also applies to measures, wherever taken, to prevent or minimize pollution damage in the territory (including the territorial sea) of a Contracting State ("preventive measures").

Damage caused by non-persistent oil is not covered by the Civil Liability Convention. Therefore, spills of gasoline, light diesel oil, kerosene, etc., do not fall within the scope of the Civil Liability Convention. Only spills from a tanker which is actually carrying oil in bulk as cargo are covered by the Civil Liability Convention. Spills from a tanker during a ballast voyage are, therefore, not covered by the Civil Liability Convention, nor are spills of bunker oil from ships other than tankers.

The Civil Liability Convention applies only to damage caused or measures taken after an incident has occurred in which oil has escaped or has been discharged. The Convention does not apply to "pure

threat removal measures", i.e., preventive measures which are so successful that there is no actual spill of oil from the tanker involved.

Compensation for oil pollution damage not covered by the Civil Liability Convention, i.e., damage caused by spills from unladen tankers or from ships other than tankers, costs of pure threat removal measures and damage caused by non-persistent oil, is governed by the applicable national law, normally the law of the State where the damage was sustained. It should be noted that the Civil Liability Convention (and the Fund Convention) only deals with oil pollution from ships. Pollution resulting from offshore operations fall outside the scope of the Conventions, and compensation for such pollution damage is governed by the applicable national law.

Strict Liability

The owner of a tanker has strict liability (i.e., is liable also in the absence of fault) for pollution damage caused by oil spilled from the tanker as a result of an incident. He may be exempted from liability only in a few particular cases, namely: (a) damage resulting from an act of war or a grave natural disaster; (b) damage wholly caused by sabotage by a third party; or (c) damage wholly caused by the failure of authorities to maintain navigational aids. Grounds for exemption are very limited, and the owner will, therefore, be liable for pollution damage in almost all incidents which occur under normal circumstances.

Limitation of Liability

The ship owner is, under certain conditions, entitled to limit his liability to

an amount of 133 Special Drawing Rights (SDR) (US\$194) per ton of the ship's tonnage or 14 million SDR (US\$20.4 million) whichever is less.⁷ In order to be entitled to limit one's liability, the owner must establish a limitation fund by depositing the limitation amount with a court or by furnishing a guarantee for that amount acceptable to the court. If a claimant proves that the incident occurred as a result of the personal fault (the "actual fault or privity") of the owner, the latter will be deprived of the right to limit his liability.

Channeling of Liability

Claims for pollution damage under the Civil Liability Convention can be made only against the registered owner of the tanker concerned. This does not preclude victims from claiming compensation outside the Civil Liability Convention from persons other than the owner. No claim can, however, be made against the servants or agents of the owner. The owner is entitled to take recourse action against third parties in accordance with national law.

Compulsory Insurance

The owner of a tanker carrying more than 2,000 tons of persistent oil as cargo is obliged to maintain insurance to cover his liability under the Civil Liability Convention. Tankers must carry onboard a certificate attesting to the insurance cover of the ship. When entering or leaving a port or terminal installation of a State Party to the Civil Liability Convention, such a certificate is required also for ships flying the flag of a State

which is not Party to the Civil Liability Convention. The victims may take legal action directly against the insurer.

Competence of Courts

Actions for compensation against the owner or his insurer under the Civil Liability Convention may only be brought before the Courts of the Contracting State in the territory or territorial sea of which damage was caused.

1971 Fund Convention

The 1971 Fund Convention was elaborated as a supplementary convention to the 1969 Civil Liability Convention. Only those States which have become Parties to the Civil Liability Convention can become Parties to the 1971 Fund Convention and thereby Members of the IOPC Fund. As already mentioned, the IOPC Fund has at present 70 Member States.

The main functions of the 1971 Fund Convention are to provide supplementary compensation to those who cannot obtain full and adequate compensation for oil pollution damage under the Civil Liability Convention, and to indemnify the owner for a portion of his liability under the Civil Liability Convention. The IOPC Fund is financed by persons who receive crude oil and heavy fuel oil in Fund Member States.

Supplementary Compensation

The IOPC Fund pays compensation to any person suffering oil pollution damage if that person is unable to obtain full and

⁷The amounts specified in the 1969 Civil Liability Convention and the 1971 Fund Convention were originally expressed in (gold) francs (Poincaré francs). This was changed by the 1976 Protocols to the Conventions under which the amounts in the Conventions are expressed in the Special Drawing Rights (SDR) of the International Monetary Fund. The value expressed in SDR is converted into national currency by referring to its market exchange rate. The amounts given in dollars in this lecture have been calculated on the basis of the rate of exchange at 26 August 1996 (1 SDR = US\$1.45529).

adequate compensation under the Civil Liability Convention for one of the following reasons:

- a) No liability for pollution damage arises under the Civil Liability Convention, because the owner can invoke one of the exemptions under that Convention;
- b) The owner is financially incapable of meeting his obligations under the Civil Liability Convention and his insurance is insufficient to satisfy the claims for compensation for pollution damage; and
- c) The damage exceeds the owner's liability under the Civil Liability Convention.

The experience of the IOPC Fund has shown that most incidents fall within category (c).

The IOPC Fund is relieved of its obligation to pay compensation if it proves that the pollution damage resulted from an act of war or if it was caused by a spill from a warship. In addition, the IOPC Fund has no obligation to pay compensation if the claimant cannot prove that the damage resulted from an incident involving one or more laden tankers. This latter case refers to spills of oil from an unidentified source.

Limit of Compensation

The compensation payable by the IOPC Fund in respect of an incident is limited under the 1971 Fund Convention to an aggregate amount of 60 million SDR (US\$87 million), including the sum actually paid by the owner (or his insurer)

under the 1969 Civil Liability Convention.²

Of the 85 incidents with which the IOPC Fund has dealt so far, only a few (for example the *Tanjo* incident) have given rise to claims in excess of the limit of compensation that applied to the incident. In such a case, compensation paid to claimants is reduced pro rata, so that the maximum amount of 60 million SDR is not exceeded. In all other incidents, the total amount of the claims arising out of each incident has been below the limit of compensation available.

Indemnification of the Ship Owner

As regards ships registered in or flying the flag of a State Party to the 1971 Fund Convention, the IOPC Fund shall under the Convention indemnify the ship owner for a part of the total amount of his liability under the 1969 Civil Liability Convention. The maximum indemnification payable by the IOPC Fund to the ship owner is 33 SDR (US\$48) for each ton of the ship's tonnage for ships up to 83,333 tons; in respect of ships over that tonnage, the indemnification payable for each ton of the ship's tonnage increases until a maximum of 5,667,000 SDR (US\$8.3 million) is reached for ships over 105,000 tons.

The IOPC Fund is relieved of its obligation to pay indemnification if it proves that the damage resulted from the willful misconduct of the owner himself. The same applies if it proves that, as a result of the personal fault of the owner, the ship did not comply with the requirements laid down in certain

²The limit was originally 30 million SDR (US\$43.7 million). It was increased in stages to 60 million SDR by the IOPC Fund Assembly.

international conventions, and that the damage arose as a consequence of such non-compliance.

Organization of the IOPC Fund

The IOPC Fund consists of an Assembly, an Executive Committee and a Secretariat. The Assembly, which is composed of representatives of the Governments of all Member States, is the supreme organ governing the IOPC Fund and holds regular sessions once a year. The Executive Committee is elected by the Assembly. It is composed of 15 Member States. Its main function is to approve settlements of claims against the IOPC Fund. The Secretariat is headed by a Director. At present it has in all fourteen staff members at its headquarters in London.

The IOPC Fund has set up three local offices, one in La Coruña (Spain), one on Shetland (United Kingdom), which is now closed, and one in Milford Haven (United Kingdom) to deal with the very large number of claims arising out of the *Aegean Sea, Braer*, and *Sea Empress* incidents.

Recent oil spills in Japan and the Republic of Korea have also given rise to numerous claims, and the IOPC Fund has been represented in these two countries by marine surveyors who deal with the claimants and make a first assessment of the claims.

Contributions

The payments of compensation and indemnification, as well as the administrative expenses of the IOPC Fund, are financed by contributions levied on any person who has received crude oil and heavy fuel oil ("contributing oil") in a quantity exceeding 150,000 tons in one

calendar year in a Contracting State of the Fund Convention.

Contributing oil is counted for contribution purposes each time it is received at ports or terminal installations in a Fund Member State after carriage by sea. The term "received" refers to receipt into tankage or storage immediately after carriage by sea. The place of loading is irrelevant in this context; the oil may be imported from abroad, carried from another port in the same State or transported by ship from an offshore production rig. Also oil received for transshipment to another port or received for further transport by pipeline is considered as received for contribution purposes.

A Member State is required to communicate every year to the Director of the IOPC Fund the name and address of any person in that State who is liable to contribute to the IOPC Fund, as well as the quantity of contributing oil received by any such person. There are initial and annual contributions. Initial contributions are payable when a State becomes a Member of the IOPC Fund. Annual contributions are levied to meet the anticipated payments of compensation and indemnification by the IOPC Fund during the coming year and of the administrative expenses for that year. The amount of annual contributions is decided each year by the IOPC Fund Assembly. Each contributor pays a specified amount per tonne of contributing oil received.

After the Assembly's decisions on the levy of annual contributions, the IOPC Fund's Director issues an invoice to each contributor. Unless otherwise decided by the Assembly, annual contributions are due on 1 February of the year following that in which the Assembly decides to levy

contributions. The contributions are payable by the individual contributors directly to the IOPC Fund. A State is not responsible for the contributions levied on contributors in that State, unless it has voluntarily assumed such responsibility.

The level of contributions varies from one year to another, since the payments of compensation will vary. In order to give an idea of the financial implications for contributors, the contributions that were levied during 1979-1995 are shown in *Table 1*. The table also shows the amount that would have been paid by a person who received one million tons of contributing oil every year (extreme right hand column). The 1995 contributions totaling £43 million were due by 1 February 1996. By June 1996, some £42 million—or 98%—had been paid.

The shares of the 192 annual contributions to the 1995 General Fund in respect of Member States are indicated below:

Japan	27.33%
United Kingdom	7.99%
Italy	10.88%
Spain	5.13%
Netherlands	9.04%
Germany	3.24%
France	8.95%
Canada	3.11%
Republic of Korea	8.68%
Norway	2.84%
Others	12.81%

An important question is whether the contributors actually fulfill their obligation to pay contributions to the IOPC Fund. When the Fund Convention was adopted in 1971,

the concept of an international fund was something new. There was no experience of the functioning of a system of this kind. Fears were expressed that the Fund Secretariat would have difficulties collecting the money required for compensating victims. These fears have proved to be totally unjustified. The contributors, i.e., the oil industry, have generally responded in a remarkable manner. In fact, there is only a negligible amount in arrears.

Table 1. Contributions (in £) to the IOPC Fund levied during 1979-1995.

	Total contribution	Contribution per ton	Contribution for 1 mi tons
Initial contributions		0.0030517	3,052
Annual Contributions			
1979	750,000	0.0008455	846
1980	10,000,000	0.0126100	12,610
1981	500,000	0.0005690	569
1982	660,000	0.0010357	1,036
1983	24,106,000	0.0260786	26,079
1984	0	0.0000000	0
1985	1,500,000	0.0018306	1,831
1986	1,800,000	0.0023360	2,336
1987	1,200,000	0.0015347	1,535
1988	2,990,000	0.0037599	3,760
1989	4,800,000	0.0060256	6,026
1990	500,000	0.0005563	556
1991	26,700,000	0.0287013	28,701
1992	10,950,000	0.0116210	11,621
1993	78,000,000	0.0783597	78,540
1994	40,000,000	0.0389400	38,940
1995	43,000,000	0.0391209	39,121

The 1992 Protocols to the Civil Liability Convention and the Fund Convention

Background

A Diplomatic Conference held in November 1992 under the auspices of IMO adopted two new Protocols amending the Civil Liability Convention and the Fund Convention, in order to provide higher limits of compensation and a wider scope of application, thereby ensuring the viability in the future of the system of compensation established by these Conventions. The 1992 Protocols superseded two Protocols adopted in 1984; they have the same substantive provisions, but with lower entry into force requirements for the 1992 Protocols.

Entry into Force

The 1992 Protocols entered into force on 30 May 1996 in respect of the following nine States which have deposited instruments of ratification, acceptance, approval or accession relating to both Protocols: Denmark, France, Germany, Japan, Mexico, Norway, Oman, Sweden, and the United Kingdom. The Protocol to the Civil Liability Convention entered into force on that day also in respect of Egypt. As of 1 September 1996, the following eight States had also deposited instruments of ratification, acceptance, approval or accession relating to both Protocols: Australia, Bahrain, Finland, Greece, Liberia, Marshall Islands, Spain, and Switzerland, which will bring the number of States Parties to the 1992 Protocol to the Fund Convention to 17 and the number of States Parties to the 1992 Protocol to the Civil Liability Convention to 18.

In its instrument of ratification relating to the 1992 Protocol to the Fund

Convention, Spain made a declaration pursuant to Article 30.4 of that Protocol, so that the instrument relating to the latter will not take effect until the end of the six-month period referred to in Article 31, i.e., six months after the total quantity of contributing oil has reached 750 million tons. The Protocol to the Fund Convention will therefore not enter into force for Spain until 18 months after the total quantity of contributing oil has reached 750 million tons. No corresponding declaration was made pursuant to Article 13.2 of the Protocol to the Civil Liability Convention.

The 1992 Protocol to the Fund Convention provides a mechanism for the compulsory denunciation of the 1969 Civil Liability Convention and the 1971 Fund Convention, when the total quantity of contributing oil received in the States Parties to the Protocol to the Fund Convention reaches 750 million tons. In the light of information available to the Director concerning progress towards ratification in other States, it is expected that the requirements for the compulsory denunciation might be fulfilled during the autumn of 1996. States Parties to the 1992 Protocol to the Fund Convention as well as States which have deposited their instruments of ratification in respect of that 1992 Protocol would then have to denounce the 1969 Civil Liability Convention and the 1971 Fund Convention within six months, with effect twelve months later, i.e., during the spring of 1988.

Main Amendments

The main differences between the Civil Liability Convention and the Fund Convention in their original version and the Conventions as amended by the 1992 Protocols are the following:

- a) Special liability limit for owners of small vessels and *substantial increase of the limitation amounts*. The revised limits will be: (a) for a ship not exceeding 5,000 units of gross tonnage, 3 million SDR (US\$4.4 million); (b) for a ship with a tonnage between 5,000 and 140,000 units of tonnage, 3 million SDR (US\$4.4 million) plus 420 SDR (US\$611) for each additional unit of tonnage; and (c) for a ship of 140,000 units of tonnage or over, 59.7 million SDR (US\$87 million).
- b) Increase in the limit of compensation payable by the 1992 Fund to 135 million SDR (US\$196 million), including the compensation payable by the ship owner under the 1992 Protocol to the Civil Liability Convention.
- c) A simplified procedure for *increasing the limitation amounts* in the two Conventions.
- d) Extended geographic scope of application of the Conventions to include the exclusive economic zone (EEZ), established under the United Nations Convention on the Law of the Sea.
- e) Pollution damage caused by spills of persistent oil from *unladen tankers* will be covered.
- f) Expenses incurred for preventive measures are recoverable even when *no spill of oil* occurs, provided that there was *a grave and imminent danger* of pollution damage.
- g) New definition of pollution damage retaining the basic wording of the present definition with the addition of a phrase to clarify that, for environmental damage, only costs incurred for reasonable measures to restore the contaminated environment are included in the concept of pollution damage.
- h) Abolition of indemnification of the ship owner.
- i) There are no initial contributions to the 1992 Fund.

The 1992 Protocol to the Fund Convention also introduces provisions setting a cap on contributions to the 1992 Fund payable by oil receivers in any given State. This cap is fixed at 27.5% of the total annual contributions to the 1992 Fund. The capping system will cease to apply when the total quantity of contributing oil received during a calendar year in all Member States of the 1992 Fund exceeds 750 million tons, or at the expiry of a period of five years from the entry into force of the 1992 Protocol to the Fund Convention (i.e., 30 May 2001), whichever is earlier. It is anticipated that the former condition will be fulfilled earlier than the latter.

Claims Against the IOPC Fund

Claims Experience

Since its establishment in October 1978, the IOPC Fund had, up to 3 September 1996, been involved in the settlement of claims arising out of approximately 85 incidents. The IOPC Fund has paid compensation in respect of approximately 75 incidents. The total amount of compensation and indemnification paid by the IOPC Fund to date is approximately £133 million (US\$207 million).

The case involving the largest payment is the *Braer* incident (United Kingdom, 1993), where £45.9 million (US\$70 million) has been paid to claimants. The *Tanio* incident (France,

1980) resulted in payment totaling FF222 million (US\$44 million). In the *Haven* incident, the aggregate amount of the claims greatly exceeds the maximum amount payable under the Civil Liability Convention and the Fund Convention, but so far only small payments have been made. The *Aegean Sea* incident (Spain, 1992), *Keumdong N° 5* incident (Republic of Korea, 1993), *Sea Prince* incident (Republic of Korea, 1995) and *Sea Empress* incident (United Kingdom, 1996) have also led to large claims against the 1971 Fund.

Claims Settlement

Bearing in mind that the IOPC Fund's function is to provide full and adequate compensation for victims of pollution damage as quickly as possible, the Director and his staff are always ready to offer assistance to those who seek information on how to present their claims against the IOPC Fund.

The IOPC Fund can pay compensation to a claimant only to the extent that the claim is justified and meets the criteria laid down in the Fund Convention. To this end, a claimant is required to prove a claim by producing explanatory notes, invoices, receipts, and other documents to support the claim. The IOPC Fund has issued a "Claims Manual" in which basic information on how to present a claim against the IOPC Fund is given. This manual is available on request.

In settling claims for pollution damage the IOPC Fund cooperates closely with the ship owner's pollution liability insurer, which in practically all cases is a P&I Club. The investigation and evaluation of damage are carried out jointly by the IOPC Fund and the P&I Club. Surveyors and

lawyers are normally employed jointly by the P&I Club and the IOPC Fund for the survey of the incident and the cleanup operations, as well as for legal advice on claims. In most cases, the staff of the International Tanker Owners Pollution Federation Ltd. (ITOPF) is used for surveying purposes. This joint employment of advisers allows claimants to submit their claims only once, instead of submitting it separately to the ship owner's insurer and to the IOPC Fund. It also ensures that decisions regarding a claim under the Civil Liability Convention and under the Fund Convention are not contradictory. The close cooperation between the P&I Clubs and the IOPC Fund is laid down in a memorandum of understanding signed in 1980. The cooperation between the IOPC Fund and the Japanese P&I Club is governed by a special memorandum of understanding signed in 1985.

The surveyors appointed by the IOPC Fund and the P&I Club endeavor to attend to a spill as early as possible. They will monitor the cleanup operations and report to the Director of the Fund and to the P&I Club on the manner in which the operations are carried out. They will also advise authorities dealing with the spill response on the best methods of preventive measures or cleanup operations, to the extent that such advice is requested or appreciated. The surveyors will discuss with the authorities the procedures that have to be observed in order to facilitate the presentation of claims against the P&I Club and the IOPC Fund quickly, and in a meaningful manner (e.g., accounting of expenses in a systematic way). Finally, the surveyors will be able to advise the authorities whether certain measures taken or to be taken may later be regarded by the IOPC

Fund as not being "reasonable". This gives the opportunity of discussing the merits of certain measures before they are actually taken and, by that, avoiding later disputes on the question of recovery of the expenses incurred.

The Director is authorized to settle the claims and pay compensation if it is unlikely that the total payments by the IOPC Fund in respect of the incident in question will not exceed 2.5 million SDR (US\$3.6 million). For incidents leading to higher claims, the Director needs the approval of the settlement from the Executive Committee. The Committee meets whenever necessary, but at least once a year.

If agreement has been reached between the IOPC Fund and a claimant as to the majority of items of a claim, but further investigation is considered necessary with respect to the remaining items, the Director may make payment as regards the agreed items. The IOPC Fund's Internal Regulations also allow the Director, under certain circumstances and within certain limits, to make provisional payment of compensation before a claim can be settled, if this is necessary to mitigate undue financial hardship to victims of pollution incidents. These procedures have the purpose of expediting the payment of compensation.

These factors—the use of experienced surveyors and lawyers, the cooperation with the P&I Clubs, and the Director's authority to make relatively high payments without prior approval of the Executive Committee—enable the IOPC Fund to make settlements of claims and payment of compensation in a relatively short period of time. All small- and medium-size claims are normally settled within a

few months of the claims documents being presented, and agreed claims are normally paid within a month of agreement being reached. Even the large claims have been settled within reasonable periods of time of the incident.

It must be stressed that the time needed for the settlement of claims is almost entirely dependent on the quality of the documentation submitted in support of the claims. In cases where the claims are well documented, it is often possible to reach a settlement within a few months of the presentation of the documentation. If, however, the documentation is insufficient, it takes a considerable time before a settlement can be reached, since protracted correspondence between the IOPC Fund and the claimants will be necessary.

It should be pointed out that the IOPC Fund becomes involved in the payment of compensation only if the aggregate amount of the proven damage arising out of a particular incident exceeds the limitation amount under the Civil Liability Convention (except in the rare cases where the ship owner is exonerated from liability). For this reason, the IOPC Fund cannot make any payments unless it is established that the ship owner's limitation amount will in fact be exceeded.

Admissibility of Claims

In order for a claim to be accepted by the IOPC Fund, it has to be proved that the claim is based on a real expense actually incurred, that there was a link between the expense and the incident and that the expense was made for reasonable purposes. The IOPC Fund has acquired considerable experience with regard to

the admissibility of claims. In connection with the settlement of claims it has developed certain principles as regards the meaning of the definition of "pollution damage".

The Assembly and the Executive Committee have taken a number of important decisions in this regard. These principles have also been developed by the Director in his negotiations with claimants. The settlements made by the Director and the principles upon which these settlements have been based have either been explicitly approved by the Executive Committee, or have been reported to and endorsed by the Committee.

In October 1993, the Assembly established an Intersessional Working Group to examine the criteria for the admissibility of claims for compensation for "pollution damage" and "preventive measures" within the scope of the 1969 Civil Liability Convention and the 1971 Fund Convention and the 1992 Protocols thereto. The Report of the Working Group was considered by the Assembly in October 1994, and the Assembly endorsed this Report.

The Assembly has expressed the opinion that a uniform interpretation of the definition of "pollution damage" is essential for the functioning of the regime of compensation established by the Civil Liability Convention and the Fund Convention.

The IOPC Fund considers each claim on the basis of its own merits, in the light of the particular circumstances of the case. Whilst criteria for the admissibility of claims have been adopted by the IOPC Fund, a certain flexibility is nevertheless

allowed, enabling the Fund to take into account new situations and new types of claims. Generally, the IOPC Fund follows a pragmatic approach, so as to facilitate out-of-court settlements.

Property damage

Pollution incidents often result in damage to property: the oil may contaminate fishing boats, fishing gear, yachts, beaches, piers, and embankments. The IOPC Fund accepts costs for cleaning polluted property. If the polluted property (e.g., fishing gear) cannot be cleaned, the IOPC Fund compensates the cost of replacement, subject to deductions for wear and tear. Measures taken to combat an oil spill may cause damage to roads, piers, and embankments, and thus necessitate repair work, and reasonable costs for such repairs are accepted by the IOPC Fund.

Cleanup operations and preventive measures

The IOPC Fund pays compensation for expenses incurred for cleanup operations at sea or on the shore. Operations at sea may relate to the deployment of vessels, the salaries of crew, the use of booms, and the spraying of dispersants. In respect of onshore cleanup, the operations may result in major costs for personnel, equipment, absorbents etc.

Measures taken to prevent or minimize pollution damage (preventive measures) are compensated by the IOPC Fund. Measures may have to be taken to prevent oil which has escaped from a ship from reaching the coast, e.g., by placing booms along the coast which is threatened. Dispersants may be used at

sea to combat the oil. Costs for such operations are in principle considered as costs of preventive measures. It must be emphasized, however, that the definition only covers costs of *reasonable* measures.

As regards measures to prevent physical damage, the requirement of reasonableness laid down in Article I.7 of the Civil Liability Convention is assessed on the basis of objective criteria. The assessment of technical reasonableness is made on the basis of the facts available at the time of the decision to take the measures, in the light of the technical advice given or offered at that time. The person in charge should reassess his decision in the light of developments and further technical advice.

Claims for costs are not accepted when it could have been foreseen that the measures taken would be ineffective. On the other hand, the fact that the measures prove to be ineffective is not in itself a reason for rejection of a claim for the costs incurred. The costs incurred, and the relationship between these costs and the benefits derived or expected, should be reasonable. In the assessment, the IOPC Fund takes account of the particular circumstances of the incident.

Claims for cleanup operations may include the cost of personnel and the hire or purchase of equipment and materials. The cost of cleaning and repairing cleanup equipment and of replacing materials consumed during the operations is accepted. If the equipment used was purchased for a particular spill, deductions are made for the residual value when the amount of compensation is assessed. If a public authority has purchased and maintained materials and equipment so that they are immediately available if an incident

occurs, compensation is paid for a reasonable part of the purchase price of the materials and equipment actually used.

Salvage operations may in some cases include an element of preventive measures. Such operations can be considered as *preventive measures* only if the primary purpose is to prevent *pollution damage*. If the operations have another purpose, such as salvaging hull and cargo, the costs incurred are not admissible under the Civil Liability Convention and the Fund Convention. If the activities are undertaken for the purpose of both preventing pollution and salvaging the ship and cargo, but it is not possible to establish with any certainty the primary purpose of the operations, the costs are apportioned between pollution prevention and other activities. The assessment of compensation for activities which are considered to be *preventive measures* is not made on the basis of the criteria applied for assessing salvage awards; the compensation is limited to costs, including a reasonable element of profit.

Fixed costs

Claims submitted by public authorities for carrying out cleanup operations and preventive measures often include elements covering costs which would have arisen even if the incident had not occurred (e.g., normal salaries for permanently employed personnel). Such fixed costs are distinguished from additional costs, i.e., costs incurred solely as a result of the incident which would not have arisen otherwise.

The IOPC Fund's position is that a reasonable proportion of fixed costs should be admissible, provided that such costs correspond closely to the clean-up period

in question and do not include remote overhead charges.

Consequential loss and pure economic loss

The IOPC Fund accepts in principle claims relating to loss of earnings suffered by the owners or users of property which had been contaminated as a result of a spill (consequential loss). As for claims for loss of earnings sustained by persons whose property has not been polluted (so-called "pure economic loss"), the point of departure is the concept of "loss or damage caused by contamination", i.e., the starting point is the pollution rather than the incident itself. Claims for pure economic loss are in principle acceptable, but certain criteria have to be fulfilled for such claims to be admissible. In particular, a claim is not admissible on the sole criterion that the loss or damage would not have occurred but for the oil spill in question.

In order to qualify for compensation, the basic criterion is that a reasonable degree of proximity exists between the contamination and the loss or damage sustained by the claimant. When considering whether the criterion of reasonable proximity is fulfilled, the following elements are taken into account: (a) the geographic proximity between the claimant's activity and the contamination; (b) the degree to which a claimant is economically dependent on an affected resource; (c) the extent to which a claimant has alternative sources of supply; and (d) the extent to which a claimant's business forms an integral part of the economic activity within the area affected by the spill. Account is also taken of the extent to which a claimant can mitigate his loss.

Measures to prevent pure economic loss

Claims relating to costs of measures to prevent pure economic loss can be admissible if they fulfill the following requirements: (a) the costs of the proposed measures are reasonable; (b) the cost of measures are not disproportionate to the further damage or loss which they are intended to mitigate; (c) the measures are appropriate and offer a reasonable prospect of being successful; and (d) in the case of a marketing campaign, the measures relate to actual targeted markets.

In order to be admissible, the costs should relate to measures undertaken to prevent or minimize losses which, if sustained, would qualify for compensation under the Civil Liability Convention and the Fund Convention. In addition, the cost of marketing campaigns or similar activities is accepted only if the activities undertaken are in addition to measures normally carried out for this purpose, i.e., compensation is granted only for the additional costs resulting from the need to counteract the negative effects of the pollution. Measures of too general a nature are not admissible. The IOPC Fund does not normally consider claims for preventive measures of this type until they have been carried out. A cautious approach is taken in respect of advance payments and the Fund does not take on the role of the claimant's banker.

Environmental damage

An important issue is whether and, if so, to what extent claims for *environmental damage* are admissible. In 1980, the IOPC Fund Assembly adopted an important Resolution on the admissibility of claims relating to damage to the environment. In the Resolution it is stated that the assessment of

compensation "... is not to be made on the basis of an abstract quantification of damage calculated in accordance with theoretical models". In other words, compensation can be granted only if a claimant, who has a legal right to claim under national law, has suffered *quantifiable* economic loss.

Damage to the marine environment cannot be easily assessed in monetary terms, as the marine environment does not have a direct market value. In recent years, models have been elaborated in many countries for the assessment of damage to the marine environment. It is submitted that any assessment of ecological damage to the marine environment in monetary terms would require sweeping assumptions regarding relationships between different components of the environment and economic values. Any calculations of the damage suffered in monetary terms will by necessity be arbitrary. For this reason, it is maintained that it would be inappropriate to admit claims for compensating damage to unexploited natural resources which have no owner.

Another important question in this context is the impact of the 1984 and the 1992 Protocols on the definition of pollution damage. As already mentioned, the Civil Liability Convention and the Fund Convention were amended in 1984 and 1992 by the adoption of a Protocol to each of these Conventions. The Protocols to the Civil Liability Convention contain an amended wording of the definition of pollution damage. A proviso was added to the effect that compensation for impairment of the environment (other than loss of profit from such impairment) should be limited to costs of reasonable

measures of reinstatement actually undertaken or to be undertaken.

It should be emphasized that the new wording of the definition was not in any way intended to broaden the concept. The Diplomatic Conference held in 1984 which adopted the new wording based its deliberations on the policy of the IOPC Fund and the principles developed by the IOPC Fund bodies as regards the admissibility of claims and the interpretation of the definition of pollution damage as worded in the original text of the Convention. It is, therefore, fair to say that the Diplomatic Conference adopted the modified wording of this definition in order to codify the interpretation of the definition as developed by the IOPC Fund.

An important question is whether the IOPC Fund pays compensation for the cost of measures to reinstate the marine environment. This matter has to be decided on the basis of the definition of "pollution damage" laid down in the 1992 Protocol to the Civil Liability Convention. To be admissible for compensation, measures for reinstatement of the environment should fulfill the following criteria: (a) the cost of the measures should be reasonable; (b) the cost of the measures should not be disproportionate to the results achieved or the results which could reasonably be expected; and (c) the measures should be appropriate and offer a reasonable prospect of success.

The test of reasonableness laid down in Article 1.6 objective point of view in the light of the information available when the specific measures were undertaken. Compensation is payable only in respect of measures actually undertaken or to be undertaken.

Unification of Law

The regime established by the Civil Liability Convention and the Fund Convention contributes to the unification of law in the field. In this context reference should be made to Article 235 of the United Nations Convention on the Law of the Sea. Under that Article, States shall cooperate in the implementation of existing international law and the further development of international law relating to responsibility and liability for the assessment of and compensation for damage, as well as in the development of criteria and procedures for the payment of adequate compensation. Reference is made to compulsory insurance and compensation funds.

The IOPC Fund has been able to contribute to the development of international law by its decisions in respect of various incidents, thereby also facilitating the harmonization of law among Member States. As major decisions are taken by the organs of the Fund, the Assembly and the Executive Committee, composed of representatives of Member States, Governments can influence the development of law within the IOPC Fund Member States.

The Voluntary Industry Schemes

The two voluntary industry schemes, known as TOVALOP (Tanker Owners Voluntary Agreement concerning Liability for Oil Pollution) and CRISTAL (Contract Regarding a Supplement to Tanker Liability for Oil Pollution) will not be renewed when their present terms end in February 1997. The purpose of these voluntary industry schemes was to provide benefits comparable to those available under the Civil Liability

Convention and the Fund Convention in States which had not ratified these Conventions.

The decision to discontinue TOVALOP and CRISTAL reflected rapid growth in the acceptance by maritime States of these two Conventions and of the 1992 Protocols thereto, which offer significant advantages over the voluntary agreements for those claiming compensation for oil pollution damage. It was considered that the existence of the voluntary agreements could slow progress by acting as a disincentive to States which had not yet ratified these Protocols.

Conclusion

The IOPC Fund can be compared to a mutual insurance company for oil pollution incidents set up by governments but financed by oil interests. When it was created, it was impossible to foresee how such a body would function. In the light of eighteen years of experience of the IOPC Fund, it is fair to say that the system of compensation established by the Civil Liability Convention and the Fund Convention has worked remarkably well. This is due to a large extent to the spirit of cooperation shown by Governments of Member States as well as by ship owners, P&I Clubs and the oil industry.

The present international framework for liability and compensation for oil pollution damage had its origins in a maritime disaster in 1967. With the entry into force of the 1992 Protocols in May 1996, a major step has been made towards ensuring that it continues to meet the needs of society in respect of compensation for victims of oil pollution damage.

LIABILITY FOR OIL SPILL DAMAGES: ISSUES, METHODS, EXAMPLES, AND CONTROVERSIES

Thomas A. Grigalunas, James J. Opaluch, and Jerry Diamantides*

*Department of Environmental and Natural Resource Economics
University of Rhode Island, Kingston, Rhode Island 02881
United States of America*

GRIGALUNAS, T.A., J.J. OPALUCH, and J. DIAMANTIDES. 1997. Liability for oil spill damages: issues, methods, examples, and controversies, p. 167-181. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

Liability for oil spills under national laws and international conventions can be an important incentive-based policy instrument for protecting the marine environment. Liability for environmental losses (1) compensates those suffering harm and (2) deters parties from polluting (Shapiro, 1991). An effective liability system internalizes the costs of spills and also provides a sustainable basis for maintaining and restoring environmental quality in coastal areas using the "polluter pays" principle.

Although the use of liability has several advantages, fundamental issues arise concerning the nature and scope of liability and quantification of the associated losses. The types of losses that are covered differ substantially among countries (Brans, 1994a, 1994b, 1995) and even within some nations. In the United States, for example, several states have developed their own liability regimes. Important differences also exist between international conventions and national laws. For example, the most encompassing national liability provisions appear to be found in the Oil Pollution Act of 1990 (OPA '90). Parties responsible for any spill of any oil or refined petroleum product are liable

for private losses and for a wide range of environmental and public losses, with government officials (trustees) representing the interests of the public under the Public Trust doctrine. Liability is strict and carries the force of Rebuttable Presumption, whereby trustees who assess damages by following the regulations set out to implement the Act are *presumed to be correct* unless responsible parties can demonstrate otherwise by a preponderance of evidence.

At the international level, the 1969 International Convention on Civil Liability for Oil Pollution Damages (Civil Liability Convention) and the 1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damages (Fund Convention) also establish strict liability for losses. However, the incidents and losses covered are much narrower than under OPA '90. For example, the Civil Liability Convention and the Fund Convention cover only spills of *persistent* oils from tankers, there is no Rebuttable Presumption, and the categories of private and public effects covered are much narrower than under OPA '90. Some other nations, in addition to the United States, have expanded potential oil spill liability to broader categories of losses

*The authors acknowledged support from the URI Agricultural Experiment Station.

than have been allowed under the Civil Liability Convention and the Fund Convention, provided that such losses can be reliably calculated (Brans 1994a, 1995).

Many challenges arise in making liability an effective policy instrument for oil spills. One critical set of issues—the main topic of this paper—involves the ability to quantify damages in monetary terms. Some oil spill costs appear straightforward to estimate, at least in principle. For example, response and cleanup costs, loss of profits by tourism and mariculture operators, and assessment costs pose few conceptual issues. In practice, however, difficulties often arise. For example, estimating the *incremental* costs of response and cleanup actions is not always easy (Grigalunas et al., 1988). Tourism and other private claims often are hard to assess due to the need to: (1) separate the effect of the spill from other factors (e.g., poor weather); (2) establish the extent of the affected market; and (3) deal with possibly exaggerated private claims (the “moral hazard” problem). It also can be difficult to separate out necessary and reasonable costs of assessing oil spill damages from what might be basic research, which is normally not subject to liability.¹

Particularly difficult to deal with, however, are damages that cannot be valued directly in commercial markets. Oil spill impacts may include not only commercial losses (e.g., mariculture, commercial fisheries, tourism businesses) but also oiling of shorelines and recreational beaches, loss of wildlife, and

loss or degradation of mangroves and other ecosystems. These latter effects may involve no commercial losses, and as a result they are hard to assess (Brans, 1994; 1995).

Due in part to difficulties with arriving at monetized estimates of damages, there has been a movement toward regimes that emphasize restoration of resources injured or impaired by a spill. For example, under both Civil Liability Convention and the Fund Convention and the new regulations under OPA '90, the goal is to restore the environmental resources injured or impaired by a spill.² Resource restoration following a spill is intuitively appealing and seems straightforward. However, the restoration goal is relatively new and, as we argue in this paper, it presents its own set of challenges (Mazzotta et al., 1994; Jones and Pease, 1996).

This paper examines some of the challenges faced when attempting to quantify damages from oil spills. Case studies adapted from work by the authors and from the literature are used to illustrate the issues involved and how they were addressed. The case studies were selected to cover a broad sweep of damages ranging from those that are *comparatively* easy to establish since market data are available to estimate damages, to much more “exotic” environmental losses for which no market data are available and the development and use of surveys are required.

Many of the losses discussed in the paper were estimated under the liability provisions set out in regulations

¹Particularly difficult to judge is the reasonableness of monitoring costs.

²As noted later, although the general goal appears to be the same, restoration allowable under the Civil Liability Convention and the Fund Convention seem to be much narrower and less defined than under OPA '90.

implementing OPA '90 and its predecessors under United States laws and regulations. As noted, under OPA '90 responsible parties are liable for not only lost use of goods and services traded on commercial markets but also for goods and services not traded on markets, for example, lost use of public beaches by recreationists and destruction of wetlands or other ecosystems. Further, OPA '90 allows for claims for losses of non-use ("passive use") value which could arise, for example, when those who do not visit an affected area or otherwise use affected resources feel worse off due to the effects of a spill. This last category of possible effects has been particularly contentious (see, e.g., Grigalunas and Opaluch, 1993; Hausman, 1993; Hanneman, 1994).

We fully recognize that liability under OPA '90 in the US is far more expansive than the liability regimes of most (if not all) other countries and international conventions. Thus, some of the categories of damages discussed below may not be applicable to other countries. The examples given below are used simply to illustrate various types of damages from oil spills that have been claimed and the challenges presented in attempting to quantify them. Our examples primarily, but not exclusively, deal with natural resource damages (losses to the public represented by government trustees) rather than to private parties because natural resource damages often involve the most challenging issues.

The remainder of this paper is organized as follows. First, general

definitions of key terms used throughout the paper are given. Then we present selected cases illustrating how a particular category of damages was estimated. For each case, the incident, alleged injury, and loss of services are described briefly; then, we outline the method used to estimate damages and the issues and challenges faced. Restoration is the primary focus under OPA '90 and important and challenging issues arising in the context of restoration are also discussed. Finally, we briefly review compensation formula that have been used to simplify calculation of losses due to oil spills.

Concepts and Definitions

Damage assessments typically must establish cause-and-effect links between a spill, exposure of natural resources, injury to resources from this exposure, a resulting loss of services that resources provide to people, and ultimately the value of these lost services to affected individuals. This is an anthropocentric or human-based view of oil spill effects: resources have value only insofar as they provide services directly or indirectly valued by *people*. This view has been the guiding principle for OPA '90 and its predecessor Acts, although new regulations under PA 1990 may expand the allowable damages to include intrinsic value; therefore, damages may not be purely anthropocentric.¹

Injury is an impairment of a resource due to exposure to a spill. The scope of allowable injury will differ depending upon the regime being considered, but

¹The most recent OPA '90 regulations state that the goal is "...to make the public and the environment whole". To the extent that the stated goal of making the environment whole is interpreted in practice as being dependent of direct or even indirect services to people, then the new regulations would represent a departure from previous regulations and to extend the concept of damages to include intrinsic value.

injury can be very broadly defined, as it is under OPA '90, for example. Injury may include not only direct mortality to fish, but also loss of wildlife, destruction of plants, and sublethal effects on biota, such as loss in the productivity of mangroves, wetlands, and other ecosystems. Oiling of a public beach and of surface waters used for navigation are other examples of injury. Impaired resources, in turn, may provide reduced services to people, e.g., lost catch of commercially harvested fisheries or lost recreational beach use.

Damages are defined, in principle, as the amount of money that, when paid to those suffering damages caused by an oil spill, would make them "whole", i.e., no worse off than they would be without the spill. Hence, damages are compensatory in nature, much like in a private case where someone who destroys a car in an accident is liable for compensating the owner for the loss. In the case of oil spills that cause losses to the public, the public does not actually receive money to be used for any purpose. Instead, damages are the amount of money that will be spent on restoration of impaired resources to make the public whole.

Economics deals with tradeoffs, and since compensation involves a tradeoff, concepts and methods used in economics are central for assessing compensatory damages (Ward and Duffield, 1992; Kopp and Smith, 1993). However, many environmental laws provide for both compensation and penalties, and it is important to distinguish between them. Compensation, as noted, has as its purpose "making whole" parties suffering losses. In contrast, penalties may be

punitive and therefore are not necessarily tied to actual losses. For example, the person who destroys the car in the above example may also have to pay a penalty for illegally speeding at the time of the accident, in addition to paying compensation for the loss of the car. This paper focuses specifically on compensation since compensation raises the difficult and interesting issue for quantification.

Damages may include loss in use, covering those that can be measured through the market (e.g., commercially caught fisheries), as well as losses in recreational opportunities that cannot be estimated through the market. As noted, damages under OPA '90 include losses in well being (non-use or passive use) by those who do not directly or physically use a resource but are made worse off due to knowledge of the spill effects.

The challenge, of course, is to apply the definitions and principles outlined above in practice. In the next section examples of damage estimates are given. As stated earlier, we begin with the case where quantifying injuries and lost services and estimating resulting damages are relatively easy; and then proceed to cases where quantification involves substantially more difficult challenges. It is noted that in most of the cases described below, the spill may have caused several injuries and damages that were part of a claim for compensation. However, it is not our intent to consider all losses in each case, and instead we focus on a single damage to illustrate the issues, methods, and challenges involved.

Case Studies

Loss of Vessel Transportation Services: The BT Nautilus (1990)

This spill of some 250,000 gallons (5,952 barrels) of heavy oil closed a section of New York Harbor, one of the world's busiest ports. Booms installed to prevent dispersion of the lost oil precluded several types of vessels (government, tankers, container ships and tugs) from entering or leaving the affected port area for about 10 hours. After this period, for an additional 2.7 days there was a 1.5-hour delay per vessel due to re-routing within the port. Hence, one of the injuries considered in this case is the "injury" to the water's surface which resulted in a reduction in services of vessel transportation.

Natural resource damages for this lost service were defined as the additional cost incurred due to the vessel delays during the response and cleanup period. To assess damages, two steps were involved. First, vessel traffic data were obtained from port officials for the relevant period. These data included arrivals and departures for all affected vessels. Then, an annualized cost per affected vessel was estimated, taking into account the capital and operating costs for each affected vessel, with costs varying by vessel type and size. This annualized cost then was converted to equivalent daily and hourly dollar figures. Using this approach, the increase in costs for all affected vessels over the relevant period was estimated to be US\$585,000. No estimate was made of any lost profits to shore-based businesses due to delayed receipt of materials.

Estimation of damages in this case was relatively straightforward, given

information about the number and size of vessels affected, the length of time they were delayed, and their capital and operating costs. Nevertheless, in situations like this the potential for double counting exists, if responsible parties were required to pay both the public trustees for natural resource damages and the vessel owners for private losses. Serious empirical challenges also would arise in estimating any lost profits to shore-based businesses experiencing delayed receipts of supplies, but this issue did not arise in this case.

Losses to Commercial Fishers Due to Alleged Price Decreases: Exxon Valdez (1989)

Salmon from Alaska account for about 90% of the US salmon catch, and it is a major economic activity in Alaskan coastal waters. Following the spill of almost 11 million gallons of heavy crude oil into Prince William Sound in south central Alaska, many fisheries were closed, and the spill and its impacts were a major environmental media story virtually worldwide. Many claims were made following this spill. This case study examines claims by Alaska salmon fishermen for alleged losses resulting from salmon price decreases due to consumer perceptions of tainting attributed to this spill.

This case involves alleged private losses but is particularly interesting. It was a very large claim and was resolved in a highly visible, very contentious court case that was tried in Alaska before a jury consisting of Alaska residents. Another interesting feature of this case is that it was based on the allegation that prospective consumers avoided salmon due to *perceptions* of tainting rather than actual

physical injury to the fish covered by the claim.⁴

To support their claim, the economics expert retained by the fishermen developed an econometric market model of the salmon market for each of the five salmon species allegedly affected (Mendelsohn, 1993). Essentially, the market model was used to predict what the price of each salmon species would have been each year from 1989 to 1991 without the spill. The predicted price for each of these years then was compared with the actual price, with the difference regarded as an estimate of the per pound price effect attributable to the spill.

Salmon prices change over time for many reasons, and the challenge is to develop and implement an appropriate framework that controls for influences on price other than the spill. To attempt to isolate the effect of the spill on salmon prices in the period following the spill, the market model controlled for influences on the annual price using such factors as: the quantity of the salmon species caught, the exchange rate between the United States and Japan (a major market for Alaskan salmon), US per capita income, the availability of substitutes, for example, tuna and farmed salmon, and other factors.⁵ Annual data for each variable for a 27-year period, 1964 through 1991, were used in the model.

This approach yielded estimates of a price decrease that, depending upon the species, ranged from US\$0.24 to \$1.09 per pound in 1989, the year of the spill.

Interestingly, the estimates made with the model in most cases showed price decreases in 1990 and in 1991, two years after the spill. In fact, for three salmon species, the estimated price decrease was greater in 1991 than in 1989, the year of the spill. In total, the fishermen's expert estimated losses to fishermen from the alleged downward shift in prices due to alleged consumer perceptions of tainting were US\$895 million.

Exxon's expert contested these results using four approaches. First, he questioned the results of the market model (Anderson, 1993). According to Exxon's expert, important structural changes in the Alaskan salmon fishing industry since 1976 had not been considered. He also found some data inconsistencies and used more recent data (1992) than the fishermen's expert. Using the more recent information, and correcting for the few errors in the data, Exxon's expert re-ran the market model and found no support for the fishermen's position that the oil spill significantly reduced prices paid to fishermen. Exxon argued in court that the damages involved were no more than US\$113.5 million.

Second, Exxon's expert also looked at salmon and other fish species prices at substitute locations (British Columbia, Washington State and Japan) for a multi-year period to see if they were affected following the spill. If there were perceptions of tainting of Alaskan salmon, one would expect fish buyers to look elsewhere, by that raising the price of salmon and other species at these substitute sources.

⁴ Prospective claims concerning perceptions also were issues in the *Amoco Cadiz* spill in France (Grigalunas et al., 1988) and the more recent *Braer* incident in Scotland (Brans, 1994a, 1994b).

⁵ Many different specifications of the basic market model were considered by the author.

Third, he interviewed 30 major Japanese fish buyers in Japan and Seattle to get their perceptions of tainting. If tainting was an important issue following the spill, then major salmon buyers should have been expressing concern about the quality of Alaskan salmon. Exxon's expert, in a study done prior to the *Exxon Valdez* spill, had surveyed these Japanese buyers about their perceptions of Alaskan salmon, as well as fish from other locations. Hence he was able to investigate any *changes* in buyer's perception of the quality of Alaskan salmon due to the spill.

Fourth, he reviewed the seafood trade literature and academic journals to see if price effects attributed to the spill were reported. If the spill had an effect on prices, it should have been mentioned in the trade press or in academic studies.

In brief, Exxon's expert found no evidence of that the *Exxon Valdez* oil spill caused a decrease in the price of Alaska salmon. The only evidence of a price effect was a price *increase* that was reported to be due to buyers' fear of possible salmon shortages following the spill. Exxon's expert also found that there was no significant change in Japanese seafood buyers' perceptions of the quality of Alaskan salmon after the spill as compared with results of the study of quality perceptions done prior to the spill. Finally, his examination of the trade and academic literature found no evidence of significant price effects.⁶

Which estimate is closer to the truth, the estimate of losses of US\$895 million by

the fishermen's expert, or US\$113.5 million, the maximum estimate of loss by Exxon? The jury in Alaska awarded damages of US\$286.8 million. Hence, the jury's assessment was much closer to Exxon's expert's estimate than to the estimate made for the fishermen. So, in this case a careful economic analysis of damages seemed to play a central role in the jury's decision. But this story does not end here. The same jury subsequently assessed punitive damages against Exxon of US\$5.3 billion, an amount that swamps the damage estimate.⁷

Lost Catch of Commercial Fish— North Cape (1996)

This spill involved the reported loss of some 828,000 gallons of fuel oil near the Rhode Island shoreline during a winter storm. Concentrations of toxic oil fractions in the nearshore water column, caused by the close proximity of the spill to shore and the heavy wave conditions at the time of the spill, resulted in a substantial (but at the time of this writing, unknown) kill of lobster. Mortality appears to have been concentrated for young lobster, those below legal size. This case is interesting in that the major issue concerns lost catch for an open-access fishery, and damages to fisheries have been notoriously difficult to establish because of problems in obtaining suitable biological information (e.g., Mead and Sorensen, 1970; Grigalunas et al., 1988). It also takes on added significance because it may be the first case under new OPA regulations to be based on a restoration framework rather than on a direct monetary estimate of damages.

⁶ See also Cohen (1995) who, after the court decision, estimated damages to be no more than US\$155 million to Alaskan salmon fisheries for the two years following the spill (1989 and 1990) using different data and assumptions and a different econometric model.

⁷ At the time of this writing (September 1996), Exxon has appealed to a higher court to reverse the US\$5.3 billion punitive award.

Several important features of the area lobster fishery should be noted. Lobsters are not legally harvestable until about age six, after which most (perhaps 80%) are caught almost immediately. As with all biological resources, some nonfishing mortality would occur even without the spill, and this must be taken into account to isolate the spill's impacts. Nonfishing mortality is highest for the youngest cohorts, i.e., it is age-dependent. Also, lobsters grow by molting (shedding their shells) which occurs only when sea water temperatures are warm, and the larger the lobster, the more it is worth per pound. Lobster prices also vary by season reflecting changing supply and demand conditions.

To estimate lost services in this case, actual harvests over time must be compared with harvests that would have been realized in the absence of the spill. In this case, the characteristics of the major species (lobsters) injured by the spill make analysis of damages more tractable than it is for most open-access fisheries. This is because lobsters are very immobile during the winter and are comparatively easy to count. Also, to estimate injury, scientists were able to begin sampling of affected and control areas almost immediately after the spill.

Factors complicating calculation of lost catch due to this oil spill include the following. First, it is necessary to estimate the additional mortality to pre- and post-recruits caused by the spill. As noted, estimation of oil spill excess nonfishing mortality by scientists began almost immediately following the spill. Second, cohorts (age or size categories) must be tracked through time to estimate the catch that would have been harvested but for the

spill. Third, the government closed an area of up to 254 mi² to lobster fishing for a five-month period. Closure of course reduces catch in the short term but allows surviving lobster to grow, and larger lobsters ("selects") are worth more per pound, as noted.⁸

Due to the complex interplay of all of the factors involved (lobster mortality across age/size cohorts, nonfishing mortality, closure of a large area for an extended period, and seasonal and size variations on prices), a model is needed to organize available information for estimating lost catch. Preliminary work involves the use of bioeconomic models of the area lobster fishery to address the multitude of factors that must be considered. Critical inputs to such a model, of course, are science-based estimates of mortality caused by the spill, by age or size class, as well as other biological information. A bioeconomic model also can be useful for assessing complicated restoration-related issues. This is particularly important, as noted, given the new (as of 1996) focus of damage assessment regulations on restoration of injured resources in the US. For example, depending upon the goal of restoration, a bioeconomic model could be used to estimate the actual and discounted loss in: (1) the number of lobsters caught; (2) the weight of the lost catch; or (3) lost "lobster-years" (or biomass-years). The model could also be used to assess actions to restore losses. These could include: creating bottom habitat, producing young lobsters in hatcheries for release, catch and release of female lobsters, fishermen buyouts to reduce harvests, or biomass protection through area closure. The model could assess alternative programs (e.g., closure)

⁸ Closure also means that some lobsters that would have been harvested instead die of natural causes.

of different scales carried out during different time periods. Of course, biologists must play a critical role in supplying information concerning the feasibility and productivity of each restoration possibility. Given this biological information, a comparison of the cost-effectiveness and of the benefits vs. costs of these alternatives could be done.

Lost Recreational Beach Use—World Prodigy (1989)

The loss of nearly 300,000 gallons of fuel oil during late June caused a considerable amount of oil to come ashore and led to the official closure of many miles of popular public beaches in Rhode Island for up to a few weeks. Thus, this case involved injury to the shoreline (beaches) and lost beach services (swimming, sunbathing, etc.) to the public. Challenges faced in this case included estimating (1) the number of days of beach use affected and (2) the value of the lost beach days.

To address these issues, the Type A model was used. Briefly, this is a computerized model developed for the US Department of the Interior as a simplified approach for estimating damages using limited field observation (Grigalunas et al., 1988). It is used primarily for "minor" spills of short duration.

Included in the model's database is information on average beach use per meter of public beach per day for all sections of the US. These estimates vary by area, for each type of public beach, by month, reflecting seasonal use of beaches. In the model, beach use is valued at US\$6.16, which is the average estimate of the value of beach days from several studies. Damages are then estimated by multiplying the estimated number of

beach visitors per kilometer for different areas of the country by month using data on beach attendance (see Grigalunas et al., 1988).

Beach damages from the *World Prodigy* spill were calculated by applying results from the Type A model. First, the generic value for beach recreation was adapted to reflect a Rhode Island specific value of US\$10.75 (Tyrrell, 1982). The model was then used to estimate recreational beach losses per kilometer-day of closure. This was multiplied by the actual kilometer-days of beach closure due to the *World Prodigy* spill. Using this method, the total losses to beach closure due to the *World Prodigy* spill were estimated to be US\$2.0 million.

Lost Recreational Boating and Recreational Fishing—President Rivera (1989)

This spill of over 300,000 gallons of number 6 oil in the Delaware River just below Philadelphia occurred in the early summer season, just prior to a major national holiday. Much of the affected part of the river is heavily used for recreational boating and for recreational fishing, most of which is done from boats. The booming of several miles of the river to contain the spilled oil limited these activities during the response and cleanup period, which extended for up to about three weeks in some locations.

Challenges in this case included quantifying the lost services (recreational boating and fishing days) and assigning an economic value per day to these lost services. Making these tasks more daunting was the fact that, unfortunately, economists did not become involved in assessing damages until *over a year after* the spill and no prior efforts were made to estimate boating losses. Other

challenges stemmed from the possibility of double counting and the fact that the river is heavily used by commercial vessels and has experienced many spills prior to the *Presidente Rivera*.

To estimate lost boating-days during the time of closure, a previous survey funded by Sea Grant of recreational boaters was used (Falk et al., 1987). This Sea Grant survey sampled registered boaters in Delaware to estimate number of boating-days that occurred, as well as to allocate boating-days to different geographic areas within the State. These numbers were used to estimate the number of boating-days that occurred during the year. This number was divided by the number of days in the typical boating season to estimate the number of boating-days for each day of closure. Adding these days up over the period of closure results in an estimate of the number of lost boating-days due to closure.

These days were allocated between lost boating-days and lost boat-based fishing days by using the percentage of boating-days that were reported to be primarily for the purpose of fishing. Average values from a range of studies for fishing and boating (Walsh et al., 1988) were used to estimate the values per day for each of these activities. In addition, an attempt was made to quantify lost services due to decreased boating after the closure period. To do so, surveys were administered to marina operators in the affected area (RCG/Hagler, Bailly, Inc. 1990) to estimate lost days of recreational boating. An independent estimate of the share of area recreational boating that was primarily for recreational fishing was used to separate out recreational fishing from boating. These estimates were used to

quantify lost days of recreational boating and of recreational fishing.

Other estimates of additional lost services were made by conducting a mail survey of homeowners along the affected part of the river to quantify their lost recreational activities on the river due to the spill. Potential problems with these estimates included: (1) non-response bias, which occurs when only those most concerned or affected respond to a survey and (2) memory bias, whereby individuals' estimates based on recall of the distant past may overstate lost use. The fact that some homeowners had filed a private legal suit claiming monetary damages for lost recreational use presented additional difficulties in weighing the objectivity of the information obtained.

Because funding was limited, no original economic study was done. Instead, "benefit transfer" was used for each affected recreational activity. Benefit transfer involves taking an estimate of economic value per day of activity made for one area and using it for another area. Initially, for each affected activity the average value obtained from several studies summarized in Walsh et al. (1988) was used. However, the areas and activities in the studies summarized were not viewed as comparable to activities affected at the spill site and alternative. More appropriate estimates from other studies were used, for example, the RCG estimates of lost fishing-days including estimates of the value of king salmon fishing in Alaska, salmon fishing in British Columbia, marlin fishing in Hawaii and other premier fishing experiences. In comparison, fishing in the Delaware river is a more modest recreation activity. Considering only those value estimates

from the Delaware area resulted in lower estimates of value. These more appropriate estimates then were utilized as part of the settlement negotiation process.

Lost Non-Use ("Passive Use") Value— The Exxon Valdez (1989)

In addition to impacts on commercial fisheries (some of which were described above), the loss of almost 11 million gallons in the *Exxon Valdez* oil spill caused substantial loss of wildlife and oiled hundreds of miles of shoreline in Prince William Sound and elsewhere. This dramatic environmental incident received major national, and even international, media attention.

A major issue in this case concerns estimates of lost non-use (or "passive use") value. Passive use values are based on the argument that when individuals learned through the media about loss of wildlife and oiling of shorelines due to the spill, they may feel worse off, even if they have never visited the area and indeed never intend to visit. In principle, there is no limit to the number of people who can have a sense of loss, so that even a small loss per person (or household) can add up to an enormous amount when aggregated across the entire population. Since by definition, non-use involves no market transactions which might be used as data, non-market methods using surveys must be employed. Estimates of non-use value have been controversial and remain a highly contentious issue in natural resource damage assessments (see, for example, Grigalunas and Opaluch, 1993; Hausman 1993; Hanneman, 1994).

To estimate non-use value losses in the *Exxon Valdez* case, economists for the State of Alaska (Carson et al., 1992) used

the contingent valuation method (CVM). CVM is a survey-based approach that uses a carefully structured survey instrument to elicit a respondent's willingness to pay (WTP) for an environmental commodity. This stated willingness to pay is viewed by practitioners as the economic value that individuals attach to the item concerned. Hence, a CVM survey in effect creates a "constructed market" for items for which no markets exist. In this case considerable effort went into development of the survey instrument. Briefly stated, respondents were asked whether they would pay US\$X for a safety program (escort vessels to avoid spills and equipment for quick control and clean up in the event of a spill) that would be guaranteed to prevent loss identical to those experienced by the *Exxon Valdez* for 10 years.

The final survey instrument was administered in person to a random sample of 1,043 households throughout the US "lower 48", with a 75% response rate. Elaborate use was made of maps, figures, and other visual aids. This is one of the most costly CVM studies ever done.

The survey described the path of the nearly 11 million gallons of oil spilled, injuries to wildlife (seabirds, marine mammals, eagles) and shorelines and the general time to recover. Participants were told that a similar spill could be expected to occur within the next 10 years, unless a special safety program was put into place. As noted, the safety program would involve use of two specially designed escort ships to escort oil tankers through Prince William Sound to avoid another spill with effects like the *Exxon Valdez*. If a spill were to occur, special crews and equipment on the escort vessels would be used to prevent the spill from spreading. Four versions of the survey were administered using trained interviewers,

with the only difference among the surveys being the dollar amount used in the willingness to pay question.

The median household WTP for the spill prevention plan was US\$31. This amounts to US\$2.8 billion when aggregated across the entire United States. Carson et al. (1992) believe that this is a conservative, i.e., low estimate.

Other Approaches

Restoration

Restoration of resources injured or impaired due to a spill is the new focus of liability under both OPA '90 and the Civil Liability Convention and the Fund Convention. The focus on restoration avoids the difficulties associated with estimating money measures of losses using economic methods. However, restoration poses its own set of serious challenges, as we describe below.

Under new OPA '90 regulations, the party responsible for an oil spill is liable for "restoring, rehabilitating, replacing or acquiring the equivalent" (hereafter "restoration") of injured natural resources with the object of making the public whole. Restoration under OPA has two elements. One is to restore injured resources to their baseline, which is called *primary restoration*. For example, an oil spilled on a public beach could be removed and contaminated sand replaced with clean sand. However, interim losses of the beach for recreational purposes might occur before it is restored to baseline. Restoring additional resources might be used to make up for these interim losses in use. This form of

restoration is termed *compensatory restoration*. Continuing the beach example, if the beach was unusable for, say, one month, due to the spill, the responsible party might take measures (e.g., provide greater access to the beach) to offset the lost interim use.

Restoration has much appeal, but faces its own set of challenges, particularly when biological resources are injured. For example, it is difficult to know precisely the baseline level for the population—that which would exist if the spill had not occurred—for biological resources, such as fish or birds. A particular population may have remained the same, increased or conceivably decreased if there had been no spill. Further, restoration itself is a relatively new activity and may be not technically feasible, or restoration may be excessively costly, particularly when extensive field monitoring and mid-course corrections are called for. Given the difficulties in determining a baseline and the effectiveness of recovery, together with natural variations in biological populations that can easily exceed mortality from a spill, it can be very difficult or impossible to determine when an injured resource has been restored to its without-spill condition.

Under OPA '90 several factors must be considered when examining restoration alternatives, including natural recovery, technical feasibility, and cost-effectiveness. An additional consideration is the standard of grossly disproportionate. If the cost of restoring a resource is unreasonably high as compared with the increment in value due to restoration,⁹

⁹In an important court decision a ratio of 3:1 was suggested. In the new, simplified Type A model a ratio of 10:1 is used.

then the proposed restoration may not be appropriate. In such a case, under OPA '90, trustees (representing the public) may acquire the equivalent of the injured resource. For example, if it is not possible to restore a bird population by, say, treating birds injured in other incidents, or raising them artificially and releasing them into the wild, then the trustees may suggest rehabilitation of a poorly functioning habitat (e.g., wetland), or perhaps the acquisition of a threatened habitat important to the lost species. Note, however, that in order to determine whether a proposed restoration is grossly disproportionate, it is necessary to estimate the value of the resources, i.e., it is necessary to use economic methods similar to those reviewed in the case studies. Indeed, in some cases it may not be feasible to restore the resources that were injured, or doing so might be extremely expensive. In such cases the regulations allow for economic techniques to be used to estimate damages, with amount collected used for restoration of comparable resources to replace those that are lost.

Under the Civil Liability Convention and the Fund Convention, impaired resources also can be restored. The restoration must actually occur, however, and the costs must be "reasonable". Clearly restoration under the Civil Liability Convention and the Fund Convention faces many of the same difficulties as under OPA, or any restoration regime, concerning technical feasibility and determining the baseline and when the injured or impaired resources have been restored. Of course, what is "reasonable" is not always clear, which again raises the issue of what is an acceptable ratio of cost to benefits, i.e., how do we define grossly disproportionate. The Civil Liability Convention and the Fund Convention do not appear to address this

issue. Nor do they seem to address what to do when it is not technically feasible or possible to restore an impaired resource (Brans, 1993, 1994a, 1994b).

Compensation Formula

Several states have developed "compensation" formula as a simplified approach for assessing damages from spills. Low cost and ease of administration are obvious advantages of this approach. In some cases, the amount calculated using the formula is intended to capture hard-to-measure environmental losses; separately calculated damages and penalties typically can be added to the amount arrived at using the formula.

Most formula begin with a base monetary amount per unit of oil spilled. This number is then multiplied by an overall score that takes into account such factors as the amount of oil spilled and the threat posed by the oil in terms of both the characteristics of the oil and the sensitivity of the affected environment. Some formula also consider the season of the spill. For example, the State of Florida uses a formula based on US\$1 per gallon adjusted by: (a) sensitivity of the area (inshore vs. nearshore vs. offshore); whether the spill impacts a special management area (e.g., state park); (b) additive amount for impacted habitats (e.g., US\$10 per square foot of coral reef); (c) pollutant characteristic depending on toxicity, solubility, persistence, and dispersability; (d) additive amount for each member of threatened endangered species affected; and (e) additive amount for administrative costs.

A fundamental problem with using a formula is its reasonableness (validity and reliability) as compared with other

approaches. Compared with other approaches that use field observations of injury, or even use “averaged” biological information as in the simplified, Type A model described earlier, the use of a formula masks the individual biological injuries for which a claim is being made. Thus, it may be difficult or impossible to determine whether the results of the formula appropriately reflect the actual damages that occurred due to a spill.

Further, the base monetary amount per unit spilled is arbitrary and, hence, so is the total damage claim using the formula. Other issues concern whether and how the formula takes into account the amount and timing of cleanup or other actions that the responsible party might take to reduce damages. This approach will not provide proper incentives for spill response actions if the responsible party knows that costly actions that might reduce spill impacts will not reduce liability.

Still other issues must be addressed. In many cases, for example, a spill will contact several environment types, such as a wetland, estuary, open ocean, or important wildlife area. In such instances, some formula use the *most sensitive* environment type contacted as the scaling factor in the formula, but this obviously is not reflective of the facts. Additional, very basic questions arise in some cases about the amount actually spilled or cleaned up, information that is not always easy to ascertain. Finally, there is the potential for double (or even triple) counting. This can arise when a responsible party must pay a state using the formula, and the federal government, and perhaps a private party for what may be the same injuries.

Conclusion

Oil spill liability can be an effective tool for compensating injured parties and for providing incentives for careful handling of oil products. Hence, liability can provide a useful, incentive-based policy instrument for sustainable financing for protection and restoration of coastal environments threatened or impaired by spills of oil or other substances. However, as the examples presented make clear, implementing liability can be complex and raises many challenges. Many approaches are possible, and each has distinct advantages and disadvantages.

The challenges in instituting liability can best be met by examining lessons that were learned from our experience with measuring oil spill damages. Although there are many similarities among oil spills, and much can be learned from past efforts to measure oil spill damages, each incident is unique in many ways. Thus, appropriate liability rules provide flexibility to use and adapt tools that are appropriate for each particular spill. Simplified methods are appropriate for small spills with minor injuries, as it is inappropriate to spend large sums to measure small damages. For these cases, a thoughtfully developed compensation formula or computer model, despite their obvious simplifications, might be an appropriate tool. However, these methods might grossly overstate or understate damages for a particular case. In such cases, it is very useful to have means of adapting methods or using alternative methods. Due to their high cost, major studies using extensive primary data collection are probably justified only for the largest and most damaging spills. It is important to provide flexible guidelines for assessing spills that fall in between the minor spills and the largest spills.

References

- Anderson, J.L. 1993. Analysis of the effect of the *Exxon Valdez* oil spill on Alaskan salmon prices. Unpublished manuscript (October): 25 p.
- Brans, E.H.P. 1994a. Liability for ecological damage under the 1992 protocols to the Civil Liability Convention, the Fund Convention, and the Oil Pollution Act of 1990, Part I. '94-3, p. 61-84.
- Brans, E.H.P. 1994b. Liability for ecological damage under the 1992 protocols to the Civil Liability Convention, the Fund Convention, and the Oil Pollution Act of 1990, Part II. '94-3, p. 85-91.
- Brans, E.H.P. 1995. The *Braer* and the admissibility of claims for pollution damage under the 1992 protocols to the Civil Liability Convention and the Fund Convention. *Environmental Liability* (3)4: 61-69.
- Carson, R., R. Mitchell, W.M. Hanemann, R. Kopp, S. Presser, and P. Ruud. 1992. A contingent valuation study of lost passive use values resulting from the Exxon Valdez oil spill. State of Alaska, Attorney General's Office, Juneau, Alaska.
- Cohen, M.J. 1995. Technological disasters and natural resource damage assess: an evaluation of the *Exxon Valdez* oil spill. *Land Econ.* (71)1:65-82.
- Falk, J., A. Graefe, and S. Swartz. 1987. The 1985 Delaware recreation boating survey: an analysis of Delaware-registered boaters. University of Delaware Sea Grant College Program, Newark, DE. (DEL-SG-06-87)
- Geselbract, Rubin, and Leschine (1989) (see p. 1)
- Grigalunas, T. et al. 1988. Measuring damages to marine natural resources from pollution incidents under CERCLA: application of an integrated, ocean systems/economics model. *Mar. Res. Econ.* 5(1).
- Grigalunas, T. and J. Opaluch. 1993. Non-use value in natural resource damage assessments: the Nestucca oil spill, p. 689-695. *In* Proceedings 1993 International Oil Spill Conference, American Petroleum Institute, Washington, D.C.
- Hanneman, M. 1994. Valuing the environment through contingent valuation. *J. Econ. Perspectives* (8)4: 19-43.
- Hausman, J.A., Editor. 1993. Contingent valuation: a critical assessment. North Holland Publishers, New York, 502 p.
- Jones, C. and K. Pease. 1996. Restoration-based measures of compensation in natural resource liability statutes. Western Regional Research Publication 9th Interim Report.
- Kopp, R. and V.K. Smith. 1993. Valuing natural assets: the economics of natural resource damage assessment. Resources for the Future, Washington, DC, 358 p.
- Mazzotta, M.J., J.J. Opaluch, and T.A. Grigalunas. 1994. Natural resource damage assessment: the role of Resource restoration. *Nat. Res. J.* (3)11.
- Mead, W. and P. Sorensen. 1970. The social cost of the Santa Barbara oil spill. Santa Barbara Oil Spill Symposium.
- Mendelsohn, R. 1993. The effect of the Alaskan oil spill on Alaskan salmon prices. Unpublished manuscript (February). 58 p.
- RCC/Hagler, Bailly, Inc. 1990. Natural resource damage assessment for the Presidente-Rivera oil spill. State of Delaware.
- Shapiro, C. 1991. Symposium on the economics of liability. *J. Econ. Perspectives* (5)3:3-10.
- Tyrell, T.J. 1982. Estimating the demand for Rhode Island public recreation areas: a combined travel cost-hypothetical valuation approach. Working Paper No. 11, Department of Resource Economics, University of Rhode Island, Kingston, Rhode Island.
- US Congress. 1990. Oil Pollution Act of 1990. Pub. Law 101-380, 104 Stat. 484, 18 August.
- Walsh, R.C., D. M. Johnson and J.R. McKean. 1988. Review of outdoor recreation econ. demand studies with nonmarket benefit estimates. Technical Report No. 54, Colorado Water Resources Research Institute, Colorado State University, Fort Collins, Colorado.
- Ward, K. and J. Dufield. 1992. Natural resource damages: law and economics. John Wiley and Sons, New York, 684 p.

DRIVING FORCES TOWARDS BETTER MARINE ENVIRONMENT AND SAFETY: CONSIDERING ECONOMICS

Hans Broberg

*Managing Director
SSPA Maritime Consulting
PO Box 24001, Göteborg,
Sweden*

BROBERG, H. 1997. Driving forces towards better marine environment and safety: considering economics, p. 182-184. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Background

Knowledge has been growing faster than ever; being spread and absorbed faster. Awareness on the effects of marine environmental problems are well-known, and several efficient measures are documented to counteract these problems. It is surprising, therefore, why we have achieved little progress. In fact, we experience catastrophes from time to time that seem to be repeating what have happened in the past. We seem to be taking small steps forward; but, in reality, move slowly sideways like the crab.

The International Maritime Organization (IMO) has been continuously producing new rules on minimum acceptable standards; and its work is definitely important and necessary. However, in practice, there are still problems. First, it is unclear how to handle those who do not abide by the rules. Second, in many cases, the rules are minimum acceptable standards; but, these days we expect adherence at a higher level.

I believe that these problems can be corrected by introducing incentives. The world wants trade and cooperation between nations. In order to stimulate transport, we should introduce incentives for those who can meet environment and

safety standards. The simple rule should be that you gain by being a good guy compared with the bad guy.

What has been done? What can be done? Are there any models? An important example can be shown by a case in Sweden. Let me first describe this situation, and then draw a few general conclusions on what may be achieved on a global scale.

Fees Differentiated Based on Environmental Conditions

A principal decision has been taken to differentiate fees when entering Swedish waters; and an agreement has been reached by the parties involved. The figures are yet to be derived. However, the aim of the agreement is to provide an incentive to install catalytic cleaning on exhaust gases and to promote the usage of low sulfur oil. Results of an investigation by SSPA (Forsman and Magnusson, 1993), illustrate the costs for reducing emission. For example, an 83% reduction of sulfur content—from 3% to 0.5%—in the fuel will cost roughly US\$2 per kg sulfur released to the atmosphere. This corresponds to US\$30-40 per ton of fuel.

Exercises for estimating the cost of reducing the emissions must be matched by analyses showing the detrimental

effects of the emissions. Based on these analyses, fees can be designed according to the "polluter pays" principle.

a starting point (Palsson and Swenson, 1995). Similar to the environmental case, where you are able to put technical prices

Can Economic Incentives be Used to Increase Safety?

The primary question to address is "safety for whom." If we are talking of safety from the society's point of view, I think we must include safety in all cases, not only for ships, but also in relation to potential risk posed for the third party; i.e., the society as a whole (see Figure 1).

As a basis for evaluating safety, the FSA (formal safety assessment) process provides

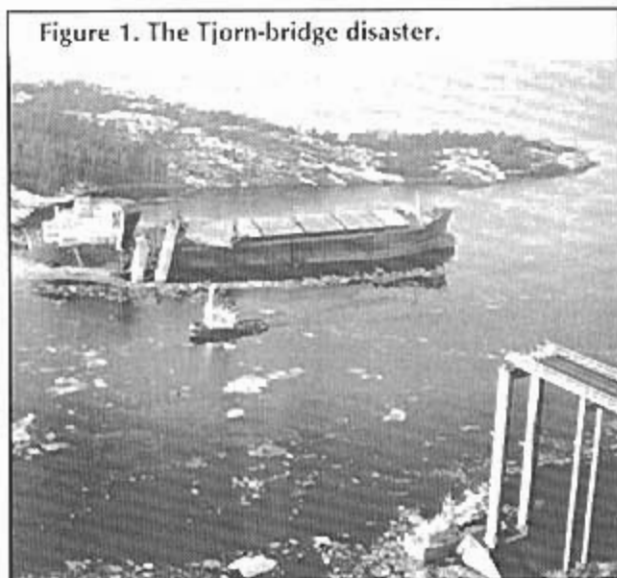


Figure 1. The Tjorn-bridge disaster.

consequences and frequency of occurrence of pollution are divided into five levels. At SSPA we have found this classification sufficient to meet the criteria for evaluation.

If it is difficult to reach common ground in the process of defining the cost for "polluter pays" in the area of safety, we experience an even higher degree of complexity. In any case it is an inevitable task, if we desire true progress. In comparison with the emission case, we can assign a value to every change in level.

For a given ship with a specific number of crew and cargo, it is possible to evaluate the risks and, accordingly, to identify and implement actions to

Figure 2. Risk acceptance criteria.

Frequency	Acceptance criteria				
	Injuries	1	10	100	1000
E Every year					
D $1 \cdot 10^{-2}$ /year				HIGH RISK	
C $10^{-2} - 10^{-4}$ /year			INTER-MEDIATE RISK		
B $10^{-4} - 10^{-6}$ /year		LOW RISK			
A $10^{-6} - 10^{-8}$ /year					
		1	10	100	1000
	1	2	3	4	5
					Consequences



control and minimize effects of possible deviations from the standard level (see Figure 3). When doing this exercise, one often finds that small increments can change the risk factor and/or the potential consequences dramatically. The process provides information on the matters to examine in order to reach appropriate results.

Are Safety and Environmental Incentives Possible on a Global Scale?

How should we translate the examples above to models applicable to the global society. Is it, first of all, desirable? To me the answer is simple and straightforward. We need incentives to avoid accidents, like the loss of the ship *Estonia* in the Baltic or the effects of pollution coming from the *Exxon Valdez* tanker. We need positive actions to be taken by those who can influence both safety and environment in navigation.

The European Union was formed primarily to maintain peace in the European continent. By integrating different societies into one, the peace process is expanded further. The bulk of budget expenditure was on agriculture issues. Without this endeavor, it would have been difficult to get enough public support for the unification process. The above process can be translated in the global level. If the global society is eager to promote trade in order to increase

wealth and understanding among peoples and nations, the same effort should be applied to ensure better standards for navigation.

If a ship owner is able to operate above the standard in environmental and safety, e.g., by showing emissions and Failure Safety Assessment outcomes below the minimum acceptable standard, he should be compensated for his extra costs by the global society. In this way, we give the high class ship owners of the world an incentive for continuing their work and to seek excellence without being threatened by their counterparts competing by employing substandard equipment and personnel.

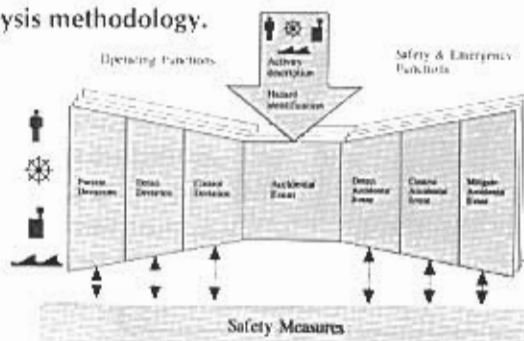
Is this Beneficial for the Operator?

By applying the concepts given above, we can transform actions towards safety and a better environment. The problem of cost is changed into a cost-benefit situation. The operators who work "in search of excellence" will be rewarded for their actions.

References

- Forsman, B. and K. Magnusson. 1993. Means for achieving environmentally friendly sea transport. SSPA Report, p. 6857-1. (In Swedish).
- Palsson, I. and G. Swenson. 1995. Formal safety assessment. SSPA Report, p. 7344-2.

Figure 3. Risk analysis methodology.



Session 3

Case Studies

LUM WENG KEE, Director, Sewerage Services Department, Malaysia.

"Privatization of sewerage services in Malaysia."

BENNY Y.K. WONG, Assistant Director, Environmental Protection Department, Hong Kong.

"Waste management in Hong Kong: private sector's participation."

ZENG ZIJIAN, Engineer, Environmental Protection Bureau of Xiamen, China.

"Waste disposal fee system in Xiamen."

YAO LIXIN, Lecturer, Department of International Trade, Xiamen University, China.

"Socioeconomic impact assessment on integrated treatment of marine environmental problems in the Western Sea area of Xiamen."

CATALINA S. TEJAM, Research Associate, GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas, Philippines.

"Socioeconomic benefits of integrated coastal management and environmental management programs: the case of clean rivers, marine parks, and fisheries."

PRADECH PHAYAKVICHIEEN, Deputy Governor, Tourism Authority of Thailand, Thailand.

"The sustainable benefits of coastal tourism management in Thailand—case study: Ko Samui."

PRIVATIZATION OF SEWERAGE SERVICES IN MALAYSIA

Lum Weng Kee

Director-General

Sewerage Services Department

1 G 1 floor, Wisma Damansaka

Jalan Semantan, Kuala Lumpur 50490

Malaysia

KEE, L.W. 1997. Privatization of sewerage services in Malaysia, p. 186-194. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

This paper focuses on the: (a) historical perspective of sewerage development in Malaysia prior to privatization; (b) privatization of sewerage services; (c) sewerage tariff under the concession; and (d) post-privatization issues.

Historical Perspective of Sewerage Development in Malaysia

Under the Malaysian Constitution, sanitation and public health are concurrent concerns; i.e., both the Federal Government and State Government are responsible for these areas. Normally, the Federal Government complements what is being done by the State.

The emphasis on health and sanitation started in the urban areas as reflected in the existence of Sanitary Boards in the early part of the century, which were the forerunners of the present-day municipal authorities. However, with the diversification and growth of urban services that needed to be provided and the gradual transformation of Sanitary Boards into the present-day municipal councils, the emphasis on health and sanitation has become less of a priority. This trend is reflected in the sanitation status of the country, as ascertained by the 1970 census.

Only 3.4% of the population in the country had access to central sewerage systems, located mainly in Kuala Lumpur's Central Business District, Georgetown and the major towns in Sabah. About 17.2% used septic tanks, 19.8% bucket latrines, and 29.9% pit latrines. A small percentage (2.6%) used pour-flush latrines, mainly as a result of the Ministry of Health's pilot projects in the rural areas, while 27.1% had no facilities or resorted to waste disposal in the river or sea.

In 1970, for the majority of people in the urban areas, the prevalent facilities used for wastewater disposal were the septic tank and bucket latrines, while people in the rural areas used pit latrines or resorted to nature. During that time, the bucket latrine was considered the least polluting to the environment, in spite of health hazards to night-soil collectors, considering that most septic tanks were never properly maintained or desludged.

In the late 1960s, the Ministry of Health, realizing that waterborne diseases can be more effectively controlled through improvement in sanitation rather than curative measures, initiated a two-pronged program for achieving sanitation improvement in the country and adapted technology appropriate to the needs and financial capability of the country.

Launched in 1974 in the rural areas, the program was most successful, covering at least 90% of the rural population, compared to 2.6% in 1970, with pour-flush latrines after 20 years.

The strategies adopted for this environmental sanitation improvement program in the rural areas included: (a) health education on sanitation practice; (b) promoting the construction of pour-flush latrines through demonstration projects, assistance in terms of materials, and organizing of community (or *gotong-royong*); (c) technical and material assistance in assessing needs, surveying, designing and constructing sanitary water supply facilities for the community by the community; and (d) demonstrations on sludge disposal and garbage disposal methods.

This rural environmental sanitation program was implemented by the Ministry of Health, a federal agency which targeted the population outside the areas where municipal or local authorities provided services and where no other agency was mandated to do the task. In the urban areas, which are under the jurisdiction of the municipal authorities, progress was slower. The technology considered technically appropriate for waste disposal in the urban areas was the so-called "central" sewerage system, where wastewater is collected and brought to a sewage treatment plant located far from the community, to serve the whole catchment. In the urban areas, the local authorities were responsible for sanitation. However, the Ministry of Health was responsible for actively promoting the implementation of sewerage projects to serve the urban areas. With the support of the Economic Planning Unit (EPU) of the Prime Minister's Department, 13

master plans and feasibility studies were completed from 1978 to 1982 for a total of 19 major townships in the country.

While the sewerage projects for these 19 townships were feasible and viable, the adoption of respective tariff schemes involved an increase in property assessments and surcharge on water bills. Therefore, most decision makers (at the respective State Governments) felt that the increase was too substantial to be politically acceptable. Without the perceived public pressure for improvement in this sector, only 5 of the 19 master plans were implemented—3 in new townships. With public pressure, the sewerage master plan for Seremban, identifying the use of Sg. Linggi as a source of water for Seremban and Port Dickson, finally pushed through under the 5th Malaysia Plan (1986-1990).

Meantime, in order to ensure that newly developed areas are adequately provided with modern sewerage infrastructure, a policy was proposed and accepted by the Federal Government in 1980, stating that all new housing projects of more than 30 units be required to install sewerage infrastructure, including their own local sewage treatment plants. In most cases, oxidation ponds were the preferred technology for treatment, due to less maintenance required, less cost, and simplicity of operations for takeover by local authorities with limited technical manpower. However, since the two Ministries mentioned were only advisory bodies in relation to the local authorities, not all local authorities adhered to this policy. Thus, by 1990, the coverage by "central" sewerage systems had grown only by 5.0% from 3.4% in 1970, while septic tank coverage had grown to 37.3% from 17.2% in 1970.

Privatization of Sewerage Services

During the preparation of the 6th Malaysia Plan, the central agencies were convinced of the need for immediate implementation of a sewerage program throughout the country to ensure safety of its drinking water sources and to enhance tourism. Data from the Department of Environment showed an increasing trend on pollution of the rivers, with municipal sewage being the biggest polluter; whereas data from the Ministry of Health's monitoring program on sources of potable water showed a very unsatisfactory quality of raw water with the level of treatment provided. There was a need to subsidize the costs of the sewerage projects to make them "politically" viable; e.g., without having to raise assessments by 100%. Thus, it was agreed under the 6th Malaysia Plan that RM550 million be allocated to implement sewerage projects in 25 townships with a grant from the Federal Government covering 50% of their capital costs. However, these projects did not take off immediately, as they required corresponding allocations from the respective State Governments.

Offers to privatize some of these projects (e.g., Kuala Lumpur Phase 2, Malacca) were also stalled. Thus, when Indah Water Konsortium (IWK) submitted a proposal to the Federal Government to privatize the sewerage services for 48 major local authorities, with charges to domestic consumers at an average of RM5.00 per household per month, the proposal was approved for detailed study. Subsequently, IWK was able to negotiate not only for the 48 major local authorities, but for all the 143 local authorities in the country. Both the Ministry of Health and the Ministry of Housing and Local Government gave their support to the exercise.

Upon successful completion of negotiations, a concession was signed between the Federal Government and the Consortium on 9 December 1993 at Langkawi. Under this concession, for the 28-year period from 1 April 1994 to 31 May 2022, Indah Water Konsortium will:

- a) Take over the management, operation and maintenance of the existing public sewerage systems from the Government;
- b) Upgrade and refurbish the existing public sewerage systems;
- c) Plan, design, construct and commission new public sewerage systems;
- d) Inspect, repair, replace, install the public sewerage systems, including all structures, equipment and appurtenances forming part or parts of such public sewerage systems;
- e) Receive, collect, convey, gather, store, transport, treat and dispose of sewage and sewage sludge entering any public sewerage systems from private connection pipes;
- f) Clear, cleanse, empty, remove, transport, treat and dispose of sewage sludge from septic tanks or any other form of sewerage systems, including, but not limited to latrines and bucket systems;
- g) Demand, collect and retain sewerage charge from customers to whom the sewerage services are provided by the concession company, and in each case to do such things which are necessary or incidental thereto.

This concession covers the operational areas of all local authorities in the country. At the end of the concession, ownership

of all public sewerage system assets will revert to the Federal Government free of charge.

To enable the Federal Government to assume the function of privatization from the local authority, the Parliament passed the Sewerage Services Act 1993 on 9 August 1993, after obtaining concurrence from the State Governments at the Chief Ministers' Conference and the National Council for Local Government. The Act vests on the Federal Government the executive authority on all matters relating to sewerage systems and services throughout Malaysia, as well as transfers all movable and immovable assets of local authorities and State Governments used for sewerage systems and services. The Act also provides for the appointment of a Director-General of Sewerage Services to regulate and plan the provision of services in the country and to enable the Federal Government to privatize the provision of sewerage services.

Other sections of the Act provide for the licensing of four categories of contractors providing sewerage services; the approval of plans for construction of any sewerage systems or septic tanks; the enforcement of maintenance/repair of private sewerage systems; and the prescription of tariffs for the provision of sewerage services and penalties for offenses.

According to the concession, IWK can appoint consultants and contractors to carry out its capital works program with the following conditions:

- a) At least 30% of the value of works should be awarded to *bumiputra* contractors;
- b) Foreign contractors shall be

employed only when contractors for such works are not available locally;

- c) Local material, equipment, and manpower should be utilized, as much as possible;
- d) Malaysian consulting engineering firms with the required expertise should be employed as supervisors on full-time basis. Foreign engineers will be employed by the firms only if such expertise is not available locally.

Phase I of the capital works program that should be completed within three years after the takeover date of each particular local authority includes:

- a) Refurbishing all existing plants/sewers and upgrading to meet standards required.
- b) New works:
 - i. P. Pinang - Jelutung S.T.W.,
Bayan Baru S.T.W.
 - ii. Labuan - Town Area, 16,000 population
 - iii. P. Langkawi - Kuah Town, S.W. Coast, Padang Matsirat
 - iv. Port Dickson - Sg. Lukut Kecil, P.D. Town, Sirusa, Teluk Kemang
 - v. Johor Bahru - Sg. Subulong, Sg. Sengkuang, CBD
 - vi. K. Lumpur - Puchong Pumping Strn., Sg. Besi, S.T.W., Setapak P.S.
 - vii. Ipoh - Greentown Ext., Gunung Rapat
 - viii. Seremban - Rasah
 - ix. Melaka - Melaka South
 - x. Kangar - Town
 - xi. Kuching - Maong catchment
Utara

The total estimated cost of Phase I works is about RM800 million.

For the remaining period under the concession period, IWK is committed to construct new sewerage systems to achieve the following coverage:

End of Phase (Year)	Category A in 48 major towns	Category B in 96 smaller towns
1. (2002)	63.8%	15.8%
2. (2007)	76.2%	17.8%
3. (2012)	82.6%	19.4%
4. (2017)	84.3%	24.0%
5. (2022)	84.3%	29.5%

The total estimated cost of the five phases is RM6.057 billion.

In addition to these public sewerage systems that IWK is committed to under the concession, there is also a substantial amount of sewerage work that developers will need to carry out as part of the infrastructure for the new projects. These systems will then be commissioned as public systems and handed over to IWK to operate and maintain.

Sewerage Tariff Under the Concession

The concession contractor is not given any additional government financial assistance, with the exception of a soft loan of RM475 million and nominal rental set at RM409 million (in effect taking over existing sewerage loans of local authorities) for lease of all sewerage assets taken over from the government for the concession period. Therefore, all other capital and operating costs and return on investment have to be recovered from the tariff for services provided by the concession company. The internal rate of return (pre-tax, pre-finance) has been limited to a range of 14% to 18%. The tariff is fixed for the first five years and

reviewed thereafter every three years based on technical and financial audits of the company's applications for tariff revision by the government.

Under the financial model used for the concession, the non-domestic sector revenue was about three times the revenue to be collected from the domestic sector. The tariff scheme fixed for the first five years set the average for the domestic sector at RM5 per month per premise (or household), with a minimum at RM2 and a maximum at RM10, and is based on three factors: (a) a percentage of the annual value of the property to provide a graduated discount for the lower income group; (b) water consumption to reflect usage charge; and (c) differential between premises connected to a public sewer network maintained by the company and premises using septic tanks (for which service is limited to desludging).

For the non-domestic sector the sewerage service charge is based solely on the water consumption and for premises connected to public sewerage systems, the average water supply rate is set as RM1.20/m³ with differential for premises using septic tanks (at RM0.90/m³).

Industries generally treat their own industrial wastewater and only discharge domestic wastewater into the public sewers or septic tanks. Cases of discharge of untreated or pre-treated industrial wastewater into public sewers are negotiated on a case-by-case basis.

Premises used solely for religious worship or for charitable purposes may be exempted from sewerage service charges by the Minister.

The financial model also assumes an escalation rate of 5% per year on the tariff, i.e., there will be an escalation of 25% at the first review at the end of year five and an escalation of 15% for subsequent reviews at the end of each three years.

Since the tariff is a common tariff applied across the country it provides a cross-subsidy from the large urban centers to the smaller urban centers where the unit capital and overhead and maintenance costs will be higher.

Post-Privatization Issues

Since the takeover of sewerage services in Kuala Lumpur on 2 April 1994, sewerage services in 84 local authorities in Peninsular Malaysia had been taken over by the concession company, covering 3,300 sewage treatment plants and 2,798 km of sewers. Work force has increased to 1,368. Construction has also commenced on new public sewerage systems in Labuan, Langkawi and Port Dickson. For a number of reasons, takingover of sewerage services in the states of Kelantan, Sabah and Sarawak has been deferred.

Since the commencement of billing for sewerage services in May 1994 in Kuala Lumpur, a number of issues have surfaced, due to the following oversights:

- a) Inadequate public information program, particularly before the commencement of billing, resulting in many complaints being received, including excessive charges, charges for no service received, poor service, and service not required. Consequently, in many cases, consumers refused to pay for
- b) Lack of understanding of the scope or change of scope of the sewerage service to be provided as a result of the inadequate public information program caused consumers to:
 - Demand for service outside the responsibility of the concession company. For instance, one local authority obliged consumers to clear chokes on the private connection pipes; other local authorities referred them to private contractors. Under the new Sewerage Services Act, and the concession agreement, the concession company is only responsible for maintaining the public sewers which are part of the public sewerage system, but not the individual connections to the public sewer.

Many complaints were also received from residents in government low-cost housing complexes where the local authority used to maintain the sewerage system, as well as internal plumbing. An oversight by the local authority led to the omission of these sewerage

systems from being declared as public sewerage systems, which the regulator can direct the concession company to take over and maintain. Unfortunately, the local authority's Sewerage Department had already been disbanded or taken over by the concession company.

- Reject the service provided by the concession company. In the case of premises with septic tanks, previous legislation does not specify the need for desludging, although most septic tanks in Malaysia are designed for retention of sludge only up to a two-year period within the tank. In most cases, occupants will call in contractors to desludge only after the whole tank had choked up, affecting the flow of wastewater from the building. The new Sewerage Services Act enables the Director-General to direct the concession company to provide the service on a scheduled basis and to charge for it. The change in scope was seen as fundamental by health and environment agencies as a quick and practical step to achieve a reduction in pollution of the country's water resources as the sewerage development program will take time to implement.
- c) Lack of understanding of the financial model, resulting in complaints about excessive profits and charges. To the public, sewerage services were among the package of services provided by the local authority for which they pay yearly assessment rates. While there was no reduction in the assessment rates, they were now required to pay separate sewerage service charges to a private company. In their opinion, it does not matter that the current assessment rates are too low to pay for the range of services required, or that there is an improvement from practically no service to a fully regulated service being provided. In most cases, assessment rates range from 2% to slightly more than 10% of the annual value of properties versus the 35% that local authorities are empowered to charge under existing legislation;
- d) Negative publicity as a result of media highlighting issues to sell their products by creating an impression that the concession company is not providing quality service but is only interested in profits. This was further compounded by the concession company's corporate movement for shareholders to restructure the equity holding of the company. It publicized its financial statements showing annual pre-tax profits of RM100 million over the first three years, but was silent on the fact that all profits will need to be ploughed back into the project for the first 15 to 20 years.
- e) Lack of support and cooperation of water supply agencies in integrated billing for sewerage services in the water bill. Since water usage was a basis for sewerage tariff, the idea for a most practical and cost-effective way of billing for sewerage services would be to incorporate it as an additional component of water supply bills and appointing the water supply agencies as agents for

the concession company. However, there is apprehension on the part of the water supply agencies over reluctance of consumers to pay sewerage services charges that may affect their own revenue collections. This reluctance translated into a delay in commencement of billing, resulting in added confusion due to arrears on sewerage service charges appearing on the first bills to consumers for the period covering the date of commencement of service to the date of commencement of billing.

- f) Inadequate data on sewerage assets held by local authorities, especially sewerage systems built by developers and turned over to local authorities to operate and maintain as public systems. Due to lack of personnel and finances, many of these systems were never properly taken over and some were still held under legal title by the developers. The issue arose only when consumers complained about malfunctioning of such systems, blaming the concession company, even though the process for taking over becomes more complicated, especially with the lack of plans.
- g) Billing errors. As a result of dependence on the water supply accounts database, which lacks sewerage service details, many consumers were wrongly billed; i.e., there were incidences of incorrect service level coding and billing of non-customers. To add to the confusion, the concession company started billing premises from the date of takeover of the

particular local authority even though desludging service had not yet been provided to individual premises with septic tanks.

- h) Lack of acceptance of the tariff formula. As a result of the adoption of cross-subsidy elements within the tariff formula and simplification for practical purposes, consumers questioned the basis of the formula (e.g., why relate to property values? why base it on total water consumption instead of actual discharge to sewer?) even though charging for municipal services had been based on property values. The general perception was that the concession company had been given a license to make profits and no amount of explanation by the concession company could be accepted that the relevant government agencies had examined and negotiated with the concession company prior to approving the tariffs.
- i) Personnel, or lack of it. Unlike other privatization exercises where privatization changes the status of staff from government employees to private sector employees, sewerage projects take the form of a new service for many local authority areas. With the current high level of economic activities in the country, the concession company has difficulty recruiting staff, and is overstretched trying to meet its obligations right from the date of taking over. This is aggravated by the lack of personnel with operating experience relevant to sewerage systems in the country. Expatriate personnel recruited for

the purpose usually possess experience only within the limits of a particular river basin authority rather than familiarity with the logistics of developing a totally new sewerage service throughout the country.

- j) Lack of penalty for non-payment of bills. Unlike water, electricity or telephone service where the service provider has the option of disconnection of service for non-settlement of service bills, the concession company was not given this mandate. Neither would it have been practical to do so. This has resulted in consumers being encouraged by some groups not to pay service bills.
- k) Political motives. One reason why the majority of the sewerage master plans were not being implemented over the last 15 years after completion of the studies was that State Governments were

generally hesitant to raise the necessary rates and tariffs to pay for these costs. It was assumed that, with privatization, accounts would be more transparent and any increase in costs can be related directly to the costs of the company providing the service. However, in reality, the exercise requires the commitment and involvement of government to explain and justify its approval of the tariff rates.

Conclusion

As a result of the large number of complaints about the tariffs and the scope of services provided, the government has directed the concession company to review and propose a new package that could be implemented and made more acceptable to the public, taking into account the experience gained over the past two years.

WASTE MANAGEMENT IN HONG KONG: PRIVATE SECTOR'S PARTICIPATION

Benny Y. K. Wong

Assistant Director

Environmental Protection Department

28/F, Southern Center, 130 Hennessy Road, Wan Chai

Hong Kong

WONG, B.Y.K. 1997. Waste management in Hong Kong: private sector's participation, p. 195-200. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Background

Hong Kong is a territory with a population of 6.3 million. Over the last three decades, it has grown to be an important manufacturing center in the Asia-Pacific region. Hong Kong has developed in financial services and shipping, and is now one of the world's largest container ports and trading economies, and a financial center of global importance.

Swift economic development brings wealth to the community, with an average of 6% annual growth rate in per capita gross domestic product (GDP) over the past two decades. However, it also brings various forms of pollution, including the rising quantity of waste that requires disposal.

Hong Kong generates large quantities of household, commercial, industrial and construction waste. In 1995, a daily average of about 23,000 tonnes of solid waste was delivered to different waste facilities for disposal. Of this amount, about 8,000 tonnes were municipal solid waste generated from households and businesses. The remainder consists of construction/demolition waste and chemical waste.

Waste Management Strategy

Hong Kong's Waste Management Strategy is being implemented in two stages. The first stage concentrates on the development of the essential infrastructure which is required to cater to the immediate problem of disposing the 23,000 tonnes of municipal waste generated daily, as well as the treatment of 100,000 tonnes of chemical waste each year. The second stage, which is quickly gathering momentum involves the development of a waste reduction plan with the ultimate aim of conserving valuable landfill capacity. This will entail implementing projects to physically reduce the quantity of waste to be disposed of at landfills, as well as developing a comprehensive program to minimize and recycle the amount of waste which the community produces.

The statutory Waste Disposal Plan (WDP) for Hong Kong was published in December 1989. It outlined the framework of the first stage of the Waste Management Strategy. New waste facility projects were identified in the WDP for implementation to replace old, environmentally unfriendly facilities. The projects include three very large landfills which are situated in the remote areas, serviced by a network of nine Refuse

Table 1. Key data and milestone dates in the development of Hong Kong's strategic refuse transfer stations.

Projects	Marine/road transfer	Prequal. issued	Tender issues	Contract period	Start of operation	Capacity
Refuse transfer stations						
Kowloon Bay RTS	Road	March 87	Jan 88	17 years	April 90	1,800 tpd
Island East RTS	Marine	Sept 89	Feb 90	17 years	Nov 92	1,200 tpd
Shalin RTS	Road	Dec 91	July 93	17 years	Oct 94	1,000 tpd
Island West RTS	Marine	June 93	March 94	17 years	April 97	1,000 tpd
West Kowloon RTS	Marine	July 94	Dec 94	17 years	April 97	2,500 tpd
North Lantau RTS	Marine	July 94	April 95	17 years	April 98	1,200 tpd
Northwest NT RTS	Road	Dec 94	Jan 97	17 years	March 99	1,100 tpd
Outlying Island Transfer Facilities	Marine	July 94	Jan 96	17 years	March 98	610 tpd
Landfills						
WENT Landfill	N/A	May 91	Dec 91	55 years	Nov 93	61 Mt
SENT Landfill	N/A	May 91	June 92	43 years	Sept 94	39 Mt
NENT Landfill	N/A	May 91	June 93	46 years	June 95	35 Mt
Urban Landfill Restoration	N/A	March 95	April 96	30 years	Feb 98	N/A
Tseung Kwan O Landfill Restoration	N/A	March 95	Aug 96	30 years	June 98	N/A
Shuen Wan Landfill Restoration	N/A	March 95	Nov 95	30 years	Nov 97	N/A
Gin Drinkers Bay Landfill Restoration	N/A	March 95	Jan 98	30 years	Nov 99	N/A
Pillar Point Valley Landfill Restoration	N/A	March 95	March 98	30 years	Apr 2000	N/A
Siu Lang Shui, Ngau Tam Mei, Ma Tso Lung Landfills Restoration	N/A	March 95	Nov 96	30 years	July 98	N/A

Transfer Stations (RTSs). These RTSs are to be built close to the centers of waste generation in order to reduce collection cost. Then the waste is transported in bulk to the remote landfills in a cost-effective manner. For chemical waste, a facility has been built to treat the solid and liquid wastes collected from factories throughout Hong Kong. A facility to handle clinical waste centrally is also being developed. Finally, an ambitious program to restore 13 old landfill sites has been planned. Details of these projects are given in *Table 1*. HK\$12 billion will be spent to build these waste facilities, and another HK\$1.5 billion per year will be required to operate them, a remarkable investment by Hong Kong in tackling its waste disposal problem.

By now, all the three landfills are in operation. Of the nine RTSs, three are in operation, three are under construction

and the remaining three are being developed. It is expected that all of them would be in operation by the turn of the century. The Chemical Waste Treatment Centre started operation in 1993.

Not only has the implementation of the Waste Disposal Plan required a great deal of financial commitment on the part of the Hong Kong Government, but the need to develop such a comprehensive set of projects has also required a careful look at their contractual framework, as the contract periods of the projects can be up to 50 years in respect of the landfills, and around 17 years for other facilities. In addition to changing the normal contractual approach, alternatives had to be explored to get the best value for money, while at the same time, imposing stringent environmental requirements and controls for these

very large infrastructure projects. It was eventually agreed that all the waste facilities projects will be developed under the Design-Build-Operate form of contract with the Environmental Protection Department as the client representing the Hong Kong Government.

Design-Build-Operate (DBO) Contracts

Under the DBO contracts, the contractor is responsible for financing, designing and constructing infrastructure; and after satisfactory commissioning, operating the facility for its "life-time", i.e. 15 years in the case of transfer stations and as long as 50 years for the strategic landfills. Though the site on which the facility is built remains as government property, the contractor is allowed to use the facility for purposes of the contract. In most of the DBO contracts, the capital cost is repaid upon satisfactory commissioning of the facility. In the case of the landfills where construction extends over a considerable period of time in phases, the capital cost is paid in a series of payments upon completion of a pre-defined package. Payment for operation is based on the throughput tonnage of waste processed by the facility on a monthly basis.

Benefits of the DBO Contracts

The Environmental Protection Department has already awarded 10 DBO contracts and more are being developed. This form of contract is particularly suitable for projects which have significant operational elements in them. From the client's point of view, the DBO contracts offer the following advantages:

- a) There is unity of responsibility and liability as only one party (the contractor) carries out all the work

including design, construction and operation (and maintenance in the case of landfills). When problems occur, the responsible party can be identified easily and remedial action can be taken quickly;

- b) The unity of responsibility allows stringent and enforceable environmental standards to be set;
- c) As contractors are asked to tender for the whole contract (i.e., including during the operational phase), the client can be assured of a level of service from the contractor at a price known from the start of the contract;
- d) The economy of scale and long-term commitment of employment attract competitive prices from the private sector. In the case of the new landfills, the unit cost of disposal of waste in the new landfills is, despite the much higher environmental standard required, considerably lower than that of the old landfills which were developed by leasing a series of short-term (typically two years) contracts;
- e) The size of the projects attracts experienced international companies to participate and hence promotes technology transfer;
- f) Procedures to enforce contract conditions and quality of service can be stipulated via financial incentives and deductions in payment for non-compliance;
- g) Projects can be built and commissioned much faster, as there will be better coordination of design and construction, including all civil, electrical and mechanical elements of the project by a single party; and

- h) In the case of landfills, the contractor is encouraged to optimize the use of open space as this effects a longer operation period for the contractor and results in profits.

To make the DBO form of contract work, the contractors or the private sector should see it as attractive. Based on the experience of the Environmental Protection Department in dealing with the contractors, it is obvious that the private sector also favors the DBO contracts because:

- a) It provides long-term commitment of employment, as the operational phase is from 15 to 50 years. The long contract period also allows the contractors to invest in equipment and processes which would otherwise be impossible for short contracts of say two or three years;
- b) The contracts only stipulate performance standards. This allows the contractors the flexibility to draw up the best arrangement according to their own expertise, so that they are not bound to particular types of material, equipment or technology;
- c) Clear performance standards are set down which allow them to price their tender accurately; and
- d) There is a fair share of financial risk between the client and the contractor. The payment arrangement whereby the contractors are paid upon completion of capital works and paid operational fees based on throughput tonnage of waste reduces financial risks that they

have to bear. A minimum throughput tonnage is also established to guarantee payment to the contractor for the fixed operational overhead at low tonnages.

Attracting Reputable International Private Sector Companies

The onerous responsibilities which are required under the DBO type of contract, especially the liability for long-term performance of the facilities, means that only very large reputable companies with adequate experience are likely to be able to take on such obligations.

In view of the importance of maintaining an effective waste management system in Hong Kong, only companies with a proven track record worldwide are considered for the development of the projects. However, the need for local companies to be involved in the projects is also a requirement and the contract stipulates that international companies must link up with local Hong Kong companies so that the best elements of each can be successfully combined. To attract the attention of the best companies in the world, one should look at the following aspect:

- a) The need to have well publicized programs backed up by clear Government policies;
- b) The client must ensure that the tendering process is fair and open. Generally speaking, the cost involved in putting together a tender of the size of the Hong Kong DBO projects is in the order of HK\$3 - 10 million. No company will be willing to invest this amount of money unless they are fully

Table 2. Typical environmental performance standards for Hong Kong's landfills and refuse transfer stations.

Element	Monitoring location	Determinant	Limit	Remark
Effluent	discharge to sewer/STW	COD Total N Volume	2,000 mg/l 200 mg/l 800 m ³ /day	* 2,000 mg/l if off-site denitrification available TM - on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters
		TM standards to be achieved		
Landfill gas	peripheral boreholes	methane CO ₂	1% by vol. 1.5% by vol.	
	peripheral ground surface	flammable gas	30 mg/l	
Ground water	peripheral boreholes	ammonia-N COD	0.2 - 5 mg/l 15 - 30 mg/l	Limits depend on baseline conditions before landfill operation
Surface water	on site	ammonia-N COD	0.5 mg/l 30 mg/l	
	discharge to sea	SS	20 mg/l	
Marine water	peripheral sea	ammonia-N COD	0.2 mg/l 35 mg/l	These requirements applicable only for SENT
	at 100 m from marine works	SS	150 mg/l	
Air	on site	VOC	OEL	VOC - volatile organic compounds OEL - occupational exposure limit OT - odor threshold
	peripheral ground surface	VOC	1% OEL or OT	
Noise	nearest NSR at 0700-1900	5-minute Leq	75 dB(A)	ANL - acceptable noise level ref. to TM on construction noise other than percussive piling
	nearest NSR at 1900-0700	5-minute Leq	ANL	
Dust	on site	TSP (8-hour time-RSP weighted av.)	10 mg/m ³ 5 mg/m ³	TSP - total suspended particulates RSP - respirable suspended particulates
	outside boundary	TSP (24-hour av.) RSP	260 µg/m ³ 180 µg/m ³	
Effluent	discharge to sewer	TM parameters for discharge into foul sewer	TM standards for discharge into foul sewer	TM - on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland, and Coastal Waters
Air	inside tipping CO hall	(8-hour time - NO ₂ weighted ave.) TSP (24-hour ave.) or, 8 Air Change per hour to be achieved	55 mg/m ³ 5 mg/m ³ 1 mg/m ³	TSP - total suspended particulates RSP - respirable suspended particulates Air Change - only applicable for Shatin Transfer Station
	on site boundary	TSP (24-hour ave.) RSP	260 µg/m ³ 160 µg/m ³	
Noise	nearest NSR at 0700-2300	30-minute Leq	55-60 dB(A)	NSR - noise sensitive receiver
	nearest NSR at 2300-0700	30-minute Leq	45-50 dB(A)	
Odor	on site boundary	Employer's odor panel level	2 odor units	
Marine water	at pre-determine stations	DO, turbidity, SS	water quality objective	These requirements applicable only for OITF

Note: KBTS and IETS requirements included

convinced that the tendering process is fair and competition is done on level ground;

- c) The projects must be able to meet high but achievable environmental standards to boost the companies' corporate image. The setting of environmental standards requires a lot of thought and effort. Examples of standards used in Hong Kong are given in *Table 2*;
- d) The client should play fair during the duration of the contract. The lengthy contract duration requires that the client and the contractor work as partners. There will almost certainly be changes in circumstances that have been overlooked at the beginning, e.g. changing waste quantities, technology, and government policies. In response to these changes, the contract may need to be modified. This can only be achieved by both parties acting fairly;

- e) Big companies, especially those of international stature, have a wealth of experience. They are eager to share their views and experience with the client and would appreciate a role to play in helping the client develop policies and strategies. The client can encourage the setting up of trade associations and maintain regular discussions with them.

Conclusion

The DBO form of contract offers a suitable framework for private sector's participation in environmental engineering projects. Not only is this form of contract attractive to the client, the private sector will find it similarly attractive provided that a fair, reasonable and achievable contract is drawn up and that the client acts fairly during the tendering as well as during the contractual period.

WASTE DISPOSAL FEE SYSTEM IN XIAMEN

Zeng Zijian

Engineer

Environmental Protection Bureau of Xiamen

People's Republic of China

ZIJIAN, Z. 1997. Waste disposal fee system in Xiamen, p. 201-205. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) *Sustainable financing mechanisms: public sector - private sector partnership*. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

Through nearly 15 years of reforms and developments, the waste disposal fee system became one of the major environmental management systems in Xiamen. Reflecting economic policies of environment protection, it not only strengthened the environmental inspections and management, but also provided a substantial amount of funds for industrial pollution treatment. The system is composed of two parts: the collection of fees, and the uses of fees as environment protection funds.

Collection of Waste Disposal Fees

The collection of waste disposal fees was based on the "Provisional Measures for Collecting Waste Disposal Fees" issued by the State Council in 1982, and some regulations and standards passed by the People's Congress of Xiamen. The main points are as follows:

- a) The purposes are to conserve resources, to treat pollution, and to improve environmental quality;
- b) All waste producing firms should comply with relevant waste disposal standards issued by state or by local governments. If facilities dispose the standard exceeding wastes, a waste disposal fee will be imposed on them. The paying facilities are not exempted from other responsibilities specified in laws and regulations, such as treating pollution and compensating for loss;
- c) All waste producing firms should report to the Environmental Protection Department about waste types, amount, and concentrations. These data will be used as the basis of waste disposal fee collection;
- d) When more than one type of pollutants are disposed, the one incurring the highest fee will be used as indicator in fee collections;
- e) An extra fee of 5% of the waste disposal fee will be imposed on those firms that still dispose pollutants exceeding the standards, from the third year after they have paid the waste disposal fee until they comply with the standard. The fees should be cut down on those firms which have reduced their amount of wastes and concentration of pollutants. Billing is stopped on those that have complied with the standards;
- f) The double fee should be imposed on new facilities which began their operations after the publication of the "Environmental Protection Act

of PRC (provisional)", and on those facilities stopping the operations of treatment equipment or dismantling them without acknowledgment of the Environmental Protection Departments;

- g) Waste disposal fees are collected every three months. Waste producing firms should pay the fees at accredited banks within 20 days after they receive notification from the Environmental Protection Department. Otherwise an extra fee of 1% of the total fee will be imposed every day. The collected fees will be used as funds for environment protection purposes. Its uses are planned by the Environmental Protection Department and Finance Department;
- h) Environment funds are used to treat major pollution sources and in integrated environment pollution treatment. Waste producing firms experiencing financial difficulty can apply to the Environmental Protection and Finance Departments for environmental protection subsidies. But the subsidies cannot be more than 80% of the total waste disposal fees they have paid. The Environmental Protection and Finance Departments will supervise the use of subsidies;
- i) Part of the environment funds can be used to buy monitoring equipment for the Environmental Protection Departments;
- j) The subsidies are allocated and supervised by construction groups.

Uses of Waste Disposal Fees as Special Environment Funds

Before 1988, the waste disposal fees were allocated to firms as subsidies to treat

pollution. In 1988, The State Council issued the "Provisional Measures in Using the Special Environment Funds to Treat Pollution" to specify the use of funds as bank loans to waste producing firms. The main points of this section include the following:

- a) The special funds are set up and managed by Environmental Protection Department;
- b) The funds are used as loans to waste producing firms;
- c) The funds are used in major pollution treatment projects; waste recycling and reuse projects; demonstration projects in pollution treatment; and establishing waste treatment equipment for relocated facilities in order to avoid pollution;
- d) If a waste producing firm wants to apply for funds, it should abide by the following conditions: it has paid waste disposal fees; its waste treatment project is proved feasible; it has accumulated some part of treatment fund; and it possesses the ability to pay back the loan;
- e) The following projects are given priority access to loans: those that should be finished in specified time; those that will solve serious pollution problems; and those that have self-accumulated funds which cover more than 60% of the total investment;
- f) The loan plans are formulated by the Environmental Protection Department and Finance Department. The Finance Department allocates the funds every three months according to loan plans;
- g) After their applications were approved by the Environmental

Protection Department, waste producing firms should reach agreements with banks. The banks disburse loans according to agreements every three months, supervise the uses of loans and submit financial reports to the Finance Department and Environmental Protection Department;

- h) The loan period cannot exceed three years. Monthly interest rates for one year is 2.4%, two years is 2.7%, three years is 3.0%. Interest is paid every three months;
- i) After examination and approval of the Environmental Protection Department, the established treatment equipment can start normal operation. The waste producing firms can apply to the Environmental Protection Department for exemptions of some part of the loan capital;
- j) The environment funds cannot be used for any other purpose.

Collection and Uses of Waste Disposal Fees in Xiamen

From 1991 to 1995, 51,240 thousand yuan of waste disposal fees were collected, 21,880 thousand (42.7%) for wastewater; 5,010 thousand (9.8%) for

waste gas; 5,090 thousand (10%) for noise pollution; 55 thousand (0.1%) for solid wastes; 19,200 thousand (35.4%) for others.

From 1991 to 1995, a total of 11,700 thousand yuan were spent for pollution treatments (6,070 thousand for subsidies, and 5,630 thousand for loans). The ratio of loans to subsidies increases every year. Loans taking up the total amount of funds increased from 41.2% in 1991 to 72.2% in 1995.

Detailed information is shown in Tables 1 to 3.

Table 1. Waste disposal fee collections from 1991 to 1995.

Year	Number of waste producing industries	Waste disposal fee (thousand yuan)	Percentage of increase relative to last year
1991	187	4,100	-
1992	229	7,630	86
1993	277	8,780	15
1994	394	12,460	42
1995	1,325	18,270	47
Total	-	51,420	-

Table 2. Fees (thousand yuan) imposed on different kinds of pollution.

Year	Wastewater	Gas	Noise	Solid waste	Others
1991	2,120	360	370	-	1,890
1992	4,010	500	450	-	2,590
1993	4,470	960	580	47	3,310
1994	5,080	1,450	1,400	5	4,150
1995	6,200	1,740	2,290	3	6,730
Total	21,800	5,010	5,090	55	19,200

Table 3. The uses of fees from 1991 to 1995.

Year	Number of pollution treatment projects	Funds (thousand yuan)		
		Subsidies	Loans	Total
1991	21	670	470	1,140
1992	23	1,120	400	1,520
1993	27	1,900	810	2,710
1994	17	1,400	1,400	2,800
1995	26	980	2,550	3,530
Total	114	6,070	5,630	11,700

The Role of the Waste Disposal Fee System in Environmental Protection

A. Providing the Funds for Treating Pollution and Improving Environment Quality

From 1991 to 1995, 97,452.5 thousand yuan were spent on 217 pollution treatment projects (pollution treatment loans and subsidies amounted to 11,700 thousand yuan). A total of 126 new wastewater treatment facilities were built, with treatment capacity reaching 17,230 thousand tons, 68.5% of industrial wastewater were treated, and 80% of industrial solid wastes were recycled.

Although the total industrial output increased fourfold from 1991 to 1995, environmental quality did not deteriorate. During this period, the average TSP (i.e., total suspended particulate) in the air decreased from 0.011 mg/m³ to 0.010 mg/m³, COD in surface water from 6.5 mg/l to 5.52 mg/l, environment noise level from 63.1 dB(A) to 57.1 dB(A); and noise level along the main highway from 77.1 dB(A) to 70.9 dB(A).

B. Motivating the Waste Producing Facilities to Improve Their Self-Management

After the implementation of the waste disposal fee system, paying the fees created a huge financial burden on the part of many waste producing firms. Thus, they began to actively undertake their own pollution treatment. New operating systems were implemented to reduce material and energy consumption through waste recycling and purification to reduce waste disposal, and by improving the waste treatment technology and their efficiency to reduce treatment costs and achieve economic benefits.

C. Providing Funds for Environment Developments

From 1991 to 1995, about 20% of waste disposal fees were used to set up new environment departments and buy monitoring equipment. During this period, environment bureaus were set up in every administrative district, several environmental monitoring stations were set up, the number of environmental workers nearly doubled, and environmental monitoring stations were equipped with advanced apparatus. The uses of environmental funds greatly facilitated the environment developments in Xiamen.

Suggestions for Improvement

A. Raise Fees Imposed on Firms Disposing Waste Not Exceeding Waste Disposal Standards

Existing policies specify that fees should be imposed on facilities disposing wastes exceeding standards, but not on the facilities disposing wastes not exceeding the standards. In Xiamen, some big firms have been producing large amounts of low concentration wastes, and the fees they paid were lower than the fees paid by small facilities disposing small amounts of the standard-exceeding wastes, even as these big facilities cause more serious environmental damages than the small facilities do. In this regard, more reasonable policies should be formulated which will consider not only the pollutant concentrations but also the amount of waste produced.

B. There Should be More than One Kind of Pollutant Used as Indicator in Waste Disposal Fee Collections

Existing policies specify that only the pollutant incurring the highest fee is

covered by fee collections. Usually there are several kinds of pollutants contained in wastes. In some cases, some waste producing firms consider only the treatment of the indicator pollutant, while other pollutants remain untreated and continue to cause environmental pollution. New policies with fees imposed on multi-pollutants should be formulated to solve this kind of problem.

C. Raise the Standards for Waste Disposal Fees

Most of the collected waste disposal fees are lower than the fees needed to operate and maintain the waste treatment equipment. Some waste producing firms would rather pay the waste disposal fees than treat the pollution. Thus, standards should be set higher to encourage pollution treatment.

D. Set Up a More Comprehensive Waste Disposal Fee Collection System

Although 113 standards of fee collection were set up for many kinds of pollution, new standards should be set to cope with other problems, such as standards for SO₂ emissions, for municipal waste water, and for mobile pollution sources.

E. Formulate Reasonable Policies for Using Environmental Protection Funds

There are many problems in the use of environment protection funds, including funds as subsidies allocations (rather than bank loans) to waste producing firms, low interest loans, and exemptions of loan capital, etc. These problems are disadvantageous to the accumulation of funds. Most of the fees (80%) should be used as loans to treat pollution, others (20%) be used to increase the strength of environmental departments.

F. Reforms in Managing the Environmental Protection Funds

Economic entities, such as environmental protection investment companies, should be set up to manage the funds, and to supervise the uses of funds from feasibility study to examination and approval after the treatment equipment is set up. Experience in other places of China has shown that such economic entities can raise the efficiency of using funds, facilitate the treatments of major pollution sources, quicken the circulation of funds, and increase fund accumulation.

SOCIOECONOMIC IMPACT ASSESSMENT OF INTEGRATED TREATMENT OF MARINE ENVIRONMENTAL PROBLEMS IN THE WESTERN SEA AREA OF XIAMEN*

Yao Lixin

Lecturer

Department of International Trade
Xiamen University, Xiamen 361005
People's Republic of China

YAO LIXIN. 1997. Socioeconomic impact assessment of integrated treatment of marine environmental problems in the Western Sea area of Xiamen, p. 206-214. *In* S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

The Western Sea area of Xiamen (hereafter referred to as WSA) has a broad, sophisticated underwater terrain with ragged coastline. Fords and trenches are closely situated in the area with isles and sea forks. Since 1949, with the development of agriculture and industry, human activities have grown tremendously. The construction of numerous dikes and dams and reclamation of the sea in the tidal flushing area have reduced the WSA by 57.91 m² (69.4% of the original area) since 1953. The tidal influxes has reduced in volume by 1.2 x 10⁸ m³. At present, water surface area or WSA at low tide is only 22.5 m², and an additional 2.65 m² could be lost in the next five years.

The coastal zone around WSA is under increasing pressure as a result of rapid socioeconomic growth and the extensive use of marine resources. Siltation of the navigation channel, damage of the ecosystem and deterioration of water and sediment quality caused by the cumulative impacts of reclamation, construction, and pollutant discharge can worsen if

necessary actions are not taken. The deteriorating marine environment of WSA could affect sustainable socioeconomic development of Xiamen in the long run.

These marine environmental changes, resulting from coastal economic development, have posed marine environmental problems (hereafter, MEPS) gaining increasing attention from society. In order to mitigate the problems and improve the quality of the environment, we will probably need a synthetic treatment project in the near future. The goal is to widen two sluices on Maluan Dike. However, before the proposal should be considered, the socioeconomic impacts must be evaluated and a cost-benefit analysis must be conducted. The results will help set up a sustainable financing mechanism for the integrated treatment of the MEPS.

Marine Functional Zonation and the Goals of Socioeconomic Impact Assessment

In Xiamen's zonation scheme, the primary role of the WSA was to be a zone for port development and transportation.

* This paper is a partial result of a team effort which is relevant to the Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas Xiamen Demonstration Project. The team leader is Dr. Hong Huasheng. The team members are Hong Huasheng, Yao Lixin, Xue Xiongzhi, Xie Zeithan, Chen Huazhon, Sun Shamei, Zhang Looping, Zhang Kefei, Huang Jianxiang, and Lin Ling.

Xiamen Harbor will be constructed as a multi-purpose port catering to passenger and cargo transportation. There are 77 berths undergoing construction, of which 11 berths can accommodate 10 to 50,000 tons, mostly located along the coastline of the WSA. As an important foreign trade port of China, Xiamen port transacts with more than 60 ports in more than 40 countries and regions. Port and shipping industries contribute significantly to the Xiamen economy. The handling capacity of the port has increased greatly since 1990 at an annual rate of 17.6% until the next five years. In 1990, the handling capacity was only 1.68 million tons of cargo and 45,400 containers. This increased to 11.4 million tons of cargo and 224,700 containers in 1994, and is expected to handle 30.1 million tons of cargo and 780,000 containers in the year 2000. Another important function of WSA is its role in waste disposal and dispersion. Most of these wastes are from domestic sources, with higher concentration of nutrients and organic matter.

Xiamen is a coastal city where the maritime industry plays a very important role in the social and economic development. The WSA is an important tourist spot. Up to now, the industries in the areas along WSA have formed the basic framework for productivity in the Xiamen economy. The WSA has become the major contributor to Xiamen's economic development, with a high level of economic activity and new development projects along the coasts.

The MEP has directly affected the socioeconomic development in areas surrounding the WSA, creating increasing negative impacts on the socioeconomic sustainable development of the Xiamen

Special Economic Zone (Xiamen SEZ). The social and economic impacts assessment (SEIA) on the MEP of the WSA should serve to achieve the goals of the socioeconomic sustainable development at Xiamen. These goals include:

- 1) **City Planning.** Xiamen City is foreseen to be transformed into a modern international and scenic sea port city moving towards the 21st century. The Xiamen City Plan specifies the WSA as taking a unique role in the development of Xiamen City.
- 2) **Socioeconomic Development Planning for Xiamen.** The SEIA will meet the goals of the Ninth Five-Year Plan and the Year 2010 Long-term Development Plan of Xiamen, including target GNP and annual growth rate, the social development index, the development of key industries, and the adjustment of the industrial structure. The economic activities in areas around WSA contribute greatly to the economic development of the Xiamen SEZ and are the key factors towards realizing the plans mentioned above.

Identifying Major MEPs and Their Impacts on the Socioeconomic System

According to the principle of cause and effect between socioeconomic growth and environmental changes, major MEPs in the WSA include the following:

- 1) Marine siltation in shipping lanes of the WSA has worsened and threatened the normal operation of the shipping industry to some extent.

As tidal influx volume has greatly decreased, tidal flushing capacity has weakened and the sedimentation process has accelerated in the WSA. In order to maintain the depth of the channel for navigation, the frequency of dredging and its cost increased. In 1984, 150,000 m³ of deposits were dredged at the channel south of Houyu for the first time. In 1993, 190,000 m³ of deposits were dredged. Two years later, 160,000 m³ needed to be dredged again. In other words, an average of 80,000 m³ of deposits had to be dredged annually. It should be noted that the increasing sedimentation rate in recent years resulted from improper coastal construction such as uncontrolled reclamation. Increasing tidal flushing capacity and sedimentation rate pose a threat to the development of the port and shipping industries.

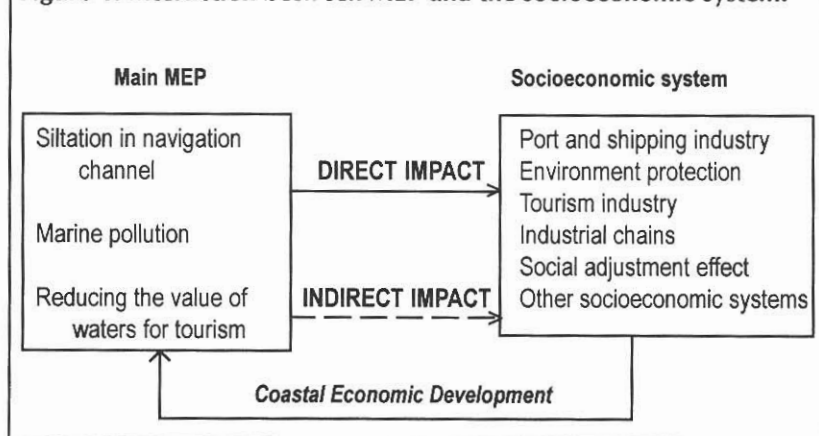
- 2) The pollutants in Maluan Bay have aggravated, and marine pollution treatment by diffusion has been incapable of solving MEP burdens to local environmental protecting agencies.

About 80% of the waste are discharged into the Xiamen Western Sea water. At present, the sewage treatment capacity is about 100,000 tons/day. Only 40% of the land-based waste are treated before discharging into the Western Sea water. With the possibility of new sewage treatment, the treatment capacity could reach 250,000 tons/day in the year 2000. By that time, 70% of the sewage will be treated before discharging into the Western Sea water. The most important pollution sources at sea are oil and waste discharged from

berths and vessels, and organic pollution from mariculture activities. Oil pollution increased from 275 tons in 1990 to 325 tons in 1994, with 55% found in the Western Sea water. The waste was flushed out by the tidal current which is a semi-diurnal type in the Xiamen Western Sea area.

- 3) The aesthetic quality of WSA's waters has declined, creating a negative impact on the development of the tourist industry of Xiamen.
- 4) Bacterial pollution manifested by coliform count is serious in the WSA. This reflects the fact that the water receives a large amount of domestic waste. With the construction of the sewage treatment plant and the regulation of the waste discharge, the total bacteria and total coliform counts in the water showed a slight decrease. However, this has not been able to meet the standard value for water quality.

The MEPs above point to a series of social and economic impacts. The direct impacts come from the MEPs direct effects on socioeconomic development. For example, the decrease in income of the shipping industry resulted from marine siltation. The MEPs create direct impacts on industries, and then make various indirect impacts on other sectors through industrial chains and social adjustment effects (see *Figure 1*). Indirect impacts are those generated from the direct impacts through industrial chains in the economic system and social adjustment effects in the social system. When evaluating socioeconomic impacts, people tend to consider only direct impacts, while omitting indirect impacts that actually are of equal or even greater importance. The SEIA in this report contains an evaluation of both direct and indirect impacts.

Figure 1. Interaction between MEP and the socioeconomic system.

promote the development of the shipping industry. The opening of Maluan Dike will greatly enhance the exchange ability of seawater in Maluan Bay, help to dilute and diffuse the pollutants in order to maintain water quality, and improve aesthetic quality at the WSA.

The SEIA on Integrated Treatment of the MEPs in the WSA

An appropriate method for both qualitative and quantitative analysis is necessary. The social and economic impact assessment should be synthesized, focusing on major social and economic impacts of the MEPs and their changes after the integrated treatment project to better illustrate the socioeconomic benefits and costs of the treatment project.

Through mathematical models, it has been proven that the opening of Maluan Dike will increase the volume of tidal influxes, stimulate the waters in Maluan Bay, change the direction of water flow, reduce backflow siltation near Baozhu Isle, and improve the water quality of the sea area near Xinglin Town and Maluan Town. If Maluan Bay is open, tidal flushing volume of WSA could increase by 20,000,000 m³, thus raising the velocity of water flowing in the whole western port. The increase of sea flow velocity will decline from north to south at the WSA. Velocity will double at Maluan channel, and increase by one-fifth at the entrance of Songyu lane. It will reduce marine siltation in navigation lanes, and

These factors contribute to the goal of sustainable development and is estimated to benefit the socioeconomic system in the next fifteen years.

Table 1 illustrates an integrated assessment of the social and economic impacts by cost-benefit analysis. Economic cost and benefit are measured through quantitative analysis. Social impacts, which are difficult to evaluate in monetary terms, are assessed by qualitative analysis. Social benefits in the long run are of more strategic importance and will assume a vital role in the sustainable development of Xiamen's SEZ.

Comparing the present value of benefits (T_b) and costs (T_c), we can get the following index of economic feasibility:

$$\beta = T_b / T_c$$

When $\beta \geq 1$, then $T_b \geq T_c$
with economic feasibility

When $\beta < 1$, then $T_b < T_c$
without economic feasibility

Economic Impact Assessment

Total Present Value of Cost (T_c)

1. The project cost for opening and enlarging sluices on Maluan Dike (C_1).

According to calculations by related departments, the project cost for opening and enlarging sluices on Maluan Dike amounts to ¥23,310,000. According to initial calculations, the annual maintenance cost of the sluice is ¥500,000 in current prices. Since the sluice is temporary, we only have to take into account maintenance cost for 5 years. If the annual inflation rate is about 8% and annual growth rate of maintenance cost is 8%, then total present value of maintenance cost of the sluice for five years is $500,000 A_5 = ¥2,500,000$.

$$\text{So } C_1 = 22,310,000 + 2,500,000 \\ = ¥ 24,810,000$$

2. The cost for constructing a bank revetment in Maluan Bay (C_2).

According to the initial estimate by the government, the cost for constructing a

bank revetment in Maluan Bay will be ¥159,960,000. That means $C_2 = ¥159,960,000$.

3. The decrease in income of the aquaculture industry (C_3).

After the opening of Maluan Dike, the aquaculture industry in Maluan Bay will be negatively affected. Together with the construction of a bank revetment at the bay, the seawater area will decrease, then Maluan Bay will be planned as a tourist site. These changes will lead to the phaseout of aquaculture, and will result in decrease in income of aquaculture in the bay. The income value of aquaculture in one year is estimated at ¥25,000,000 nowadays. In general practice, the income decrease in three years can be taken as the compensation cost, which equals to the loss of income in aquaculture.

$$\text{Then } C_3 = 25,000,000 \times 3 \\ = ¥75,000,000$$

$$\text{So } T_c = C_1 + C_2 + C_3 \\ = 24,810,000 + 159,960,000 \\ + 75,000,000 \\ = ¥ 259,770,000$$

Table 1. The methods of economic impact valuation.

Economic impacts	Valuation methods
Cost of Maluan Dike opening	Project expense
Cost of dam construction	Project expense
Decrease in income of aquaculture industry	Compensation cost appraisal
Decrease in expense of dredging expense	Alternative market and project deposits
Increase in income of port and shipping industry	Estimate and calculate
Decrease in cost for sewage expense	Alternative market and project treatment
GDP increase resulting from increasing income of port and shipping industry through industrial chains	Input - output analysis
Decrease in expense of dredging deposits in areas other than navigation lanes and anchorage	Linear regression equation
Land value of added land resulting from dam construction in Maluan Bay	Alternative market and project expense
	Land appraisal

Total Present Value of Benefit (T_p)

1. The expense decrease of dredging deposits in navigation lanes and port areas (B_1)

At present, the rate of increase of sediment deposits in the navigation lane and anchorage area is 0.1 m per year. After the opening of Maluan Dike, the rate of increase in marine deposits in that area will reduce by 0.05 m per year. The Gulang Isle Anchorage is 3 km², reducing marine deposits by 150,000 m³ (V_1) annually. From this anchorage to Houyu, the shipping lane is 10.77 km long and 2 km wide, the annual reduction of marine deposits is 110,000 m³ (V_2). From Houyu to Chaoshan Coal Port, the shipping lane is 2.4 km long and 0.12 m² wide, the annual reduction of marine deposits is 150,000 m³ (V_3). So the total annual reduction of marine deposit is

$$\begin{aligned} V &+ V_1 + V_2 + V_3 \\ &= 150,000 + 110,000 + 150,000 \\ &= 275,000 \text{ m}^3 \end{aligned}$$

The dredging cost of marine deposits per m³ is ¥ 15, so the annual cost decrease of dredging marine deposits is $C_{md} = 275,000 \times 15 = ¥ 4,126,000$.

Thus, the total present value of decreased expense for dredging marine deposits in the navigation lanes of the WSA in the coming 15 years is $B_1 = 4,126,000 \times 15 = ¥ 61,875,000$.

2. The increased income of the port and shipping industries (B_2)

According to analysis and calculation, the transportation sectors in Xiamen Port will increase its income by 1.51% after the opening of Maluan Dike.

The income of the port and shipping industries in 1994 was ¥570,000,000. So the income increase in 1994 is $V_p = 1.51\% \times 570,000,000 = ¥ 8,610,000$.

The port and shipping industries have enjoyed a high rate of development, but this rate will decrease in the future. Therefore, the conservative estimate of the rate of increase is about 16%. If the interest rate is 8%, the total income increase of the coming 15 years after 1994 will be

$$\begin{aligned} B_2 &= [8,610,000 - (8\% - 16\%)] \\ &\quad \times \{1 - [(1 + 16\%) + (1 + 18\%)]^{15}\} \\ &= ¥ 314,360,000. \end{aligned}$$

3. The decrease in cost of sewage treatment (B_3)

At present and upon the opening of Maluan Dike, the level of pollutants in the WSA does not exceed the national standards. The pollutants in the WSA can be completely self-purified by the seawaters of the WSA. Now, tidal flow in the WSA is 0.17 billion m³ in one tide. After the opening of Maluan Dike, the tidal influxes will increase by 0.02 billion m³ in one tide. Therefore, the capacity for treating sewage will increase. Then the treatment ability of COD in the WSA can increase by 2 tons per tide, and by 4 tons per day because there are two tides in a day. This is equal to the COD removal capability of a second-grade sewage treatment plant with treatment capacity of 17,000 tons ($17,000 \times (330 - 100) \times 10^{-6} = 3.91$ tons per day). We can take the construction expense and operations cost of a sewage treatment plant with the abovementioned capacity as the decreased cost of treating sewage after the opening of Maluan Dike. Such a plant costs ¥ 22,000,000 and the annual

running cost is about ¥ 3,000,000. The total operations cost in 15 years is $C_1 = 3,000,000 \times 15 = ¥ 45,000,000$

$$\text{So } B_1 = 22,000,000 + 45,000,000 \\ = ¥ 67,000,000.$$

4. GDP increase resulting from increased income of the port and shipping industries (B_4)

The opening of Maluan Dike improves sea transport conditions and contributes to income increases of the port and shipping industries. It will also contribute to increased GDP through the industry chain effects. We take GDP increase as the integrated and final indirect economic impact of opening the Maluan Dike.

An analysis of the relationship between the income of Xiamen port and GDP can produce the following formula as following:

$$V_g = V_p \div [\alpha \times 2^{(t-1) \times 10\alpha}],$$

where V_g = annual GDP increase;

V_p = annual increased income of the port and transport industry; and

α = the average ratio of Xiamen port income to GDP from 1990 to 1994.

On the basis of data listed in *Table 2*, $\alpha = 0.03644$.

Then, the total increase of annual GDP is

$$V_g = 8,607,000 \div \{0.03644 \times 2^{15 - (10 \times 0.03644)}\} \\ = ¥ 35,253,000.$$

So that total GDP increase in 15 years is $B_4 = 35,253,000 \times 15 = ¥ 528,750,000$.

5. The decreased cost of dredging marine sediment deposits in areas other than shipping lanes and anchorage areas in the WSA (B_5).

After the opening of the Maluan Dike, marine deposit rates in areas other than shipping lanes and anchorage areas in the WSA, which measures 45 m², will also reduce by 0.02 m per year. Thus, the total decrease in amount of marine deposits in those areas is $V_1 = 45,000,000 \times 0.02 = 900,000 \text{ m}^3$.

Total volume decrease in 15 years will be $V_1 = 900,000 \times 15 = 13,500,000 \text{ m}^3$.

If the cost of dredging deposits per meter is ¥15, then

$$B_5 = 13,500,000 \times 15 = ¥ 202,500,000.$$

6. The value of reclaimed land due to the construction of a bank revetment in Maluan Bay (B_6)

After the construction of a bank revetment in Maluan Bay, we can get another 17 km² land which can be utilized by industry. According to land values of neighboring Xinyang Industrial Park (¥150 per m²), the potential value of reclaimed land is 2,550,000,000 billion. Due to the lack of detailed data about the construction plan, further cost-benefit analysis cannot be discussed.

Table 2. GDP and income of port and shipping industries (in thousand yuan in constant 1990 prices) from 1990 to 1994.

Year	GDP	Income of port and shipping industries
1991	6,340,000	290,000
1992	7,570,000	320,000
1993	11,580,000	460,000
1994	14,740,000	570,000

Then, total present value of benefits is

$$T_b = B_1 + B_2 + B_3 + B_4 + B_5 = 61,875,000 + 314,360,000 + 67,000,000 + 528,750,000 + 202,500,000 = 1,174,850,000.$$

The economic feasibility index is $\beta = T_b / T_i = 1,174,850,000 / 259,770,000 = 4.52$.

The integrated treatment project produces great environmental and economic benefits with economic feasibility.

Social Impact Assessment

After the integrated treatment project, the following social benefits can be expected:

- 1) Improvement of marine environmental quality in the WSA;
- 2) Increase in tourism value resulting from improvement of aesthetic quality of waters in the WSA; and
- 3) Decrease of damage to human health by improvement of the deteriorating environment.

In addition to the aforementioned direct social impacts, the indirect social impacts are as follows:

- 1) Increased employment;
- 2) Improvement in the standard of living and enhancement of social welfare; and
- 3) Improvement of investment conditions.

From the discussion alone, it appears that the project is worthy of consideration. Generally speaking, the integrated treatment project will help attain sustainable development in Xiamen. It is therefore recommended that capital must be invested into the project. In view of

sustainable development, we should protect the environment of the WSA while developing the economy. The degradation of the marine environment will seriously hinder socioeconomic growth. It is more important to invest in improvements today than spend on rehabilitating the possible degradation in the future.

After the SEIA on the MEPs (including cost-benefit analysis on the planned integrated treatment project on MEP), we can set up an appropriate waste treatment project which is economically feasible. Assessment and analysis are very important to persuade the public and private sectors to invest in the project. Only through public and private sector partnership can the sustainable financing mechanism work. As pointed out previously, sustainable development needs the support of a sustainable financing mechanism. Therefore, further study on SEIA techniques is required.

Figure 2. An analytical framework: SEIA on MEP.

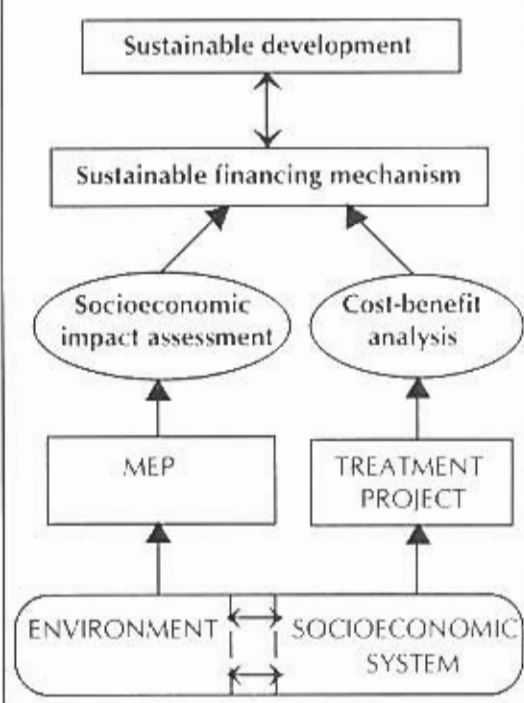


Table 3. The methods of social impact assessment.

Social impacts	Valuation methods
Improvement of marine environmental quality in the WSA	<ul style="list-style-type: none"> • Environmental energy cost method • Environmental quality cost method
Increase in tourism value of WSA waters	<ul style="list-style-type: none"> • Travel cost method
Decrease of damage to human health resulting from improvements in the deteriorating environment	<ul style="list-style-type: none"> • Estimated by the following steps: • Case study with quantitative valuation • Incidence of infectious diseases • Marine environmental problems contributing to infectious diseases
Increased employment	<ul style="list-style-type: none"> • Employment per ten thousand - GNP (Net income)
Improvement in standard of living and enhancement of social welfare	<ul style="list-style-type: none"> • Qualitative analysis • Delphi method
Improvement of investment conditions	<ul style="list-style-type: none"> • Matrix analysis • Summarizing method

Table 4. Comprehensive cost-benefit analysis of MEP treatment.

	Cost	Benefit
Economic cost-benefit analysis	<p>C_1 The project cost for opening and enlarging sluices in Maluan Dike</p> <p>C_2 Cost of construction of bank revetments</p> <p>C_3 Decrease in income of aquaculture industry</p>	<p>B_1 Decrease in cost of dredging sediment deposits in navigation lanes and port areas</p> <p>B_2 Increase in income of port and shipping industries</p> <p>B_3 Decrease in cost of sewage treatment</p> <p>B_4 Increase in GDP resulting from increased income of the port and shipping industries through the industrial chain</p> <p>B_5 Decrease in cost of dredging sediment deposits in areas other than shipping lanes and anchorage areas in the WSA</p> <p>B_6 Increase in land value of reclaimed land due to the construction of bank revetments in Maluan Bay</p>
Social cost-benefit analysis		<p>B_7 Improvement of marine ecological quality in the WSA</p> <p>B_8 Increased tourism value of scenic waters in the WSA</p> <p>B_9 Decrease of damage to human health resulting from quality improvement of the deteriorating environment</p> <p>B_{10} Increased employment</p> <p>B_{11} Improvement of standard of living and enhancement of social welfare</p> <p>B_{12} Improvement of investment conditions</p> <p>*B_7-B_{12} Monetary values are uncertain due to lack of data</p>
	Total present value of cost $T_c = C_1 + C_2 + C_3 = ¥ 259.77$ million	Total present value of benefit $T_b = B_1 + B_2 + \dots + B_{12} = ¥ 1,174.85$ million + uncertain value
Economic feasibility index ($B = T_b/T_c$) $B = 4.52 > 1$		

SOCIOECONOMIC BENEFITS OF INTEGRATED COASTAL MANAGEMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMS: THE CASE OF CLEAN RIVERS, MARINE PARKS, AND FISHERIES

Catalina S. Tejam

Research Associate

GEF/UNDP/IMO Regional Programme on the Prevention and Management of Marine Pollution in the East Asian Seas

DENR Compound, Visayas Ave., Diliman, Quezon City

Philippines

TEJAM, C.S. 1997. Socioeconomic benefits of integrated coastal management and environmental management programs: the case of clean rivers, marine parks, and fisheries, p.215-226. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

This paper reviews the experiences of coastal and environmental management programs according to the three themes of clean rivers, marine parks, and fisheries development. It concentrates on the successful implementation of the Clean River Program of Singapore; the Coral Reef Protection and Marine Park Management Program in Phuket Island, Thailand; and the Coastal Resource Management Program of Brunei Darussalam, particularly on the concrete social and economic benefits that coastal and marine management programs have brought to the countries that invested in them.

This is the beginning of research work in the area of economic assessment to be used as an information source for the development of future activities. The research identified a serious lack of reliable data on socioeconomic benefits. This work presents some economic indicators and how future ICM studies can improve their outputs by planning socioeconomic assessment into their programs. The resulting benefits are direct and indirect. Hopefully, the study shall encourage environmental managers and

planners to further examine the verity of the economic indicators provided, and find the unique relationship between the variables introduced.

The Rewards of Clean Rivers

The Singapore Clean Rivers Program speaks proudly of an accomplishment of ten years of sound strategic planning, intense collaboration, public cooperation, and political will. Spurred by a directive from then Prime Minister Lee Kuan Yew, the Ministry of the Environment submitted a report in October 1977, outlining what was to be the program for "The Cleaning-up of the Singapore River and the Kallang Basin."

The major problems identified by the program were pollution and loss of national development potential; thus the targets of the program included public health, tourism development, and national discipline. The program involved addressing pollution problems at both point and end sources, which required tracing waste producers that pollute canals and streams leading to catchment areas, and draining at the rivers. The process was tedious—requiring the swift and

collaborative action of 11 departments of five government agencies, and cooperation from the affected sectors. This effort amounted to S\$200 million for a ten-year program, initiated in 1977.

Program benefits were not confined directly to the river itself, even as the gains were immediately manifested in a cleaner and healthier environment, and the return of aquatic life. Rewards of the program included the non-monetary, and more importantly, benefits of national discipline, opportunities for recreation, and a sense of well-being.

Improvements in Public Health

Figures from the Economic Survey Reports of Singapore show large expenditures for health and economic services from 1975 to 1980. Economic services include national development, communications, trade and industry, labor, research and development, consistent with intensive infrastructure and industrial development in that period. The following ten years, from 1980 to 1990, show a surge in expenditures for public housing and a sharp decrease (71%) in development expenditure for health and the environment (see Table 1).

The structure of household consumption likewise indicates a small amount spent for health (approximately 3% of total consumption), relative to other expenditures. In relation to the Clean Rivers Program, a large amount of government resources was spent on infrastructure, housing and education, which may explain the continuous increase in expenditure for the three sectors. The improvement in public health resulting from this collaborative effort may have contributed to the generally slow rate of increase in expenditures for health. Other manifestations of improvement in public health include increases in worker output and potential income. The average work hours in Singapore increased from 45.9 to 46.6 per week from 1980 to 1990. Likewise, average earnings increased from S\$692 to S\$1,557 per month in the same period. In the manufacturing sector alone, labor productivity measured by value added per worker increased at a rate over 60% every ten years from 1960 to 1990, with remuneration increasing more than twice as much within the same period (see Figure 1).

An increase in worker output creates spillover effects, encouraging further investment and employment opportunities that contribute to national welfare.

Improvements in Tourism Potential

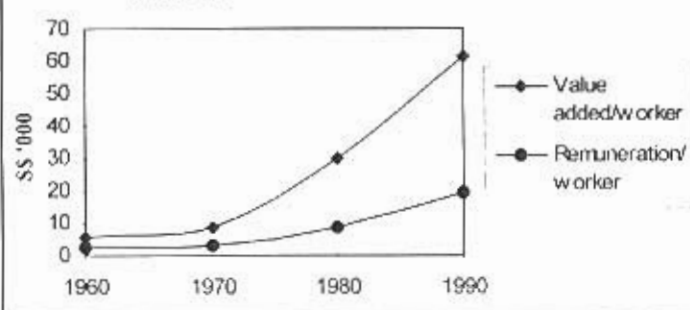
The cleaning of the Singapore and Kallang Rivers has enhanced the country's potential for recreational, social, and cultural activities that benefit its present and future generations. To date, rafting, boat racing, fishing, and river carnivals make up spectacular tourist, sports, and leisure attractions at the Singapore River; while its banks have been turned into parks for rest and recreation.

Table 1. Government expenditures by sector as percentage of total, 1975, 1980, and 1990.

Sector	1975	1980	1990
Education	21.0	9.7	5.9
Health	2.8	4.1	1.2
Environment	21.0	19.0	5.4
Public Housing	6.0	0.0	55.2
Defense	13.4	9.8	6.9
Economic Services	36.6	57.8	25.4

Source: Economic Survey Report, Singapore, 1989-1994.

Figure 1. Labor productivity and income, Singapore, 1960 to 1990.



Total tourist arrivals have been increasing in Singapore, more than twice in number from the period 1980 to 1990 (see Table 2), with most visits intended for holiday purposes.

As of 1995, Singapore ranked fourth in most number of tourist arrivals, and third as largest tourism income earner within the East Asia and Pacific regions.

Table 2. Visitor arrivals by purpose, Singapore, 1980 to 1990.

Purpose	1980	1985	1988	1990
Holiday	1,644.2	1,904.3	2,786.2	3,312.4
Business	300.9	395.7	531.9	691.5
Business and Holiday	166.1	162.4	187.2	214.3
In transit	253.7	293.0	352.9	481.2
Others	200.1	275.5	327.8	623.4
Total	200.1	275.5	327.8	623.4

World tourism reports Singapore as among the top 20 most frequented tourist destinations in the world. In 1995, tourist arrivals at Singapore reached 6.595 thousand individuals; that is, over Thailand's 6.532 thousand.

Improvements in Singapore's physical infrastructure and social climate have brought in large revenues from tourists, as well as investors. The Singapore Tourist Promotion Board lists receipts from tourism amounting to US\$7.5 million (1995); that

is, above Thailand's US\$6.6 million and Indonesia's US\$5.3 million (see Figure 2). Value added from hotel and catering services increased from S\$1.1 million in 1988 to S\$1.9 million in 1991.

Sectoral Developments

Hog and duck raising. Trends in the agricultural sector show that output of animal products continued to increase in spite of the phaseout of backyard farms (see Figure 3). This was due to the consolidation of small farms into medium and large-scale farms equipped with waste treatment devices, and their relocation to areas away from cities. Other agricultural products showed a decline (see Figure 4), due to the country's movement away from the agricultural phase and into full industrialization. However, value added continued to increase (see Table 3), showing a growth in efficiency.

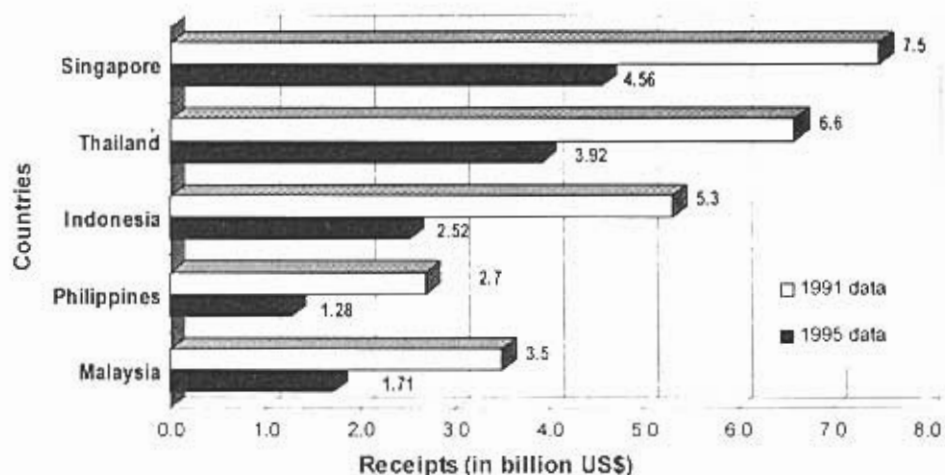
Hawking, wholesale and retail trade. The program required that all hawkers, wholesale, and retail traders be licensed and moved to food centers and markets that are equipped with adequate sanitary, lighting, and sewage treatment facilities. This effected a decrease in the number of hawkers. However, these food trading centers

Table 3. Value added in agriculture, Singapore, 1970 to 1992, in million US\$.

1970	1980	1982	1990	1992
44	150	123	97	104

Source: World Development Report, 1978-1994.

Figure 2. Tourism receipts of ASEAN countries, 1991 and 1995.



Source: World Tourism Organization.

showed an increase in value added and employment after the River cleanup, accumulating value added of S\$1.8 and S\$8.8 million from retail and wholesale trade, employing a total of 220,862 individuals in 41,417 establishments in 1991.

Industry trends. Statistics show a reversal in trend between the commerce and

Figure 3. Output of animal products, Singapore, 1980 to 1990.

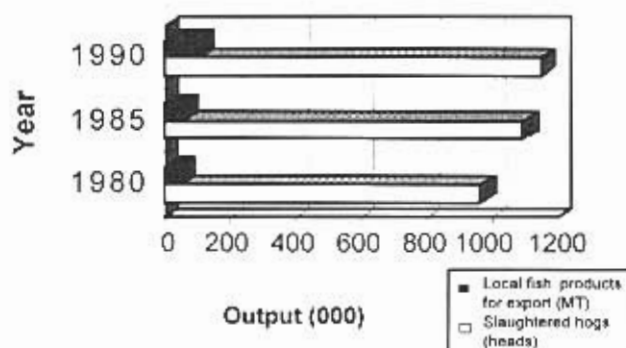
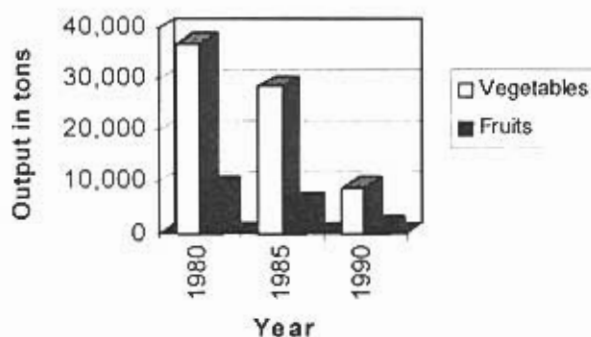


Figure 4. Output of selected agricultural products, Singapore, 1980 to 1990.



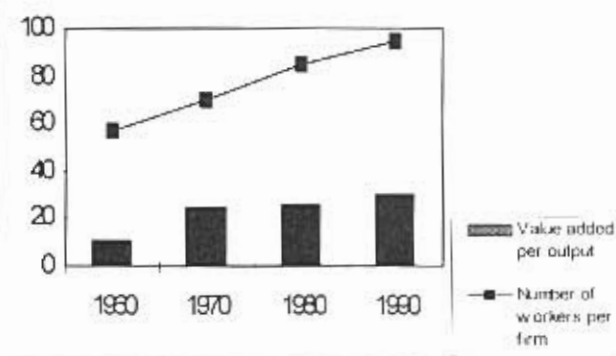
manufacturing sectors of the Singapore economy over the period of the program. The contribution of commerce to GNP declined from 33% in 1960 to 17.3% in 1995; while the manufacturing sector more than doubled its share from 11.7% in 1960 to 25.3% in 1995. This implies a shift of emphasis from trading to actual production, obtaining more value added for the whole economy.

In 1995, the manufacturing sector's contribution to GNP was US\$672 million more than that of commerce. Its value added per output had been increasing at a rate over 11% every ten years since 1960. In 1990, the total value added of the manufacturing sector was US\$21,615 million. Likewise, labor absorption grew steadily at about 3% per year (see Figure 5), reaching 358,453 persons employed in 1991.

Inadequately housed urban communities. From 1960 to 1995, the Housing Development Board (HDB) built 700,000 flats housing 86% of the population. Nine out of ten people living in these flats already own their homes. Public housing was initially intended for the country's low-income groups. However, the scheme was opened to middle-income families due to escalating prices of property. Under the Home Ownership Programme, the government established a mortgage and discount plan to help families finance their flats.

The development of more spacious and better equipped housing in areas far from the Central Region, where the Singapore and Kallang Basins are located, encouraged the movement of population away from the rivers and catchment areas. Between 1980 and 1990, population density decreased by 18.9% in the Central Region, while in other regions, except offshore islands, popula-

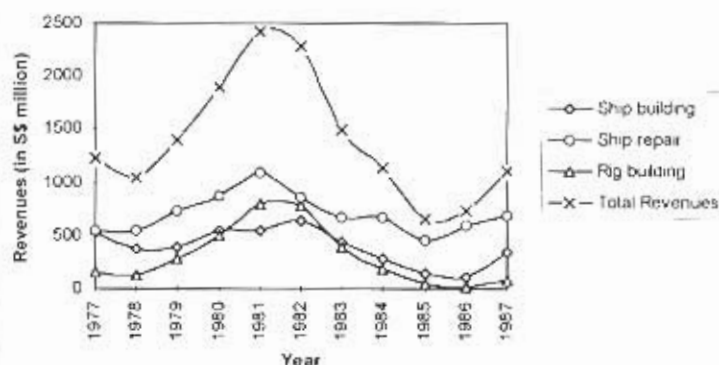
Figure 5. Manufacturing sector value added and employment, Singapore, 1960 to 1990.



tion density increased from 54.9 to 141.5%.

Ship building and repair. With its strategic location along the Malacca and Singapore Straits, ship building and repair has become one of the most lucrative industries in Singapore. Figure 6 presents the various ship-related activities and the trends in their revenues. In fact, cargo from seafaring vessels has been steadily increasing every year, more than twice as much from 1984 to 1994, even as the number of licensed vessels have declined over the years.

Figure 6. Revenue from the marine industry, Singapore, 1977 to 1987.



In 1991, Singapore reports around 70 shipyards in its southern and western portions offering a wide range of world class service. The industry is said to account for approximately 4.0% of total output and 5.6% of total value added in the manufacturing sector. Concrete actions towards waste treatment and pollution prevention, as part of the program, coupled with a strict system of fines and penalties prevented the recurrence of pollutants in the river, and instilled environmental consciousness and national discipline into the Singaporean populace.

Summary

The Singapore Cleanup Program has become a symbol of pride and political will of the Singaporean people. Together with other infrastructure projects and efforts at building its local industry, Singapore's environmental preservation efforts have led the country into the status of a newly industrialized country (NIC). Over and above these concrete manifestations of economic benefits, there are qualitative benefits that accrue over generations to come, such as national discipline, cultural enhancement, and improvements in the country's international stature.

The Importance of Marine Parks

Coral reefs, mangrove and seagrass areas need to be protected, as they ensure a constant supply of marine species. These so-called sanctuaries and fish nurseries have often been subject to exploitation due to their ornamental and medicinal value. Therefore, marine parks meet two objectives: the preservation of species and sustainability of income from tourism. These concerns were among the reasons why Thailand implemented a Coastal Resource Management Project from 1986 to 1992.

The Thailand project started with an assessment of the area, identifying the major groups that benefit from the use of Phuket's coral reefs, and the extent of damage brought by human and non-human activities. Aside from the effects of tourism and recreation activities, the project dealt with issues related to pollution and the prevention of further reef damages. In March 1992, the national government adopted the National Coral Reef Strategy with an appropriation of around US\$2 million, and implemented with the cooperation of the Coastal Resources Center of the University of Rhode Island.

After four years of operation, the project had established measures involving policy formulation, surveillance and enforcement, education, and public support. In early 1992, new legislations, including a Hazardous Substances Act, a National Environmental Quality Act replacing the National Environment Act of 1975, and a Factories Act, created a stronger foundation for environmental management. These regulations introduced measures to control the use of explosives, chemicals, and toxic substances for fishing, the sale of fish caught illegally, collection or export of corals or sponges, collection of sea turtles and their eggs, trawling, and push-net operations within 3 km from shore. The government's Department of Fisheries was assigned with activities involving surveillance and enforcement. Fifteen areas were designated as Marine National Parks. Above all, the environment was chosen as one of the key concerns of the government's Sixth National Development Plan, such that definite targets were set for the environment in the Seventh Plan.

Public Sector - Private Sector Partnership

The project also attained remarkable private sector and public support for coral reef management, resulting from the extensive media coverage, education and scientific activities. Volunteer associations of divers and tour operators initiated projects, in collaboration with the government's Office of the National Environment Board, Department of Fisheries, Harbour Department, Royal Forestry Department, Tourism Authority of Thailand, and the Provincial Government, against damaging reefs. These included the installation of mooring buoys in selected areas, sponsorship of a Coral Reef Day, donations of public awareness brochures and posters, inclusion of a curriculum on coral reef protection in schools, and development of reef exhibits at the Phuket Aquarium. A group of environment conscious divers organized an Undersea Conservation Group, aimed at protecting and rehabilitating coral reefs. Starting at Phuket, they set up pontoons for tourist boats and removed nets caught in the corals.

Economic Benefits of Coral Reef Protection

Two years after the project started, tourist arrivals and daily expenditures increased extensively. Moreover, visitor perceptions improved. Based on 1,880 German tourist respondents to a survey from 1 December 1993 to 18 February 1994, Phuket-Krabi ranked first among the favored beach resorts of the country. Pattaya ranked second. Germans constitute the fourth largest group, and the second highest spenders, among tourists visiting Thailand. In 1989, Thailand earned funds from its tourism activities

sufficient to offset half of its negative balance of trade.

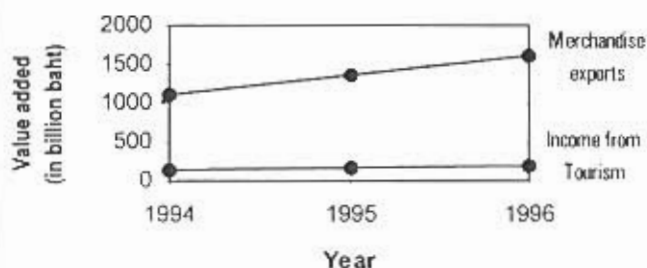
From 1989 to 1995, daily expenditures of tourists in Phuket grew by 115% to 2,845.82.baht or about US\$114 per day. Revenues from tourism activities in Phuket also grew from 6.7 billion baht in 1989 to 33.9 billion baht. However, hotel occupancy rates were at a downtrend, due to visitors' movement away from hotels and towards beach houses. Developments in Phuket and other tourist destinations affected and benefited several other sectors, including agriculture and fisheries, forestry, hotel and restaurants, construction, mineral mining, public works, communication and transportation, and sanitation. Thailand's southern region—where Phuket Province belongs—gainfully employed around 12% of the country's total work force, or an estimated 3,849.6 thousand individuals, in 1993. Of these individuals, 58.4% were in agriculture, fisheries, forestry and mining; 14.9% in craftsmanship; 11.1% in sales; and 4.3% in services, sports, and recreation.

At the national level, the Tourism Authority of Thailand reports about 551,220 persons employed directly and indirectly in Thailand's tourism industry in 1983. With tourism promotion and public awareness on environmental development, employment has increased to 1.27 million persons in 1994, with 34% of the work force in hotels and 3.5% in travel agencies. This manifests a 131% increase in employment in tourism within a decade. Tourism receipts are estimated at US\$5.8 billion, for an average of 7.06 days per stay and a 52% room occupancy rate. Classified among services, the tourism industry contributes a modest amount to the gross domestic product

(GDP), due to the small value added associated with the sector. On the other hand, it supports overall GDP by attracting investments in other sectors, such as the manufacturing industry, which maintains a major share in GDP (see Figure 7).

number grew to 1.14 million after ten years. In 1985, the market value of crewed boats was estimated at over \$50 million, while the value of the bare-boat types was around \$9 million. In 1984-1985, about one million passengers were ferried by these vessels, fetching some \$35 million in gross revenues, excluding souvenirs and equipment sold or leased within the boats.

Figure 7. Trends in value added, Thailand, 1994 to 1996.



Marine parks development has proven effective as a complement to tourism. In other parts of the world, marine parks have proven to be relatively important sources of income, such as in the Great Barrier Reef Marine Park in Australia, which has been able to generate income from its Public Aquarium.

Tourism proves to be one of the most significant uses of the Great Barrier Reef, benefiting around 19 resorts and tourist boat operators in the area. In 1994-1995, a total of 694 new permits were issued in the Marine Park, 43% of which were tourist program permits. In 1984, the Queensland Department of Harbours and Marine registered a total of 435 boats plying the area, including passenger boats, water taxi, government surveillance and construction ferries. Boat owners and operators invested and gained millions in revenues from visitors to Australia. Approximately 0.516 million foreign nationals visited Australia in 1975. This

In 1995, Australia ranked eighth among the most frequented tourist destinations in East Asia and the Pacific, receiving some US \$6.875 million in revenues from tourism alone (STPB, 1996). From

April 1979 to March 1980, approximately 2 million visitor trips were recorded. Fares and other costs continue to rise, increasing revenues constantly over the years.

In another light, commercial and local fishing share in the benefits of preservation and conservation. The number of trawling vessels rose from 250 in 1960 to 1,400 in 1983, reporting a gross turnover of approximately 40 million Australian dollars.

Offshore Resource Management

Littoral States along the South China Sea have been blessed with rich marine and offshore resources, characterized by abundant oil and gas reserves. These include Negara Brunei Darussalam, Malaysia, and Indonesia, which rank among the largest exporters of crude oil and natural gas in Southeast Asia. However, in view of the limited nature of oil and gas resources, governments have begun shifting their priorities to the

development of their regenerative agri- and aqua-based resources, including livestock, poultry, fish, prawns, and shrimps.

In 1988, Brunei Darussalam initiated a policy to conserve its oil resources by reducing production to around 150,000 barrels per day. Exploration for new reserves and alternative sources of energy is underway and intensifying, considering that the country's oil reserves are projected to run out in another 27 years. With the new policy, earnings from oil exploration in Brunei declined in its share in the country's gross domestic product (GDP), from 88% in 1974 to 58% in 1990, employing only 5% of the total labor force in the oil and gas industry. With the shift in production priorities, fisheries was identified as one of the sectors with a high potential resource base.

Aquaculture has provided sustenance, as well as an alternative source of income and employment, over the years. Estimates in the late 1970s have placed the number of people employed in small-scale fisheries in Southeast Asia at 5 million, and increasing. This population has been reported to be responsible for over half of the total marine landings in the region. Ironically, fisherfolk are also known to comprise the poorest of the poor, if assets and savings form the bases of assessment. In addition, the increasing use of capital-intensive fishing technologies and the indiscriminate dumping of waste in the ocean have disrupted regeneration, damaged marine habitats, and dimmed prospects for economic gain. Thus, it is only fitting that governments institute measures to protect and regulate fishing activities in their respective countries. Along with the issue of overfishing and illegal fishing, Southeast

Asian countries have to deal continuously with problems related to oil spills, marine pollution, red tides and siltation that plague marine life.

A National Coastal Development Plan

In 1986, Brunei Darussalam made a formal commitment to develop its coastal resources, when it initiated participation in the ASEAN-US Coastal Resources Management Project (CRMP). The project started as a training component, developing into a full-blown program after the first National Steering Committee attended by representatives from various government agencies and chaired by the Department of Fisheries.

Immediately after the program was approved, a National Interagency Committee on Environment was established to respond to the lack of a coordinating agency for environment and the absence of legislation to address environmental matters. This Committee is chaired by the Minister of Development and is equipped with its own Secretariat. In addition, Working Groups were established to address the more specific problems of water resources and solid waste management.

The Department of Fisheries has also developed its own National Oil Spill Contingency Plan, in collaboration with the Brunei Shell Petroleum Co. Sdn. Bhd., to protect its coasts in the event of an oil spill. In this regard, sensitivity maps were prepared to project oil trajectories and to identify priority areas for protection. The maps and reports have been used to design strategies, and plan for equipment and labor requirements to respond to such crisis.

Closely related to the Oil Spill Plan is the component on protecting coral reefs

through artificial reef building using abandoned oil rigs. The Rig Reef Program earned the *Gold Award of Excellence in 1994* for the Department of Fisheries, due to its innovative and practical concept.

A Red Tide Action Plan formulated during the program proved effective in arresting the health problems associated with red tides. In past occasions, response was possible only after information has been relayed from Malaysia. Red tides occurred in 1976, 1980 and twice in 1988, causing paralytic shellfish poisoning. To prevent future occurrences of this phenomenon, regular monitoring, public education and discipline are undertaken by the Department of Fisheries, in collaboration with the Ministry of Health, Ministry of Communications, and other media facilities.

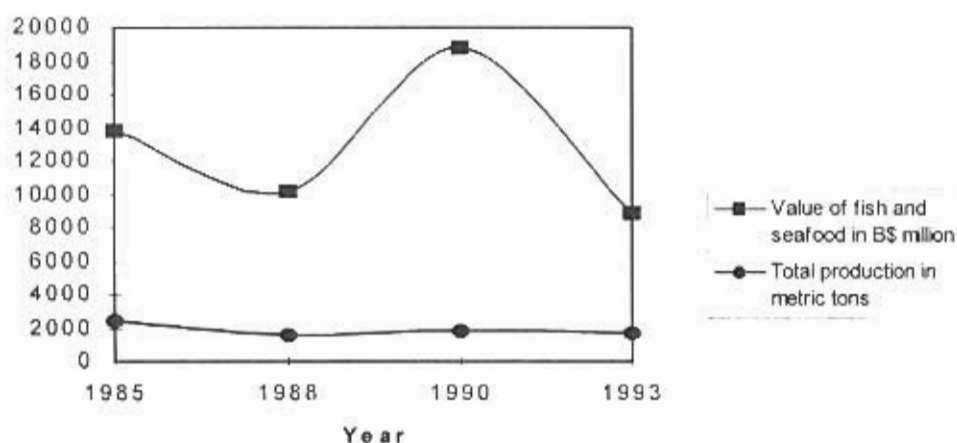
With regard to the issue of soil erosion, turfing and landscaping projects were undertaken to arrest the problem. A related task involves the protection of mangroves, which was delegated to the Forestry Department.

Finally, as an expression of its continuing commitment to coastal

resources management programs, Brunei Darussalam has been actively participating in marine pollution prevention and management programs, including the ASEAN-Canada and the ASEAN-Australian Cooperative Marine Science Programs, and the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas.

Five years after the CRMP formally started, fish production in Brunei Darussalam has increased by 6.2%, and the number of part-time artisanal fishermen increased by 27%. In terms of volume and value of production, local fish catch manifested an irregular trend. In 1993, quantity of local fish production was reported at 1,727 mt, valued at B\$8.9 million, both figures lower than those in 1986 (see Figure 8). Since this amount falls short of local demand, imports were still necessary. The drop in fish production and catch of commercially-valuable fish stock may be due to the Department of Fisheries' implementation of a strict licensing program to control fishing activities, including regulations on the use of gears and vessels. To counter this

Figure 8. Quantity and value of local fish production, Brunei Darrusalam, 1985 to 1993.



difficulty, the Department is developing ways for fisherfolk to adopt new fishing methods to improve their catch and income. In spite of the initial setback experienced by the fisheries sector, its contribution to GDP, income and employment is expected to improve with the program's efforts towards sustained fish stock and income for fisherfolk.

Several ASEAN nations have embarked on their own Coastal Resource Management Programs, with the help of donor countries including Australia, Canada and the U.S. Brunei's initiative should provide food-for-thought to oil-rich countries to develop their own sources of food security and sustainable income.

Synthesis

A comparison of the three themes lead us to several points of convergence with regard to economic and ecological benefits. The series of strategies and targets appear similar to each other, even as the manner by which the strategies are applied differ slightly toward their respective goals.

In the case of the River Cleaning Program, planning was followed by the more specific procedures listed in *Diagram 1*.

River and city cleaning improves the "national image," as it affects the psyche of citizens and foreign visitors. In accounting terms, this is synonymous to an investment in advertising. In the case of Singapore, efforts were geared toward promoting Singapore as a Convention City. The cleaning of the Kallang and Singapore Rivers led to an influx of tourists, effected an increase in value of

land and property, and encouraged foreign investments into the country. The latter are concrete manifestations of significant benefits generated, though indirectly, by the cleanup program. Thus, investments on marine pollution prevention and management proved themselves worthwhile and beneficial in perpetuity. In terms of return on investment (ROI), billions of dollars invested in marine pollution prevention and management translate to slow but constantly increasing returns to the national economy and generations to come.

Tourism and fisheries both require marine parks as a form of "zonation scheme" to define sanctuaries and nurseries, to preserve species and to maintain fisheries' maximum sustainable yield. Further, they require strict environmental impact assessment, licensing and restrictions, wastewater and sewage treatment facilities, public awareness drives, and strict monitoring to control environmental degradation within and beyond their scope of operation.

Direct and Indirect Impacts of Environment Programs

The study shows how environment and integrated coastal management programs impact on the issues of pollution and environmental degradation, while addressing the issues of economic stability, resource sustainability, food security and social welfare. The targets are summarized in *Diagram 2*.

Ultimately, these programs, when working together, help translate individual efforts to actions that work with nature rather than against it.

Diagram 1. Programs and strategies.

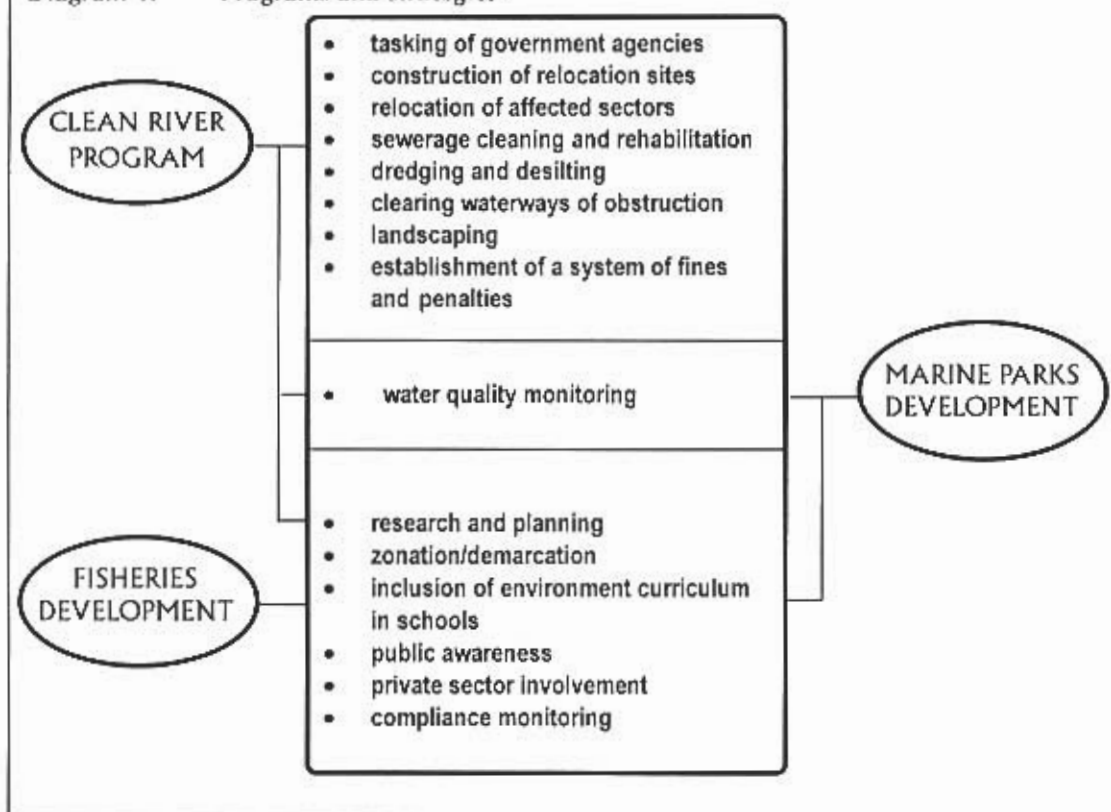
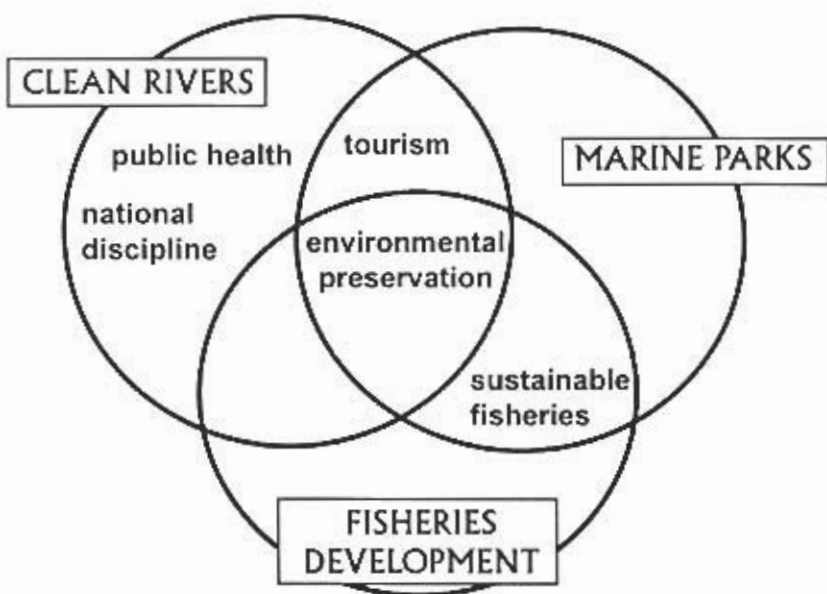


Diagram 2. Programs and targets.



THE SUSTAINABLE BENEFITS OF COASTAL TOURISM MANAGEMENT IN THAILAND—CASE STUDY: KO SAMUI

Pradech Phayakvichien

*Deputy Governor for Planning and Development
Tourism Authority of Thailand
372 Bamrung Muang Road, Bangkok 10100
Thailand*

PHAYAKVICHIEEN, P. 1997. The sustainable benefits of coastal tourism management in Thailand—case study: Ko Samui, p. 227-232. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) *Sustainable financing mechanisms: public sector - private sector partnership*. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

During the past two decades, tourism in general and coastal tourism in particular experienced impressive growth in the East Asian and Pacific regions. The World Tourism Organization (WTO) has reported that the tourism industry in the East Asian and Pacific regions attracted around 84 million international tourists, generating US\$70.20 billion in tourism receipts for the region, accounting for 18.9% of the world share.

Thailand alone experienced a tourist arrival growth rate of 12.73% in 1995, with 6,951,566 international tourists traveling to Thailand and producing US\$7,664.33 million in tourist receipts for the country. It is anticipated that the growth trend in the tourist traffic will continue to substantially boost the economy in Thailand as it offers a variety of tourist destinations throughout the country, with natural resources, such as beautiful mountains, scenic beaches, archeological sites including ancient cities and religious temples, and many traditional activities, such as floating markets and a vegetarian food festival.

With regard to coastal tourism in Thailand, there are a number of exquisite beaches, seas and islands along the long

coastline of the country. Several well-known seaside resorts with coastal tourism development programs attract numerous tourists and raise tourist receipts annually. These include Pattaya, Phuket and Ko Samui. Ko Samui is one of the remarkable seaside tourism destinations in the south of Thailand with its unique characteristics and outstanding tourist attractions throughout the island. There were 681,161 tourists, both foreigners and Thais, traveling to Ko Samui in 1995, growing at a rate of 26.82% from 1994 and generating 8,775.99 million baht (US\$1 = Baht 25.5) in tourist receipts for the local population.

This paper presents Ko Samui's tourism development plan and its implementation, and comprehensively examines the development plans for sustainable benefits to Ko Samui and its local people.

Ko Samui: Case Study

General Background and Tourism Situation

Samui Island (or "Ko Samui" in Thai language) is one of the significant tourist attractions of Thailand in the southern region, characterized by peaceful and beautiful marine and natural resources,

such as beaches, isles and coral reefs around the island. These tourist resources make Ko Samui an appropriate place for tourism and recreation, with coconut plantations as the landmarks of the region.

Ko Samui is gaining greater interest and popularity among Thai and foreign visitors every year. The number of tourists tend to increase, leading to the expansion of tourism facilities and services, including accommodations, restaurants, souvenir shops and various activities for recreation and touring.

Physical condition

Ko Samui is geographically located in the middle part of the Siam Gulf covering a total area of 231.36 km². It is a large island, about 80 km northeast of Changwat Surat Thani. Ko Samui is characterized by a mountainous area of granite and sandstone, with lowlands, beaches and sand bars. The coastal areas of the island contain bays and capes which are covered by rich significant tourism resources. Along the coastlines and the archipelago, there are beautiful coral reefs that are highly valuable both for ecology and tourism.

There are two seasons: summer and the rainy season. Summer is from February to April and is the appropriate time for traveling because of the calm sea and blue sky; while the rainy season is from May through January. The average temperature of Ko Samui is about 27.8°C, with 29.2°C as the highest in April and 26.3°C as the lowest in December.

Social and economic condition

Ko Samui has a population of 31,643 persons according to household registration records. This number is predicted to

increase at an average population growth rate of 2.04%. That is, population is expected to be 37,422 and 45,783 persons in the years 2001 and 2011, respectively.

The economy is still dependent on local agriculture in terms of production and employment, particularly in the growing of monkey coconut, durian, rambutan, mangosteen, cocoa, coffee and rice. However, the population's biggest source of income comes from tourism, which generated a cash inflow of 499.3 million baht and 671.1 million baht in 1992 and 1993, respectively. The average local income is 33,000 baht/month with farmers earning merely 5,020 baht/month, while tourism entrepreneurs gained 56,774 baht/month.

Tourist destinations

There are 27 tourist attractions at Ko Samui, comprising 17 beaches, 3 mountains and 7 religious places. Moreover, there are 4 cultural art and local activity centers, including 7 coral reefs spots. Samui's best beaches line the northern and eastern coasts, the most popular being Chaweng and Lamai. Other attractions on Ko Samui include waterfalls, the phallic rock formations, Big Buddha—a massive seated Buddha image, the island's major seafront settlement where ships, restaurants, tour agencies and hotels are located, the Butterfly Park and the Monkey Training Center. Aside from these attractions, Ko Samui has a good reputation for its serenity and calmness with long prominent coconut trees along the beaches and ancient local houses known for their uniqueness throughout the island.

Tourism market

In 1995, 681,161 tourists travelled to Ko Samui, an increase of 26.82% from

1994. Tourists can be categorized as approximately 25.42% Thai and 74.57% foreign, with the average length of stay of 3.33 and 6.84 days, accordingly. Tourism in Ko Samui also reported an average expenditure of approximately 1,922.94 baht/person/day, which accounts for a 2.35% increase from 1994. It consequently generated 8,775.99 million baht revenue, categorized as 39.78% Thai and 61.18% foreign. It has been estimated that future tourists traveling to Ko Samui shall number 992,315 and 1,415,843 persons in 1998 and 2003, respectively, with the proportion of foreign tourists reaching between 42 and 43%.

With regard to tourism services, these have been rapidly expanding in terms of quantity and quality. In 1995, there were 322 accommodations with 8,989 rooms, increasing from 1994 when there were only 318 accommodations with 6,756 rooms. Accommodations have been transformed into permanent buildings. The standard of services has highly increased. Other services not only increased, but devolved the main services to the minor service centers among varied tourism resources, especially in Hat Chaweng and Hat Lamai. Ko Samui has 30 restaurants not contained in accommodation compounds, 30 souvenir shops, 11 tour agencies, 7 diving accessories rental services, 85 car rental services, 34 transportation ticket services, and 74 entertaining services such as bars, pubs, and discotheques.

Problems of Ko Samui

In the past, though tourism development of Ko Samui has been continuously expanding in both quantity and quality, reports show that there still are many undesirable situations which should be changed and measures should

be taken to control the increase in violent incidents. Problems on tourism development at Ko Samui comprise four main points:

Tourism resources

Trespassing and takeovers of public land in tourist attraction areas, such as marshes, beaches, and mountains, have occurred. There has been no planning or appropriate standards for construction of buildings which block the roads to public beaches. Moreover, the existing tourism resources lack good management. There is no zonation plan, leading to unsanitary conditions and the deterioration of tourism resources.

Tourism services

Tourist businesses in Ko Samui, especially medium and small-scale, still need to upgrade their standard of services, particularly personnel skills. Most service businesses are not legally registered, as their qualifications are not legally checked and it normally takes such a long time to verify their qualifications.

Infrastructure

As for road safety, accidents have resulted in rather vast damages to lives and properties of visitors. Accidents result from factors such as narrow roads, reckless drivers, inadequate traffic signs, and uncontrolled speed.

Environment

Environment seems to be a major problem of Ko Samui, especially with garbage piling at tourist attractions and along the sea and beaches. Ko Samui still has problems of inefficient garbage

collection and disposal systems. Furthermore, community wastewaters still do not have a treatment system. Local residents and tourism service entrepreneurs lack the appropriate knowledge and understanding on sewage treatment and environmental management.

TAT Efforts for Ko Samui

The Tourism Authority of Thailand (TAT), on behalf of the Thai Government, feels concerned over tourism development at Ko Samui, which should be well-planned and managed. Thus, in 1980, TAT implemented a preliminary survey and study to come up with a master plan for tourism development of Ko Samui-Surat Thani, and to study the carrying capacity for tourism development of Ko Samui.

Although there have been modifications of the master plan, including various development studies and recommendations, actions have not been very satisfactory. New developments have still caused anxiety over the declining state of resources which may worsen in the near future. Consequently, TAT had set up the practical action plan of Ko Samui within its carrying capacity in 1995 by emphasizing projects that focus on participatory development within carrying capacity. Participation is required in implementation but more so in the planning stage of agencies, local people and enterprises, and specific interest groups.

Action Plan for Tourism Development of Ko Samui within its Carrying Capacity

TAT established "The Action Plan for Tourism Development of Ko Samui within its Carrying Capacity" in 1995. The plan

was formulated based on the carrying capacity of the environment and its components using a resource-oriented approach and covering the following four main objectives:

- a) To identify the physical, environmental and social carrying capacity of Ko Samui;
- b) To provide measures for controlling the number of tourists, infrastructure and services within the limit not harmful to the environment;
- c) To be aware of the tourism situation and problems at present and its trends in order to proceed with the action plan on tourism development of Ko Samui;
- d) To recommend the schemes which have been amended by specifying the budget and the responsible agencies explicitly.

The Action Plan for Tourism Development has set the "*Sustainable Tourism Development Direction*" for Ko Samui. The direction reconciles economic growth and the conservation of natural resources in order to achieve appropriate benefits, to sustain Ko Samui's resources for the next generation, and to create the consistent image of a "clean and pollution-free natural tourism resource". Nevertheless, in order to accomplish the mentioned objectives and maintain the image of Ko Samui, the action plan has proposed 33 projects with a total budget of 117.34 million baht, which could be briefly categorized as the follows:

- a) Project for Administrating and Managing Development;
- b) Project for Modifying and Managing Land Uses and Communities;

- c) Project for Development of Infrastructure and Public Services;
- d) Project for Managing Tourism Services;
- e) Project for Development of Tourist Attractions;
- f) Project for Managing and Preserving the Environment;
- g) Project for Additional Tourism Aspects

Benefits of Ko Samui Tourism Development

Since 1980, with TAT's tourism development of Ko Samui, improvements resulted in benefits to Ko Samui. These can be categorized in three specific areas:

Economic benefits

Tourism development has been largely beneficial to Ko Samui's economic condition. Local income from tourism seems to be the most outstanding output of development. It resulted obviously to a "change of occupation." More local people shifted occupation from the "agricultural sector" to "service sector" which created more income through trading, services and labor. There were two types of occupation shifts in Ko Samui. The first was an expansion of existing occupations, such as farming and transportation services within the area. Local farmers can sell more agricultural products to tourists. Thus, they grow more fruit, vegetable, and livestock in response to the increasing demand. Second, new occupations were created in accommodations, restaurants and tourism services. During the last five years, there has been more than 80 established bungalows and restaurants in Ko Samui.

In addition, it should be noted that tourism development contributed to the increase in value of land in Ko Samui. Before the expansion of tourism, some areas in the island had low economic value. The area around Hat Chaweng is an excellent example. It was a beautiful beach with coconut orchards of low productivity with the price of land at 3,000 baht/rai (one rai = 1,600 m²). With tourism, the land was developed for tourist

Plan implementation

To address the problems and concerns regarding the previous tourism plan of Ko Samui, TAT consequently established "The Sub-Committee for Supervising the Action Plan on Tourism Development of Ko Samui" in November 1995, consisting of 32 members from pertinent government and private organizations. The Sub-Committee was mandated to set up a specific organization to manage and liaise with TAT to coordinate between organizations in the region and among development agencies. The main responsibility of the Sub-Committee is to consider proposed projects in accordance with the action plan and address current problems of Ko Samui towards the fulfillment of its goals.

In conjunction with the action plan, TAT decided to launch a number of projects in order to solve the problems of Ko Samui within its carrying capacity. These are due to commence in 1997-1998. Most projects are associated with physical infrastructure and environmental improvement, including traffic lights and sign installation, road and pathway improvement, landscape improvement, public awareness, education, natural resources conservation and buoy mooring in coral areas.

resorts, restaurants and accommodations which yielded more economic return than that of coconut. As a result, the price of land has increased to at least 250,000 baht/rai.

Tourism development not only created employment and higher incomes for the local and public sectors. It also increased revenues from taxes and brought in more foreign currency. It was estimated that Ko Samui brings in foreign currency approximating of 51.68 million baht per year.

Social benefits

Social benefits from tourism development can apparently be described in terms of the standard of living. In relation to increased income and employment, the standard of living of local people improved. People get more education and learn good traits of foreign visitors, such as politeness, cleanliness, consumer behavior, as well as the English language.

There is considerable unreported unemployment in the agricultural sector of Ko Samui as the coconut orchards require little tending. Tourism could absorb this hidden unemployment and transform it into formal employment, such as driving taxis and buses for tourists. With regard to the adolescents who do not continue their education, tourism development offered them the possibility of occupations as tour guides or service staff. This helped reduce the number of felonies caused by unemployment.

Environmental benefit

Tourism development contributed to more efficient use of natural resources. Many old wolfram mines and abandoned coconut farms which had been completely exploited around the island were turned

into tourist resources and infrastructure, such as the Monkey Training Center, tourist bungalows, and restaurants. The local people generally feel that there has been a change in their status from a rural one to a busy urban one; but the change is welcome and has not encountered resistance among the local population.

Conclusion

It is obvious that tourism development has been substantially beneficial to the local people and the region. Economic benefits translate to more employment and higher income, social benefit in form of the standard of living, and environmental preservation. However, tourism development should be effectively controlled and managed in the right direction. Over-development of tourism can bring negative effects and subsequent problems to the area. Consequently, research studies, projects and mechanisms need to be established as a tool to manage and guide tourism development, which should integrate intensive coordination between relevant organizations, and the government and private sectors.

In sum, TAT has implemented tourism development at Ko Samui since 1980. A number of studies and plans have been conducted and implemented for many years. The Sub-Committee for supervising the action plan on tourism development of Ko Samui has been established in order to coordinate among private sectors, people and local agencies.

Ko Samui is striving for sustainable tourism development, which complements economic growth and natural conservation towards optimum sustainable benefits and the image of a "clean and pollution-free natural tourism resource" for generations to come.

Session 4

Business Opportunities

ALEX MACDONALD, President, Strategic Ventures Corporation, Canada and NEIL ANDERSON, Vice-President, International Business Development, Nautical Data International (NDI), Canada.

"ECDIS and sustainable finance mechanisms in the East Asian seas."

MARK BYRON WELLINGTON, Business Development Manager, LADS Corporation, Ltd., Australia.

"Economic benefits from operational laser bathymetry in Australia, 1993 to 1996."

CONSTANTINO L. ARCELLANA, JR., General Manager, Mid-Ocean Ship Management Corporation, Philippines.

"Socioeconomic implications of the seafarer's training and certification."

BERNARD FLEET, Director of Technology, Eutech Cybernetics Pte. Ltd., Singapore, ARUN ABRAHAM, Senior Program Officer, International Development Research Centre, Singapore and HELENA LANDAZURI, Senior Program Manager, Inter-American Development Bank, Washington.

"Integrated management strategies for maritime and industrial wastes: opportunities for public sector - private sector partnership."

MARISSA V. DAVID, Technical Operations Manager, Industrial Environmental Management Project, PRC Environmental Management, Inc.

"Reaping success from waste minimization: the Philippine experience."

SHIGETO OGURI, International Marine Consultancy Pte. Ltd., Singapore.

"Financial requirements to sustain the maintenance and deployment of oil spill equipment stockpiles."

ECDIS AND SUSTAINABLE FINANCE MECHANISMS IN THE EAST ASIAN SEAS

Alex Macdonald

*President, Strategic Ventures Corporation
225 Eglinton St., Fredericton, New Brunswick, Canada*
and

Neil Anderson

*Vice President
Nautical Data International
691 Richmond Road, Ottawa ONT K2A 0G6, Canada*

MACDONALD, A. and N. ANDERSON. 1997. ECDIS and sustainable finance mechanisms in the East Asian Seas, p. 234-243. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

Managers of ocean resources throughout the world face a daunting array of challenges in addressing sustainable development and pollution control of complex ecosystems. These managers have wide reaching mandates and relatively limited resources, usually financed by government sources with national concerns. Ecosystems, particularly in the marine world, do not follow national boundaries. Therefore, regional and global approaches are necessary, adding financial and managerial complexities.

The shipping industry has an important role in the environmental and sustainable resource management of marine areas. Marine transportation routes often pass through the waters of many countries, as well as international waters. Today there are proven technologies available that improve the safety and efficiency of navigation and reduce the risk of oil spill pollution. Together, these "eco-efficient" (Schmidmeiny and Zorraquin, 1996) technologies and information systems form the basis of a "Marine Electronic Highway."

These geospatial databases also provide an information infrastructure framework for other applications, including pollution control, as well as environmental and resource management. The infrastructure is based on a national and international network of databases that will serve the needs of the shipping community, resource managers, as well as many other users involved in marine and coastal affairs. By integrating the information needs of each of these sectors, a sustainable financing mechanism can be designed.

Electronic Chart Display and Information Systems (ECDIS)

ECDIS is the specific title for the system specifications that have been approved by the International Maritime Organization (IMO). Perhaps the best testimonials for ECDIS come from the most well-known Canadian commercial user, Canada Steamship Lines (CSL). In 1996, Captain John Pace, Director-Navigation, Ports and Safety for CSL wrote:

The arrival of ECDIS on the bridge of a ship is a singular event without precedent for the modern navigator. ECDIS is not just another

incremental improvement in navigation technology. Rather, it signals a quantum technical leap that will provide the navigator with new functionality.

It is the unique ability of ECDIS to integrate vast quantities of data for high speed computer processing and analysis prior to real time display on an electronic chart that spells the difference between ECDIS and traditional navigation instrumentation. ECDIS performs the navigation information gathering and computational tasks automatically and with high accuracy. This frees the navigator from the time consuming and error inducing task of collecting data from internal and external sources over a period of time. Instead, the navigator can concentrate on making navigation decisions based on information presented in a manner optimised to support the intended navigation plan.

By bringing together up to date navigation information and data resident in onboard databases, imported from the vessels onboard sensors or downlinked from external sources ECDIS is capable of supporting a technical systems approach to navigation.

Sea trials with ECDIS under the most demanding conditions imaginable have consistently demonstrated that electronic charts and Differential GPS are technically capable of delivering a high degree of precise sustained navigational performance that is not considered achievable with traditional methods.

Finally, ECDIS will relentlessly compare database and sensor information against the vessels' safety parameters and alert the bridge team in the event of a safety margin violation. By providing highly accurate real time navigation information to the bridge team, ECDIS will help navigators to stay ahead of the passage plan and anticipate the next decision required to conform to the plan. ECDIS will reduce the workload on the bridge and improve the quality of navigation decision making in all weather.

A second array of ECDIS testimonials comes out of the San Francisco Bay Demonstration Project. This is one of the United States' busiest port areas with steady increases in large vessel traffic, complicated by confined maneuvering areas, depth limitations, fog and strong currents. One Project objective is to complete the installation of current, tide, and salinity instruments and provide access to uniform, integrated data from all installations:

Electronic Chart Display and Information Systems (ECDIS) will improve marine transportation efficiency and reduce risk of collisions and groundings in the San Francisco Bay region. The implementation of electronic chart technology aboard commercial ships, particularly when integrated with real-time current and water level information, will allow maximum safe-ship drafts to be used, reduce delays in ship arrivals and departures, and allow larger ships and increased levels of commercial traffic to more safely

transit in the Bay region. Electronic chart data will also contribute significantly to the upgrade of the San Francisco Vessel Traffic System (VTS) (Wilson, 1995).

Electronic Nautical Charts permit the user to make current, tide, wind, siltation and water level data active and three-dimensional by using ECDIS. As noted by Captain Jean-Luc Bedard (1995), Port of Montreal:

One of the main reasons the user wants to make charts active is the gains—every inch of additional draft represents a financial gain (to a carrier). The challenge for government should be customer satisfaction.

Marine Electronic Highway

The Marine Electronic Highway represents the integration of telecommunication technologies, ECDIS and electronic navigation charts (ENCs), as well as the transmission of real-time water level and current information.

Until recently the acceptance of ECDIS has been constrained by the lack of international standards. The development of ECDIS Performance Standards was undertaken by a joint International Maritime Organization (IMO) - International Hydrographic Organization (IHO) Harmonization Group and in late 1995 the IMO assembly adopted the necessary standards. Subsequently, Adam Kerr (1996a), Head of the IHO, wrote the following:

The IHO must now face, with great urgency, the objective of coordinating the activities of the HOs

in the digital era. Now that the Performance Standard and its associated IHO and IEC specifications are reasonably well in place, the IHO must give high priority to the task of developing a world wide coverage of digital data for ECDIS.

In another article, Adam Kerr (1996b) also wrote further on the Worldwide Electronic Chart Database (WEND):

An updating service would be provided by each HO and the updates would also be integrated as regional packages and delivered to customers. Revenues from sales by regional centres would be redistributed back to the HOs providing the data, less overhead and costs borne by the regional centre. Eventually, all regional centres would be linked so that data and services for any area covered by a regional centre would be available at any other center... The objective must always be to provide international shipping with fast, accurate and convenient delivery of chart data and updates.

From a sustainable financing point of view, this last statement is most important. The key to attracting shipping sector participation lies in delivering value. Users will pay for relevant, timely information, if increased profitability is the result.

Mobile data communications will be required on vessels using the Marine Electronic Highway to receive electronic navigation chart (ENC) update information as well as real-time water level and current information. Vessels that add the small incremental cost of transponders will be able to transmit position information to shore-based Highway facilities, as well as receive the position information of other

vessels in the area and display the information on ECDIS, supplementing radar information.

The need for ENC production and development of regional services is well-known within the hydrographic community. Within the Asia region several nations have the necessary ENC production tools and are either in production or are planning to begin production.

Although this is a large task, the financial paybacks for the shipping community should prove quite attractive. For example, it is possible that the combination of precise ENCs and timely water level information could enhance the margins of safety in critical areas, such as the Strait of Malacca, and enable carriage of larger loads well within safe limits. If this possibility can be developed into reality then significant increases in revenues to shippers and cargo owners can result, giving rise to a potential revenue source, part of which could offset the costs of production of the infrastructure.

It is important now that the application and implementation of ECDIS be more fully incorporated into the thinking and planning of the shipping community.

ECDIS Utilization in Canada

The precipitating event to build the electronic chart infrastructure in Canada was the catastrophic *Exxon Valdez* oil spill. The Canadian government evaluated the hearings on the disaster and concluded that if the ship had been using precise navigation technology that, even then, was commercially available, the *Valdez* mishap would in all probability have been avoided. The Canadian government

committed \$9.2 million to build the ENC databases, including a project to educate the shipping community, placing technology aboard a variety of ships, overcoming the resistance of experienced mariners to new technologies and ultimately winning the confidence of the Canadian shipping community. This represented a unique public - private sector cooperative process in the introduction of new technologies in the marine world.

In 1993 and 1994, in cooperation with the Canadian Hydrographic Service (CHS), Canada Steamship Lines (CSL), Canada's largest fleet operating in Canadian waters, adopted a fleetwide implementation of ECDIS. In early 1995, CSL announced publicly the results:

- a) Increased safety above all;
- b) Increased profits through a year of incident free operations, longer hours of work in adverse conditions, operating when the traditional aids to navigation were removed or had malfunctioned; and last but not far from least
- c) Decreased costs of insurance (through increasing the deductible portion of ship insurance).

In the autumn of 1995, the Canadian Shipowners Association announced that all of its members would voluntarily adopt the utilization of precise navigation tools, currently an ongoing process. These developments have been closely observed by authorities in the USA (Alexander and Ganjon, 1995).

Based on the insight the United States Coast Guard and National Oceanic and Atmospheric Administration (NOAA) have

gained from working directly with a wide variety of mariners in the U.S. and Canada, it is clear that when properly used, ECDIS is a significant improvement over more traditional means of maritime navigation.

The relevant waterways of the Canadian Marine Electronic Highway are predominantly within Canadian jurisdiction so the matter of database creation was one which Canada undertook as a national priority. However, as most Marine Electronic Highways traverse the waters of many nations, as well as international waters, infrastructure building and financing are an international challenge that will require the participation and cooperation of several nations, as well as ship and cargo owners.

Public Sector - Private Sector Partnerships in Canada

Increased involvement of commercial companies in digital data creation must be recognized as a new element in IHO coordination. While maintaining overall control of their own data, particularly with respect to quality, HOs would be well advised to harness the productive power of commercial organizations, by forming partnerships (Kerr, 1996b).

The navigation advances in Canada were enabled by the building of the necessary electronic nautical chart infrastructure by the Canadian Hydrographic Service (CHS) which is the agency responsible for the production and distribution of Nautical Charts of Canadian waters. In 1993, CHS entered into a public - private sector partnership with Nautical Data International, Inc. (NDI)

to produce, market and distribute ENC's based on international standards. CHS's primary role is production and quality control whereby NDI's primary business is data management, marketing and distribution. The term "primary" is used because the dividing lines of responsibility of any true partnership are not always clear and are based on shared responsibility.

Although NDI was initially created to market and distribute electronic charts and other digital products of the CHS, it has developed expertise and now provides services in system integration, ENC data production, training and consulting to hydrographic offices. This partnership has allowed CHS to increase its services and allow more flexibility in the marketplace to meet the user's needs. It also provides an effective mechanism for the creation of a financially self-sustaining service. One very interesting result has been the sale of data to environmental consultants who utilize the data for environmental studies. This type of partnership has attracted the attention of several nations.

Maritime Traffic Safety in the Asia Region

Although all indicators of marine transportation are important, the statistics on oil shipments are particularly instructive. Several nations of the region are experiencing dramatic increases in per capita energy consumption. Recent APEC estimates suggest that China's net external oil requirements alone will rise from some 600,000 barrels per day to over one million by 2000 and nearly three million by 2010.

In fifteen years, East Asia oil imports could easily triple to more than 15% of global consumption (Calder, 1996).

For coastal nations along oil tanker routes these predictions are full of environmental implications and raise the urgency of assessing and implementing safety measures. For these nations the situation is complex, given the right of innocent passage through international waters and enforceability issues within EEZs. The imposition and enforcement of international safety rules is complex and time consuming to implement. Therefore the voluntary compliance of the shipping industry, in implementing precise navigation technologies, would be more effective. This can be more easily achieved if the shipping sector can see increased profitability as a probable result. This means international cooperation to develop global port to port ENC services of the Marine Electronic Highway that allow the companies to maximize their efficiencies and increase their profits, as well as improve safety.

A coordinated regional and global strategy is needed to assist national authorities in encouraging the adoption of necessary technologies by domestic shippers, in entering into the necessary international cooperation agreements to share data and in creating an inviting legal framework by which private investment can be securely attracted.

Environmental and Sustainable Resource Management

The electronic chart databases provide the framework for the incorporation of marine spatial data into resource management information systems. This has been recognized in the San Francisco Bay Demonstration Project which will "integrate technology and data into products focused on navigation and safety while providing tools for coastal management" (Wilson, 1995).

The effective management of coastal zones is an area of intense interest worldwide. Many projects are currently being planned and financed by governments often in conjunction with International Financial Institution (IFI) loans.

One of the most effective tools for environmental management is the geographic information systems (GIS) and ECDIS is a special application of the GIS. The GIS is used to process and display spatial data for a wide variety of multi-disciplinary applications. In a World Bank Discussion Paper the Bank's view of the GIS was outlined as follows:

Even a cursory review of the information technology underpinnings of Bank projects reveals a set of core competencies in management information systems with a strong emerging specialty in Geographic Information Systems ... The challenge is to build local capability to exploit these new (GIS) tools and to organize and analyze the vast amount of data involved in environmental and resource management (Hanna and Boyson).

Environmental and resource managers normally have limited resources to gather and manage multidisciplinary data. Often the ability to keep databases updated and therefore relevant expires simultaneously with the end of project funding. By tying electronic chart infrastructures to environmental and sustainable development infrastructures, it becomes possible to develop a financially sustainable plan to maintain the underlying databases for several user communities.

Finally, intentional oil spill pollution, often in the form of improper bilge pumping, is also a serious environmental problem. The International Maritime Organization is working to meet parts of this challenge with the Port State Control System, which will allow inspection information to be readily exchanged between nations to assist in verification that improper discharges have not been carried out. The Highway infrastructure will be a valuable tool in augmenting Port State Control System activities.

Financial Sustainability

Many Asian nations have, and are, considering the issues of private sector financing of infrastructure projects, typically projects involving familiar undertakings such as roads, rail systems and water treatment facilities. However, private sector financing is not easy to access.

Proposals for huge infrastructure projects are on the drawing boards all over Asia, creating a fierce competition for financing....Most deals in Asia are one-off deals, because lots of countries don't have a systematic legal and administrative framework for private sector involvement in infrastructure (Liden, 1996).

By way of analogy, there are several examples of major road building financing which were originally intended to recover costs, and repay loans, through toll revenues which have yet to materialize.

A Marine Electronic Highway is vital to the transportation of many important goods, not the least of which is oil. But a Marine Electronic Highway can be fully

developed at a fraction of the cost of land-based highways. Mountains need not be moved, nor tunnels dug, nor residents displaced. Indeed, marine highways have existed for as long as there have been ships. Today's technical ability to produce precise electronic charts, to measure and transmit water level information, to interpret precise positioning and to transmit positional information all exist at total costs which are a fraction of building land-based transportation systems.

In the introduction to this paper the term "eco-efficient" was used to describe the Marine Electronic Highway. The term eco-efficient was coined by the Business Council for Sustainable Development to "describe a process of adding ever more value while steadily decreasing resource use, waste and pollution" (Schmidmeiny and Zorraquin, 1996). This quote is taken from *Financing Change—The Financial Community, Eco-Efficiency and Sustainable Development*, a highly informative book on the emerging focus within the capital markets on environmental performance. In his foreword to the book, James D. Wolfenson, President of the World Bank, says:

We recognize that the achievement of sound environmental practices depends upon a constructive partnership between businesses and governments. We hope that we can play a useful role in promoting such partnerships and in assisting governments to put into place incentives that ensure that economic growth is sustainable (Schmidmeiny and Zorraquin, 1996).

Such comments from the World Bank President are encouraging, particularly

because World Bank infrastructure divisions are developing a keen interest in information infrastructure project development as that institution's role in telecommunications and power infrastructures diminishes. The challenge to a financial institution, and to project developers, is to gain an awareness of the data and information disciplines and to define user group requirements and probabilities of revenue stream generation. The Marine Electronic Highway information infrastructure addresses the needs of a key industry user sector. National Highway sections will generate revenues to repay investors, public or private, and not simply rely on the general tax revenues of the various nations. In effect, nations should be able to construct and maintain valuable information infrastructure, vital for environmental management and protection, at very little, if any, ultimate cost.

To some, oil spills are synonymous with marine pollution. The dollar cost estimates of the *Exxon Valdez* incident range as high as four billion dollars. With such enormous potential losses in mind, a Marine Electronic Highway makes sense as an "eco-efficient" oil spill prevention strategy, efficient for the shipping and cargo communities and valuable for resource managers. In addition, the Highway will also benefit many other users.

A well-researched business plan, written to evaluate capital and operating costs along with credible income projections can attract financing sources to commit, within a secure legal framework.

The most important element of the business plan is the probability of revenue generation sufficient to maintain operations and, after a start-up period,

retire debt or pay dividends. If the oil tanker and cargo owners of the region, for example, become convinced that the use of ECDIS equals increased profitability, then indications of support from such users would be highly persuasive in dealing with financial sources. The ability to maximize loads safely, the ability to navigate precisely, the potential cost savings of automatic updating, the potential for decreased insurance costs are all important factors. For some owners, the network need only be within a certain region, or between certain ports within a region to attract their interest. For others, it must ultimately become a global port to port service.

The "construction" costs of producing reliable ENC's, including the gathering of additional hydrographic data where necessary, are generally an undertaking which national authorities finance. If the nation states have the financial resources and have prioritized the ENC production, only the incremental costs of networking those databases would be necessary. The Global Environment Facility (GEF), a two billion dollar grant facility, and its International Waters Protection section are committed to assisting in the reduction of barriers to new environmentally friendly technologies. It is probable that the GEF will look favorably upon assisting with the necessary costs of developing a regional network management capability. The GEF provides incremental finance, meaning the Highway nations will need to address the financial issues of their Highway sections. GEF grant participation would certainly assist in making a business case more financially feasible.

Some nations, however, may not have the financial resources, and in those areas, private sector funding may be possible in

the context of a larger business plan. Alternatively, or additionally, in some areas, international aid agencies could be approached for necessary assistance. (OECD, 1996)

Finally, the public - private sector partnership approach may be the most cost-effective means of delivering the services. It allows the government agencies to maintain control of the data and ensure quality control of the ENCs while allowing the flexibility of the private sector to customize and maximize services for the marketplace and, therefore, revenues. The revenue sharing agreement is determined within each of the partnerships that together comprise the Marine Electronic Highway. This arrangement also facilitates the international networking of the databases meeting the needs of the individual countries while providing a common service to the international shipping community, as well as to regional and global environmental and resource management programs.

Conclusion

When the Marine Electronic Highway is built, the transportation community will use it. This has been the case in Canada. The acceptance of the shipping sector required the demonstration and experience gained by the early adopters, such as CSL. Once private sector confidence was established in the value of the new technologies, the response became one of voluntary compliance. The Canadian experience is instructive and it hopefully will encourage progress.

The most powerful businesses of the 21st century will be those which have the best access to the most powerful databases and which have the best ability to iterate relevant data into useful information. In

Asian seas, the confluence of surging marine transportation growth, environmental awareness, interest, as well as capability in appropriate emerging technologies, all point towards world leadership in building a Marine Electronic Highway.

Ship owners, ship operators, cargo owners and resource managers throughout the region can address both private and public priorities through international cooperation in networking and managing appropriate databases. More exact, reliable data, allow tighter definition of safety and performance margins. The empowering of mariners with better data and information by which to increase operational efficiencies is a means to attract voluntary compliance by the shipping sector. Those that do comply will be developing a competitive advantage over those that do not. A voluntary compliance approach is more likely to succeed in a meaningful time frame than is the laborious imposition of regulatory controls which do not add to the shipping community's profitability.

The financing of a Marine Electronic Highway needs to be evaluated in light of a business plan that credibly addresses issues, such as capital, operating costs along with well thought out revenue projections. The support of national authorities responsible for international cooperation will also need to be gained with assurances that the databases will remain as national property and with royalty revenues paid to the contributing nation for data usage, after operating costs and debt service are factored in. When the Marine Electronic Highway is designed to meet the needs of a wide range of users and the services delivered through an international network based on common standards and convenient

access, it provides the opportunity to maximize revenues that can attract a broader range of investments.

The public-private sector partnership approach facilitates management of an international network with revenue generation to the participating agencies.

The hydrographic community is well aware of the urgency of creating the

necessary databases to support widespread ECDIS usage. The interest and involvement of the shipping community are vital and need to be attracted as expeditiously as possible.

There is a wide recognition of the need to address marine pollution issues which so greatly affect the well being of present and future world populations. What is needed is a plan of action.

References

- Alexander, L. and F.K. Ganjon. 1995. Sea Technology, March 1995:10.
- Bedard, J.L. 1995. Moving from artwork to network. Hydrocomm 95, Ottawa Ontario, February 1995:5.
- Calder, K. Foreign Affairs 75(2):58, March-April 1996.
- Hanna and Boyson. Information technology in World Bank lending - increasing the development impact. World Bank Discussion Papers No. 206.
- Kerr, A.J. 1996a. The IHO and electronic charting, Contour, no. 7, Spring, Dept. of Fisheries and Oceans, Canada.
- Kerr, A.J. Spring 1996b. Worldwide Database, Contour, no. 7, Spring, Dept. of Fisheries and Oceans, Canada.
- Liden J., Manila repairs require billions - the Philippines looks for private financing for road, rail projects. Wall Street Journal, 16 August, 1996:5.
- Pace, J. 1996. The case for bridge management-ECDIS on the bridge. Contour, no. 7, Spring, Dept. of Fisheries and Oceans, Canada.
- Schmidmeiny, S. and F. Zorraquin. 1996. Financing change - the financial community, eco-efficiency, and sustainable development. MIT Press, Cambridge, Massachusetts.
- OECD Development Assistance Committee, Guidelines on aid and the environment, No. 8. Guidelines for aid agencies on global and regional aspects of the development and protection of the marine and coastal environment. Paris.
- Wilson, National Ocean Service: San Francisco Bay Demonstration Project Plan. National Ocean Service, September 1995:14

ECONOMIC BENEFITS FROM OPERATIONAL LASER BATHYMETRY IN AUSTRALIA, 1993 TO 1996

Mark Byron Wellington

Business Development Manager

LADS Corporation Ltd.

Vision Systems Bldg., Second Ave., Tech Pk., The Levels

Adelaide 5095, Australia

WELLINGTON, M.B. 1997 Economic benefits from operational laser bathymetry in Australia, 1993 to 1996, p. 244-252. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

The primary objective of the Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas is to support the development and execution of long-term and self-reliant programs by participating governments. The adjectives long-term and self-reliant imply sustainable programs. Sustainability depends upon, among other things, sustainable funding sources which, in turn, are influenced to a large degree by the availability of technologies which can address program costs effectively and in a timely manner.

Today's tight economic and political environment increases the importance of cost effective technologies that are attractive to governments, funding agencies, and industry, which are the sources of the funding necessary to initiate sustainable pollution prevention and management programs. This paper introduces a cost-effective technology for hydrographic survey using airborne laser.

Accurate hydrographic survey not only reduces the risk of pollution causing accidents, but also increases shipping efficiencies. Airborne laser bathymetry

offers significant time and cost savings without compromising accuracy, and makes an area hitherto financially unattractive to governments, funding agencies and industry, considerably more palatable.

Approach

This paper initially demonstrates the economic benefits of an effective hydrographic service by referring to a work done by John Coochey for the Royal Australian Navy (RAN) Hydrographic Service. Then it looks in more detail at the RAN program, which is based on a modern fleet of surface vessels and the Laser Airborne Depth Sounder (or ADS) working in an integrated fashion. This paper also introduces the LADS technology and operational history.

The key point of this paper is the relative cost-effectiveness of LADS technology and conventional sonar technology. RAN statistics are used on areas surveyed and platform operating costs, real case studies are presented to illustrate the following benefits of the RAN program that are relevant to this conference:

- a) Reduction of pollution risk through prevention of shipping accidents; and

- b) Increase of shipping efficiencies (and development of new maritime trade opportunities) by opening new shipping routes.

Economic Benefits of Hydrographic Survey

In 1992, the RAN commissioned John Coochey to report on the economic benefits of the RAN Hydrographic Programme. The RAN had until then lacked quantitative data on its contribution to the Australian economy and needed to provide an economic rationale for its program to support the already well developed military rationale. The needs of the RAN reflect those of the hydrographic community in general, and the Coochey report is highly relevant.

Coochey made conclusions based on the following four themes:

- a) *The efficiency of shipping.* Shorter, deeper shipping routes save time and money, and increase the efficiency of capital through the realization of economies of scale.
- b) *Protection of the marine environment.* Effective hydrography supports safety of navigation, thus making a significant contribution to prevention of pollution from accidents and resulting oil spills.
- c) *Exploitation of resources.* Hydrographic services amass extensive databases that are of great economic value to the mining and oil industries, the fishing industry, the tourist industry, etc.
- d) *Safety of life and property.* Life is of economic value, and is

protected by effective hydrography through its support of safety of navigation.

The focus will be on the first two themes, the efficiency of shipping, and protection of the marine environment, which are of primary relevance to this conference.

Efficiency of Shipping

It is obvious that shorter, deeper shipping routes will have positive economic impacts. However, the full level of potential economic benefits may not be so obvious. For example, in 1989 the Australian Industry Commission determined that savings of US\$130 million in FOB export prices and CIF import prices would result in annual flow-on savings of US\$860 million to the Australian economy.

While this particular study focused on savings in cargo handling costs, the relevant fact is that small savings in shipping costs will have much greater impact on a nation's economy as a whole. Of course, the converse is also true, and a small increase in costs will result in relatively large flow-on costs. When we consider the cost of running a 150,000 ton vessel is approximately US\$35,000 per day (as cited by Tejam in *Tropical Coasts*), it is clear that the cost of shipping inefficiencies can multiply rapidly.

Coochey uses the Hydrographer's Passage through the Great Barrier Reef to the Coral Sea, which was originally surveyed by the RAN Hydrographic Service for RAN patrol boats, to support this observation. Once charted, the passage was used by large bulk coal vessels which had previously to travel a

considerable distance before being able to traverse the reef. A cost-benefit study done by the Australian Bureau of Transport Economics demonstrated a cost-benefit ratio from marking the Hydrographer's Passage of 2:7 in terms of fuel savings alone.

Another example cited by Coochey is that of the channel into the port of Dampier in northern Australia. The channel was surveyed at 40 feet depth and, when one ore carrier recorded a bump of one foot at the bottom of the channel, ore carriers were forced to load lighter until the channel could be dredged of what turned out to be a large tyre from construction equipment. The temporary loss of loading capacity resulted in a loss of almost US\$1.6 million (1960) dollars.

Protection of the Marine Environment

While Coochey notes that oil spills are characterized as 'very low probability estimates for high consequence events', he also cites an Australian Bureau for Transport and Communications Economics study which concluded in 1991 that the probability of a tanker oil spill of more than 1,370 tons occurring in Australian waters in the succeeding five years was as high as 48% (and 93% in the succeeding twenty years).

Of prime concern to Australians is the Great Barrier Reef which, as most of you would be aware, is revered throughout the nation. However, the coral that gives the reef its beauty also makes the area hazardous for navigation and would render oil spill control measures almost impossible to execute.

The potential economic impact of oil spill accidents is difficult to calculate and

depends on the way in which the economic value of natural assets is determined. Coochey cites an estimation of the Great Barrier Reef's minimum value as US\$900 million. The cost of the *Exxon Valdez* disaster has been estimated at US\$3 billion, based on the out of court settlement and the amount paid out by Exxon Corporation to clean up the damage.

Whatever the methodology employed, it is clear that the economic and social damage of oil spills is enormous. The case for using the adage prevention is better than cure is indisputable.

RAN Survey Programme

Thus we can see the economic justification for effective national hydrographic programs, and for accurate hydrographic survey in general. Savings in shipping costs from improved navigation routes result in significantly greater flow-on savings for the overall economy; and prevention of shipping disasters through well marked shipping routes and well placed navigational aids, helps save the high cost and negative social impact of shipping accidents.

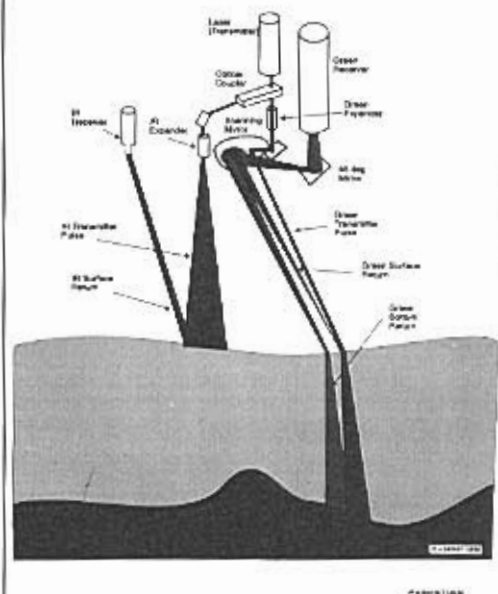
The RAN Hydrographic Service is the Commonwealth of Australia's government agency responsible for the publication of nautical charts and other information required for the safety of ships navigating in Australian waters. The RAN hydrographic program, based on two hydrographic survey ships and four survey motor launches (total 3,674 tons), and the LADS in a Fokker F-27 fixed wing aircraft, is a demanding one. As of 1990, 50% of Australia's continental shelf was adequately charted and, as of 1992, over 100,000 square nautical miles of Australia's major shipping lanes had still to be surveyed by modern methods.

In 1975, it was estimated that it would take the RAN's surface fleet up to 100 years to complete its entire backlog of survey work. This was the driving reason behind Australia's Department of Defense tasking its Defense Science and Technology Organization (DSTO) to develop an airborne system capable of accurately surveying large areas of coastal water quickly. DSTO developed the Laser Airborne Depth Sounder (LADS) prototype over the ensuing 15 years at a cost of US\$60 million. The prototype was the basis of a commercial contract let in 1989 to Vision Systems Limited for the development of the operational LADS for the RAN at a cost of a further US\$35 million. The LADS thus built has now been in routine operation with the RAN since February 1993.

LADS Characteristics and Operational History

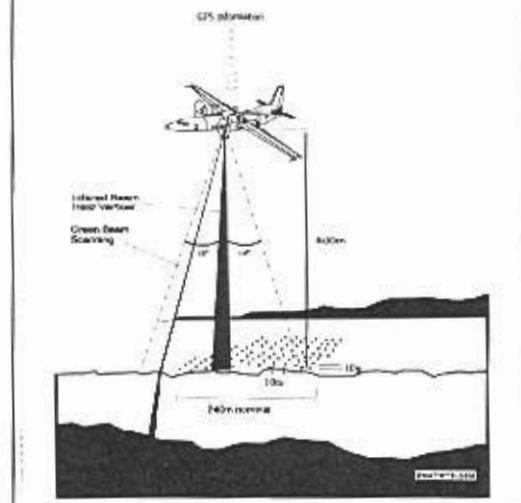
The RAN LADS is mounted in a Fokker F-27 fixed wing aircraft which flies at 145 knots (75 m/sec) at an altitude of 500 m (1,640 ft). The laser, mounted on a stabilized platform, fires 168 pulses per second and scans 7 times per second across a swath of 240 m width (*Figures 1 and 2*). The LADS

Figure 2. Laser path.



thus gathers over 500,000 soundings per hour in a 10 m rectilinear grid pattern, which equates to a survey rate of approximately 16 square nautical miles (50 km²) per hour. This rate of survey has enabled the RAN LADS Unit to survey as much as 88 square nautical miles of continental shelf in a single LADS sortie.

Figure 1. LADS scanning pattern.



Raw data, comprising depth data and positional data from onboard P-code global positioning system (GPS), are recorded on optical disk for automatic post-processing in an on-ground computer. Post-processing inputs tidal and other benchmark data, and verifies and dedensifies the data, producing soundings accurate to International Hydrographic Organization (IHO) standards at a nominal 30 m spacing (specified by the RAN) in fair chart form,

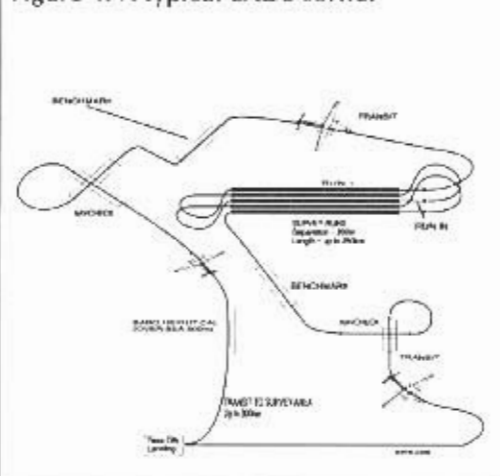
flown per week. A typical survey sortie is depicted graphically in *Figure 4*.

Cost-Effectiveness of Airborne Laser Bathymetry

The following evaluation is based on the RAN Hydrographic Service's 1993-1994 Annual Report, which summarizes the Service's outputs of area surveyed, charts produced and the costs of those activities.

The evaluation compares all ship and aircraft platforms used by the RAN Hydrographic Service and takes into account total operating costs and amortized replacement costs for each platform. A comparison of LADS with the entire surface

Figure 4. A typical LADS sortie.



fleet is also included. The results of the evaluation are provided in *Table 1*.

Table 1. Cost-effectiveness comparison.

	Area Surveyed (nm ²) in 1993/1994	Total Costs: • operating • maintenance • amortized replacement (US\$)	Cost per unit area surveyed (US\$/nm ²)	Cost ratio Ship: LADS (475 hrs/year)	Cost ratio Ship: LADS 950 hrs/year
LADS-475 [VS1] ¹	2,317	6,825 m	2,946	1	-
LADS-900 ²	4,634	8,025 m	1,732	-	1
Survey Motor Launches ³ (4 units)	921	9,008 m	9,781	3.32	5.63
HMAS Flinders ⁴	1,396	9,780 m	7,006	2.38	4.05
HMAS Moresby ⁵	2,524	15,293 m	6,059	2.06	3.50
Total Surface Fleet	4,841	34,081 m	7,040	2.39	4.07

Notes:

¹ LADS in routine operation for 475 hours for the year - this was the case in 1993/94

² LADS in routine operation for 950 hours for the year - forecast costs based on actual costs for 475 hours (over 950 hours per annum has been achieved in subsequent years)

³ SMLs - twin hull coastal vessels
- displacement 384 tonnes
- crew of 12

⁴ Flinders - hydrographic ship for coastal & offshore
- displacement 760 tonnes
- crew of 40
- range 3,375 nm @ speed 10 kts

⁵ Moresby - hydrographic ship for offshore
- displacement 2,530 tonnes
- crew of 140
- range 5,250 nm @ speed 15 kts; 10,000 nm @ speed 11 kts
(ship includes 3 Survey Motor Boats, 1 Bell 206 helicopter)

On the basis of the RAN Hydrographic Service's figures, LADS surveys a given area up to five-and-a-half times more cost-effective than surface vessels. Overall, LADS proved to be four times more cost-effective than the RAN Hydrographic Service's surface fleet during its first full year of routine operation in 1993-1994.

In considering these outcomes, it must be remembered that LADS and surface vessels do their work in fundamentally different types of survey site. Ships generally work in deeper, less hazardous waters, whereas LADS works in shallower, more hazardous, and therefore more complex, areas. Thus, if the cost-effectiveness of the two types of platform were compared in the same shallow area, it is argued that LADS's cost-effectiveness would exceed that of a ship by a factor much greater than five-and-a-half.

It is important to emphasize here that, although LADS has obvious operational and cost advantages over conventional ship borne sonar technology, the system is most effective when working together with surface vessels in an integrated manner. Indeed, the RAN has found that LADS clearly delineates the optimal areas for survey by surface vessels, thus improving the surface vessels' operational efficiency, in addition to improving the cost-effectiveness of survey in shallow water.

Specific Case Studies

Cape Bowling Green

The first chart produced by the RAN using LADS data conclusively demonstrated the benefits of using LADS. AUS826 covers an area of dangerous reef in the Great Barrier Reef. The original chart, surveyed by surface vessels, was largely classified as

'inadequately surveyed', primarily because it is too hazardous for surface vessels. The data on which the original chart were based were as much as 110 years old.

The revised AUS826 includes more than 400 variations from its predecessor. These variations comprise over 100 new shoals that were identified by the LADS survey. LADS also disproved scores of shoals that were marked on the original chart but do not exist, and relocated hundreds of shoals that were incorrectly positioned on the original chart.

Perhaps of greatest importance is the confirmation of Flinders Passage as a navigable channel through the Great Barrier Reef. Cape Bowling Green is adjacent to a major coal mining area which is served by a port for bulk vessels carrying coal to Japan. Prior to the LADS survey, Flinders Passage, which is directly opposite the port, was not sufficiently surveyed to be designated a safe shipping route. The bulk carriers were forced to sail south on leaving the port to a passage through which they could safely traverse the reef and sail north to Japan.

Since the LADS survey the revised chart allows vessels to sail direct from Cape Bowling Green through Flinders Passage to Japan, cutting two to three days from their steaming time, and resulting in savings of millions of dollars every year in shipping costs alone. The flow-on impact on the Australian economy is obvious and significant.

Penny Shoal

During LADS's initial operational trials in southern Australian waters in January 1993, LADS located a hitherto uncharted granite shoal some 50 m x 20 m

broad, and rising to 11.9 m in an area generally 20 m deep. The shoal is of navigational significance because it lies within a nautical mile of a busy harbor regularly used by bulk carriers drawing up to 14 m.

Of relevance here is the fact that the area had already been charted by the RAN using acoustic sounding methods, and the shoal had not been identified. Investigation of the original acoustic survey of the area done in 1963 demonstrated that survey lines had been run at 200 m spacing and that the shoal was located exactly in the middle of two such survey runs.

The shoal has since been named Penny Shoal in recognition of the DSTO Scientist who is affectionately known as the "Father of LADS."

Conclusion

This paper has endeavored to demonstrate the economic benefits accruing from hydrographic survey. The evidence presented is supported by the following quotes cited in Coochey's report:

- a) In a benefit-cost assessment of the Canadian Hydrographic Service (CHS), Brinkman stated:

...with benefit cost ratios from 9:1 to 17:1, clearly, the CHS (Canadian Hydrographic Service) is a great investment for the Canadian economy.'

- b) In reference to the Coochey report itself, Vice Admiral I.D.G. MacDougall AO RAN, Australia's Chief of Naval Staff, wrote:

...this report provides an excellent analysis of a Navy Programme which provides substantial economic benefit to the nation. Anyone reading this report should be convinced that the RAN Hydrographic Service is good value for money.

Having established that sovereign nations derive significant economic benefit from effective hydrographic programs, I have introduced a new generation airborne laser hydrographic survey technology and demonstrated its superior cost effectiveness in shallow waters relative to conventional sea borne sonar methods using the RAN's operational experience and recent case studies.

Funding Sources for Hydrographic Survey

While there is overwhelming evidence supporting the case for maintaining an effective hydrographic service and aids to navigation, sovereign hydrographic agencies often live on the bottom of the pecking order when funding is distributed, whether it be by their parent governments, by international development funding agencies, or by industry.

Hydrographic agencies are in most cases a part of their country's military, generally as an arm of the Navy. As such, they tend to come after their military brothers, sisters and cousins in the rush for limited defense budget. It is difficult to influence nations' budgeting policies, although the availability of more cost effective hydrographic survey techniques is creating increased interest throughout the world.

In its Information Paper No.6, the International Hydrographic Office (IHO) calls for greater contributions from the development aid community to help improve nations' hydrographic status. In arguing that '...hydrographic projects...should be given at least equal priority as those with more obvious benefits...', the IHO points out the following:

- a) A lack of modern hydrographic data and updated nautical charts impairs the economies of those nations that rely on the efficient export and import of goods; and
- b) Nations need modern hydrographic data if they are to benefit fully from the potential existing in their EEZs.

Aid-funded projects are subject to strict viability guidelines during feasibility study and appraisal, and undergo exacting monitoring and evaluation throughout

their execution. It is in this area where hydrographic projects may fail in the eyes of aid agencies because they do not demonstrate the 'obvious benefits' of other maritime development projects, such as fisheries or port projects. The less obvious benefits of effective hydrography outlined in this paper support the case for greater flexibility in project viability guidelines.

Finally, it is arguably most appropriate to look to the private sector to fund improved hydrography, because it is industry which stands to benefit most from improved shipping routes and more effective navigational aids. By following a user pays philosophy, private companies which benefit from safe shipping, and from ships which can carry more cargo because of better charted shipping routes, can contribute to a truly sustainable financing mechanism for the improved hydrographic status of the world's sea lanes. However, that is a topic for another paper.

SOCIOECONOMIC IMPLICATIONS OF THE SEAFARER'S TRAINING AND CERTIFICATION

Constantino L. Arcellana, Jr.

General Manager

Mid-Ocean Ship Management Corporation

*2/F N&M Bldg., 1184 Chino Roces St., Makati City
Philippines*

ARCELLANA, C.L. JR. 1997 Socioeconomic implications of the seafarer's training and certification, 1993 to 1996, p. 253-257. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector-private sector partnership.** MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

Recent surveys have stressed the need for quick action to address the growing shortage in ship's crew. One report was the inter-agency study entitled, "Manpower Development Plan for Seafarers (1993-1998)." According to the report, the dollar remittance of sea-based Filipino workers amounted to US\$438.2 million in 1993, which was 29% of the total official receipts generated by overseas contract workers. It predicted that by 1998, the amount will reach US\$1 billion. Using the conservative estimate of US\$1,000 average income per seaman per month, at least US\$10,000 remittance per year may be expected, multiplied by 160,000 seafarers deployed, this totals US\$1.6 billion annually (Shipping and Travel Journal, 1996).

These are the direct remittances. Other revenues derived by airlines, schools and training centers are the indirect incomes derived from the seafaring industry. The same manpower study stated that the deployment of Filipino seafarers more than doubled during the last seven years, from

67,042 in 1987 to 145,673 in 1993. Over a ten-year period (1984-1993), total deployment was 933,199. The projected deployment for the Philippines, vis-à-vis the supply growth rate, is indicated in *Table 1* (Manpower Development Plan for Seafarers, 1985-1994).

The seafarer supply and demand situation in the Asia-Pacific region was also reviewed in the ESCAP report, "Maritime Manpower for the Shipping Industry in the Asia-Pacific Region." Of special interest is the reported increase in the number of ships in the world fleet, from 23,861 in 1985 to 27,860 in 1994, an increase of 3,999 vessels (Maritime Manpower for the Shipping Industry in the Asia-Pacific Region, 1995). Assuming an average of 22 crew members manning a vessel, plus a back-up crew of 11, the requirement for seafarers increased by 131,967 over the interval of 9 years. This does

Table 1. Projected deployment for Filipino seafarers versus supply growth rate.

Category	Percentage of Employment	Percentage of Supply
Licensed Deck & Engine Officers	16-21%	3.5-6%
Deck & Engine Ratings	11-28%	13-14%
Special Ratings	13-27%	14-20%

not take into account the attrition of 7% to 10% per year. The increased demand for trained seafarers is obvious. To keep up with the demand, Asia would have to produce approximately 15,000 trained seafarers each year.

As another example, the 1992 Dearsley Report (Chia, 1995) showed that the region's merchant shipping fleet has grown significantly requiring additional seafarers. Dearsley estimated, for India alone, demand will increase from 21,800 to 32,400 ratings. Between 1992 and 1997, he projected shortages would occur including 9,600 officers and 5,200 ratings. This implied that training levels would need to increase over the 5-year period by 40% for officers and 50% for ratings just to maintain the status quo of 1992.

Globalization of Trade

Between 1990 and 1994, world sea borne trade rose by 3% annually. Container traffic is forecast to increase by 7.7% to 8.5% annually for 1995-2005, which will result in an increase of 125% in container handling over 10 years.

The Bremen-based Institute for Shipping Economics and Logistics (ISEL) projects a 6.2% to 7.5% container volume increase between 1995 and 2000, 5.6% to 6.5% for 2000-2005, and 5.0% to 5.5% for 2005-2010. The global container fleet last year consisted of 1,590 ships (35.9 million dwt capacity) (Lloyd's List, March 1996). ISEL in fact claimed that container volume would increase more rapidly than global economy and trade due to several factors, including:

- a) An increasing change of higher value goods on a global scale;
- b) The transformation of fast growing developing countries into industrial countries, with respective changes in their foreign trade structure;
- c) Relocation of production sites to other countries, resulting in comparatively higher sea borne container traffic;
- d) Shift of non-containerized goods into the category of containerized goods; and
- e) The prominence of feeder traffic, with likelihood of boxes being counted twice.

It is recognized that in excess of 85% of international trade volume is carried by sea. This emphasizes the fact that growth in world trade directly impacts on shipping, and presents new challenges and opportunities for maritime labor supplying countries, such as the Philippines.

The Philippines' Response

The country's position as the world's premier supplier of seafarers is being threatened by the growing share in the development of international seafarers by other countries elsewhere in Asia, as well as in Europe, and the United States.

There is an urgent need to adopt concrete measures designed to improve the situation in the Philippines, in order to meet the requirements of the maritime industry. The Philippine government and the maritime private sector have begun responding by instituting reforms in the education and training systems, in the license and accreditation system, and in the policy environment of the entire maritime sector.

The private sector is required to assume a lead role in the training and certification and overall development of Filipino seafarers. The Philippine government's role has been the promotion, support and financing of activities in a few, well-defined priority program areas. The public and private sectors are expected to support the following programs:

- a) Infrastructure development, including development of instructors and trainers, industry information systems and other institutional and administrative updating;
- b) Maximization of available resources, including technical and financial assistance, formulating consortiums and networking with agencies within and external to the Philippines, intensified research and development, and continuing professional retraining/upgrading of seafarers; and
- c) Strengthening linkages between the educational sector and the maritime industry through accreditation, apprenticeship programs, innovative regulation/deregulation schemes, marine exam reforms, improvement in the administration of credentials and the development of a comprehensive employment referral system.

Aside from this three-pronged approach, bilateral and multilateral funding sources are also important to the seafarer training program in the Philippines. The recent signing of a bilateral agreement between the Royal Kingdom of Norway and the Philippines concerning the implementation of maritime projects is one example of

cooperation with a country whose fleet is a major employer of Filipino seafarers.

The Training Situation in the Philippines

Six years ago, there were only a handful of maritime training centers, primarily handling basic safety courses, like fire fighting, first aid and emergency response. Today, there appears to be a "mad rush" everywhere to establish courses and training centers for seafarers, from the concrete jungle of Metro Manila to the remotest barrio in Jolo, Sulu. Recent estimates indicate that there are 38 training centers operating nationwide, two of which are foreign-controlled. Obviously, training centers have already become a business opportunity in the Philippines (Meek, 1995). Similarly, maritime schools have mushroomed in much the same way. The total number of schools is of the order of 120, based on a Maritime Training Council survey.

While the growth in maritime schools and training centers offers opportunities for overcoming the shortage of seafarers, it brings to question the level of training being offered and the quality of graduates.

In the Philippines, at the present time, there is much emphasis on upgrading seafarers. An individual cannot get seaman book from the Maritime Industry Authority without undergoing Safety of Life at Sea (SOLAS) courses, an upgrading prerequisite to enter the seafaring profession. In addition, some government agencies are proposing training courses for fish workers (i.e., those working onboard fishing vessels) before being given a seaman book or being allowed to deploy overseas. Starting in 1997, the Professional Regulation Commission will

not renew the license of a ship officer without having undergone the Continuing Professional Education (CPE) program.

In addition, international maritime conventions require the upgrading of all deck ship officers, to Global Maritime Distress and Safety System/International Maritime Satellite Organization (GMDSS/INMARSAT) certificates (Ocean Voice, 1995). Most important, the revised Standards for Training, Certification and Watchkeeping (STCW) convention and the International Safety Management Code (ISM) specify new training requirements and certification standards for seafarers serving on international ships.

There are claims that today's seafarers are saddled with so many regulations that they will be "immobilized" in the end. The revised STCW convention stresses "show me how" and submission of documents, emphasizing the need for quality training and certification of all seafarers serving onboard ocean going fleets. The primary reason for the revised STCW convention was preservation of life and property at sea, as well as prevention of pollution of the marine environment. Ship disasters, such as the *Exxon Valdez* and *Herald of Enterprise*, have served as a warning to us all. Over the years, a great deal of time and effort have been focused on improving technologies and standards for the construction and operation of ships. The human factor is now emerging as a contributing cause of many marine accidents.

On the other hand, new and vigorous measures to exact "safe and expeditious shipping service" places the burden more and more on the ship's officers and crew. The impact has been early retirements and lack of interest in prolonged sea service, according to the ESCAP report.

New Training Demands

In the Asia-Pacific region, it is reported that aside from normal passenger shipping, there is rapid growth in the cruise industry. Singapore and Malaysia have already built modern passenger terminals to cater to cruise vessels. There has also been rapid growth in ferry services for combined passengers and cargo. More than half of the 25 top ports in the world are located in the region. There has been a reported increasing need for land-based personnel concerned with customs, immigration and port-related police works.

Also, there is a growing demand for "crash courses" on simulator courses, emergency response and marine pollution control courses. At present, there is a growing need for shipboard training programs, although very few local and overseas shipping companies offer shipboard apprenticeships.

It is noteworthy that, because of the global nature of the seafaring industry and the critical role that seafarers play in world shipping, regional cooperation is of paramount importance. International agencies such as the International Labor Organization (ILO), United Nations Conference on Trade and Development (UNCTAD), and within the Asia-Pacific region, Economic and Social Commission for Asia and the Pacific (ESCAP), have played important roles in bringing about cooperation among the three sectors: government, seafarer unions, and employers. No doubt, such cooperation will help improve the situation in the Philippines, but the question is time. The shortage in ship crews is here now, and the demand for quality crew is also present. How to marry these two demands

and benefit the country's economy is the issue. Appropriate measures that may be taken include:

- a) Address the new and more stringent requirements of international maritime training and certification regulations specifically the STCW revised convention;
- b) Improve management of the seafaring industry, including solving the problem of inefficient use of trained seafarers;
- c) Estimate the needs and requirements of both the domestic shipping industry and overseas

employment of local seafarers; and

- d) Cooperate at all levels in all sectors to raise standards and to meet the challenges.

References

- Filipino seamen help prop up economy. Shipping and Travel Journal, August 1996.
- Chia, L.S. 1995. Maritime manpower for the shipping industry in the Asia-Pacific region. United Nations, New York.
- Lloyd's List, March 1996.
- Meek, P. 1995. Problems and issues in Philippine maritime education. PAMI Education Seminar, 1995.
- Ocean Voice, July 1995.

INTEGRATED MANAGEMENT STRATEGIES FOR MARITIME AND INDUSTRIAL WASTES: OPPORTUNITIES FOR PUBLIC SECTOR - PRIVATE SECTOR PARTNERSHIP

Bernard Fleet

*Director of Technology
Eutech Cybernetics Pte. Ltd
#04/21, 55 Ayer Rajah
Crescent 139949
Singapore*

Arun Abraham

*Senior Regional Program Officer
International Development
Research Centre (IDRC)
460 Alexandra Road, 7/F RELC Bldg.
258352 Singapore*

Helena Landazuri

*Senior Program Manager
Inter-American Development
Bank, Washington*

FLEET, B., A. ABRAHAM, and H. LANDAZURI, 1997. Integrated management strategies for maritime and industrial wastes: opportunities for public sector - private sector partnership, p. 258-266. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) *Sustainable financing mechanisms: public sector - private sector partnership*, MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

Governments in developing countries are coming under increasing pressure to adopt global standards for the sound management of industrial wastes. These include the new International Standards Organization ISO 14000 series of standards for the management of hazardous wastes and the IMO-MARPOL recommendations on the provision of adequate reception and treatment facilities for ship-generated wastes.

However, many of these governments are cautious about embarking on major new programs for industrial or maritime waste management. In view of the plethora of competing environmental pressures including overpopulation, lack of education, communal violence, lack of basic sanitation or access to clean water, this attitude can at least be understood if not condoned. The fact is, however, that all of these environmental problems are inextricably linked. Industrial pollution conditions flourish best in a climate of poverty and lack of education. It represents a permanent deficit on the environmental balance sheet with wide ranging impacts on human health and

damage to resource-based industries, such as agriculture, fishing or tourism.

Rationale for a Sound Maritime Waste Management Policy

Thus, a major challenge facing any maritime nation is to develop both the motivation and an effective strategy for the sound management of ship-generated wastes and to ensure that the resulting system operates efficiently and cost effectively to the benefit of all of the stakeholders.

The challenge is best mounted by citing the wide experience from industrialized countries which clearly demonstrates that the adoption of sound waste management practices has led to increased productivity at the local level and increased competitiveness at the national level. At the same time, realizing that the resources of governments are limited, this argument needs to be reinforced by an exposition of clear economic benefits. How will the proposed strategy benefit the country in terms of increased investment and trade? What are the real costs of poor waste management practices in terms of damage

to the environment, to human health and to natural resource based industries? When these facts are combined with the inevitability of international environmental legislation, a clear case for action can usually be made.

Infrastructure Building

The first step for any developing country in developing a plan for the sound management of maritime wastes is a review of policy and infrastructure. For reasons outlined later, this should include all industry sectors that generate hazardous or regulated wastes. In order to support a maritime waste management plan it is necessary to ensure that the supporting infrastructure of regulations, policies and appropriate training facilities are in place. The preferred approach would be to initiate a feasibility study to assess current legislation and waste management practices, prepare waste inventories including future pollution loads, and intensities and carry out an assessment of existing training institutions.

From this study, an infrastructure needs plan can be developed which would include recommendations on priority pollutants for all industry sectors, emission standards, waste generator registration and waste charges along with a monitoring and enforcement protocol.

Modern industrial waste management policies are shifting towards a hybrid approach, away from rigid standards in favor of integrating regulations with economic instruments along with increased public participation in decision making. Thus the potential for the use of market-based instruments to assist various sectors of industry to comply with new regulations should also be reviewed. In

the area of environmental awareness, one approach is to implement some type of pollution prevention training facility. This has been successfully demonstrated in the Philippines under the Industrial Environmental Management Project (IEMP) and the ASEAN Environmental Improvement Project. The International Development Research Centre (IDRC) has also recently launched a Pollution Prevention Training Center in Bogor, Indonesia, along with a similar initiative at Zheyang University in China.

Pollution Prevention in the Maritime Industry

Without doubt, the most significant advance in industrial pollution abatement during the past decade has been the widespread acceptance of pollution prevention (P2) principles. Sometimes referred to as waste minimization or process re-engineering, this is a common sense engineering approach which follows the age old saying that "an ounce of prevention is worth a pound of cure". There is now an enormous literature of well-documented case studies on the successful application of P2 opportunities which demonstrate the real cost savings that can be realized (White et al., 1993; Freeman, 1995). These generally follow one of three main approaches: source reduction, process change or recycling methods.

Pollution prevention is now also being practiced in the maritime industry, especially in ports and marine yards (CDHS, 1989). The major categories of regulated wastes which have been targeted include oily wastes, oil-water mixtures including bilge wastes, solvents and other chemical wastes, painting and paint wastes especially toxic lead and

organotin-based residues and wastes from engine and power plant servicing. Pollution prevention strategies have identified many opportunities for source reduction, on-site treatment (in place of off-site) and point-source recycling, for example in oil recovery. Clearly, enforcement of standards are much easier in a port or marine yard than they are on board ship, but increased education and awareness programs should assist the wider dissemination of these principles throughout the industry (Fleet and Warford, 1994).

International Standards

The need for a sound environmental infrastructure is also fueled by increasing international pressure on developing countries to adopt uniform environmental standards. These are not merely an offshoot of environmental activism but are part of a worldwide trend, where the failure to keep in step may have serious political and economic consequences. Countries which fail to implement acceptable standards may ultimately face trade embargoes and other economic sanctions. This is particularly true of the standards on maritime waste management introduced by the International Maritime Organization (IMO) and other bodies. These include the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 and the 1990 Convention on Oil Pollution Preparedness, Response and Cooperation. The most comprehensive legislation, however, which is now being incorporated in many national environmental policies is the International Convention for the Prevention of Pollution from Ships, as modified by the Protocol of 1978 (MARPOL 73/78).

Furthermore, in addition to the constraints imposed by MARPOL, the maritime industry is being pressured to fall in line with other industries and adopt the global environmental management standards as set out by the International Standards Organization (ISO). ISO is about to implement the ISO 14000 series of standards, which are derived from the earlier ISO 9000 manufacturing standards and provide guidelines for companies on managing, measuring, improving and communicating the environmental components of their operations in a systematic way. There is now an enormous level of interest in ISO 14000 in all sectors of industry, stemming from the realization that it will soon shift from being a voluntary guideline to becoming a mandatory condition for carrying on international business.

Business Opportunity

While the implementation of these regulations may currently pose a problem to countries with limited technical and financial resources, various reports and studies have shown that implementation of MARPOL legislation by developing countries can also present significant business opportunities (Fleet and Abraham, 1995; Loos, 1995; Fleet and Fleet, 1996; Fleet et al., 1996).

These result from the possibility to adopt some type of public sector - private sector partnership, along with integration of maritime waste management into a national hazardous waste management plan. Through segregation of wastes at various ports and marine yards and collecting recyclable materials, such as waste oils, significant economies of scale can be achieved which can result in

maritime and industrial waste management becoming a profitable enterprise.

Additional business opportunities arise since maritime waste reception and treatment facilities need to be able to handle chemical wastes, so that there is the possibility of integrating the program into a broader plan for industrial waste management. This could be implemented on a local basis, by accepting wastes from plants or industrial estates adjacent to the facility, or it could be implemented into a nationwide waste management plan. Both industrial and maritime waste treatment facilities need to treat large volumes of wastewater, hence integration of the two operations makes both technical and economic sense.

Inventory of Maritime and Industrial Wastes

In approaching this problem, the first step is to develop an inventory of maritime and industrial wastes. Although there are established techniques for doing this, of greater significance are the estimates of pollution loads and intensities that will be generated over a time frame of the next ten to fifteen years. This anticipates the need to handle increasing pollution loads as industrial expansion programs are realized.

For developing baseline levels, various models can be used such as the Industrial Pollution Projection System (IPPS) developed by Wheeler et al. (1995) for the World Bank, or the employment statistics model of Monaghan (1990). For maritime wastes, however, reliance must be placed on economic surveys on projected port usage, linked to IMO profiles on waste generation according to vessel type and size.

There are also techniques that can be used to avoid over-design of waste management facilities which may result from over-optimistic estimates of waste generation levels. These include the provision of extra ballast tankage and increasing the plant operating hours from a single shift per day up to 24-hour/day full-time operation. When estimating hazardous waste generation levels in the developing countries, two competing trends need to be considered. These are the increasing levels of regulated wastes which will accompany industrial expansion, modulated by the increasing adoption of pollution prevention strategies as industry adopts better manufacturing practices. Despite individual plants reducing pollution intensities (waste generated per unit of productivity) overall pollution levels in most of the developing countries are still increasing rapidly.

All of these approaches need to be adopted and supported by analysis of government statistics, assessment of industrial development plans, port and industry site visits and a comparison of estimated pollution loads and intensities with data from other developing countries.

Treatment Strategies for Maritime and Industrial Wastes

A key consideration in selecting strategies for the sound management of maritime wastes is the issue of "appropriate technology".

Appropriate Technology

Treatment technologies and strategies for the management of ship-generated, oily wastes and industrial chemical wastes range from highly sophisticated, capital

intensive methods, such as incineration, to low cost, common sense engineering approaches, such as cleaner production or process re-engineering. In selecting treatment technologies it is important that these be matched to local resource capabilities and are capable of being assembled and serviced locally, possibly under some form of "technology sharing" agreement.

In general, physicochemical treatment methods are preferable to high-cost technologies, such as incinerators or cement kilns. Oily wastes, for example, can be treated using relatively simple, but process know-how intensive methods, based on thermal-chemical techniques. In some cases, use of decanter centrifuges may be employed to treat oily sludges. Depending on the quantities of oily sludges generated, use of thermal desorption units may be justified although it is anticipated that these could be small, possibly transportable, units.

In the area of chemical hazardous wastes, efforts should be focused on the use of recovery and recycling opportunities. In-plant technologies for treating solvents, metals and especially process water recycling are preferable, wherever they are technically or economically feasible. Secondary water (wastewater after treatment) can often be recycled for non-essential uses, such as watering of green areas, and costs are often less than one quarter of water supplied from public utilities.

For all other hazardous wastes, conventional physicochemical treatment approach may be the method of choice. This involves collection, segregation and buffer/storage, followed by solids separation, neutralization of acid/alkali

wastes, precipitation of heavy metals, filtration, dewatering and stabilization of the sludges with cement, prior to storage at a secure chemical landfill. A process schematic of a typical layout for an integrated industrial/maritime waste management facility is shown in *Figure 1*.

Wastewater Discharge

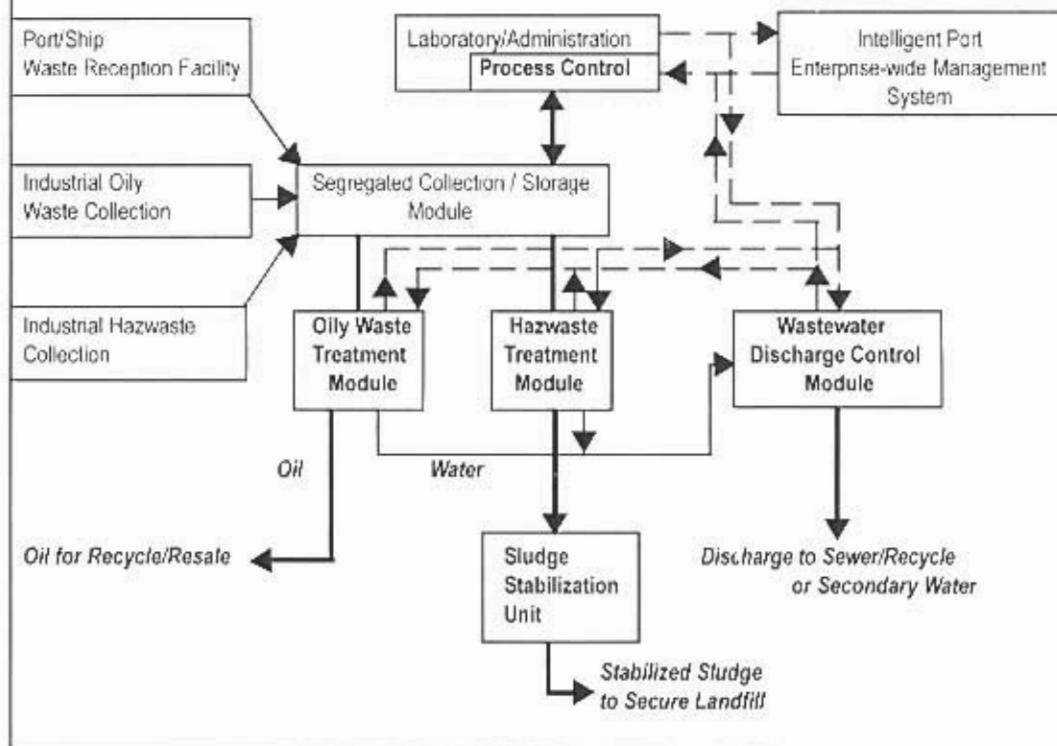
One of the features of an integrated facility for management of maritime and industrial wastes is that the wastewater fraction of oily wastes may be combined with the effluent from chemical waste treatment. Typically these combined wastewaters can be batch treated, using two collection tanks; the first full tank being pH adjusted, prior to discharge, while the second tank is filling. The control of pH is implemented using a PID (proportional, integral, derivative) controller, linked to a plant-wide process control system. Combined effluents require pH control before final discharge.

It is also possible to recycle treated effluent for local industry use as secondary water since this may be entirely adequate for many purposes. This may also realize significant cost savings over the use of primary water.

Process Control

Precise and fail-safe control of all of the treatment processes is a pre-requisite of any integrated waste management facility. This can be achieved through the use of a SCADA type (supervisory control and data acquisition) control system consisting of a central server/computer linked via a network to a series of stand-alone PLC controllers. These controllers manage both the various treatment units, such as the pH control subsystem, or the

Figure 1. Schematic of integrated treatment and recycling facility for maritime and industrial hazardous wastes.



oil/water separation subsystem, as well as monitoring the final effluent from the facility. The computer control system will also maintain historical records of all waste samples received and log all treatment operations and discharges from the facility.

Intelligent Port Control System

An important consideration in the design of an integrated waste management facility is that the overall control and monitoring system may well be linked into an overall port enterprise-wide management system. In this type of control system, the various "islands of automation" within the port management system, such as shipping control, container terminal management, customs,

security, etc. can be linked into a single computer network. Environmental and essential services management would be an important component of this system. The computer system would provide a graphical user interface showing the treatment system status and indicating the operational condition of each subsystem. It will also maintain historical records of the plant's operation, as well as provide a database for waste generator records and logs of all incoming wastes.

Reception, Waste Segregation, and Transport

A major component of the project will be the recommended plan for the development of a reception, waste segregation, pre-treatment and waste

transportation infrastructure. The MARPOL protocol requires adequate segregated collection facilities at each port. These typically may consist of a series of storage tanks. In the case of oil waste reception, these may also include some preliminary separation of oily water wastes. Oily wastes from all of the collection facilities would then be transported by tanker truck to the treatment facility. For strategic reasons it may be beneficial to site the treatment facility close to one of the ports, possibly in an industrial development zone, so that direct pier access can be provided, allowing some wastes to be piped directly from the vessels to the treatment plant. This approach may also minimize expensive and time consuming public hearings that often accompany the site selection process for an industrial waste recycling facility.

Transportation of industrial hazardous chemical wastes may also be carried out by road tanker, although most wastes will probably be transported using 55-gallon, recyclable plastic drums.

Economics

The economics of industrial pollution abatement is always a complex issue. It involves a balance between the need for governments to provide an effective industrial waste management infrastructure with the competing demands of making such facilities financially self-supporting. In developing countries the problem is even more marked due to strong competition for scarce financial resources. Moreover, whereas most industrialized countries can generate sufficient wastes to enable integrated treatment facilities to operate profitably, this may be more difficult for smaller, newly industrializing regions. Special problems may also be

encountered during the start-up phase of industrial waste treatment facilities, when waste quantities may be lower than planned due to industry being unprepared and government regulations not fully implemented.

Hence, an accurate estimate of the capital and operating costs of the recommended reception facilities, central integrated treatment facility and transportation infrastructure is essential, as well as clearly defined financial and management structures operating the proposed facility in a cost efficient manner.

The economic plan is critical to the successful operation of the proposed facility. It should include the following components:

- a) The proposed management and investment structure for the facility indicating the levels of financing sought from the private sector partner;
- b) An acceptable scale of waste charges in order to guarantee the revenue stream to the facility; an equitable charging structure may include fees to generators for chemical wastes and wastewater treatment along with possible rebates to generators of high quality waste oil;
- c) Some guarantees of revenue during the start-up period, possibly in the form of "put-or-pay" guarantees;
- d) A cashflow forecast for the proposed facility based on current and future estimates of waste quantities to be received;
- e) Estimates of the direct cost-benefits to the government as a

result of the planned investment, along with direct and intangible benefits to all stakeholders including government, private sector investors, industry and the general public.

Sustainable Project Management

There is a clear argument that national integrated waste management facilities operate most efficiently under some form of private sector - public sector partnership. Public sector participation ensures that the public's environmental interests are protected while private sector management ensures cost effective operation of the facility. This arrangement is more effective than traditional public sector operation since it provides access to private sector financial resources and technology. It also acts as a catalyst for leverage of Overseas Development Administration (ODA) funding to top up private sector investment. Other important benefits of this arrangement include enhanced capacity building, ease of replication of successful projects and increased community involvement.

Benefits

It is important to give a clear statement of the technical, economic and social benefits of the proposed investment to all of the stakeholders.

Technical benefits include increased productivity and product quality resulting from process re-engineering improvements. The development of local industry partnerships in the area of environmental technologies and waste management training capacity building could be an added benefit.

Economic benefits arising from the provision of an effective infrastructure and supporting legislation for the management of hazardous wastes estimated may include increased investment and relocation by foreign firms. Elimination of the risk of possible trade embargoes or other market barriers is another benefit. The supporting environmental infrastructure will also assist local industry to move towards implementing ISO 14000 or equivalent environmental management standards.

Indirect benefits from improved environmental quality for air, land and water quality should also be estimated. The Asian Development Bank's environmental indices model (Rogers et al., 1995) may also provide a useful qualitative measure of the "cost of consumption of environmental quality."

Conclusion

Private sector - public sector partnerships may offer the best route for providing eco-efficient solutions to the problem of sound management of maritime and industrial hazardous wastes. In order to justify these investments, a comprehensive environmental plan should be developed which includes an inventory and projection of all loads and intensities of regulated pollutants. This should be supported by a technical proposal which sets out the proposed treatment strategy and appropriate technology solutions. An economic analysis should define the structure of the public sector - private sector partnership and indicate the financial benefits to the private sector investor.

Finally, a clear statement of the economic and intangible benefits to all of the stakeholders should be presented.

References

- California Department of Health Services (CDHS). 1989. Hazardous waste minimization audit study for the maritime industry. Sacramento, California.
- Fleet, B. and A. Abraham. 1995. Environmental protection strategies for the maritime industry. *Tropical Coasts* 2(2):11.
- Fleet, B. et al. 1996. The management of maritime and industrial wastes in Trinidad and Tobago. Report for the Inter-American Development Bank.
- Fleet, B. and J.J. Warford. 1994. Managing hazardous wastes in developing countries. *Ecodecision* 14:40-46.
- Fleet, B. and N. Fleet. 1996. Pollution prevention strategies for the maritime industry. *Ecodecision* 21: 66-69.
- Freeman, H.M. Editor. 1995. Industrial pollution prevention handbook. McGraw Hill.
- Monaghan, D. 1990. Estimation of hazardous wastes from employment statistics. *Waste Manage. Res.* 8(2):145.
- Rogers, P. et al. 1995. Environmental indicators and indices. Draft final report for the Asian Development Bank (TA 5542), Manila.
- Roos, H.W. 1995. Environmental management standards for the maritime industry. *Tropical Coasts* 2(2):5,14.
- Wheeler, D. et al. 1995. The industrial pollution projection system. Policy Research Working Paper 1431. The World Bank.
- White, A.L., M. Becker, and D.E. Savage. 1993. Environmentally smart accounting using total cost assessment. *Pollution Prevention Rev.* Summer:247-259.

REAPING SUCCESS FROM WASTE MINIMIZATION: THE PHILIPPINE EXPERIENCE

Marissa V. David

*Technical Operations Manager
Industrial Environmental Management Project
PRC Environmental Management, Inc.
9/F JMT Corporate Cond., ADB Ave., Pasig City
Philippines*

DAVID, M.V. 1997. Reaping success from waste minimization: the Philippine experience, p. 267-274. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

The Philippines, like most developing countries in Asia, is experiencing rapid industrialization. Among the consequences of such industrialization are serious environmental and health problems. Industrial pollution continues to escalate and is now viewed to jeopardize the country's ability to sustain broad-based economic development. There are several factors that contribute to industrial pollution. Among these are outdated or second-hand equipment, inefficient pollution control technologies, lack of management commitment to control pollution, inefficient processes and operating practices, and failure on the part of the government to adequately enforce environmental regulations.

The government's role in environmental management has always been regulatory in nature. The Philippine Department of Environment and Natural Resources (DENR) sets environmental quality standards for industry to comply with. This regulatory image of the government somehow does not encourage industry-initiated waste minimization activities. In most cases, industry provides pollution control facilities for fear of receiving cease-and-desist orders (CDO) from government for

non-compliance. Company closure results in a mass of jobless workers, thus jeopardizing the country's economic goals. While there are penalties for non-compliance, there is minimal or no incentive for compliance. This absence of incentives discourages industry from investing in environmental projects.

Environmental regulations focus on treating effluent and emissions after they are generated. This approach, also known as "end-of-pipe" treatment, although proven an effective method in protecting the environment, has some disadvantages. It is very costly to control pollutants after they are generated. Moreover, pollutants are just transferred from one medium to another, thus resulting in a no net environmental benefit.

The limitations on the end-of-pipe treatment have caused environmental decision makers worldwide to consider alternative methods of pollution prevention and control. It is now clearly preferable to avoid producing pollutants in the first place, rather than treating them prior to discharge. The Philippines, with assistance from the United States Agency for International Development (USAID), is one of the countries which has initiated the shift from the traditional end-of-pipe approach to the concept of waste minimization.

This paper presents the results of a government project that is geared towards promoting waste minimization as an incentive to industry to engage in environmental investment. The paper will illustrate that (1) environmental investments can be economically feasible; (2) improved waste management practices can increase profitability; and (3) waste minimization can significantly reduce pollution generation.

Industrial Pollution Situation

More than 15,000 industrial and manufacturing plants currently operate in the Philippines. These plants are diverse in terms of size and activities undertaken. The country's industrial sector can be described by the following structural characteristics:

- a) There is a broad range of industries—from the large-scale petroleum refineries to backyard electroplaters;
- b) A large concentration of manufacturing activities is in Metro Manila and in some core regions; and
- c) There is a large number of small, diverse, and unregistered establishments that make up the informal industrial subsectors.

In 1990, the Environmental Management Bureau (EMB) of the DENR reported that more than 8,000 industries were generating wastewater. In 1992, the Environmental and Natural Resources Accounting Project III (ENRAP III) estimated that Philippine industries produced about 2.4 million tons of biochemical oxygen demand (BOD), an increase of about 20% from 1988. With the present strength of the economy, there is no doubt that pollution generation has correspondingly increased.

ENRAP III also estimated health damages caused by water pollution (from industrial and, domestic wastewater and surface runoff) in terms of increased incidence of water-borne diseases (*Table 1*).

Table 1. Health damages from water pollution, 1992 (in 1988 pesos).

Cost of medication	P139,000,000
Foregone earnings, work lost days	P131,000,000
Foregone earnings, premature death	P346,000,000

Non-health damages were also estimated based on loss of earnings from depleted natural resources. *Table 2* shows the damages to fisheries, among other types of natural resources.

Table 2. Non-health damages to fisheries from water pollution, 1992 (in 1988 pesos).

Municipal (Inland and shallow waters)	P662,000,000
Commercial (deep water)	P124,000,000

The Industrial Environmental Management Project

The Industrial Environmental Management Project (IEMP) is one of the initiatives taken by the DENR to fulfill government obligations under Agenda 21. Through the IEMP, DENR targeted pollution reduction as one of its highest priorities. IEMP has three major components: (1) pollution reduction initiatives; (2) capability building; and (3) policy studies. This paper focuses on IEMP's pollution reduction initiative,

whereas the two other components, which have contributed equally to IEMP success, are briefly discussed.

Capability building is an important component of any project if sustainability is to be achieved. Under the IEMP, six environmental training modules were developed and conducted throughout the country. Nearly 2,500 professionals from the public and private sectors, including nongovernment organizations (NGOs) and local government units (LGUs) have been trained. *Table 3* shows the IEMP-conducted training courses. All training courses have been specifically focused on Philippine experience and practices.

Training course	Participants (as of June 1996)
Pollution management appraisal	922
Environmental impact assessment	771
Environmental risk assessment	140
Compliance monitoring	230
Compliance auditing	225
Data collection, sampling and sample analysis	200

IEMP has completed six major studies with recommended action plans (*Table 4*). All have been used as source documents in the recent revision of the Philippine Environmental Code which is now being discussed at the Congress. Aside from integrating the recommended policy initiatives into the revised environmental code, the DENR has started putting some of these initiatives into action. Actions include revising the Environmental Impact Assessment (EIA) system rules and regulations; developing and implementing the EIA programmatic

compliance policy; ecoprofiling certain regional growth centers; refining the fines and penalties system; initiating implementation of a national pollution charge system; and developing an action plan to implement Republic Act 6969, the Toxic Chemicals and Hazardous and Nuclear Waste Control Act of 1990. These policy studies will continue to influence the evolution of the Philippine environmental policy development in the coming years.

Table 4. Environmental policy studies conducted by IEMP.

1. Financial Resources to Fund Environmental Investments
2. Proposed Standards for Characterization and Registration of Hazardous Waste
3. Analysis of Gaps in the Regulatory Programs for Pollution Management
4. Strengthening the Environmental Impact System
5. Case studies in Decentralized Environmental Management
6. Market-Based Instruments to Promote Pollution Reduction

Another extremely important influence of IEMP's policy studies is the institutionalization of public/private dialogues as a means to provide opportunities for government and industries, and other stakeholders, to discuss environmental issues, resolve differences, and arrive at solutions acceptable to the majority of stakeholders.

It is also important to note that during the last two years of project implementation, nearly all of the technical expertise required by IEMP has been provided by Filipino consultants. This shift in utilizing Filipino consultants for

all components of the project has broadened local expertise on environmental management and thus provided a valuable resource base for the growing demand for environmental services in the country.

Pollution Reduction Initiative

Of the three components of the IEMP, pollution reduction initiatives was specifically focused on technical assistance to the Philippine industry. Well within the goals of the Philippine Strategy for Sustainable Development (PSSD) and Agenda 21, this component has become an incentive to encourage industries to invest in environmental projects. With this, industry is seen to contribute to sustainable economic growth with less environmental degradation.

IEMP encourages industry to adopt the concept of waste minimization through improved process efficiency, as a strategy for pollution reduction, rather than the traditional end-of-pipe treatment. The benefits of adopting this approach include:

- a) Cost savings for industries that use energy and raw materials more efficiently, while producing less emissions or effluent, thus reducing pollution;
- b) Improved market demand for goods and services used in waste minimization, reduction, and management;
- c) Increased investments in environmental projects; and
- d) Reduced risk and liability to industries and improved worker health and safety.

At the beginning of the project, IEMP assisted DENR in establishing a ranking

system for industries called National/Regional Industry Prioritization Strategy (NRIPS) which applied a macro Environmental Risk Assessment (macro ERA) approach. The objective was to identify and rank industry subsectors and firms, by region and nation-wide, in terms of the relative potential risk they manifest. Teams composed of IEMP consultants and DENR staff visited all regions, including the Laguna Lake Development Authority (LLDA) and reviewed over 3,300 industry records, representing about 30% of DENR records, to rank these firms using the NRIPS methodology. The national ranking is shown in *Table 5*.

Table 5. National priority industry subsectors (based on relative potential risk to public health).

1. Gold ore mining
2. Coal mining
3. Steam heat and power plants
4. Sugar milling and refining
5. Pulp, paper, and paperboard manufacturing
6. Desiccated coconut manufacturing
7. Malt liquors and malt production
8. Nickel ore mining
9. Copper ore mining
10. Carpets and rugs manufacturing

IEMP used the regional ranking to list priority industries in different regions that are targeted to receive technical assistance. Four of the nationally ranked subsectors also appeared on most regional rankings and thus are included in IEMP priorities. These are sugar milling and refining, pulp and paper manufacturing, desiccated coconut manufacturing, and malt liquors and malt liquor production. IEMP concentrated its waste minimization efforts in Regions IV, V, VI, VII, VIII, X, XI and XII.

Pollution Management Appraisal

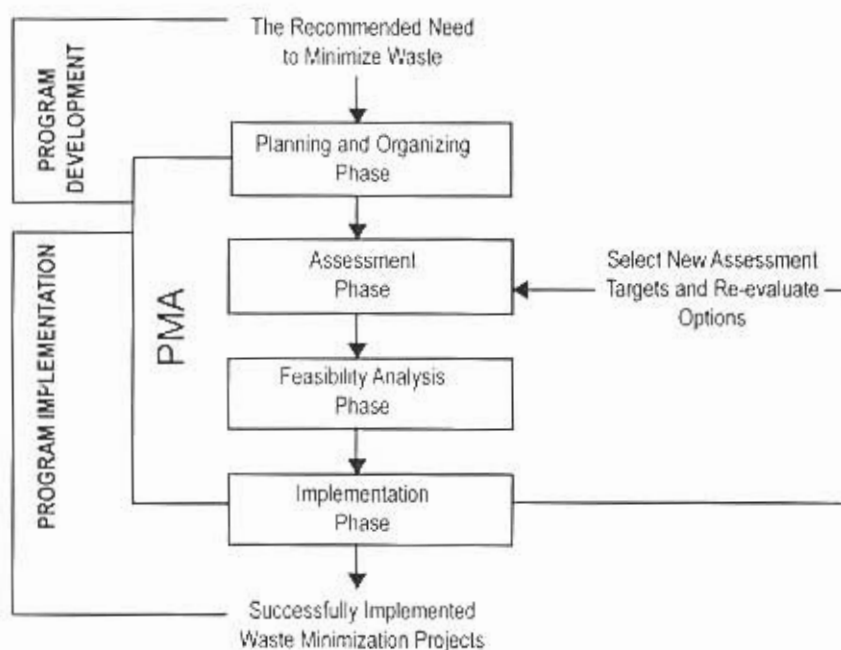
IEMP developed a modified version of environmental audit in the form of what is now known as pollution management appraisal (PMA). PMA is introduced as a tool for industries to identify financially sound opportunities that would result in substantial waste reduction and improve process efficiency. It involves (1) gathering baseline data and information; (2) review plant operations, from raw material procurement to waste treatment and disposal; (3) conduct on-site visits; (4) develop options to minimize or properly manage wastes; (5) select technically and financially feasible options; and finally (6) implement the options. The types of options generated range from simple housekeeping procedures, to process or raw material changes, recycling and recovery options, as well as waste exchange opportunities.

PMA is a continuing process, not a one time occurrence. The interrelationship between waste minimization and PMA is illustrated in *Figure 1*. Management's support and commitment to the PMA, as well as employees' participation during the whole process, are crucial to the success of PMA implementation. Once management is convinced of the need to minimize waste, the PMA takes off when an organized team is identified. The team takes the lead in the process with management endorsement, and thus will be responsible in going through all the phases of the PMA.

IEMP's PMA Program

Under the IEMP, participation in the PMA program is voluntary. This is to encourage private sector initiative in environmental protection. However, based on our experience, there is always

Figure 1. The interrelationship between waste minimization and pollution management appraisal.



some resistance from most industries to join the PMA program. The reasons vary from the simple "I couldn't care" attitude to the more basic non-prioritization of environmental projects and financial constraints. Added to these reasons, generally, industry feels that the more it opens its operations to the government, the more it will be controlled and restricted. Thus, some industries are reluctant to join the IEMP because it is a government project.

IEMP's mission to encourage industries to join the program was not easy to realize. An approach was developed wherein many industrial sectors and facilities were contacted, and follow-up meetings and visits organized. Several one-day industry seminars were conducted for target industries to show them the benefits of practicing waste minimization, both in terms of cost savings and pollution reduction. To date, more than 15 seminars have been conducted for more than 1,200 participants nationwide. The seminars are conducted in coordination with regional DENR offices and with the cooperation of several regional and local industry and professional associations. Volunteer facilities are selected from the participants, based on their willingness to implement a waste minimization program, and upon endorsement of the regional DENR.

Roles in the PMA Program

There are three major players in IEMP's PMA program: the volunteer facilities; the IEMP team; and the DENR. Each has its own role to play to foster success and sustainability of the program.

While participation in the PMA program is voluntary, volunteer facilities

are given responsibilities to make them more proactive in the process. The responsibilities are outlined in a Memorandum of Agreement (MOA) signed between facility officials and regional DENR officials. The responsibilities include:

- a) Seriously implement the waste minimization program;
- b) Provide IEMP access to facility files and technical and financial data;
- c) Send at least two representatives to a PMA workshop at company expense;
- d) Provide local transport and lodging to IEMP consultants;
- e) Submit regular progress reports; and
- f) Allow release of public version PMA reports and publication of success stories.

On the part of the DENR, a one-year moratorium from issuance of cease-and-desist orders is granted to volunteer facilities to allow them sufficient time to implement the waste minimization options identified during the process. The moratorium can be withdrawn if the facility does not show firm commitment to implement the program.

IEMP, on the other hand, provides the technical expertise in conducting the PMA, at the workshop and during the on-site visits. IEMP prepares a report which is treated with confidentiality and submitted only to the volunteer facility. All information gathered by IEMP is also treated as confidential and thus cannot be used for any regulatory purpose. A public version of the report is released with the agreement of the volunteer facility.

Measuring success achieved by volunteer firms requires long-term

monitoring. After the on-site PMA, it usually takes 3 to 4 months for a facility to show measurable results. Within the monitoring period, facilities submit regular monitoring reports to IEMP, and IEMP conducts follow-up visits. Long-term monitoring has two objectives: (1) to measure results; and (2) to provide additional support to the firm. This helps institutionalize the PMA as an environmental management commitment.

Industry's Response to Waste Minimization—A Success

One hundred forty facilities have now volunteered to join IEMP's PMA program. Most of the facilities have implemented most, if not all, of the waste minimization options identified for them. The options range from no cost/low cost to capital intensive, which can be categorized as follows:

- a) Good housekeeping;
- b) Baseline monitoring of raw materials and wastes generated;
- c) Process changes to eliminate or minimize wastes;
- d) Waste reuse and recycling;
- e) Energy and water conservation;
- f) New by-products from wastes;
- g) Equipment upgrades and replacement;
- h) Treatment facility improvements

Table 6 shows a summary of IEMP achievements based on the project indicators.

The success of IEMP volunteer firms in achieving two seemingly conflicting objectives, namely increased profitability and pollution reduction, is demonstrated by the results. The

initial motivation is profit, and IEMP volunteer firms are amply rewarded for their efforts. And pollution load reduction cannot be taken for granted. IEMP volunteer firms have, so far, reduced biochemical oxygen demand (BOD) generation by as much as 29,700 tons per year, which is about 1.2% of the BOD generated by the Philippine industry in 1992.

A summary of investments and net benefits, as well as water and pollution load reduction (PLR) achieved by IEMP volunteer firms are shown in *Table 7*. Most of the investments shown were financed internally, which means that industries are willing to invest in environmental projects if the projects are proven to be financially feasible. Furthermore, this result shows that environmental projects need not involve large investments. In fact, most of the investments are considered low cost and yet can result in considerable benefits and pollution reduction.

Opportunities for the Future

Building on the foundation and success of IEMP and other environmental projects, there is an immense opportunity for industries to adopt and sustain the concept of waste minimization. IEMP has introduced the concept of waste minimization to over 400 firms and to

Table 6. Project impact indicators.

Indicator	Target	Achieved (as of June 1996)
Investment by firms	not defined	\$21,600,000
Net annual benefits	\$800,000	\$31,400,000
Pollution reduction (BOD)	5 to 10%	28%
Water use reduction	not defined	33,700,000 m ³ /year

industry and professional associations through workshops or actual on-site PMAs. While IEMP experienced success on a per facility level in sustaining waste minimization programs, on a national level, it is apparent that the 140 firms, or about 1.4% of industrial firms, are not sufficient to create a "critical mass" needed to influence industries within and across subsectors to make waste minimization self-sustaining.

IEMP has proven that investments on waste minimization programs can reap significant profits and benefits to industries and at the same time create a positive impact on the environment. Profit is, and will remain, the strongest motivating factor that can influence industry to accept waste minimization as an option. However, improvement in environmental

regulations, including increased fines and penalties, as well as introduction of market-based incentives will definitely provide stronger motivation for industries to cleanup.

On the other hand, industries need to show a strong presence in environmental protection by being more proactive rather than just being passive bystanders. As stated by Richard McLean in the *Environmental Business Journal*, December, 1993:

Those companies struggling to maintain compliance today may not be around by the end of the 90's. Those toeing the compliance line will survive, but those viewing the environment as a strategic issue will be leaders.

Table 7. Summary of PMA benefits by industry subsector (as of June 1996).

Industry subsector	No. of PMA firms	% Implementation	Capital investments (PhP)	Annual net benefits (PhP)	Annual water use (m ³)	Annual PLR (kg)	% PLR
Fish canning	11	82	24,865,470	54,939,808	424,823	667,415	19
Dessicated coconut	10	100	2,476,751	29,028,797	205,287	1,324,193	14
Pulp and paper	7	100	25,593,913	11,331,717	2,212,805	176,953	17
Coconut oil	10	100	5,037,992	24,553,710	1,021,545	94,523	18
Sugar milling	13	100	48,460,975	86,413,490	27,334,091	22,161,946	51
Distilled spirits	3	100	2,166,323	8,048,579	523,519	1,115,131	3
Starch	4	100	3,172,645	218,826,820	623,507	3,201,633	22
Seaweeds	6	100	853,563	19,325,039	51,616	116,343	14
Other seafoods	2	100	76,350	235,259	11,143	0	0
Fruit canning	4	100	5,171,130	1,850,723	107,538	1,674	2
Hog raising	12						
Chicken raising	2	93	22,493,258	22,870,422	180,795	433,417	24
Industrial chemicals	6	100	495,550	3,296,357	32,271	384,033	44
Slaughtering	5	100	509,100	1,618,712	190,325	89,742	23
Wood products	3	100	15,565,332	38,467,606	510,372	132,330	2
Softdrinks	2	100	5,037,200	5,959,298	166,856	140	12
Tanneries	2	100	673,801	274,119	4,395	4,703	5
Metal finishing	8	100	6,028,040	10,221,119	58,737	NA	NA
Cement	2	100	381,948,480	276,190,000	0	NA	NA

FINANCIAL REQUIREMENTS TO SUSTAIN THE MAINTENANCE AND DEPLOYMENT OF OIL SPILL EQUIPMENT STOCKPILES

Shigeto Oguri

*International Marine Consultancy Pte. Ltd.
12 Kensington Park Drive #19-01
557325 Singapore*

OGURI, S. 1997. Financial requirements to sustain the maintenance and deployment of oil spill equipment stockpiles, p. 275-279. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector-private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

The Chinese military strategist Sunzi told us that if we understand our opponent and understand ourselves, we will never know defeat. As a result of many surveys and much research, our understanding of oil spill control measures is well-established. Arguably, we have entered the stage where anti-oil spill measures will provide us with success every time.

International interest and developments in effective anti-oil spill measures began with the *Torrey Canyon* accident. Over time, experience in handling oil spills has resulted in international conventions and regional agreements, national laws, standards, and practices. New discoveries have been made, and new approaches for combating oil spills have been developed. Oil spill response, to describe it frankly, can be said to belong to the field of empirical engineering.

What will the next major achievement be in oil spill response? In my opinion, the strengthening of private sector involvement in anti-oil spill programs, in cooperation with national governments and large corporations, is an obvious next step. In an area where action costs money, private sector involvement is required in order to ensure cost-efficiency, as well as cost-effective implementation of national and regional programs.

Implementation of anti-oil spill measures by nations and large corporations involves, respectively, expenditures from the public purse and expenditures of sales revenues. At present, there are suggestions that the private sector at large should become directly involved as well, and voluntarily allocate money for the prevention of oil spills and anti-oil spill measures to protect the environment.

But how are we to apply the thinking of the Chinese strategist Sunzi to the situation? Already large sums have been invested, international frameworks have been set up and global, regional, and national organizations focused on preventing oil spills have been established. There would appear to be an impressive array of arrangements and mechanisms already in place. In practice, one weakness of the existing mechanisms is an overall lack of coordination. The situation must be given direction, and methods must be examined to find rational uses for the money and human resources which have been invested, as well as efficient use of resources which have been provided to these various bodies. We must also examine issues of economic rationality and efficiency, such as whether the number of existing organizations and agencies is adequate or

too much, whether the quantity and nature of resources are appropriate, and whether there is an overlapping of resources.

If the current uncoordinated arrangement was given direction, the organizational strengths could be multiplied ten-fold. It should be emphasized that providing such direction will require communication and cooperation among governments, international agencies and the private sector, not just in their awareness of the issues but also in their actions. Proposals are often made and reports are frequently prepared which recommend particular actions; but the reality is that such proposals and reports receive limited hearing. The adoption of international treaties and domestic laws and regulations which form the foundation of action are not so straightforward.

Accordingly, in order to deal with oil spills and related environmental issues, it is essential to have mutual acknowledgement of intentions between governments and the private sector, as well as a common strategy for dealing with the problems.

The Way Forward

Because the threat of oil spills is a global issue, the major overall direction and fundamental concepts need to be debated at the national and international levels. However, intergovernmental and UN resolutions often tend to be influenced by national interests, making it either impossible to get the agreement of private companies who should be taking action, or lead to unrealistic resolutions. This paper does not argue that we should place a greater expectation on

national governments and the UN, and lighten the responsibilities of private companies. The role of countries and the UN and the role of the private sector differ by their very nature.

There are two aspects to the role of private companies: one of providing business for the nation, and one of providing welfare to the private sector, in that they post sales through their principal business operations, pay taxes and provide wages to their employees. These roles demand that they concentrate their efforts on their principal business, which does not involve adopting anti-oil spill measures for events, such as oil spill accidents, which are incidental to those operations.

The private sector may be pleased to hear the issue put this way, but I am not suggesting that you should not be responsible for your actions. *Novus actus* refers to the responsibility for one's actions which can change situations which normally prevail, must not be forgotten. As the parties directly responsible for accidents, and as indirect authors of accidents which have happened, private companies must bear their share of responsibility.

The form and degree of the involvement of private companies is therefore the main topic to be examined. "Private" and "companies" are herein referred to as the oil industry and maritime shipping industry. Although other industries, such as insurance, may be included as important supporting roles, they can be regarded as incidental.

To date, private sector involvement has been preventive in nature. The oil industry was asked to provide the material

resources for preventing oil spills and to implement personnel training. Shipping companies were asked to maintain the professional levels of their sailors and to meet certain standards in the construction of their ships. Many tanker companies implement emergency preparedness measures, such as training of staff and preparation of emergency and spill response manuals. However, accidents do inevitably occur—and many of them are a result of human error. Thus, it is imperative that companies take proactive measures to improve the awareness and capabilities of their crew, as well as awareness of their responsibility from a moral aspect, and from the financial aspect.

Although the maritime shipping industry, in contrast to the practices of the oil industry, is said to be placing its main efforts into preventive measures, I believe that it should be asked to become more involved in anti-oil spill measures than it is at present.

Leadership of the oil industry lies with the major oil companies. However, many oil companies still just superficially provide material resources and personnel training. Although the funds which the companies are providing are considerable, it is doubtful that in an emergency the investment will actually be helpful, given current methods of maintaining and managing material and human resources.

In the western world, anti-oil spill action organizations are well-established. In Asia, the situation is somewhat different. Taking into consideration the development of countries in the Asian region, and the degree of maturity of regional industry, there is much to be

hoped for in the future. However, oil spills do not choose the time or place to occur, and they require anti-oil spill measures immediately. Effective means for using existing material resources must be examined. There are differences in the level of each country's awareness. The issue of who will shoulder the burden also needs to be addressed. This is especially evident in narrow straits in the region, such as the Straits of Malacca, traversed by international tankers bound for energy-importing countries, such as Japan, South Korea and Taiwan.

With international cooperative programs, such as those fashioned by IMO, ASEAN's Oil Spill Response Action Plan (OSRAP) mutual cooperation structure, the preparation of a structure of material resource management in the Oil Spill Preparedness and Response in the ASEAN Region (OSPAR) Project, and the setting of PAJ material resources, along with private sector anti-oil spill measures, such as the East Asia Response Limited (EARL) activities and the establishment of PIMMAG, there is much hope for the future. Even though there is a wealth of debate on theoretical aspects, activity on the practical front is slow.

Given that many countries meet their energy demands by using common straits and crossing common oceans, it is necessary to establish dialogue among them. Through dialogue a mutual understanding will be deepened. The private sector must, as much as possible, be invited to engage in the dialogue, which oftentimes tends to be limited to governments. By including the private sector, developments will be made in which policy and practice reinforce each other.

Conclusions

Statistics indicate that, globally, oil spills occur most frequently in the West and in Africa. However, small oil spills also occur in Asia, and taking into account the differences between countries' reporting systems, degrees of information disclosure and levels of awareness, there is room for doubt over these statistics. Small oil spill accidents may be left without any action taken or dealt with using comparatively simple anti-oil spill measures. Thus, they may not provoke the motive to put into place serious anti-oil spill measures.

This attitude evokes environmental destruction, and can only lead to a situation where anti-oil spill measures are not a reality when large-scale accidents do occur. In order to resolve this undesirable situation, we must therefore deepen our understanding and awareness through increased dialogue between countries, and the expanded involvement of the private sector.

Although the main points of this paper have been the promotion of mutual understanding and dialogue in order to implement rational and effective anti-oil spill measures, the renewal of awareness of the private sector is also emphasized. The private sector must recognize its responsibility for a portion of the costs of such measures.

Although anti-oil spill policies and dialogue are promoted temporarily in the unfortunate event of an accident, a first step would be to put to more effective use the ASEAN OSRAP and OSPAR conferences. This requires the assistance of the IMO and other international agencies. Involvement by the private

sector will first require a forum in which they can readily participate. Forums for demands from and conducting dialogue with public agencies must be held where the companies are located. In order to eliminate language problems, interpreters should be in attendance, and a variety of methods can be employed to appeal for the involvement of the companies operating in countries of the region. Steps will need to be taken to call for their involvement on the basis of their voluntary awareness. Although mandatory involvement through legal means is possible, it will be difficult for the interests of many countries to agree on this point, which will not be achieved immediately.

Accordingly, what I would like to propose, is the establishment, without any entirely new input of funds, of a support agency for the prevention of oil spills which makes it easy for the private sector to become involved. First, in Asia, various organizations and agencies with the material resources to prevent oil spills, already operate on a twenty-four hour basis. The support agency, with the acknowledgement of these organizations, agencies and governments, would have the role of coordinating the parties involved in times of emergencies, and would function with the main objective of preventing accidents and implementing anti-oil spill measures. It would be able to operate with a communications operator and several specialists. The action groups would be existing organizations and agencies, who would be charged with the responsibility for carrying out anti-oil spill measures. Although the support agency would be an emergencies agency, the range of accidents it would deal with would be broader than that demanded by any one international or national policy

instrument. It would handle an extensive range of activities, ranging from salvage, to anti-oil spill measures, to emergency medical aid, to insurance and to emergency response.

If the services provided by this agency were convenient for the oil and shipping companies to use, it would be easy for them to become involved, particularly for shipping companies. The agency would of course be a non-profit organization, in the nature of a public body.

I have often sounded out relevant parties about this agency and, on the whole, I have had a fairly good reaction. However, on the crucial issue of its implementation, problems arise as to responsibilities and operating expenses. There are ways to resolve these issues. I look forward to the opportunity to discuss these matters in detail in a forum which includes representation from all pertinent sectors in the region.

Session 5

Financing Investments

SADATOSHI KOIKE, Chief, Section for International Regulation and IMO Affairs, Japanese Maritime Safety Agency.

"Japanese government's experience on the Malacca Straits."

CECIL DAVE M. DUNCAN, Port Captain, Port of Saldanha Bay, South Africa.

"Cargo taxation as a means of funding navigational and pollution management."

HANS JURGEN ROOS, Harbour Master, Bremen Port Authority, Germany.

"Operation of private port reception facilities of Bremen."

NEIL CHALLIS, Director, Strategic Planning and Development (Asia), International Response Corporation, Thailand.

"The establishment of a MARPOL waste oil reception facility for Bangkok and the ports of the Eastern Seaboard of Thailand: public sector - private sector partnership for marine pollution prevention."

JAPANESE GOVERNMENT'S EXPERIENCE ON THE MALACCA STRAITS

Sadatoshi Koike

Chief

Section for International Regulation and IMO Affairs

Japanese Maritime Safety Agency

1-3 Kasumigaseki 2 Chome, Chiyoda-ku

Tokyo 100, Japan

KOIKE, S. 1997. Japanese government's experience on the Malacca Straits, p. 282-285. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Background

Japan is a country that has limited natural resources and relies mainly on import of raw materials from overseas. Almost all oil, which is the most important energy source in Japan, is imported and about three-quarters of this oil is transported through the Straits of Malacca and Singapore. Because many tankers carrying oil bound for Japan pass through the Straits, it is not an understatement to say that the Straits of Malacca and Singapore are a lifeline for the Japanese economy.

However, there are many rocks and reefs in the Straits and some areas are very narrow. Furthermore, there is a significant tidal change and strong tidal current in the Straits. For these reasons, the Straits is considered very difficult to navigate. It was under these circumstances that the decision was made to establish the Malacca Strait Council.

The Malacca Strait Council was established in 1968 by the Japanese users of the Straits together with the Japanese Government. Since that time, the Japanese Government has been working with the coastal States of Indonesia, Malaysia, and Singapore, through the

Council, carrying out various programs to enhance the safety of navigation in the Straits.

Hydrographic Survey and the Issue of Navigational Charts

In the 1960s, the navigational charts available for the Straits were considered inappropriate for large vessels navigating the Straits. These old charts had been prepared mainly with hydrographic data obtained before World War II. There were some discrepancies on the charts covering areas on the Indonesian and Malaysian sides of the Straits. Following a preliminary hydrographic survey conducted by the Japanese Government in cooperation with the coastal States, the Japan International Cooperation Agency (JICA), which is the national agency in Japan responsible for technical cooperation, the Malacca Strait Council and the coastal States embarked on a series of hydrographic surveys from 1968 to 1978. The product of this effort was the Common Datum Charts from 1976 to 1982.

Over the past 25 years, conditions in the Straits have been changing because of drifting sand, uncharted ship wrecks and rocky shoals. The coastal States have

requested the Japanese Government to conduct a re-survey of the Straits. In response, following a Government decision to conduct a joint re-survey, funded under the Official Development Assistance (ODA) scheme, JICA and the coastal States agreed to a joint re-survey of the Straits in 1996. The primary objective of the re-survey is to enhance the safety of navigation by reviewing and revising the existing ship routing system, as well as by updating navigational charts of the Straits. In addition, the result of the re-survey will be used to construct an electronic navigational charts (ENC) database, the latest technology in the marine community.

Installation and Maintenance of Aids to Navigation

Before the establishment of the Malacca Strait Council, there were insufficient navigational aids in the Straits. The Council funded the installation of 40 navigational aids at 30 locations from 1968 to 1988 and donated them to Indonesia and Malaysia. The Council has also replaced some of the original installations which have depreciated over time. In addition, because navigational aids require regular maintenance, the Council has undertaken joint maintenance programs with the Governments of Indonesia and Malaysia since 1981.

Observation of Tide and Tidal Current

In order to promote safety of navigation, particularly to prevent grounding accidents, a vessel passing through the Straits is obligated to keep a minimum of 3.5 m underkeel clearance. However, because of the large tidal range and strong tidal current, it is difficult to keep the clearance. The ship master needs

access to tidal data in order to ensure safe navigation. From 1976 to 1978, JICA, the Council and the coastal States jointly conducted tide and tidal current studies. The results of the studies were published for use by vessels in the Straits.

Removal of Obstacles in the Channel

As a result of the hydrographic survey, four ship wrecks were found along the navigational channel of the Straits. The Council removed the wrecks between 1976 and 1978. The Council also dredged shoals located in the navigational channel off the Port of Singapore from 1979 to 1981.

Donation of a Buoy Tender

In 1973, for installation and maintenance of aid to navigation, the Council donated a buoy tender to the Government of Malaysia.

Donation of an Oil Skimming Vessel and Establishment of the Revolving Fund

When an oil spill occurs, it is essential to contain and collect the oil rapidly. To meet this need, the Council donated an oil skimming vessel to the Government of Singapore in 1975. The Council also donated 400 million yen to the coastal States to establish a Revolving Fund, for emergency response and cleanup of spilled oil.

The Revolving Fund is managed by one of the three coastal States, on a five-year rotating basis. The Fund operates as a ready source of financial support to the responsible agency, to implement emergency actions for control and removal of spilled oil. Following the oil

spill incident, the Revolving Fund is reimbursed by the company or individual who was responsible for the accident.

OSPAR Project

The International Convention on Oil Pollution Preparedness, Response and Cooperation 1990 (OPRC 1990) requests individual countries to establish oil cleanup and removal systems and to assist other countries when accidents occur. OPRC also promotes international cooperation, such as technical assistance, training and joint research and development activities.

The Japanese Maritime Safety Agency (JMSA) encourages international cooperation between countries in the ASEAN region by providing indirect support. Since 1990, JMSA, along with the Ministry of Transport, has been promoting the "Oil Spill Preparedness and Response in the ASEAN Region" (OSPAR) project, with the objective of establishing a regional emergency cleanup and removal system to respond to large-scale oil spill accidents. By 1995, JMSA and its associated organization implemented the following:

- a) Provision of equipment, etc., to enhance the oil cleanup and removal capabilities of the ASEAN region;
- b) Establishment of a computerized information network system; and
- c) Establishment of a supervisory committee to properly maintain, administer and utilize the above.

Cooperation Through International Organizations

As mentioned before, the Japanese Government has directly or indirectly

contributed to the safety of the Straits of Malacca and Singapore. But in order to enhance the safety of the Straits, the Japanese Government has made various contributions through international organizations, such as IMO.

In response to major oil tanker accidents in the Shetlands and off Sumatra in January 1993, the Japanese Government appealed to IMO to immediately investigate oil tanker safety measures (February 1993). In May 1993, the Japanese Government submitted the "Urgent Proposal on Oil Tanker Safety and Marine Environmental Protection" to the 62nd Session of IMO's Maritime Safety Committee and the recommendation was adopted as Resolution A.743(18) at the Eighteenth Assembly in November 1993.

In March 1993, the Japanese Government provided two experts to the IMO Malacca Straits Working Group. The report of the Working Group, including recommendations concerning safety measures, was approved at the 62nd session of the Maritime Safety Committee.

Prospect on the International Cooperation on the Malacca Straits

In recent years, the situation in the Malacca Straits has been changing markedly due to the increase in maritime traffic and the growing necessity to safeguard the global environment. Additional navigational aids and an expansion of the vessel traffic service (VTS) are needed in the Straits to maintain the safety of navigation. However, if such installations are undertaken in the Straits for the sake of international navigation, the safety measures should be examined by the user States, as well as the States bordering the Straits. International

cooperation between the States bordering the Straits and the user States, is taken into account in Article 43 of the United Nations Convention on the Law of the Sea.

Japan is pleased to cooperate with the States bordering the Straits to further the cause of navigational safety. At present, information on vessel usage of the Straits is limited. The Japanese Government has a plan to investigate the amount of traffic in the Straits, in consultation with the States bordering the Straits.

Exchanges of opinion and information with the States bordering the Straits and user States at this conference are quite useful. Furthermore, Japan believes that the establishment of a new cooperative scheme for the Straits needs to be discussed further at a regional conference of coastal States and user States, with the coordination of an international organization, such as IMO. To be successful, such a conference would need to obtain the participation and cooperation of as many user States as possible, and would therefore need an international body, such as IMO to support such an endeavor.

CARGO TAXATION AS A MEANS OF FUNDING NAVIGATIONAL AND POLLUTION MANAGEMENT

Cecil Dave M. Duncan
Port Captain
Port of Saldanha Bay
P.O. Box 477, Saldanha 7395
South Africa

DUNCAN, C.D.M. 1997. Cargo taxation as a means of funding navigational and pollution management, p. 286-295. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

This paper was compiled at a time when South Africa is embodied in widespread change and a basic total revision of fundamental national policy. Portnet, the country's Port Authority, is one of a number of divisions of Transnet which is registered as a company, with the State as the sole shareholder. As such, Transnet is regarded as a parastatal, falling within the portfolio of the Minister of Private Enterprises. The South African Government has appointed the Hong Kong and Shanghai Banking Corporation (HSBC) as its special advisor on the privatization and restructuring of State assets. A team of local and international experts is tasked with producing a strategy to establish techniques, priorities, timing, and implications in the reshaping of the South African State sector.

With this background, it is obvious that this paper can only serve to detail historical factors which have influenced the management of navigational and pollution prevention resources at the port level. However, a review of existing mechanisms in the South African (SA) context provides an appreciation of the role that ports can play in financing a national program dealing with

navigational safety and marine pollution prevention and management.

Existing South African Policy on Coastal Navigation

The South African Department of Transport (DOT) is responsible for the provision of a Decca Navigational System around the coast with respect to obligations under the Safety of Life At Sea Convention 1974 (SOLAS). Notice has already been given that the existing contract with Decca will not be renewed after 31 March 1998 and no final decision has yet been made as to what will replace it.

The Department of Transport does not view the establishment of a coastal vessel traffic service (VTS) system along the South African seaboard as a necessity in that the existing traffic volume does not justify such a facility. Both voluntary and mandatory reporting systems are under investigation.

The network of coastal lights and beacons is operated and maintained by Portnet's Lighthouse Services, which are also contracted to maintain the various Port's navigational aids. Light dues are levied by Portnet to finance the coastal navigational aids (*see Table 1*).

Table 1. Coastal assets of Portnet Lighthouse Services.

45 Lighthouses and associated equipment	6 Buoys
23 Radio beacons	4 Vessels
9 Racons	2 Leading lights
5 Fog signals	10 Unlit beacons

With two authorities (i.e., DOT and Portnet) having responsibility for coastal navigation, it was necessary to create an Interim Maritime Navigation Committee (IMNC) to harmonize the provision of maritime aids to navigation on the South African coast to satisfy the requirements of SOLAS and other international and national requirements.

IMNC Terms of Reference

The IMNC is an advisory body overseeing related activities in harmonization of aids to navigation requirements. The committee is required to make recommendations on the following:

- Preparation of a National Maritime Radio navigational plan for SA ensuring that SA continues to meet its international responsibilities with respect to safe navigation;
- Coordination of the provision, maintenance and operation of maritime navigation aids;
- Keeping abreast of navigation technology and international trends in the provision and financing of navigation aids; and
- Ensuring that all aids to navigation, both existing and future, meet international standards.

In addition, the IMNC is tasked with:

- Putting in place an equitable means of raising revenue for supplying, maintaining and developing maritime navigation aids in the national interest;
- Collaboration with the authorities in SA responsible for air and land navigation;
- Involvement of all facets of industry in the research necessary for the provision and/or cancellation of aids to navigation;
- Advising on the legislation necessary for achieving the harmonization objective, including amendment(s) to any existing legislation;
- Liaison with appropriate international bodies and participation in international conventions where appropriate;
- Nomination of representatives to IALA and its sub-committees and any other navigation aid committee;
- Improving maritime safety in the Southern African region by collaborating with regional and international organizations, agencies and committees with the same aims; and
- Improving the coordination of activities of organizations or agencies within SA entrusted with maritime safety in the Republic of South Africa.

Existing South African Policy on Coastal Pollution Management

Following the *Wafra* disaster in 1971, off Cape Agulhas, the Government decided that it needed to provide its own

facilities to deal with the risk caused by the ever-increasing numbers and size of crude oil carriers passing SA shores. Safmarine contracted with the Department of Transport to provide a fleet of oil abatement vessels and two tugs capable of dealing with the largest laden tankers transiting the coast in the worst weather. The vessels were launched in 1976 and went into service immediately. The first tanker casualties were the sister ship ultra large crude carriers (ULCC) *Venpetand Venoil* in December 1977.

Since the advent of the tug service on the coast, in excess of 40 tankers of very large crude carrier (VLCC) and ULCC class have been assisted to safety. In many cases, this has included the execution of ship-to-ship (STS) transfers of cargo and, in some instances, bunkers. Pentow Marine provides the full resources for these transfers including hoses, berthing pilots, discharge/loading advisors, assist tugs and all the associated personnel and equipment. To date, 17 STS operations have been carried out, where over one million tons of crude oil have been transferred from casualties which have threatened the South African environment. The arrangement has been in place for 20 years and can be regarded as having been highly successful as a result of the tug operator serving the casualty owner on the basis of a commercial contract. It is also encouraging to note that some developed countries are also now adopting similar arrangements.

The Department of Environment Affairs is charged with maintaining oil spill contingency plans on a regional basis. Individual port plans are required to complement their regional plan.

South African Ports

Unlike most European ports, each South African port has a natural hinterland with a defined market and this determines, to a large extent, the nature and types of cargo handled at each port. This, in turn, dictates the type of facilities each port provides. As such, each port operates as an independent business developing its own particular character.

Portnet's seven ports form an integral part of South Africa's transport network as they are linked to the road and rail systems serving the interior of the country beyond its borders. Road haulers also operate between the South African ports and neighboring African States, complementing the regular rail services, while coastal feeder services provide for coastal and feeder traffic by sea.

The Port of Saldanha

Saldanha is a deep water port and is the largest natural port in Southern Africa. The port is unique in that it has a purpose built railroad serving a bulk handling facility which is connected to a dedicated jetty for the shipment of iron ore. It is also a VLCC terminal serving a crude oil tank farm facility with 6 million tons storage capacity. A general cargo quay (to be expanded shortly) caters to the export of other bulk products. It is also a major fishing harbor.

The Port of Cape Town

The Port of Cape Town is a full service general cargo port. It is world renowned for its deciduous fruit, perishable and frozen product exports. The fishing industry based in Cape Town is a major port user.

It is strategically positioned on the world's sea routes and is ideally situated to serve as a hub for cargoes between Europe, the Americas, Africa, Asia and Oceania. It is fully equipped to handle all types of general breakbulk and containerized cargo via its specialized terminals.

The Port of Mossel Bay

Mossel Bay Port has always been a fishing port of substance with limited commercial activity. More recently it has served the oil industry. This industry has played an important role in the development of the port. It is the only South African port that operates two offshore mooring points within port limits. It also serves as the oil rig supply boat base. Additionally it is the hub of the south coast fishing industry.

Port Elizabeth

Port Elizabeth, with its proximity to heavily industrialized and intensively farmed areas, has facilities for handling all associated commodities. A major fruit terminal caters to fruit exports. The next largest export commodity is manganese ore, which is handled via a bulk installation. Another feature of Port Elizabeth is that it serves as an entry for the motor car industry in the Eastern Cape. The container terminal is linked to the Port of East London by a regular feeder service.

The Port of East London

East London Port is the only commercial river port on the South African coastline. The port has the largest grain silo on the South African coasts and grain, primarily maize, is the most important single product exported through the port. It also caters to

the export of Zambian and Zairean copper. Regular feeder services to and from the port, together with effective road and rail networks, strengthen the port's ability to land-bridge cargo to neighboring countries.

The Port of Durban

The Port of Durban is a full services general cargo port handling about 20% of South Africa's total port traffic. It is the busiest port in Southern Africa and is also the most conveniently situated port for the industrialized Pretoria-Witwatersrand-Vereeniging (PWV) area. Durban Port has unmatched shipping opportunities, both in terms of frequency and destinations served. No other South African port can match the number of direct links to ports worldwide. It is especially effective as a hub port for cargo to and from the Far East, serving both South Africa and East African countries.

The Port of Richards Bay

Richards Bay Port is South Africa's main port for the handling of bulk cargo. It is a deep water port and handles about 50% of South Africa's total port traffic. The port is well-known for handling bulk commodities, e.g., coal, wood chips and other "belt-able" and neo-bulk commodities, such as granite blocks, steel, etc. Bulk liquids, such as chemicals, are handled by pipeline. The largest volume of cargo shipped through the port is export coal handled at the Richards Bay Coal Terminal (RBCT), the largest coal terminal in the world with a capacity of 54 million tons per year.

South African Port Tariffs

The South African port tariff structure provides for:

- a) Infrastructural tariffs; and
- b) Operational tariffs.

In turn, these can be further subdivided into tariffs payable by ships and those payable by cargo owners and their agents.

Infrastructural Tariffs

Payable by ships

These include port dues (break waters, port navigational aids, turning basins and channels, etc.), berth dues (wharf usage if no cargo is handled), and light dues (lighthouses and other navigational aids along the country's coastline).

Payable by cargo owners/agents

These include wharfage (quay walls, backup areas, roads, and railways, etc.) and dredging along quays.

Operational Tariffs

Payable by ships

These include marine services tariffs (tugs, berthing, pilotage, etc.) and wharf crane and labor tariffs (liner terms), terminal handling (containers).

Payable by cargo owners/agents

These include terminal handling tariffs (breakbulk/bulk) and wharf crane and labor tariffs (non-liner terms).

Port Dues

Port dues, which are payable by all ship owners at each port of call, are related to the provisions and maintenance of the basic infrastructure. Port dues are determined

according to the highest gross cubic meters capacity of a ship as reflected on the ship's register/tonnage certificate, plus the cubic meters capacity of all cargo spaces not included therein. The dues payable vary with the time spent in the harbor.

Berth Dues

Berth dues are payable by the owners of ships occupying a repair quay or any other berth and not physically landing, shipping or transshipping cargo, and are related to the cost of the provision and maintenance of the quays. The tariffs are determined according to the gross cubic meters capacity of the ship or part thereof, as defined for port dues and vary with the time the berth is occupied.

Pilotage Services

Pilotage is charged for the services of a pilot, which is compulsory. The charge is determined according to the capacity of a ship in cubic meters per service and is intended to cover the costs involved.

Tug Assistance

Tug assistance charges are payable by the ship owner for the assistance and/or attendance by tugs to ships entering or leaving a harbor or shifting from one berth to another inside the harbor. The type and number of craft allocated for a service are at the discretion of the Port Captain. The charge is related to the capital costs, maintenance and operating costs of tug services. The tariff per tug is based on the capacity of the ship in gross cubic meters.

Mooring and Unmooring Services

Berthing service charges are payable by the ship owner for the services of the

staff for ships mooring and unmooring in a port. The charge is determined per service and is based on the cost of the berthing staff employed.

Wharfage

Wharfage is payable by the cargo owner on all cargo passing over the wharf in the ports. The revenue derived is used to cover the costs of the basic infrastructure including dredging alongside the quays. The charges for imports and exports are based on the value of the cargo, but in respect of coastal cargo and transshipment cargo, the charge is levied per harbor ton.

Charges for Landing, Shipping, and Transshipping of Cargo

Charges for landing, shipping, and transshipping are calculated at a prescribed rate per harbor ton (being 1,000 kg or 1 m³, whichever yields the higher tonnage and one kiloliter for liquids in bulk). The charge is payable by the cargo owner and is based on the costs involved, including capital, maintenance and the operating costs of the equipment.

Benchmarking

Essentially, the benchmark price is a price that would generate sufficient revenue to cover all direct and indirect costs associated with the delivery of a service or facility to the customer. Recognizing that overseas ports have different costs and management structures, it is very difficult to draw a direct comparison in costs. Moreover, overseas ports in Europe and North America operate in an extremely competitive environment, which is not necessarily the case in South Africa.

Nevertheless, a comparison has been drawn regarding container handling and marine charges. The South African ports compare very favorably with overseas ports insofar as marine charges and terminal handling charges are concerned, the latter without wharfage. If wharfage is included in the terminal handling charge, South Africa becomes the most expensive to handle containers.

Wharfage

Principles

The revenue derived from wharfage is utilized for the provision and maintenance of the basic infrastructure such as quay walls and backup areas thereto, roads, railways and dredging alongside the quays to ensure adequate depth. Wharfage is based on a percentage of the value of the cargo for imports and exports.

Import Wharfage. 1.78% of the value of goods as declared to Customs (normally the price free-on-board at the port of shipment).

Export Wharfage. 0.89% of the price free-alongside the ship.

Transship and Coastal Cargo Wharfage. For coastal cargo (i.e., in the Richards Bay and Saldanha ports), wharfage is applied per ton or container. The same principle is applied to cargo transshipped. The value for wharfage purposes is subject to a maximum of Rand 9,000 per harbor ton, and a minimum of R204 per mass ton. In other words, wharfage is applied to all cargo passing over the wharves in the South African ports.

Policy

The wharfage pricing policy, as applied to cargo entering and leaving SA ports, is based upon:

- a) Captive markets, defined as traditional cargo or cargo that would normally move via a SA port; and
- b) Competitive markets, defined as cargo that has an alternative country port as entry or exit point, e.g., Zimbabwean cargo via the Port of Beira or Zambian cargo via the port of Dar Es Salaam.

For coastal shipments of cargo within South Africa, the ports are in competition with land-based transport. For transshipment cargo, the SA ports are in competition with other African and world ports.

Regarding the competitive market, Portnet is flexible on its wharfage levels, in order to stimulate cargo movement via the Southern Corridor to/from the Sub-Saharan countries. Generally no flexibility is provided for the captive market cargo. In order to avoid wharfage becoming punitive on beneficiation processes (i.e., when a base product is imported, beneficiated by refining, assembling, etc., and exported), a special wharfage dispensation is allowed. A special wharfage dispensation is also applied to Africa (over the border) traffic in an "African Traffic Policy."

Practice

Wharfage is a main source of revenue for Portnet. It has also been a bone of contention, mainly due to its uniqueness relative to other world ports. Wharfage

contributes about 47% of the total Portnet revenue.

A very buoyant RSA currency has resulted in even larger returns, which has caused even more concerns for Portnet. The present wharfage structure differentiates between imports and exports, at a ratio of 2:1. With growing industrialization, the export of manufactured goods is on the increase. The question arises whether there should be a further incentive from the ports to stimulate exports.

Other alternatives to applying wharfage tariffs have been considered over the years. In view of the magnitude of the variances in value of a particular commodity, and the multitude of commodities being handled, the value-based wharfage system seems to be most practical.

Clients generally expect that any alteration to the wharfage structure will bring about a lower wharfage tariff simply because they are aware of the high return on wharfage that Portnet currently enjoys. Importers claim that exchange rate fluctuations impede their local value adding efforts, while exporters claim that the export wharfage tariff is generally too high and negatively impacts on their competitiveness in overseas markets.

Possible Future Scenario

It is believed that the following areas need to be explored by Portnet, in conjunction with the maritime and cargo industry, in order to come to a win-win situation for all parties concerning wharfage:

- a) Introducing a fixed exchange rate for wharfage purposes on imports,

in view of the buoyancy of the local currency or alternatively, applying a maximum fluctuation; and

- b) Special wharfage dispensations for certain industrial sectors only, in order to stimulate local growth.

Port Pricing Philosophy

A paper presented by T. Dowd entitled, "Port Pricing: A Process", Ports and Harbors, November 1992, puts the issue of port pricing and port operations into perspective. He stated as follows:

Port pricing cannot be dealt with in isolation since pricing is a major factor in the implementation of a port's strategic plan. Pricing must be viewed as one element in a much broader port management concept. This concept has three elements. The first is a port's planning and development philosophy and a port's goals or objectives. The second is a port's investment criteria and policies. The third is a port's pricing policies and techniques.

These three elements are closely interrelated. Significant change in any one of these three elements directly affects the other two elements. This means that a port's pricing approach should be supportive of the port's overall objectives, be consistent with the port's development and planning philosophy, and be a logical extension of the port's investment criteria and policies.

There are three basic approaches that ports should consider in formulating their pricing policies.

The first is a purely economic approach, which argues for marginal cost pricing. The second is a financial approach, which argues for prices to be set to recover fixed and variable costs and provide an adequate rate of return. The third approach is a public enterprise approach which argues for prices to be set to recognize the need for the port to be a means to foster local development and existing local, regional and/or national economic activities.

The economic approach would be used by ports that are primarily concerned with being self-supporting (breaking even). The financial approach would be used by ports that want to maximize profit as their main port goal. The public enterprise approach would be used by the ports that are primarily concerned with maximizing throughput and can afford to subsidize certain operations and function in order to capture cargo.

Each of these approaches has its own strengths, but their basic requirements are often in conflict. The resolution of this conflict is the first step toward formulation of a pricing policy that is each port's foundation for rationally pricing facilities or services.

There is no single pricing approach that is accepted and applied uniformly by all ports. Nor can it be said that there is a "best approach". Ports are different and these differences are reflected in the pricing approach or combination of approaches that they use.

There is nothing inherently desirable or undesirable in this diversity and lack of uniformity in pricing. The only thing that is mandatory for a successful port pricing policy is that it be supportive of the port's planning and development philosophy and objectives and the port's investment policies and criteria. As simple as this may sound, it is probably one of the most complex management decision areas for any port.

Tariff Policy

In the absence of a comprehensive tariff policy for Portnet, a tariff policy has been drafted recently. The policy document seeks to align existing behavior with strategy focused on the various functions of Portnet.

Portnet is in a unique position in that it has limited competition. The market is predominantly captive with only a small competitive market being present. The tariff policy also addresses the situation from the captive and competitive markets perspective. A captive market includes all shipping and cargo movements related to South African imports and exports and all shipping and cargo movements related to the South African coastal routes (e.g., Richards Bay to Saldanha, foreign transshipment and Africa traffic). Competing cargo terminals include private ports, road haulers, bunker trade, salvage, towage, ship repairs and charters. The ship repair business is not regarded as Portnet's core business but, by its very nature, operates in a wholly competitive environment.

The tariff policy addresses such activities as:

- a) Port management and the provision and maintenance of basic port infrastructure (wharfage, port dues, berth dues); rendering of marine services (tugs, pilotage, berthing, floating cranes, etc.); ship repair facilities (dry docks, floating docks, synchrolifts, slipways); and lighthouse services (light dues);
- b) Port operations including cargo handling operations (container, breakbulk, bulk cargo handling), and cartage operations (breakbulk and container cartage services)

The devised tariff policy for the various businesses is supportive of strategy, limits independent action, sets boundaries, yet allows decentralized decision making where it counts, i.e., in the competitive market and beneficiation areas, such as warehousing and distribution.

Future Strategy

In view of the basic three approaches identified, e.g., an economic, a financial and a public enterprise approach, Portnet will need to align itself with the activities in an individual port (i.e., suited to that port's unique needs) and collectively for all ports (i.e., one approach or a combination of approaches for all ports). The future synergy with other Transnet divisions will be dictated by Portnet's repositioning in the transport market. The outcome of all these factors will, in turn, have to be incorporated and will dictate a future tariff policy.

Conclusion

Overseas ports have different cost and management structures and operate in a completely different and highly competitive environment. The South African ports need only ensure that SA port tariffs generate sufficient revenue to cover all direct and indirect costs associated with the delivery of a service to the customer.

While the SA port tariffs are aligned to the services rendered the customer, a comprehensive costing schedule per service is absent. Pricing of services should follow a strategy. Port pricing must be supportive of the port's planning and development philosophy, objectives, and investment policies and criteria. The wharfage tariff issue will also need to be aligned with the tariff policy initiatives.

OPERATION OF PRIVATE PORT RECEPTION FACILITIES OF BREMEN

Hans Jurgen Roos

Harbour Master

Bremen Port Authority

Hafenstrasse 66, Bremen 28217

Germany

ROOS, H.J. 1997. Operation of private port reception facilities of Bremen, p. 296-313. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Summary

The ports of Bremen, namely Bremen and Bremerhaven, provide reception facilities for waste oil and garbage, ensuring that vessels can discharge their wastes without undue delay and without incurring additional operating costs. Limited facilities are also available for MARPOL 73/78 Annexes II (noxious liquid substances) and IV (sewage) wastes. All required legislation and standards for effective environmental protection are in place and so are measures for monitoring and enforcement of the regulations.

Facilities available include mobile collection services, intermediate storage and separation facilities, recycling and treatment plants (for metals, plastics, paper, glass, oil and paints), as well as incineration and waste disposal facilities. The collection, treatment and disposal of ship-generated waste have been integrated into a comprehensive waste management system, which incorporates both land-based and sea-based sources of pollution.

Experience in Bremen has proven that the management of ship-generated waste cannot be the sole responsibility of the private sector. A certain amount of government involvement is required. Experience in Bremen indicates that by

making the port authority responsible for the collection and disposal of ship-generated waste, environmental controls and operating requirements become part of the routine operation of ships while in port.

A pre-condition for a successful waste collection and disposal is that the port by-laws should be very clear with respect to the obligations of the ship. In addition, sufficient qualified personnel must be available in the port authority to monitor and enforce the port by-laws.

A pilot project involving "free-of-charge" shore reception services for MARPOL Annex I and II wastes, was conducted over a three-year period by the Governments of the Federal Republic of Germany and the Federal Coastal States. The project was successful insofar as adequate facilities and services were installed in the participating ports and the number of ships using the services increased by 100% (i.e., approximately 10%-12% of all ships calling at the German ports used the shore reception services during the pilot program). However, the pilot project was costly and was unsustainable. When the pilot project and the "free-of-charge" reception service ended in 1995, the situation reverted to the days before the pilot project. The

number of ships using the services decreased dramatically.

A new financial mechanism for sustaining shore reception services has been proposed by Bremen. The proposal is based on the “polluter pays” principle, but with an added feature. The charges are distributed evenly between ships and cargo. The advantages of the proposed financial mechanism are that:

- a) Ships are not charged for each individual collection, but pay an environmental fee regardless of whether the shore reception service is used or not; and
- b) An environmental surcharge is levied on all cargo handled in the port, which contributes to the cost of the shore reception service.

The mandatory collection and disposal of household-type garbage from ships in Bremen port requires ships to discharge all Annex V waste prior to departure. The service is provided by the Port Authority’s contractor, who delivers a specified number of receptacles on arrival of the ship, based upon the ship’s size. The contractor collects the receptacles prior to the ship’s departure and transports them to the incineration plants. The cost for the service is stipulated in the port tariff. The fee is charged and collected regardless of whether the service is used or not.

The collection and disposal of MARPOL Annex V special waste (i.e., residues which require special handling not normally provided by garbage reception facilities, based on the physical, chemical, and biological properties of the substance) operates on the basis of

contracts between the ship and the waste collector. In general, this system functions well. Contaminated garbage or mixed special waste do create some problems on occasion.

Recommendations

Legal Aspects

Experience in Bremen has shown that a primary component in the sustainability of shore reception facilities is the existence and application of appropriate legislation and controls. Some elements of the control system include:

- a) Regulations governing waste management/pollution control, transport of dangerous goods, water protection, and industry, with the appropriate execution ordinances and technical guidelines;
- b) A national waste management master plan for land-based and ship-generated wastes, containing requirements for waste disposal (e.g., incineration, landfills, storage, recycling);
- c) Statutory requirements for local government units (e.g., provincial or municipal governments) to prepare waste management plans, including designation of responsible authorities, siting and usage of facilities, collection and transport of waste, and commissioning/decommissioning standards;
- d) Emission and effluent standards, including monitored programs by competent authorities;
- e) For each new installation, an environmental impact assessment and a risk analysis;

- f) Licensing of all intermediate storage facilities and treatment plants, to be issued only when the legal requirements and emission standards have been met;
- g) Licensing of waste collectors and transporters; and
- h) A cradle-to-grave waste notification system, tracking wastes from the point of generation to treatment/processing and final disposal.

Non-compliance with environmental legislation and standards should be subject to heavy fines and criminal charges, with possible imprisonment of offenders.

Commercial Aspects

When planning and designing shore reception facilities, consideration needs to be given to the type and number of ships visiting the port, as well as the nature of cargo being handled. Obviously, smaller ports or ports handling a single commodity will not require reception facilities and services that would be necessary for large, multi-use ports. Small ports may simply require a reception service and intermediate storage, from which wastes can be transferred to a central location for treatment and disposal at regular intervals.

Investment in collection equipment (e.g., tank trucks, barges), intermediate storage facilities and treatment and disposal facilities can be substantial. In order to cover the operating and maintenance costs associated with such facilities, ensure the efficient use of staff, and provide adequate return on investment, there needs to be a minimum throughput of waste to the facilities. Recognizing that the amount of waste

generated on ships is small compared with the volume generated in land-based activities, private investors and facility operators look to land-based sources of waste to maintain adequate throughputs for their plants.

In Bremen, all entities involved in the collection and treatment of ship-generated wastes collect or treat wastes from land-based sources as well. Although the situation in Bremen is not directly transferable to Asian countries, the general principle may be conveyed. It is clear that unless both land and ship-generated wastes are collected and treated in an integrated fashion, sustainability of ship-generated waste services will be difficult to achieve because of insufficient revenue to cover the operating and overhead costs.

Lessons Learned

A number of lessons can be learned from the Port of Bremen experience.

- a) Within a country, it is important that the same rules and regulations apply to all ports in order to avoid unfair competition among ports;
- b) Where ports in a region are very close to and compete with each other, national approaches should be harmonized;
- c) "Free-of-charge" shore reception services for MARPOL Annexes I and II wastes are too expensive and are not sustainable;
- d) Environmental tariffs may be levied on ships and cargo to finance the establishment and operation of reception facilities for Annex I wastes originating from engine operation;
- e) Cargo-related waste falling under MARPOL Annexes I and II, and

Developing and Implementing Reception Facilities and Services in Bremen

Historical Perspective

Until the middle of the 1980s, the delivery of ship-generated waste was not regulated. It was left to ships and to private enterprises. Ships were not allowed to dump any waste into the harbors, rivers or waters within the three-mile sea boundary. However, supervision outside the immediate port area or the rivers was infrequent. When a ship was in dry dock or shipyard, it was required to unload household-type waste ashore. Oil residues or oily ballast and bilge water were only collected in dry docks and shipyards when it was necessary to clean a bilge or tank for repair purposes. Collected waste was considered to be shipyard waste and was dealt with in accordance with local waste disposal practices.

Normally, ships collected their household-type waste in waste drums on deck and threw them over the side as soon as they were outside the three-mile limit. Solid cargo residues were dealt with the same way, unless the ship's holds had to be cleaned in port for a new cargo. In such cases, private companies were engaged to collect the waste and dispose of it according to the local waste practice. At the time, people were very happy when they found timber, wooden crates, oranges, and other cargo residues along the sandy beaches of the North Sea.

Until the beginning of the 1970s, ships' engines were running on diesel oil. There was hardly any sludge onboard and

- special waste falling under Annex V, may be dealt with on the basis of the "polluter pays" principle;
- f) Mandatory collection and disposal of Annex V household-type waste (garbage) has proven to be successful in Bremen and can easily be transferred to the ports in the Asian region;
 - g) The operation of reception facilities, especially collection services, may best be undertaken by the private sector, under contract of the Port Authority;
 - h) Contracts should be awarded by public tender, with careful screening of the companies;
 - i) A detailed specification of the required services must be prepared in order to enable the contractor to submit a fair bid;
 - j) Bids received should be carefully evaluated to ensure the bids are reasonable;
 - k) Contract documents should clearly state all requirements, obligations and expectations of both parties and include a section on procedures for settlement of disputes;
 - l) For the domestic shipping industry (ferries, fishing vessels, etc.), private contracts between waste collecting companies and shipping lines may be considered;
 - m) Close monitoring and supervision of all the services are very important for a successful operation, thus avoiding chronic violations by contractors and ships; and
 - n) Provision of sufficient qualified monitoring/administrative personnel is essential.

fuel tank cleaning was performed after the ship had left the port area. Any oil-water mixture pumped into the open sea did not affect the German coast. There were few chemical tankers and whatever was pumped into the sea was not noticed.

The issue changed in the 1970s when environmental awareness increased. More and more plastic materials were used for packaging materials in ships' stores and as a means of cargo segregation. Plastics did not dissolve in seawater. At the same time ships' engines were undergoing change. Heavy fuel oil replaced diesel oil, which resulted in more sludge being generated and pumped over the side. Oil slicks and oil-polluted beaches became a common problem.

When the MARPOL Convention was adopted by the IMO, Germany became a Party.

Developments Until Now

Legislation

National waste management legislation

Due to the constitutional arrangements, the individual federal states are responsible for port operations in Germany, including the provision of port legislation and reception facilities.

Ship-generated waste is subject to the German federal law on waste prevention and disposal. The Waste Law, 1986, requires that the waste generator must deliver such material to competent authorities with responsibility for disposal as stipulated in the laws of the individual federal states. The Waste Law also requires the preparation of waste disposal plans and the statutory determination of

waste disposal plants (incineration plants, dumping sites, handling sites). The waste disposal plans may include designation of responsible authorities, designation of disposal facilities, implementation of specific collection routes, and/or limitations on the use of certain facilities.

Further requirements for the preparation of disposal plans are identified in the Bremen Execution Ordinance to the Waste Law. The Ordinance: a) regulates the procedures for the preparation of disposal plans; and b) authorizes the Senate of Bremen to pass the necessary regulations to make the plans mandatory for persons or institutions responsible for waste disposal. Enforcement of waste regulations is the responsibility of competent authorities, which are normally the environment protection agencies of the federal states. In case of the disposal of waste from ships, the port authorities are included in the enforcement process. A cradle-to-grave notification system has been developed in order to assist in the monitoring of wastes from the point of origin to final disposal.

MARPOL 73/78 - Annex 1 (Oil)

The Bremen port by-laws prohibit the discharge of substances harmful to the aquatic environment, especially oil, oil derivatives, oil residues and liquids containing oil. The MARPOL Convention designates allowable oily waste discharges, based upon distance from nearest land, or within special designated geographic areas. Ships are required to provide slop tanks for the collection of oil-water mixtures and oily sludge and slops.

There is no legal requirement in the Convention for ships to discharge their

waste at a particular shore reception facility. It is normally left to the ships to decide if they want to use the facilities provided in Bremen and Bremerhaven.

To ensure the compliance with MARPOL and the port by-laws, the Port and Waterway police monitor every ship to determine the validity of the International Oil Pollution Prevention (IOPP) Certificate and the oil record book. If the quantity of residue in the slop tank is greater than 80% of the capacity stated in the IOPP certificate, and/or the remaining tank capacity is insufficient to collect the residues likely to arise during the forthcoming voyage, the ship's master will be requested to arrange for collection prior to the sailing of the vessel. Non-compliance with this request will result in the ship not being allowed to sail. The contractor collecting the slops must have a license for transporting and providing intermediate waste storage. The license must be issued by the competent environment protection agency, in accordance with the Federal Waste Prevention and Disposal Law.

Intermediate storage and transfer to the treatment facilities are undertaken in accordance with the waste disposal plan of the federal state and municipality. A transport bill is issued by the transport operator, stating the name of the ship, the date, the quantity of residues received, and the quality of residues. The bill is signed by the ship's master.

Treatment facilities are licensed by the environment protection agency of the federal state and operate in accordance with the emission and effluent standards set by the federal government. The operators of the treatment facilities issue a receipt to the transport operator,

identifying the quantity and quality of waste received. The transport bill and the receipt from the treatment plant operator are submitted to the competent authority to ensure that no illegal disposal has taken place.

MARPOL 73/78 - Annex II (Noxious liquid substances)

There are no chemical plants or terminals in Bremen and Bremerhaven. Any ship requiring disposal of chemical slops is required to employ private contractors that are available for Annex II wastes. The same legal requirements apply as for Annex II waste handling.

MARPOL 73/78 - Annex IV (Sewage)

Annex IV is not in force in Germany. There is no legislation available. In some municipal marinas along the German coast, inland waterways and lakes, local controls are in place requiring boats to have either sewage tanks or chemical toilets on board. The vessels must discharge the sewage into the local sewage system.

MARPOL 73/78 - Annex V (Garbage)

Household-type waste: Up to the middle of 1987, Bremen's municipal disposal plan did not include ships as a waste source. The port by-law requested ships to deliver their waste to the port authority or to an authorized collector, but there was no legal requirement to do so. In 1987, Bremen changed the waste disposal plan. All ships calling the ports of Bremen were identified as a waste source and treated accordingly. In response, the Bremen port by-law was revised, stipulating that all seagoing ships and river barges deliver their household-

type waste to the competent authority for disposal. The Port Authorities in Bremen and Bremerhaven have been designated as the competent authorities. A licensed waste collection and transport company is contracted by the Port Authorities to actually undertake the collection, transport and disposal of the waste.

Household-type waste must be placed in a receptacle provided by the waste collector prior to the departure of the ship. The crew assists with the collection of the receptacles. The contractor acknowledges the receipt of the receptacles in writing.

Special waste: Special waste is treated in the same manner as household-type waste under the municipal waste disposal plan, except for one distinct difference. It is the responsibility of the special waste generator to contract a licensed treatment and disposal facility for managing the waste. This applies to ship-generated special waste. Thus, under the municipal disposal plan, the port is considered the generator of household-type waste and the ship itself is considered the generator of special waste. The ship or its licensed collector has the responsibility to find a licensed treatment plant for such waste, and to pay directly for the services provided.

Economic Instruments

MARPOL Annex I

From 1988 to 1991, a pilot project was funded in the ports of the (former) North German coastal states for the "removal" ("removal" includes reception, transport, intermediate storage, treatment and ultimate disposal) of oily mixtures and

residues emanating from the ship's operation, as well as harmful liquid substances carried in bulk. The project included the improvement of the reception, treatment and disposal facilities in the port areas. The removal of oily mixtures and residues were provided free-of-charge to the shipping industry. The project was financed jointly by the state government (50%) and the federal government (50%).

Investment in infrastructure

The total investment for the improvement of facilities and optimization of the regional infrastructure was German Marks (DM) 3.95 million. Of the total investment, DM2.55 million were spent by private companies and DM1.4 million were contributed by the governments of three coastal States and the Federal Republic. In Bremen, no investments were necessary as the infrastructure was already in place, paid for by private companies.

Operational expenditures

From June 1988 to May 1991, about 14,100 disposal operations took place, resulting in the disposal of approximately 400,000 m³ of MARPOL Annex I waste. The cost of the operation was approximately DM31.6 million.

Difficulties experienced

The system operation was expensive. Fees charged by contractors for providing removal services were uncontrolled. Differences of up to DM150 per m³ for collection, transport and final treatment of residues existed.

System usage

Only about 10% to 12% of the ships calling the German ports made use of the free-of-charge reception facilities provided during the pilot project period, and until the end of 1995 when that concept was abandoned. Several reasons were evident. The majority claimed that due to the restricted time in port and insufficient manpower they were unable to use the facilities. Others claimed that the agents were not giving the ships adequate advance information about the facilities available.

When the pilot project ended, the coastal States decided to continue to finance the removal of oily mixtures and residues from ships. Continuation of the free-of-charge removal service extended to the end of 1993, with the objective of solidifying the progress made during the pilot project phase and encouraging the shipping industry to enhance oil pollution prevention capacities and standards.

From 1993 to 1995, coastal States attempted to develop a user fee system based upon the "polluter pays" principle. However, due to the objections of the shipping industry, no common fee structure was developed. Bremen decided to continue the free-of-charge service to the end of 1995, under the following conditions:

- a) A public announcement was made that the government intended to contract qualified waste collecting/transporting companies;
- b) In the announcement, certain conditions were stipulated, such as: (1) The companies must be licensed in accordance with the Waste Law, (2) They must have a

successful record in such operations within the last three years; (3) Proof of the available technical equipment was required; and (4) Proof of financial soundness, by providing a declaration of the total yearly turnover for the previous three years and a corresponding bank declaration;

- c) The submissions were evaluated and tender specifications were sent to the companies that qualified. The specifications contained all information on the services required and the management of such services;
- d) Prices quoted in the tender included: (1) the trip to and from the ship on an hourly basis; (2) the collection operation alongside the vessel on an hourly basis; (3) the disposal operation, including intermediate storage, transport to the treatment plant and the final disposal costs on a cubic meter basis; and (4) costs for manpower or additional equipment, on an hourly basis;
- e) Upon receipt of the bids, two companies with the lowest offers were chosen. The reason for contracting two companies was to ensure that all ships requesting the service could be accommodated without undue delay;
- f) Minimum requirements for ships using the services were introduced, namely: (1) only 3% of the total fuel consumption since the last collection was free of charge; (2) cargo residues were not covered; (3) a minimum pumping capacity of 5 m³/hour was required; (4) the maximum pumping time allowed for

quantities over 20 m³ was four hours; and (5) only one hour was allowed for connecting and disconnecting hoses.

The result in Bremen was only a slight reduction in costs, when compared with the previous free-of-charge approach. This was due to the fact that the quantities of waste oil collected were relatively small per operation because of smaller vessels calling at the port. In addition, most operations had to be carried out by barge. In Bremerhaven, where larger quantities of oil were collected, the average price for the service went down by approximately 30%. The conditions imposed on the ships resulted in improvement of equipment onboard and better cooperation between the ship's crew and the contractors.

MARPOL Annex II waste

Annex II waste is rarely handled in Bremen. Collection and disposal of cargo residues were conducted under a private contract between the ship and a waste collecting company. There are no records of any disposal having taken place in recent years.

MARPOL Annex IV waste

No services are provided.

MARPOL Annex V waste

On 31 August 1987, the Port Authority contracted a licensed waste collector and transporter. The contract requires the contractor to provide waste receptacles to distribute and collect them in the ports of Bremen and Bremerhaven and to transport them to the treatment and disposal facility. The contract was entered following a

public tender. Prior to submitting their bids, the companies received details of the administrative procedures and the estimated number of ships calling the ports per year. The different sizes of ships and the number of receptacles to be provided and collected were specified.

The contractor based his bid on the following criteria:

- a) The average length and duration of a trip to distribute, collect and transport the receptacles to the treatment facilities (i.e., municipal incinerator);
- b) The transport cost calculated on the basis of the German tariff for the transportation industry;
- c) The cost of the receptacles;
- d) The charges levied for incineration of one ton of household type waste; and
- e) The average weight of the waste (e.g., about 15.6 kg for a 120-l plastic bag).

The calculated costs normally resulted in about 2% of the total cost for receptacles, 8% of the disposal fee and 90% of the distribution, collection, and transport.

Present Situation and Future Outlook

MARPOL Annex I waste

Wastes originating from engine operation: It has not been possible to reach a consensus among the coastal states regarding a common waste disposal fee system for MARPOL Annex I waste. One concern is the competitive disadvantage for ports in Germany against the other ports in the region (North Sea area) if a mandatory system was imposed.

Bremen has decided to discontinue the free-of-charge reception service from 1 January 1996, and to leave the service to private operators. Ships will be required to pay the service provider for each service rendered, as is the procedure in other ports in the region. Many environmental groups and private contractors are unhappy with the situation. The cancellation of the free-of-charge reception service has resulted in an approximately 50% decrease in the demand for collection services by approximately 50% in Bremen. With ships once again paying for the service, other ports are being used for discharge of slops, where it may be cheaper or more convenient. On a positive note, the quality of slops has increased considerably, meaning that the water content in the oil-water mixtures is less than before. Indications are that ships' crews now use the separation equipment more effectively because of the fee levied on each cubic meter of oily waste discharge.

Bremen will continue to strive for a common fee system for the disposal of MARPOL Annex I waste on a national and regional basis. Any new concept must meet the following criteria:

- a) "Polluter pays" principle;
- b) The basis for any charges should be fair;
- c) Any charges levied should be shown separately in the disbursement account;
- d) Any charges collected should go into a special account solely used for providing the service;
- e) The costs should not be borne only by the ships;
- f) The ships should not be charged for each individual collection;
- g) Incentives should be provided to minimize waste;
- h) Ships with good maintenance and

operation should have a financial benefit over ships badly maintained and operated;

- i) Exemptions should be possible, e.g., for ships calling at a port regularly in short intervals (e.g., feeder vessels);
- j) Direct contracts should be allowed between facility operators and shipping companies engaged in national trade, e.g., ferries, fishing vessels, etc.;
- k) Adequate utilization of the facilities should be provided through stable base quantities
- l) Administration should be straightforward; and
- m) Every port in the region should utilize the same fee system in order to avoid unfair competition among ports.

Bremen has put forward the following proposal to the German coastal States and to other ports in the region, as a basis for discussion:

- a) Environmental dues should be introduced which entail collection from ships, as well as from the cargo handled in the port;
- b) Based on the experience over the past six years in Bremen, the total costs for the collection of Annex I waste emanating from engine operations are of the order of DM4.0 million;
- c) A surcharge of 1.5% on the handling charges levied on cargo would recover half of the service costs (DM2.0 million);
- d) The remaining DM2.0 million could be recovered from the ships calling at the ports, which would amount to an average charge of DM250 per ship call;

- e) The charges to the ship should be based on the horsepower of the engine plant, rather than on gross tonnage, which can be obtained from the ship's documents;
- f) The ship charge and the surcharge on the handling fee could be shown separately in the disbursement accounts, and could be collected by the port administration with other charges;
- g) For the charges levied, the ship is entitled to discharge engine room slops at any time, provided that certain discharge criteria are met;
- h) The services would be provided by contractors of the Port Authorities;
- i) Ships calling the port at regular short intervals without using the facilities every time could be exempted from the ship's charges after having paid for a certain number of calls;
- j) To provide incentives for reducing the amount of slops to be collected, a sliding refund of charges could be integrated into the scheme;
- k) When the environmental standards, technology, transportation, and treatment costs are similar in a region, a harmonized fee system among the ports in a region would seem achievable;
- l) Revenues from the charges are predictable to a great extent, thus providing a stable base from which to make investments and attract private sector interest;
- m) A charge system should be flexible and adapted to changes in trade patterns; and
- n) Ferries and coasters employed in national trade and fishing vessels should be exempted from paying

any charges if they provide evidence that they have entered into a contract with a licensed collector of wastes.

Bremen has already prepared the necessary changes to the legislation which can be introduced as soon as an agreement has been reached with the other coastal states and/or competitive ports in the region.

For wastes originating from cargo operation, it is suggested that the ship or the cargo owner should pay for any disposal. No change is required to the present "polluter pays" system. However, due to the fact that more and more tankers comply with the MARPOL requirements for separated or segregated ballast tanks and employ the "load-on-top" system, the need for a slop collection service is decreasing rapidly.

MARPOL Annex II to Annex V waste

No changes are anticipated, as present procedures have proven to be adequate and acceptable to all parties concerned.

Services and Facilities Available

Services Available

MARPOL Annex I

Waste Originating from Engine Operation: In the ports of Bremen, there are nine private collecting and transporting companies registered and licensed by the competent environment protection agency. All of them have either tank trucks or barges, or both, and conduct the collection operation at the berths. Ships are not required to shift berth in order to discharge oily residues. The

services are provided 24 hours a day, year-round. Contractors also provide equipment, such as hoses and portable tanks and the necessary personnel for the operation. Ships are requested to assist the removal operator with rigging the gear.

As part of the procedure, the master of the ship normally advises the collecting company 24 hours in advance, either directly or through his agents, about his intention to discharge slops, the expected quantity, the requested time of commencement and the berth. The contractor decides which type of removal operation is best (tank truck or barge) and notifies the removal operator. The contractor also notifies the Port Authority about the commencement and completion of the operation and the quantities collected. The Port Authority has the right to instruct the contractor to use a specific method of collection (shore or seaside collection) for safety reasons. The contractor will bring the residues collected to the treatment plant under a waste transport bill, in accordance with the waste disposal law. Samples of the residues are taken and analyzed by the treatment plant operator to establish the composition and quality of the residues. The intermediate storage facility and/or the treatment plant will issue a receipt for the residues received.

It is difficult to analyze the exact costs of each operation as they vary from ship to ship. However, based on the prices paid by the Port Authority from 1994 to 1995 during the free-of-charge service to ships the present costs to ships are estimated to be as follows:

1. trip to/from ship (barge)	DM350 - 500 per hour
2. trip to/from ship (truck)	DM75 - 150 per hour
3. collection, transport and treatment	DM59 - 106 per m ³

The prices stated under item 3 include the removal operation, the intermediate storage, transport to the treatment plant and the final disposal costs.

Wastes originating from cargo operation: Services, procedures and costs are the same as for Annex I waste originating from engine operation.

MARPOL Annex II waste

The services and procedures are the same as for MARPOL Annex I waste. Different substances, quantities and qualities of residues imply different treatment processes and handling procedures. This results in a wide and disparate range of costs.

MARPOL Annex IV waste

No dedicated services are available as Annex IV is not yet in force. However, companies possessing either tank barges with clean tanks or tank trucks may provide collection services, should ships require such services.

MARPOL Annex V waste

Household-type wastes: There is a 24-hour collection service provided by a waste collection contractor under contract to the Port Authorities in Bremen and Bremerhaven. Shortly after the arrival of the ship in the port, the removal contractor automatically places onboard the appropriate number of receptacles (plastic bags or bins) with a capacity of 120/240 liters. The number of receptacles placed onboard is based on the average consumption of the crew, according to the size of the vessel. River barges will receive one receptacle every 14 days. The filled receptacles are collected by the

"removal" contractor either every two days or shortly before the departure of the ship. Normally, the collection is done daily between 0800 hours and 1700 hours. However, the receptacles will also be collected on request. The Master of the ship has to sign a statement concerning the number of receptacles received and returned full. The ship's crew is requested to assist in the collection of the receptacles. The ships are asked on arrival to separate the wastes as much as possible into glass, paper, plastic, and other categories like foodstuff. Facilities to collect separated wastes are available. The waste is transported to the treatment plants, either in Bremen or Bremerhaven, where it is incinerated.

The ships are also informed on arrival that household-type waste should not be mixed with special waste. Such mixtures are treated as special waste and charged separately. In cases where ships do not comply, the mixtures have to be separated by the contractor, who informs the Port Authority immediately of such occurrences.

For providing the receptacles, transportation and disposal services, the Port Authority levies a fee. The basis for the fee is the price charged by the contractor providing the service, plus an additional percentage (approximately 5%) as an administrative surcharge. The public sector may only cover the costs for the service provided and is not allowed to make profit. The fees paid by the ships are presently as follows:

Up to 300 GT	1 receptacle	DM18.20
301 - 500 GT	1 receptacle	DM20.05
501 - 1,000 GT	1 receptacle	DM33.15
1,001 - 1,600 GT	2 receptacles	DM66.30
1,601 - 5,000 GT	4 receptacles	DM132.60
5,001 GT and above	6 receptacles	DM198.90

For each additional receptacle DM18.05 are to be paid. Barges are charged DM17.35 for each receptacle requested.

Special waste: There are several licensed collectors and transporters of special waste. Treatment and disposal facilities are available within Germany to handle the different compositions and quantities of special waste. The Master of the ship or his authorized agent is required to notify any one of the licensed removal operators normally at least 24 hours in advance, about the quantity and quality of the waste to be disposed, the requested time of commencement of operation and the expected berth. The removal operator will carry out the operation in accordance with the procedures laid down in the waste prevention and disposal law. The operator takes samples of the waste, making an analysis to establish the composition and quality of the residues, and to select the appropriate treatment process. After preparing a transport bill, which is signed by the Master of the ship, the residues are transported to the treatment plant, either directly or via a licensed intermediate storage facility. The removal operator is required to advise the Port Authority of the commencement and completion of the operation. The treatment plant operator will issue a receipt of the quantity and quality of the special wastes received.

The costs of the operation are not known to the Port Authority. The ship owner contracts the collector and transporter directly. The costs vary with the type and quantity of the special waste. There are some cases where the Port Authority or the water police detects special waste onboard that is ready for discharge. In such instances, ships are

required to arrange the collection of special waste prior to their departure.

Difficulties have been experienced with contaminated and mixed special wastes. To determine which treatment plant is authorized to accept the special waste, a thorough analysis has to be made of the special waste. This is sometimes a lengthy process which could delay a ship. As an alternative, the waste collector receives an advance payment from the ship, based on experience and a guarantee that any additional charges will be paid upon presentation of the detailed bill. Experience has shown that these guarantees are not always honored, and as such the collector additionally requires a written statement from the state of Bremen that any costs not recovered will be borne by the government. This has resulted in a couple of instances where the state of Bremen has paid over DM100,000 for the disposal of special waste.

Facilities Available

MARPOL Annex I

Equipment used for collection: There are nine private companies available for the collection of MARPOL Annex I waste in Bremen and Bremerhaven. Some companies provide collection services with tank trucks, others by means of floating equipment. There is presently only one company that provides both services (shore and water side).

Intermediate storage facilities: Around the German coast there are 11 licensed intermediate storage facilities, consisting of storage tanks only. They are located mainly in the smaller ports, fishing ports

and pleasure craft harbors and have a total capacity of approximately 30,000 m³. When necessary, the contents of these tanks are collected by tank barges, small coastal tankers or tank trucks and transported to treatment facilities. In Bremen and Bremerhaven, no intermediate storage facilities are available.

Intermediate treatment plants: All treatment plants are privately operated. Two plants with a capacity of approximately 250,000 m³/year are available in Hamburg and four plants with a capacity of approximately 160,000 m³ per annum in Bremen, Bremerhaven and Blexen. The operation of the plants are fairly similar. In Blexen, for example, the maximum throughput is 80,000 tons per year. Presently, approximately 30,000 tons of oily water mixture are collected annually from ships and processed through a separator. Approximately 9,000 tons of oil are extracted and sold to permit holders for fuel (shipping companies, incinerator plants, etc.). The selling price is 20% to 30% lower than the market rate for bunker oil.

The remaining oily water (oil content of the water is still 10%) is shipped to a treatment plant in Hamburg (approximately 16,000 tons) or Bremen (approximately 5,000 tons). At the treatment plant, it is pretreated prior to release to the river or into the sewage system.

The investment cost for the Blexen installation was DM3.0 million. Transportation and treatment costs are high (approximately DM500,000 per year). The company is in the process of building a new oily water treatment plant on the premises. The capital investment for the plant is DM0.75 million.

MARPOL Annex II

The equipment and intermediate storage facilities for Annex II waste are limited to that which is available for MARPOL Annex I waste. Their use is restricted to non-corrosive substances.

Final treatment plant: There are two treatment plants available in Bremen with restricted capabilities. They are mainly used for treatment of land-based generated wastes, because bulk liquid chemicals are not handled in the ports of Bremen and Bremerhaven. However, installations that receive Annex II cargoes are also capable of receiving and treating slops and residues.

MARPOL Annex IV

The Ports of Bremen and Bremerhaven have municipal sewage treatment plants. However, only Bremen has a berth where barges can discharge to the sewage plant system.

MARPOL Annex V

Collection equipment is owned by a private contractor. In Bremerhaven, because the majority of ships are large container vessels and car carriers, sophisticated equipment is used. Normally, 240-liter bins are provided onboard. For larger vessels, which require bigger containers, these are also provided. For the delivery and collection of bins and containers, a special crane truck with 18-ton lifting capacity and a container truck are used. In Bremen, plastic bags are used for the collection of household-type waste. The distribution and collection is done with a normal truck which has a chassis comprised of segregated boxes for the separation of wastes. For the collection

of special waste or cargo residues, large containers are provided in both ports. Upon request of the owner or the ship's command, special containers for all types of solid waste are available.

Intermediate Storage Facilities: In Bremen, the contractor does not have any intermediate storage facility. In most instances, waste is delivered directly to the incineration plant. Occasionally, special arrangements are made with a private contractor to use intermediate storage facilities, but these are infrequent.

In Bremerhaven, the contractor operates his own licensed storage facility for intermediate storage and separation of wastes. The investment cost of the facility is approximately DM70,000.

Municipal Incineration: Both cities, Bremen and Bremerhaven, have an incinerator, which are operated as private, non-profit companies. The municipalities are the principal shareholders of the installations.

Other Facilities: A special facility for the intermediate storage and handling of damaged dangerous and harmful waste has been built in Bremen by the Port Authority. The first construction phase has been completed in 1993 at a cost of DM1.619 million. It has been designed and constructed in accordance with the stringent conditions of the Federal Pollution Control Act. It has received permission from the environment protection authorities for the intermediate storage of harmful and hazardous substances. Damaged dangerous cargo and special harmful waste collected from ships may be kept at the facility until their disposal. The site will be operated by the fire brigade, which will maintain a

constant watch when cargo or waste is on the premises.

One private company that also operates an intermediate treatment plant for oil and chemical residues has developed a special facility to recycle plastic and metal-containing residues of paints, varnish, adhesives and bitumen. The plant is used mainly for land-based generated waste, but could also serve waste collected from ships.

Relationship Between Ship-Generated and Shore-Generated Wastes

The amount of waste generated onboard ships is very small compared with the amount generated in land-based activities. An exception may be the generation of MARPOL Annexes I and II wastes, originating from cargo in ports with oil refineries and chemical plants. Normally, the amount of waste on vessels is limited and will vary with trade patterns. Investments in collection equipment (trucks, barges), intermediate storage facilities and treatment plants are costly. In order to get an adequate return on investment and to cover the operating costs, each facility requires a minimum throughput. Furthermore, to ensure an adequate utilization of the personnel employed, there must be a steady flow of waste. These two criteria will not normally be met by the collection of waste from ships alone. Waste collection companies and waste facility operators must therefore have other sources of waste in order to make their operations sustainable.

In Bremen, all the parties involved in the collection and treatment of ship-generated wastes are also collecting or treating land-based generated waste or provide other services. Examples include:

- a) Annex I waste collectors operate either oil and gasoline storage facilities or gasoline stations, provide tank cleaning or oil collecting services for gasoline stations and private households, provide cleaning services for private households in case of sewage pipe blockages, etc. or a combination of service;
- b) Oil and chemical treatment plants treat wastes from land- and sea-based operations, including plastics, contaminated paint residues and other special waste;
- c) The collector for Annex V waste is also the contractor of many municipalities for the weekly collection of garbage from households, and the collection of special waste from households, factories and building sites (construction debris); and
- d) The treatment plants and landfill sites in the two cities treat or deposit wastes collected mainly from the two cities of Bremen and Bremerhaven, as well as the surrounding rural areas.

Unless land- and ship-generated wastes are collected and treated in the same facilities, sustainability of services is unlikely. There simply is insufficient income to cover operating costs and an adequate return of the investment.

Public Sector - Private Sector Administrative Framework(s)

Contract Between the Public and Private Sector

For the operation of reception facilities, especially the collection services, it is advisable to use private

companies that are under contract of the Port Authority. In Bremen, the contract was awarded by public tender after careful selection of the companies invited to tender.

Prior to preparing the specification for the contract, operational considerations were reviewed which included important factors such as:

- a) Area covered by the contract;
- b) Extent of services to be provided;
- c) Responsibilities of the contractor;
- d) Pre-conditions that should be met by the ships in order to qualify for the provision of services;
- e) Monitoring of the performance;
- f) Financial impact and the provision of adequate funds;
- g) Financial settlement arrangements between the port authority and the contractor;
- h) Notification to all parties concerned; and
- i) Consultation with interested parties.

A detailed specification of the services was prepared in order to enable the contractor to submit a fair bid. It is very important that such a specification is prepared. Otherwise surprises may be in store for the Port Authority if certain items have not been included in the specification or are not detailed enough.

Some areas that were part of the specification are mentioned below. These are by no means comprehensive and need to be adjusted in accordance with local requirements, such as:

- a) Period of service (day shift only or 24-hour service);
- b) Sunday and holiday surcharges;

- c) Quantities to be expected (it should be clearly stated that these quantities are only estimates);
- d) Type, quality and quantity of equipment to be provided;
- e) Personnel requirements;
- f) Type of service to be provided (e.g., only distribution and collection of garbage bins, or total service including separation of wastes, intermediate storage and final treatment);
- g) Areas to be covered by quoted prices (same as above);
- h) Minimum insurance coverage for pollution incidents;
- i) Procedures in case of non-performance; and
- j) Whether one or more contractors will be employed.

The bids received are carefully evaluated and checked to determine if the quoted prices are reasonable. Bids that are too low for the proper execution of the required service are discarded. The contract document states clearly all requirements, obligations and expectations of both parties and includes the concept for a better understanding of the above. The contract document contains all paragraphs required by public contract law, as well as conditions specific to the state of Bremen contract requirements for public contracts.

Monitoring and Enforcement of Regulations and Standards

The basis for any monitoring and enforcement of regulations and standards is adequate legislation. In Germany this consists mainly of the federal waste law, transport of dangerous goods law, water protection act and factory law with the appropriate execution ordinances and technical guidelines of the federal states.

Another requirement is waste management plan. This plan is required by the German waste law and prepared by the federal states. It contains the statutory determination of waste disposal plants (incineration plants, dumping sites, handling sites) and waste disposal plans. In the waste disposal plans other statutory determinations are included, such as the authorities responsible, which disposal plant has to be used by the person or institution responsible for the disposal, the use of specific routes for the collecting vehicles or the time limitations for the use of certain plants.

Emission and effluent standards are in place. Compliance with these standards are monitored on a regular basis by the competent authority, in most instances the trade supervisory office or environmental protection authority. For each installation, an environmental impact assessment has to be carried out, as well as a risk analysis. All companies operating intermediate storage facilities and treatment plants receive a license to operate from the environment protection office when all

legal requirements and emission standards have been met. Also, waste collectors and transporters must possess a license which is only given when certain standards are met.

A cradle-to-grave notification system is in place that allows a constant monitoring of the waste streams from the waste owner to the final treatment or disposal. With regard to the monitoring of the compliance with the MARPOL Convention, a competent authority has been nominated who not only supervises the ships under German flag but also perform the port state control functions. For the compliance with the port by-laws which cover the collection and disposal of ship-generated waste, the Port Authority is responsible who has employed qualified marine engineers for the monitoring. Non-compliance with environmental legislation and standards are either infringements of applicable laws which may be punished with heavy fines (up to several hundred thousands of German Marks) or criminal offense with the capital punishment (imprisonment).

THE ESTABLISHMENT OF A MARPOL WASTE OIL RECEPTION FACILITY FOR BANGKOK AND THE PORTS OF THE EASTERN SEABOARD OF THAILAND: PUBLIC SECTOR - PRIVATE SECTOR PARTNERSHIP FOR MARINE POLLUTION PREVENTION

Neil Challis

Director of Strategic Planning & Development (Asia)
International Response Corporation
c/o BMT (Asia) Co., Ltd., Thai CC Tower
20th Floor, 889 S. Sathorn Road
Sathorn, Bangkok 10120
Thailand

CHALLIS, N. 1997. The establishment of a MARPOL waste oil reception facility for Bangkok and the ports of the eastern seaboard of Thailand: public sector - private sector partnership for marine pollution prevention, p. 314-319. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

Oil wastes from ships arise from cargo residues and from the operation of machinery. Historically, such wastes were disposed of at sea in a largely uncontrolled manner, giving rise to various environmental impacts. However, the growth in shipping movements and particularly those involving the transport of large volumes of crude oil and petroleum hydrocarbon products resulted in the early 1970s in international concern over the potential for pollution of the marine environment by ships.

This concern was reflected in the introduction of the International Convention for the Prevention of Marine Pollution from Ships (MARPOL 73/78 [Consolidated edition 1991]) which was adopted by the International Maritime Organization (IMO) in 1973, and subsequently amended by the Protocol of 1978. The convention is now commonly referred to as MARPOL 73/78. The Convention consists of five Annexes,

which define regulations for the control of ship-generated pollution, as presented in *Table 1*. This paper concentrates on the issues relating to the provision of Annex I waste oil reception facilities.

Table 1. Annexes to the Convention.

Annex Number	Title
I	Prevention of Pollution by Oil
II	Control of Pollution by Noxious Liquid Substances
III	Control of Pollution by Harmful Substances in Packaged Form
IV	Prevention of Pollution by Sewage
V	Prevention of Pollution by Garbage

The adoption of Annexes I and II is compulsory for ratification of the Convention. Regulation 9 of the Convention addresses the control of oil discharges from ships and severely restricts or bans the discharge of oily wastes under various circumstances. Regulation 12 defines the requirements for

reception facilities to accept waste oil from ships and states:

...the Government of each Party undertakes to ensure the provision at oil loading terminals, repair ports, and in other ports in which ships have oily residues to discharge, of facilities for the reception of such residues and oily mixtures as remain from tankers and other ships, adequate to meet the needs of the ships using them without causing undue delay to ships.

As of June 1996, some 97 countries, representing around 93% of the world's fleet had ratified Annexes I and II of the Convention. However, while MARPOL 73/78 has been successful in many areas of marine pollution prevention and ship owners have been responsive to implementing the requirements placed upon them by the Convention, there remains a recognized worldwide lack of port-based oily waste reception facilities. Although it is true that improvements in shipboard technology and ship design could significantly reduce the amount of waste that will be produced, port-based reception facilities will continue to be an essential element in the reduction and management of marine pollution for many years to come.

Why are Reception Facilities Still Absent from many of the World's Ports?

While the Convention states that signatory countries should "ensure" the provision of such facilities, it does not say how this should be done. In most cases, the problem of the provision of facilities is one of financing and regulatory enforcement.

Although in some cases, such as Sweden, the taxpayer bears the cost of oily waste reception facilities, most countries are understandably reluctant to incur the cost of the construction and operation of MARPOL facilities and prefer such activities to be performed by the private sector. The question then becomes how to make the establishment and operation of reception facilities commercially viable in the eyes of the private sector.

One of the fundamental problems with respect to the commercial viability of reception facilities is the relative ease with which ships can discharge wastes illegally at sea. Although many ship owners are now increasingly aware of environmental issues and are responsible in the way they handle their wastes, there will always be some who will take the easy and cheaper option of dumping at sea. As such, ports can often get a distorted view of the need for reception facilities. The fact that ships do not request the use of reception facilities every time they call at a port does not mean that they are not needed—although it could mean the vessel has recently discharged to a facility in another port, it could also mean that they have discharged illegally at sea.

Generally speaking, the environmental business is driven by the introduction and enforcement of regulations. Unlike on land where illegal dumping of waste is fairly visible and the source fairly easily traceable, the enforcement of anti-dumping regulations for ships is immensely difficult. The level of monitoring of shipping lanes that would be required to provide the necessary enforcement is in most cases exorbitantly expensive and impractical. Ultimately, a regional Port State Control (PSC) approach

such as that in Europe should assist in the enforcement of anti-dumping regulations, although this is likely to take many years to establish in Asia and requires effective information handling practices and a high level of coordination between governments.

Financing Mechanisms for Waste Oil Reception Facilities

Given the problems associated with enforcement of ship-source pollution regulations described above, emphasis needs to be placed upon the development of innovative financing mechanisms. The following are some of the main criteria that should be considered when examining such mechanisms:

- a) Will the mechanism itself contribute to the reduction of marine pollution by stimulating delivery of waste to ports?
- b) Will the mechanism stimulate waste reduction onboard?
- c) Will the mechanism interfere with interport competition?
- d) Does the mechanism apply the internationally accepted doctrine of the "polluter pays" principle?

Most existing reception facilities charge the discharging vessel on the basis of per tonne of waste delivered (often referred to as the "fee system"). The level of charges vary enormously around the world and, in some cases, such as the US, the cost of discharge can be extremely high. Such an approach will always act as a disincentive to ships, and may even encourage illegal discharges. Although the fee system provides commercial viability in some ports and countries where enforcement of environmental regulations is strict and shipping numbers high, in many areas of the world it does not

provide a sound basis for the establishment of reception facilities.

Oily wastes from ships have an intrinsic value that could be realized by recycling. However, the ease of dumping at sea and the uncertainty over the levels of waste oil associated with the fee system introduce an unacceptably high level of commercial risk in most ports. Unlike with the terrestrial waste business, the problem of predicting the level of ship-board waste is exacerbated by the ease with which ships can move the waste from country to country and dispose of it where they wish.

One possible way to limit the effect of the uncertainty over waste volumes, which arises with the fee system and provides the stable income necessary for commercial viable reception facilities, is the creation of a compulsory fee on ships when they call at ports. This is fundamentally the approach being developed in Norway. Under such a system, a ship is charged a small fee (in most cases considerably less than the sum the ship would pay if it actually discharged at a facility operating a fee system) when it calls at a port, whether it discharges waste or not. Knowing that there is going to be a charge anyway, the ship is encouraged to discharge rather than run the risk, albeit relatively slight, of being caught dumping at sea. Of course, the collection of any wastes should be quick and efficient so as not to delay the vessel and, in so doing, act as a disincentive to discharging. By reducing the level of charges on regularly calling vessels and vessels which have onboard waste reduction technology, this mechanism is unlikely to interfere with interport competition and should encourage onboard waste reduction measures. Importantly, the mechanism also conforms to the "polluter pays" principle.

The structure and application of such mechanism is presently being discussed at the Ship-Port Interface Group (IMO, Report of the Marine Environmental Committee, 38th session, 9 July 1996) of the International Maritime Organization, which was tasked with finding solutions for the financing of reception facilities. Although earlier discussions in the group considered the inclusion in MARPOL of a mandatory financing mechanism similar to that being introduced in Norway, the group has sensibly moved away from this, recognizing the huge variation in existing mechanisms and maritime administrative structures around the world. This being the case, the last Marine Environmental Protection Committee noted that whatever system was used, it was the responsibility of the Parties to the Convention, i.e., governments, to ensure that ports provide such facilities.

The European Commission is reviewing the lack of reception facilities in its ports. The focus at present seems to be on the compulsory discharge of wastes when a vessel enters a European port. Although this will reduce the uncertainty associated with the volumes of waste, such a system is unlikely to stimulate the discharge of wastes in port on its own, and will need to be associated with an effective regulatory enforcement mechanism. Although this would be difficult in Asia at present, the improvement in Port State Control within Europe may well make this a feasible approach for European waters.

A MARPOL Waste Oil Facility for Thailand

The Thai Government has taken a Policy Decision to ratify MARPOL 73/78. This followed a number of pollution

incidents in the vicinity of the ports in the Bangkok area and on the Eastern Seaboard of Thailand. Many of these incidents are believed to have arisen as a result of the illegal dumping of waste from ships using the various ports and anchorages in the area. The Eastern Seaboard is an important international tourist destination and relies heavily on the reputation of its beaches. The Thai government hopes that the establishment of reception facilities and the ratification of the Convention will restrict the discharge of such wastes into the marine environment and reduce the number and severity of reported incidents.

In April 1995, the International Response Corporation (IRC), a company specializing in environmental solutions for the maritime industry, was awarded a contract by the Industrial and Environmental Management Program (IEM) of the Federation of Thai Industries. The purpose of the work was to investigate the feasibility of the development of MARPOL waste oil reception and recycling facilities in Bangkok Port and along the Eastern Seaboard of Thailand. Under the contract, 50% of the cost of the feasibility study was provided by USAID, while the other 50% was covered by IRC. The intention of the cost-sharing agreement was to bring in a company that had both the commitment and the resources to establish a facility should the feasibility study prove to be positive.

With the initiation of the feasibility study, an official committee was established to oversee and assist in the projects development. This was chaired by the Ministry of Transport and Communication (MOTC) which has overall responsibility for shipping in Thai waters, and consisted of representatives from the Harbour Department, Port Authority of Thailand and

many other relevant agencies. Through the committee, IRC had access to data and information necessary for the feasibility study.

The MARPOL convention requires “reception” facilities; it does not specify “treatment”. In many countries, facilities for the treatment of oily waste exist as a consequence of waste oil collection from land-based sources. In Thailand and other Asian countries, the required treatment facilities are still lacking. As such, it is not possible to separate oily waste collection and the subsequent treatment. The feasibility study concluded that the proposed facility should be capable of providing a complete service. The viability of such facilities can be improved by including, where possible, the collection of waste oil from land-based sources to supplement the volumes received from calling ships.

With regard to the financing of the facility, the feasibility study concluded that:

- a) The facility could not rely solely on revenue from the recycling and sale of waste oil due to the difficulties in predicting the volumes of waste that could be collected from vessels calling at Thai ports;
- b) A sustainable financing mechanism would need to be developed through discussions between the private sector, the government and other interested parties in order to make the proposed facility commercially viable.

Following the completion of the feasibility study and IRC’s subsequent decision to continue with the pre-

construction phase of the project, a smaller working group was established under the direction of the MOTC to continue the public-private sector liaison and project development.

IRC is now nearing completion of the pre-construction work and aims to be in a position to initiate construction of the facility early in 1997. The environmental impact assessment and site investigation work are finished, and the detailed design is nearing completion. The precise nature of the proposed financial mechanism is still being developed by the relevant Thai authorities, but the intention is to create a situation which will provide the desired level of security to enable private sector investment while at the same time providing a cost-effective and efficient service to the shipping community. Agreement on the structure of the mechanism will be timed to coincide with the start of construction of IRC’s facility, and the introduction of the mechanism with the commissioning of the facility.

Facility Description

The proposed storage and treatment facility will be in Laem Chabang, the new deep water port on the Thai Eastern Seaboard. Barges will be used to collect wastes from ships calling at Bangkok, Map Tha Phut, Siracha, Siam Seaport and other ports and anchorages along the Eastern Seaboard. As stated in Regulation 12 of MARPOL, the collection of wastes should not “unduly” delay the ship. From a ship owner’s perspective, a delay can be far more costly than the waste collection charge. Although common, the use of vacuum trucks is often not attractive for internationally trading vessels due to the need for a quick turnaround and the limited time during which the truck can service the

vessel. In this respect, barges offer much greater flexibility. IRC intends to use a number of such vessels at strategic locations along the coast. The intention is to examine the possibility of these barges being outfitted for oil spill response. Operating 24 hours a day in potential high risk spill areas, these vessels would provide an ideal first line of response for oil spills in coastal areas.

Waste collected from the various ports and anchorages will be transported to the facility at Laem Chabang where it will be pumped ashore and treated to produce a basic fuel. The product will be sold to industry. In the initial phase of operation, the facility will have a design capacity to accept and treat some 25,000 tons of waste per year. This will be increased to 35,000 tons per year in the second phase when more waste oil is expected with the expansion of operations at a nearby shipyard in Laem Chabang.

Conclusion

The approach adopted by the Thai authorities provides an excellent example of how the public and private sectors can

work together to solve marine environmental problems. Public sector support from the initiation of the feasibility study, through to the introduction of a sustainable financing mechanism, has provided the commercial confidence for IRC to tackle a marine environmental problem that has remained unsolved for many years in Thailand. At the same time, the project gives the government the necessary infrastructure to both ratify and fulfill its obligations under the MARPOL Convention. The ship owning community gets the service that is so often lacking, enabling it to conform to the increasingly stringent environmental standards being set by governments and the industry itself.

Thailand is far from unique in the region with respect to the lack of adequate MARPOL reception facilities. Although many Asian countries have ratified the Convention, reception facilities are conspicuous by their absence. The more widespread use of approaches such as that described for Thailand could go a long way to improving the handling of shipboard wastes and the general marine environment of the region.

Session 6

Enhancing Public Sector- Private Sector Partnership

ROBERT J. DOBIAS, Environmental Advisor, Environmental Division,
Asian Development Bank, Philippines.

*"Asian Development Bank support for public - private sector
investment in the environment."*

EUGENIO RAYMUNDO B. INOCENTES III, Assistant Director,
Public Investment Staff, National Economic and Development
Authority, Philippines.

*"Management of partnerships between the public and private
sectors in financing environmental activities: policies on the
provision of government support arrangements to private sector
participation in water infrastructure."*

RINA MARIA P. ROSALES, Research Associate, GEF/UNDP/IMO
Regional Programme for the Prevention and Management of Marine
Pollution in the East Asian Seas, Philippines.

*"Financial mechanisms for mobilizing in-country and external
resources for the prevention and management of marine pollution."*

ASIAN DEVELOPMENT BANK SUPPORT FOR PUBLIC - PRIVATE SECTOR INVESTMENT IN THE ENVIRONMENT

Robert J. Dobias
Environment Specialist
Asian Development Bank, Manila
ADB Avenue, Pasig City
Philippines

DOBIAS, R.J. 1997. Asian Development Bank support for public - private sector investment in the environment, p. 322-331. *In* S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Overview of the Asian Development Bank's Environmental Policies and Operations

The realization of sustainable development is the essence of the Asian Development Bank (ADB). This is reflected in the strategic objectives of the ADB as presented in the Medium Term Strategic Framework:

- Economic growth;
- Poverty reduction;
- Women in development;
- Human development; and
- *Sound management of natural resources and the environment.*

The ADB's current environmental agenda is, for the most part, a logical and progressive extension of key policies determined in the late 1970s. Such policies mandate the incorporation of appropriate environmental measures in all of the ADB's development activities and prioritize projects designed to protect, rehabilitate, manage, or otherwise enhance the human environment and the quality of life in its developing member countries (DMCs). In the 1970s and most of the 1980s, the approach was to solve environmental problems as they arose.

However, the ADB gradually moved from a reactive to a proactive approach which identified and even anticipated problems, looking at these from both an economic and a social viewpoint, and planning solutions in a similarly comprehensive manner. A review of the environment program in 1986 refined these policies by stressing project review, further promotion of the environmental awareness and training of ADB staff, establishment of the ADB as a regional resource center, strengthening of the environmental capabilities of DMCs, greater cooperation with NGOs, and increased support for projects with direct environmental benefits (ADB, 1994a).

The ADB screens all proposed projects for their expected environmental impacts as a matter of course. At the project level, environmental assessment is done at all important stages, i.e., preparation, appraisal, approval, implementation, and post-evaluation. Guidelines for assessing the environmental impacts of projects have been prepared to assist project staff in facilitating borrower compliance with the environmental assessment requirements of the ADB. Importantly, summary environmental impact assessments are

required to be made available to the public 120 days before the ADB's Board discusses the project in question.

Environmental impact assessment is not confined to project loans. The ADB has formulated detailed operational guidelines to ensure that adequate attention is given to environmental aspects in the context of other

lending modalities, including credit lines to financial intermediaries and equity investments. In credit lines to financial intermediaries, for example, environmental concerns are dealt with at two levels: the first to ensure that the operational policies of the recipient institution are environmentally friendly, and the second to require the preparation of environmental assessments for subprojects judged to be environmentally sensitive.

The ADB continues to update its environmental policies and action agenda, which include the adoption of a strategic planning approach and strategic

Classification/project mix	Percentage of total loan project	
	By number	By amount
<ul style="list-style-type: none"> • Traditional growth projects • Projects aimed at social concerns • Projects aimed at the environment • Growth oriented projects having secondary features to address social and/or environmental concerns 	Less than 50	Less than 60
	Greater than 50	Greater than 40

Table 1. Integration of environmental considerations at different planning levels.

Planning level	Context	Approaches and techniques
Country	National development plan	National Agenda 21 Country strategy study Country programming Three-year rolling plan Environmental profiles
Region	Multidisciplinary and regional development plans	Land use planning Integrated development planning Economic-cum-environment development planning
Sector	Sectoral reviews	Environmental guidelines Environmental country strategy and sector strategy
Project	Environment review during project cycle	IEE and EIA Project review and monitoring

development objectives. The nature of this strategic framework is indicative of the ADB's commitment to meet the DMCs' needs in the coming years. Through its Office of Environment and Social Development, the ADB incorporates environmental considerations into different planning levels of DMCs, as shown in *Table 1* (ADB, n.d.).

Through its Medium Term Strategic Framework, the ADB is promoting a policy that directs its project mix, or the types of projects that will be supported based on their strategic development objectives, toward increasing support for environmental and social projects (*Table 2*).

Given the limited financial resources available to DMC governments and the ADB, the ADB recognizes the important role of public-private sector cooperation in achieving its targeted

project mix and in promoting sustainable development in the region. This paper provides an overview of how the ADB is approaching this issue.

Promoting Public-Private Environmental Investment

In recent years more attention has been given to the role of private enterprises, and particularly those that enhance environmental quality while generating economic growth. Among the first initiatives undertaken by the ADB, in 1989, was a regional technical assistance entitled "Economic Policies for Sustainable Development: Implementing the Brundtland Commission Recommendations in Selected DMCs." The technical assistance involved individual country studies in Indonesia, Malaysia, Nepal, Pakistan, the Philippines, the Republic of Korea, and Sri Lanka.

In the environment - industry interface, for example, the ADB provided support through the technical assistance to address the policy implications associated with improving the environmental management capabilities of industries. Specifically, the studies (i) reviewed trends in industrial production and transformation, including employment, the use of raw materials and energy, and waste disposal; (ii) reviewed government policies and strategies relating to these, and assessed the impact of these policies on the pattern of industrialization, the distribution of industries, the use of raw materials and energy, waste disposal, and the impact on the environment; and (iii) identified relevant policy and institutional issues, and recommended policy options aimed at achieving sustainable development.

This initial, policy-oriented work was followed in 1992 by a "Study of Financing

Mechanisms for DMC Environmental Programs and Projects", also financed under a technical assistance. The purpose was to develop specific recommendations on the most appropriate mechanisms for mobilizing existing and additional investment funds to finance environmental projects in the DMCs. The short-term objective was to pave the way for financing several priority environmental projects through modalities which would encourage environmental lending to DMCs in general, both through the public and private sectors. Priority areas included: (i) pollution control in the industry and power sectors; (ii) integrated urban environmental improvement; (iii) tropical forest management and conservation of biological diversity; (iv) projects that alleviate poverty and enhance the environment; and (v) strengthening of environment-related institutions and human resources.

The study also attempted to evaluate the need for, and feasibility of, a regional environment fund involving a majority of DMCs, as well as several of the other ADB member countries. The intended output of the technical assistance was to help the participating countries to overcome some of the hurdles standing in the way of environmental lending, which is handicapped as much by the absence of suitable financing mechanisms as by a shortage of candidate investment projects. In the longer term, the study was intended to be a major early step in helping DMCs to mobilize their own resources for funding environmental actions to complement external funding, and to make achievement of the countries' environmental targets less dependent on often unpredictable levels of external support.

The technical assistance began with the preparation of background technical recommendations and case studies containing a feasibility-level analysis of a regional environment fund and recommendations for alternative financing mechanisms. The background papers were discussed by a high-level panel during a seminar attended by senior DMC officials from finance, planning, and environment agencies, and representatives of the private sector, NGOs, and bilateral and multilateral agencies. The seminar highlighted the ways of combining external with internal financing and explored the potential for DMCs to generate their own resources either through sectoral reallocation of financial resources or through new, revenue-generating environmental policies. The outcome of the technical assistance was a publication of the seminar proceedings (ADB, 1994b).

In February 1996, the ADB hosted the United Nations Council on Sustainable Development Third Expert Group Meeting on Financial Issues of Agenda 21. The general conclusion from all of these initiatives is that the private sector has an instrumental role in providing investment in sustainable, environmentally sound development activities. Enterprises and entrepreneurs can combine their private sector funding expertise and the discipline of the market in order to achieve attractive financial returns from investments in a rapidly growing and profitable global and Asian market for environmental goods and services. Much additional effort is needed to make enterprises and investors aware of the market and how to invest successfully in it.

Based on the ADB's past studies and its dialogue with other international

financial organizations, United Nations organizations, governments, donors, industrial associations, business development organizations, and private entrepreneurs about how best to promote sustainable enterprise development, there would appear to be two critical elements identified as essential for promoting successful, environmentally sound investments: (i) the mobilization of incremental financial resources; and (ii) the creation of an institutional framework in each country to make operational sustainable development concepts and bring them together through intermediation of the various aspects that generate investments. These include information about available technologies, support services, finance and institutional credit, legal advice, and marketing promotion.

Experience over the past several years suggests that each of the two elements is a necessary but not a sufficient condition for the process of investment to be sustained. In particular, the availability of financial resources for environmental investments alone is not sufficient in the face of a general lack of awareness of the value of sustainable technologies as strategic (and profitable) business tools, lack of mechanisms or fora for the exchange of information on opportunities for technology cooperation, lack of information on the means of obtaining credit for investments, and lack of knowledge about how new technologies can be adapted to local conditions in profitable ways. It follows that in the absence of financial resources, an institutional framework for promotion of sustainable investments would be equally sterile. On the other hand, the two together can generate a dynamic climate for investment promotion, since the availability of an institutional framework for intermediation

of services in support of investments in environmentally sound enterprises can serve as a catalyst, generating interest by investors and the mobilization of funds for new investments in improved technologies.

Investments in environmentally sound enterprises are generally of two types: (i) new investments that incorporate improved and adapted environmentally sound technologies; and (ii) investments to improve or expand existing industries or processes through the introduction or transfer of improved technical processes. There are many terms used to describe these types of investments, including "eco-efficient" firms, "environmentally sound technologies", and "environmentally sound and sustainable development", among others. In general, the group of enterprises or technical processes that can be considered as environmentally sustainable are those with the following characteristics:

- a) They incorporate technical processes that protect the environment, are less polluting, use all resources in a more sustainable manner, recycle their wastes and by-products, and handle residual wastes in a more socially acceptable manner than the technologies for which they are substituted.
- b) Environmentally sound investments comprise not just individual technologies, but total systems which include know-how, procedures, goods and services,

and equipment, as well as organizational and managerial procedures.

- c) They include mechanisms to promote technology cooperation, the transfer of know-how, and the building up of economic and managerial capabilities for the efficient use and further development of transferred technology. Such investments include means to address the human resource development and local capacity building aspects of improved technological choices.¹

Over the next several years, the level of investment required in environmental goods and services and in enterprises that incorporate sound technologies is significant. In order to achieve the investment goals set in Agenda 21 for the Asia and Pacific Region, capital expenditures of at least US\$13 billion per annum are required by the year 2000. In contrast, traditional financing sources, such as DMC governments and donors, can provide at most about US\$8 billion per year, resulting in a financing gap of at least US\$5 billion per year.² Given the size of this gap, the identification of new and complementary sources of financing has become an urgent priority.

There are several reasons why investments in environmentally sound and sustainable technologies have been slow. Investigations, self-assessment, and research have identified the following as the most significant:

¹ The World Business Council for Sustainable Development (WBCSD) terms these "adapted technologies", those that have been maintained by the local work force, and are increasingly produced locally and developed by local industrial research centers.

² Estimated on a business as usual scenario. This gap rises to an estimated US\$62 billion per year under an accelerated progress scenario

- a) Lack of information. Companies are not yet aware of the tangible benefits which can be gained from operating in a sustainable manner, or of the cost-effective techniques by which this can be achieved.
- b) Limited access to finance. Making the transition to environmentally sound and sustainable development may involve significant capital investment. Many DMC enterprises lack access to a full range of financing sources, or are not familiar with structuring their investments in a manner which facilitates financing and reduces risk.
- c) Uncertainties about technology. The acquisition of clean, energy-efficient, resource-saving technologies is an essential element for investments in environmentally sound and sustainable enterprises. However, there is frequently a shortage of reliable information on available technology options, costs, and benefits or how best to adapt these to local processing methods. Also, potential suppliers of technology are not really available because they are not active sellers.
- d) Limited international experience. National differences in language, business culture, and legal provisions have frustrated potential transnational deals.
- e) Lack of in-country institutional support. Even if enterprises are interested in adopting sustainable and efficient business practices, they may not have sufficient guidance from qualified local authorities to implement required programs.

Most lacking in creating the dynamic process needed to promote environmentally sound and sustainable development is an institutional framework in each of the DMCs to address these constraints. Required is a mechanism to assist the business community, the public sector, and the capital markets to promote such investments. This institutional framework is often described as an intermediation role, or one that addresses the transaction of pre-investment costs associated with new investments in environmentally sound technologies.

The progression of the ADB's contribution to sustainable support for environmental investments has resulted in a number of large and small initiatives. These can be illustrated by a proposed new initiative, a regional technical assistance for the promotion of investments in environmentally sound and sustainable enterprises that has been proposed by the ADB's Private Sector Group and Environment Division in consultation with DMCs. A description of this initiative follows.

Promotion of Investments in Environmentally Sound and Sustainable Enterprises

The overall objective of the proposed technical assistance, which would be done over two years, is to establish within selected DMCs an institutional foundation to provide continuing services to both the public and the private sector for the promotion of investments in environmentally sound and sustainable development. The technical assistance would develop an institutional capacity to provide for financial, marketing, technical, and commercialization services

related to investments for environmental protection, pollution control, energy conservation, and technology enhancement. Typical promotional activities would include assessment of production technologies, identification of environmentally sound industrial processes and site locations, mobilization of capital from financial intermediaries, technology and product adaptation to ensure that the technology is integrated into the acquiring firm, and awareness building about “green” markets, among other services. An important criteria of success would be the number and level of investments promoted under the project.

Specific subcomponents related to the intermediation or “upstream” business activities to be conducted under the proposed technical assistance include:

- a) An Outreach Program consisting of information dissemination, institutional cooperation, and capacity building with a view to establishing a local counterpart organization for sustainable enterprise development. While the institutional name and functions in each of the participating DMCs may vary, for simplicity these local counterpart institutions are termed sustainable enterprise development centers (SEDCs).³
- b) Project Advisory Services to be provided by a technical support team(s) financed under the technical assistance, with a focus on incorporating sustainable practices and technologies in the design of proposed investment projects, and mobilizing financing for such projects.
- c) Research and Assessment of Sustainable Investments with a view toward identification of projects, investment opportunities, and business strategies for investments in environmental services and/or investments to introduce environmentally sound technologies. The Project Advisory Team in association with SEDCs would initially focus on promoting investments in municipal services (solid waste management and wastewater treatment), energy efficiency, industrial pollution abatement through waste minimization, mitigation of pollution from electronics industries, and tourism (including eco-tourism).
- d) Business Development, including the provision of marketing services to promote the commercialization of environmentally sound technologies, and the intermediation of services (finance, marketing, legal advice) so as to develop within the SEDCs practical experience in putting deals together among financial intermediaries, entrepreneurs, and technology brokers.
- e) Implementation and Monitoring of the above activities to ensure compliance with performance targets and to ensure that

³ The technical assistance would build upon the existing local institutional framework for investment promotion in each participating DMC, such as the Business Councils for Sustainable Development (BCSDs), chambers of commerce, industrial associations, and the UN Asian and Pacific Center for Technology Transfer (APCTT).

technologies are successfully integrated in the acquiring firm.

DMCs tentatively selected for participation are those that can quickly benefit from a deepening of promotional opportunities through diffusion and adaptation of technologies and institutional initiatives for environmental investments. They include India, Pakistan, Malaysia, Thailand, Indonesia, and the Philippines.

The technical assistance will finance a team of three part-time international technical experts, including an Environmental Investment Advisor with skills in investment promotion in various environmental sectors. Assisting would be two Sustainable Enterprise Advisors, one focusing on technology transfer and the other on financial promotion and business strategy. The work of the three advisors would be supplemented in each participating DMC by a local country coordinator to network and establish strategic alliances with local investment promotion groups.

Key elements of outreach and promotion are workshops, case studies, and diagnostic assessments used to inform industrialists and entrepreneurs of the range of technologies open to them. An estimated 12 industry-focused workshops and training sessions would be conducted over the two years by the team. Industry advisory services, technical consultants, industrial planners, and individuals with expertise specific to the investment or sector being promoted (energy efficiency, solid waste management, tourism, electronic waste mitigation, wastewater treatment, and industrial pollution) would be engaged for appropriate durations.

A major supporting role would be played by the governmental agencies responsible for establishing the framework for investment in environmentally sustainable enterprises. They include investment promotion boards, ministries of trade, industry, and tourism, municipal authorities, and the governmental bodies that enforce compliance with environmental standards, including the ministries of environment and environmental protection agencies.

In each of the participating DMCs, the WBCSD has established an affiliate organization. Also, the United Nations Asian and Pacific Center for Transfer of Technology (APCTT), headquartered in New Delhi, India, has established an International Network for Transfer of Environmentally Sound Technologies (INTET) which operates in each of the participating DMCs. It is proposed that the Project Advisory Team would establish a contractual relationship with either the local BCSD or the INTET as its counterpart institution. Both BCSD (or its affiliate) and INTET are private entities which would also further the aim of establishing a sustainable institutional presence in the DMCs for promotion of environmentally sound investments.

Renewable Energy Development Project

A second example of how the ADB is promoting public-private sector cooperation in environmental investment is the recently approved Renewable Energy Development Project in India. The project is part of the national plan to alleviate power shortages, which are a serious constraint to sustainable economic growth in India. To achieve this, investable

funds will be provided to private entrepreneurs through the Indian Renewable Energy Development Agency, Limited (IREDA), which is wholly owned by the Government.

The basic rationale for the project is to support the development of the renewable energy subsector which, although somewhat developed in India in terms of policy and regulatory framework, is still at the promotion stage. The project will provide an external impetus to promote renewable technologies to expand commercialization and private initiatives and investments in the subsector. The power generated from the renewable energy sources will augment supplies and reduce the adverse consequences on industries suffering from severe power shortages. The project will also promote cleaner technologies and environmentally sustainable infrastructure compared with commercial energy sources.

The main objectives of the project are to: (i) promote commercialization of renewable energy technologies by strengthening IREDA's capacity to promote and finance entrepreneurial investments in alternate energy; (ii) encourage private sector investments in small-scale power generation using renewable energy technologies; (iii) expand marketing and financing mechanisms for the sale and delivery of alternate energy systems based on the full cost-recovery principle; and (iv) promote environmentally sound investments to prevent the depletion of India's limited forest resources and to reduce the energy sector's dependence on fossil fuels.

Support will be provided for financing renewable energy investments in industry,

with a focus on four major industrial technologies. These include: (i) biomethanation for production of in-plant energy, thereby reducing external power requirements; (ii) bagasse (the fibrous material remaining after sugarcane has been pressed) based co-generation of power, also for in-plant use, but with excess power sold to the grid; (iii) wind energy development, for internal use and for sale to other consumers; and (iv) solar-thermal systems, mainly for internal use.

Detailed consideration has been given to the market, technical, environmental, and social issues related to the four technologies to be considered for financing. The estimate of the market was based on considerations involving the total potential for each of the technologies in terms of the number of plants interested in installing them; estimates of the market penetration during the medium term of about ten years; and estimates of the possible market shares that may be achieved under the proposed loan.

The project is expected to have several direct benefits, including increased availability and improved reliability of power supply to help meet industrial and decentralized rural energy needs. Enterprises undertaking renewable energy investments will act as role models for other enterprises, and so the project will facilitate the demonstration on a commercial scale of renewable energy use that should lead to replication. The project will mobilize private investments in renewable energy and will also help to develop the domestic renewable energy equipment industry that is essential for further growth of the subsector in India. The project, therefore, will play an important role in implementing the Government's strategy for sustainable

energy development. It will also support the Government's efforts to reduce industrial pollution. The expected annual power generation of about 125 MW equivalent will reduce coal consumption in the country by about 625,000 tons per year.

Conclusion

The ADB fully realizes the need for, and supports, greater public-private sector cooperation in environmental investment. This paper has briefly discussed how, during the past several years, ADB-assisted initiatives have helped to develop a framework for such cooperation, and how this has been followed with technical assistance packages and projects to begin putting the framework into practice. More

support will follow in the coming years. The ADB welcomes ever-closer collaboration with its DMCs, other international agencies, and private sector organizations in pursuing sustainable development through public-private sector cooperation in environmental investment.

References

- ADB. n.d. Integrated environmental aspects of development into Bank operations. Asian Development Bank, Manila. 29 p.
- ADB. 1994a. The Environment Program of the Asian Development Bank: past, present, and future. Asian Development Bank. 171 p.
- ADB. 1994b. Financing environmentally sound development. Asian Development Bank, Manila, 397 p.

MANAGEMENT OF PARTNERSHIPS BETWEEN THE PUBLIC AND PRIVATE SECTORS IN FINANCING ENVIRONMENTAL ACTIVITIES: POLICIES ON THE PROVISION OF GOVERNMENT SUPPORT ARRANGEMENTS TO PRIVATE SECTOR PARTICIPATION IN WATER INFRASTRUCTURE¹

Eugenio Raymundo B. Inocentes III

Director III - Public Investment Staff (PIS)

National Economic and Development Authority (NEDA)

NEDA sa Pasig Bldg., Amber Ave., Pasig City

Philippines

INNOCENTES, E.R.B. III. 1997. Management of partnerships between the public and private sectors in financing environmental activities: policies on the provision of government support arrangements to private sector participation in water infrastructure, p. 332-344. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-FAS Conference Proceedings No. 6, 352 p.

General Framework

The need for new approaches to sustainable development is particularly pronounced in the aspect of generating financing options—ultimately, financial resources—for sustainable development activities. This need is strongly felt at both the global and local levels. In the Philippines, both the national and the local governments presently and equally play a role in the selection and implementation of domestically appropriate and preferred investment and management outputs, standards and processes. Likewise, both governments—individually and cooperatively—have to establish new financing initiatives. Inasmuch as the nongovernment organizations and private sectors participate extensively and intensively in the economic development process, they are bound to contribute resources, including financial, to the attainment of sustainable development.

Principle

The financing options for sustainable development should, in and by themselves, be sustainable. In a market economy, this principle is made operative by enabling the investment and economic activities to internalize the costs of sustainable development and its externalities. The financing options for Philippine sustainable development shall encompass mechanisms that aim at: (a) generating budgetary resources; and (b) changing patterns and modes of production and consumption in line with both sustainable development objectives and practices, e.g., “getting the prices right” in energy, water, transportation and agriculture.

The financing options likewise shall promote mechanisms that are geared towards:

- a) Mobilizing local revenues for sustainable development expenditures; and

¹ This monograph spins off from an earlier paper written by the author for Philippine Agenda 21, entitled “Philippine Agenda 21: Framework Paper for Generating Financing Options for Sustainable Development Activities in the Philippines” (March 1996).

- b) Directing local expenditures to environmentally and socially viable activities, more adaptable to varying conditions and buoyant in uncharted academic and business waters.

Past and Current Approaches

The past and current approaches of developing countries, including the Philippines, to financing sustainable development programs and projects involve mainly the allocation of domestic, i.e., country, resources and the provision of external, i.e., bilateral and multilateral, resources to a host of infrastructure, environmental and social programs and projects. These approaches have essentially been budgetary and financial in nature and contingent on the availability of funds. The external resources which have been made available under these approaches are largely official development assistance (ODA) grants and concessional loans. Under these approaches, the funds are extended to the beneficiary programs and projects through both government and nongovernment entities, as well as through private voluntary organizations.

New approaches

The new approaches to generating financial resources for sustainable development are characterized as:

- a) Economic in nature;
- b) Market-based; and,
- c) Able to exhibit potentials for national and global resource mobilization.

Integrating the new approaches into a country's national economic framework and subjecting them to international market forces are expected to make the approaches more sustainable over time,

The political and institutional constraints to the application of the new approaches however can not be underestimated. The experience with the application of command-and-control instruments (CCIs) has been disappointing in developing countries, including the Philippines. The inability of enforcement authorities to institute appropriate and sufficient mechanisms to encourage or to restrict individual or communal behaviors relating to the utilization of natural resources, for instance, has aggravated problems of open-access to natural resources and unmitigated environmental degradation. This increases the costs associated with the implementation of a number of CCIs.

In like manner, some of the new approaches will potentially be easier to employ than the others. In terms of costs and units of economic and social development and of environmental improvement associated with the application of the approaches, some promise "win-win" outcomes; others may raise at least enough revenues to be self-liquidating; the rest will have net costs over any savings that may be generated. Ideally, approaches of the first category should be applied first.

The current approaches, as differentiated from the characteristics of the new approaches, have been financial in nature and supply dependent. The current approaches have listed towards the provision of available excess funds which are allocable to activities that meet a set of eligibilities. While the current approaches have provided financial

facilities, the new approaches are expected to introduce economic instruments (EIs).

Market-based Instruments

The developed countries are interested in promoting the application of market-based instruments (MBIs) or EIs to generate financial resources for sustainable development, particularly for environmental management, for the following reasons:

- a) CCIs have become increasingly more difficult to implement on account of increasing associated implementation and enforcement costs;
- b) The tight fiscal situation of both developed and developing countries requires new revenue sources to finance environmental policies and programs; and
- c) MBIs or EIs are cost-effective relative to CCIs. MBIs or EIs are motivated by the "user pays" and "polluter pays" principles.

The EIs generally aim to achieve four major objectives:

- a) Getting the prices right, i.e., achieving domestic economic reform;

Getting the prices right is essentially getting the economics right. *It stems from instituting property and tenurial rights. When the right prices are applied, the pressure to provide subsidies and price support eases.*

Granting property and tenurial rights to forest lands will reduce the incidence of open-access

exploitation of forestry and wildlife resources. In fisheries, providing community rights over fishing and coral reef areas will disabuse the harvesting of fishery and coral resources. In agriculture, reducing, if not eliminating, inorganic fertilizer subsidies will rationalize the use of fertilizer inputs. Likewise, charging true water prices will encourage water conservation. In energy, true energy prices will make energy generation and consumption efficient.

The caveat however for getting the prices right is that higher prices may deter the poor from accessing the resources. This takes place when getting the prices right does not translate into increased incomes for the poor, which in turn are to be sourced from increased prices for the goods and services which they provide. The caveat holds when increases in factor prices, e.g., the poor's labor, do not compensate for price increases in the goods market.

In the marine sector, part of getting the prices right is establishing the proper charges for marine pollution. Loss of revenues from curtailed legitimate fishing activities, damages to mariculture (fish farming), reduced tourist trade and costs of cleaning up oil and chemical spills into the seas provide some basis for determining the right prices.

- b) Reducing public sector deficits, i.e., making government systems efficient and effective;

This objective dovetails the first. To the extent that subsidies and price support are diminished, fiscal deficits are reduced. This is one side of the objective. The other focuses on improving, if not establishing, fiscal systems that lead to still “getting the prices right”. *These systems are those which catch economic rents and which charge fees from users or on externalities—social or environmental.*

In forestry, agriculture, the energy and water sectors, taxing economic rents will reduce the pressures on, if not rationalize, the use of forest, agricultural, energy and water resources. The introduction of environmental taxes will induce the minimization of the generation of pollutants and other environmentally unfriendly emissions and discharges. The proposed international air transport tax (IATT) is an example of such taxes and is clearly transborder in scope. A green taxation system will also likely induce the discovery or invention of environmentally friendly technologies, as well as of pollution abatement technologies. User charges and penalties will promote responsible and discriminate utilization of resources.

- c) Increasing trade and investments, i.e., establishing freer international markets;

The liberalization of foreign exchange is the key to a successful export promotion strategy as it

“gets the prices right”. Over the long term, increased trade, particularly that which is driven by increased exports, will provide adequate employment to the population and, in turn, will lessen the pressure on natural resource exploitation for subsistence living.

With trade, a balancing act is always imminent. Trade opportunities may cut the other way as well. Reducing tariffs and eliminating non-tariff barriers (NTBs) can induce increased utilization of production inputs which are essentially natural resource-based. Increased manufacturing activities spell increased energy consumption, at the least. While new technologies may abate the pollution generated by such economic activities, it is possible that the absolute levels of pollution will increase.

Increased trade may aggravate environmental problems. To the extent that macroeconomic, in particular trade, reforms may hasten the utilization of natural resources as inputs to manufacturing and trade expansion, these may be supported less, or not be supported at all, by society (Munasinghe and Cruz). The appropriate response to this situation is not to resist the reforms but, perhaps, to identify complementary measures which could negate, if not mitigate, the expected adverse environmental effects of trade expansion.

- d) Promoting private sector participation in sustainable

development activities, i.e., orienting the private sector to become developmental.

The realization that environmental costs and benefits are transborder, transgenerational and transcultural commands from everyone a common cause and responsibility. Sustainable development becomes everybody's concern and objective. The true costs of private economic activities cover their potential damages to both man and environment. *"Greening" an economic activity's rate of return, i.e., attributing a part of the profit to the public good nature of the activity's environmental benefits, can slow down the utilization of the natural resources.*

EIs derive their effectiveness from the need for property rights. The ineffectiveness of EIs may come from natural market failures, institutional inefficiencies and wrong policies. Some natural resources are, by nature, non-excludable (Boadway) and nonrival (Musgrave, 1969). Clean air in an open public space is non-excludable as it is impossible and very costly to keep an individual from breathing or "consuming" it. Knowledge obtained from attending an international environmental conference is nonrival as it provides the same benefits to more than one individual at the same time. However, the total or marginal utility of the information to the individuals may vary. The inability of markets to set the prices for these resources and to keep users who are not willing to pay for the resources from consuming them has resulted in the existence of market failures.

Some solutions to environmental problems may be neither financial nor economic. They may be institutional. This type of a solution renders itself more to situations where CCIs, rather than EIs, have originally been instituted. The imposition of environmental air ambient standards in the Philippines, for example, has been envisioned to regulate the emission of environmentally harmful materials to the air. However, the very weak monitoring of pollutant emissions and the handicapped guidelines for enforcement, e.g., unrealistic sanctions and fines, among other factors, have made the environmental clearances, i.e., environmental clearance certificates (ECCs), issued by the national government vaguely useful. The paucity of implementation details, the inappropriateness and high costs of procedures and the weakness of the enforcing agencies may clip the abilities of these instruments to elicit environment-friendly business behavior and to obtain environmentally sustainable consumption utilities.

Some environmental problems are the consequences of, or are exacerbated by, wrong policies of national and local governments. The provision of subsidies to some natural resource-based industries, for example, may encourage the unconstrained entry of private firms into these industries and result in the exploitation of the resources.

The concern against providing subsidies and any form of price support indicates a major source of financing for sustainable development. Generating the financial resources involves not only finding additional monies but also obtaining savings from appropriate spending. Not spending for anything not needed reallocates monies to those

needing them. Thus, "getting the prices right" is also "getting the expenditures right".

Partnerships Between the Public and Private Sectors

This section investigates partnership as an approach to sustainable development financing. Sustainable development challenges governments and private firms worldwide to assess and define, according to contemporary developments and requirements, the roles and responsibilities of, as well as the linkages between, the public and private sectors. *There is a growing realization that the long-term viability of infrastructure facilities and services is inextricably linked to the quality of the environment in which the users live.*

Partnership as an Encompassing Approach

In earlier sections, the paper presents principles and approaches to the establishment of new EIs for sustainable development financing. Partnership between the public and private sectors is a very promising approach as both national and local governments, on the public sector side, are involved and needy of large investment capital which the private sector can organize and package into a project financing arrangement. *In partnership, both governments and firms recognize that environmental management is everybody's concern as it affects goods and services, markets and consumption patterns, technologies and production patterns and long-term sustainability.*

Linking Sound Environmental Management and Good Business Sense

Public policy has to go beyond merely enticing private firms to comply with environmental standards or penalizing them for failing to do so. *Public policy has to steer governments and private firms to establish, if not adapt, deliberate strategies to link long-term business profitability and effective environmental management* (Bond and Carter, 1996). Across the world, build-operate-transfer (BOT) proponents and their government agency sponsors have realized the need for extensive community consultations and organizing to generate support from local residents for environmentally sensitive projects. The International Finance Corporation (IFC) cites the cases of the Sual Thermal Power Plant Project in the Philippines, the Toll Highway Project in Argentina and the 36 MW Small Hydro Project in Nepal, among other projects, as examples where "lender and sponsor comfort" was exhibited. That the BOT proponents and government agencies took efforts to abide by environmental guidelines and demonstrated the desire and will to manage environmental risks made the activities more attractive to investors and lenders.

The strategies for and tools of public policy-making will have to change the private sector's traditional business paradigm that the application of environmental measures and controls increases costs and reduces profits. This is essential to changing production patterns to achieve sustainable development. The strategies and tools

have evolved into efficiency measures for environmental management. Any incremental costs associated with them give rise to manifold economic benefits and financial returns in the medium- and long-term periods. For example, improved water delivery and quality and, ultimately, health and productivity are expected to result from the establishment of wastewater treatment facilities. With the availability of quality water, water consumers and users are expected to be more willing to pay the right price for such an amenity. Legitimate consumers' willingness to pay and enhanced tariff collection efficiency will translate necessarily into sustainable earnings.

Current Forms of Philippine Public Sector-Private Sector Partnership

In the Philippines, (a) private sector participation in public infrastructure and services and (b) privatization are two of the approaches being explored actively by the government for the delivery, administration and management of facilities and services, e.g., provision of water and disposal of wastes, which directly relate to marine pollution prevention and management. The private sector, which normally has the comparative advantage in technical skills and business acumen, undertakes the investment activities associated with the facilities or services. The public sector, which has to ensure society's equitable access to the facilities and services, performs the regulatory functions in the concerned sector.

The public sector's task is by no means insignificant. At every stage of a project's life cycle, which covers design and bidding, financial closure, procurement and construction, commission and

operation and, in some instances, disposal, public policy plays a fundamental role that can spell the success or failure of the project. The quality of the enabling environment, on which governments have a direct influence, will determine the quality of the partnership.

Private Sector Participation

The various natures of partnerships have provided both the national and local governments a wide range of options to undertake and finance public investments. These include BOT and its variant schemes, joint ventures, concessions and leasehold arrangements.

The power crisis and the fiscal constraints of the Philippine government in 1992 introduced more pronouncedly the BOT arrangement as an alternative source of financing. The BOT scheme has been instrumental in accelerating the flow of private capital into the power sector, building long-delayed power generation facilities and increasing power generation capacity from about 6,500 MW in 1992 to about 10,400 MW in early 1996 (Inocentes, 1996). Twenty-five projects account for the incremental capacity of about 3,900 MW generated through the Philippine BOT Program.

At present, the BOT and its variant schemes are being applied also in urban mass transportation, toll roads, information technology and water supply projects. Specifically for projects in the water sector, public sector-private sector partnership is still at an infant stage. There are currently only two BOT multipurpose projects in various stages of preparation and implementation. Having to contend with hydrology risks, for example, in the irrigation components of these multipurpose projects seems to make the

BOT scheme for the water sector less financially palatable to the private sector. Government support may be provided to balance the risks inherent in such an investment undertaking between the public and private sectors.

Shepherding the Partnership in the Water Sector

In the water sector, the need for BOT feasibility funds stems from the situation wherein government agencies in the sector and local governments are technically and financially handicapped to develop well-prepared, i.e., bidding-grade, project proposals. This constrains agencies from pursuing competitive tenders for their intended investments. The flipside is that this exposes the agencies to the temptation of courting, if not succumbing to, unsolicited proposals.

Provision of BOT Feasibility Funds

The establishment of a BOT feasibility funds facility may be favorably considered as it is expected to:

- a) Strengthen the solicited or competitive bidding track;
- b) Mitigate the asymmetry in information between the government and the private sector at project entry level; and
- c) Create an incentive for national government agencies, government-owned or -controlled corporations (GOCCs) and local governments to shepherd projects to a successful competitive bidding.

The facility may be used for the following activities:

- a) In-house project proposal preparation;
- b) Hiring of consultants to prepare the proposals; and
- c) Capability-building through the conduct of technical assistance (TA) for BOT feasibility preparation and project negotiations.

While the provision of feasibility funds can enhance the government's selection and development of BOT projects, more sustainable financial mechanisms should be established by the government. The options for the mechanism include: (a) establishment of a central fund in the national government's budget which is administered based on a national BOT framework plan for the water sector and available to government agencies and local governments on a competitive basis; (b) payment by the winning bidder or, in case of unsuccessful bidding, by the proponent government agency or local government; and (c) payment in the form of outright cash or as a share of the revenues generated. The latter two options may be included in the bidding parameters for a BOT project.

Should the option on the central fund materialize, the Philippine government prefers that this be output-based and incorporated in the budgets and ceilings of the agencies. The initiative should not create general purpose or unprogrammed lumpsum funds in the national budget. Necessarily, such a funds facility should promote and be made available only for the solicited track of a BOT scheme.

Access to ODA Funds

Particularly in the water sector, some BOT projects, such as multipurpose

projects, are designed in a way that the financially viable components cover the obligations of the financially nonviable components. These are eligible to access ODA funds under the Amended BOT Law.² However, while concessional financing is appropriate for the less financially viable components of BOT projects, the concessionality from ODA may be diluted considering that the government has to take the risks associated with such components.

The use of ODA sets aside other possibilities wherein the private sector can assume the risks of the nonviable components and is compensated through other means, e.g., higher return on its equity. The use of ODA in BOT undertakings should be considered prudently, almost even conservatively, so as not to crowd out socially desirable public investments. If only for this reason, the government should consider ODA financing as a last resort of support arrangement for BOT projects and only under the solicited track.

Provision of Government Support Arrangements

The water sector has expressed the need for government support arrangements for its BOT projects in the forms of (a) performance undertakings; (b) fiscal incentives; and (c) cost sharings. Performance undertakings are sought to improve, if not compensate for, the credit standing of the country and to minimize lender and equity risks. These may come in the forms of guarantees,

subsidies and equities. Fiscal incentives are used to minimize the tariffs to be charged to the consumers of the infrastructure facility or service. Likewise, fiscal incentives are expected to introduce the utilization of clean technologies in production. Cost sharings provide a mechanism for making projects viable for private sector participation and for capturing other risks which the private sector cannot assume, e.g., site acquisition, rights-of-way and government or institutional clearances.

Managing the Partnership

The heart of a public sector-private sector partnership is the diversification of risks that thrive on the various project components and the proper assignment of these liabilities to risk managers who can best handle or mitigate them (Mody and Patro, 1996). Guarantees are singularly the most common instrument sought by lenders and offered by borrowers to cover the downside risks of project financing. They are commonly applied only to the debt portfolio as the private sector is supposed to assume fully the risks associated with its equity portfolio in exchange for higher expected returns. Should guarantees be sought too for the private sector's equity contribution in the financing package, they should be used in exchange for lower yields on the equity.

The guarantees that the government provides to BOT projects need to be managed. These contingent liabilities of the government, when called upon by the private sector, become real costs.

² Power, irrigation, and flood control components combined under a waterbasin project and commercial development and rail components combined under an urban mass transportation project are examples of multipurpose projects. For water-based multipurpose projects, the largest component is usually power. Water supply, irrigation, flood control, and water quality improvement components are included to achieve optimality in the use of the capital, to improve project economics and, at times, to enhance the social packaging of the projects.

Notwithstanding the fact that contingent liabilities are future liabilities, they have to be managed here and now. A government's guarantees are scarce fiscal resources that command both an economic and a financial price. In this regard, the Philippine government has begun to undertake efforts to tag the right price on the country's guarantee resources.

The water sector believes that the provision of full guarantees to its projects will attract BOT proponents to participate in the sector (Inocentes, 1996). Performance undertakings and minimum offtake arrangements are being sought to serve as credit enhancements for the sector where substantial amounts of inefficiency losses (in generation, distribution or fees collection) presently abound. Multipurpose projects, likewise, are soliciting ODA assistance for the generally financially nonviable irrigation and flood control components. The San Roque Multipurpose Project, for example, has been seeking concessional financing from the Japan Export-Import (JEXIM) Bank and the Overseas Economic Cooperation Fund (OECE). An amount of about US\$400 million is being sourced from ODA to soften the commercial financing which the private sector is expected to syndicate for the project.

Sewerage and sanitation activities likewise may require full or partial guarantees to initiate large-scale investments in these subsectors. The Mexican experience, for example, required the establishment of a six-month debt reserve account, under escrow arrangements, for a wastewater treatment facility. This proved useful after the Mexican peso was devalued in December 1994. The devaluation reduced the

foreign exchange equivalent of the facility's assets and resources.

Environmental concerns need to be considered in the rationalization of the fiscal incentives program of the national government. While fiscal incentives have benefited the entry of pollution abatement, i.e., "curative" technologies into the country, these need to be made available too for the acquisition of clean, i.e., "preventive", technologies. The relevance of and arguments for clean technologies cannot be relegated to those of pollution abatement technologies.

Privatization

Privatization entails the complete transfer of (a) the responsibility for the provision and maintenance of required public facilities and services and (b) the ownership of both assets and liabilities of a government-owned or -controlled entity to the private sector. As in BOT arrangements, the government retains the regulatory function under the privatization of a sector.

Traditionally, in most developing countries, water supply and sanitation services have been provided by public corporate entities which have full, direct and immediate recourse to national government support, such as guarantees and subsidies. Under this condition, wear and tear of the facility, as well as inefficiency in its operation, have characterized the sector. Privatization is expected to address the following ills: (a) inadequate service coverage; (b) deteriorating and outdated facilities; (c) technical incapacities; (d) substantial system leakages and losses; (e) highly subsidized prices; and (f) inefficient fee collection system, among other things.

In the water sector, the privatization of the Metro Manila Waterworks and Sewerage System (MWSS) is currently underway. The present privatization proposal for MWSS aims (a) to find the best option for MWSS to improve the provision of quality water; (b) to expand the area and service coverage; and (c) to ease the sector's, as well as the corporation's, fiscal burden on the government. Water supply coverage is targeted to reach about 95% of the Metro Manila environs by year 2025. The present coverage is only 70%. Sewerage service coverage, on the other hand, is expected to expand to at least 55% of the area. At present, this is only 10%. Institutional reforms are likewise facilitated or brought about by privatization initiatives. A body separate from MWSS is being considered to be set up to take charge of the regulation of the water supply sector.

The privatization of the MWSS, through the awarding of concessions, clearly exhibits the tenet that public sector-private sector partnerships are likely to emulate or duplicate successful projects or programs wherein good environmental management has resulted in (a) increased efficiency in the delivery of a good or service; (b) reduced risks; (c) increased access to quality goods or services; and (d) sustained profitability for the private sector. The concessions awarded in 1993 to Aguas Argentina to manage the Buenos Aires water supply and sewerage system and in 1994 to Concesionaria de Aguas de Aguascalientes (CAASA) to run the City of Aguascalientes' water supply and

sewerage system are two cases the Philippines can learn from.

Under the Argentinian case, tariffs were reduced by about 27% as this resulted directly from the winning bid. Two years after operation, in 1995, about 400,000 additional water and 250,000 sewerage connections were made. The average repair response time dropped from 180 hours to 48 hours. In 1995, for the first time in fifteen years, the city of Buenos Aires frolicked in summer without any water shortages (Bond and Carter, 1996). Under the Mexican case, P24 million worth of liabilities were assumed by the concessionaire. The city of Aguascalientes is being paid a royalty equivalent to 10% of fee revenues by CAASA. While a differentiated tariff scheme is being implemented, a gradual incremental tariff schedule has been adopted to avoid politically unpalatable sharp increases over the short-term. Now, service and water quality standards have been established (Tavares Diaz de Leon, 1996).

The public sector normally provides incentives for the private sector to participate seriously in a country's privatization program. Fiscal incentives, e.g., tax holidays, relaxed or duty-free importation of project equipment and inputs, access to concessional financing sources, etc., may stimulate private sector interest. In the MWSS case, while it has been studied that the privatization program can be supported by existing tariff levels with estimated increases over regular periods of time, the tariff schedule will be rationalized by applying the principles of efficiency, equity and financial adequacy.¹

¹The cited targets were based on assessed tariffs of 37% increase planned for the second semester of 1996 over the current price, i.e., from P6.43/m³ to P8.78m³, and a 5% increase every five years thereafter. Should the water tariff remain at the current level, adjustments will have to be made to keep the program, e.g., downsizing of the targeted water supply and sewerage coverages.

Similar with guarantees, fiscal incentives also need to be managed. The Philippine government may have to rationalize the provision of fiscal incentives as all sectors involved in BOT financing would like to avail of them. The government may have to consider extending a uniform package of incentives to projects across all sectors, including the water sector, whether undertaken as foreign direct investments, BOT projects or joint venture activities. Further, to level the playing field, information about the package of incentives, if and when provided, should be transparent and made available right at the start to all. This will even facilitate the competitive processes.

Conclusion

The paper begins by describing a framework which aims at facilitating the institution of market-based measures and guidelines for generating financing options for sustainable development. Shifting away from traditional financial and budget-based resources, sustainable development provides a venue for bringing together the public and private sectors to collaborate on achieving country-level, as well as global, socioeconomic targets and standards. Midway, the paper cites schemes and forms of public sector-private sector partnerships which are being explored in developing countries, including the Philippines. How the Philippine government promotes the initiative through its provision and management of support arrangements for BOT undertakings and privatization activities closes the paper.

The guidelines and strategies for promoting public sector-private sector partnerships, while aiming at increasing private sector participation in and financing of public infrastructure projects, must strike a happy balance in the risk sharing between the government and the private firms. This balance may be achieved through the judicious extension by the Philippine government of support arrangements, particularly in the forms of guarantees, fiscal incentives and subsidies. These support items will have to be rationally extended across the various sectors which have different levels of need therefor.

Public sector-private sector partnerships, such as BOT and privatization programs, in the water sector stand to be beneficiaries of these support arrangements as water supply, sewerage, flood control and irrigation projects are generally economically viable undertakings with high social impact. That they may be financially unviable at times does not necessarily preclude them from being eligible to receive governmental assistance. Government support arrangements, however, should not serve as first resort, i.e., they should not supplant appropriate market-friendly adjustments or compensate for inefficiencies arising from imperfections in the fiscal and regulatory environments.

Acknowledgement

The author acknowledges the assistance provided by Ms. Rowena R. Martin-Cham and Mr. Broderick G. Garcia, both of PIS, NEDA, NEDA sa Pasig Bldg., Amber Ave., Pasig City, Philippines.

References

- Boadway, R. Market failure and the rationale for government intervention. *Public Sector Economics*, p. 31.
- Bond, G. and L. Carter. 1996. Financing private infrastructure: lessons of experiences. Vol. 4. International Finance Corporation, Washington, D.C.
- Inocentes, E.R.B., III. 1996. A challenge to the Philippine build-operate-transfer (BOT) program: do more with less! Investment Coordination Committee (ICC)—National Economic and Development Authority (NEDA).
- Mody, A. and D.K. Patro. 1996. Valuing and accounting for loan guarantees. *The World Bank Research Observer* 1(1):119.
- Munasinghe, M. and W. Cruz. Economywide policies and the environment. World Bank, Washington, D.C.
- Musgrave, R.A. 1969. Provision for social goods, p. 124-125. *In* J. Margolis and H. Guitton (eds.) *Public economics*. St. Martin's Press, New York
- Tavares Diaz de Leon, A. 1996. Program on fiscal decentralization and financial management of regional and local governments. Harvard Institute for International Development, Cambridge, Massachusetts.

FINANCIAL MECHANISMS FOR MOBILIZING IN-COUNTRY AND EXTERNAL RESOURCES FOR THE PREVENTION AND MANAGEMENT OF MARINE POLLUTION

Rina Maria P. Rosales

Research Associate

*GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas
DENR Compound, Visayas Ave., Diliman, Quezon City
Philippines*

ROSALES, R.M.P. 1997. Financial mechanisms for mobilizing in-country and external resources for the prevention and management of marine pollution, p. 345-352. In S. Adrian Ross, C. Tejam and R. Rosales (eds.) **Sustainable financing mechanisms: public sector - private sector partnership**. MPP-EAS Conference Proceedings No. 6, 352 p.

Introduction

This paper focuses on financial mechanisms being employed in the Philippines, that can be used to mobilize in-country and external resources for marine pollution prevention and management programs. Because of limited practical data on application in the marine area, the paper addresses financial mechanisms and their application in the power sector. The case study contains lessons that are applicable to marine pollution in the Philippines and elsewhere.

The presentation is part of the research work completed and submitted by the author to the Regional Programme. It does not necessarily represent Programme strategy or policy. It will be used as an information source for development of future activities under the Programme.

The BOT Scheme

One of the most successful public sector-private sector partnerships that has been formed in the country is the implementation of the Build-Operate-Transfer scheme, more popularly known as the BOT. The BOT is a contractual

arrangement entered into by a private sector proponent with the government for the construction, financing, operation and maintenance of an infrastructure facility for a fixed period, after which the facility is transferred to the government. It is usually used by governments that are financially strapped in meeting their economies' capital investment requirements to sustain economic growth. Other versions include the Build-Transfer or BT, the Build-Lease-Transfer or BLT, the Develop-Own-Transfer or the DOT, the Rehabilitate-Operate-Transfer or the ROT, the Build-Own-Operate or the BOO, the Rehabilitate-Own-Operate or the ROO, the Rehabilitate-Lease-Operate or the RLO, the Rehabilitate-Own-Manage or the ROM, and the Contract-Add-Operate or the CAO. The swift implementation of BOT projects can attest to the success of the scheme in providing infrastructure requirements in the Philippine economy.

Factors for the Success of the BOT Scheme in the Power Sector

To understand the application of the BOT scheme in the power sector, it is first necessary to understand the background of that sector in the Philippines.

Legal Environment

It can be recalled that from 1990 to 1994, the country was reeling from 8- to 10-hour power outages all over the country, particularly in Metro Manila, which accounts for the majority of industrial production and the service sector in the country. Because of the urgent need to put up power plants to meet the increasing demand for power, the National Power Corporation (NPC), a government-owned corporation responsible for power generation, was given the authority to deal directly with project proponents from the private sector, through the signing of the Power Crisis Act into an executive order. NPC alone could not meet the requirements for more power, not only because of lack of manpower and technical know-how, but also because of lack of funds. Another important law that was signed during the period was Republic Act No. 6957, otherwise known as the BOT Law. From 1991 to 1994, twenty-three power plants had been set up to start operations, all financed using the BOT scheme and its variants, such as the BOO, the ROM, and the ROL. So far, the total cost of BOT power projects has reached US\$4.466 billion, including one that is scheduled to be operational by 1999. Meanwhile, the additional 23 plants in operation have a capacity of 3,466.46 MW, equivalent to 59% of the estimated peak demand for the whole country in 1996. Without the BOT process that facilitated the provision of power plants, the country would still be experiencing severe power outages. Needless to say, the growth rates the country is experiencing would not have been possible.

Competitive Pricing Structures: Costing Schemes

One of the major criticisms about Philippine BOT projects is the high costing of projects that meant huge counterpart funding on the government side in financing the projects. Despite this criticism, there are four projects lined up for bidding, and another ten in the pipeline. An innovation that allowed initially high-cost projects to be justified was the use of the concept of "avoided costs" by the NPC. Avoided costs are defined as the least incremental costs that an electric utility would incur towards meeting its anticipated power demand, if such utility does not buy power from a private sector generating facility (PSGF). If the amount of the project falls below or is equal to the avoided cost of the NPC, then the proponent is granted the authority to construct, provided it meets the other requirements.

On the part of the proponent, their costs are adjusted for income taxes, since NPC projects are tax-free. Furthermore, interest and exchange rates are adjusted, whereby two exchange rates are used: the commercial rate and the government-prescribed rate. A project's costs do not have to be lower than the avoided costs using both interest rates and both exchange rates. If one set allows the costs to be lower than the avoided costs, that becomes enough justification to endorse the project.

Government Guarantees: Risk Sharing Between the Government and the Private Sector

Another factor that was influential in the success of the BOT scheme is the

provision of government guarantees to approved project proponents. During project negotiations, the NPC would guarantee a minimum amount of energy generated by the power plant to be bought, whether or not it will be distributed for final consumption purposes. In other words, the private sector could safely calculate its sales forecasts from the power plants, without worrying about consumption fluctuations. In one example, the NPC guaranteed to purchase all electricity generated by the plant. Other guarantees included the provision of the plant site and access roads, payment of all real estate taxes and assessments, rates and other charges with respect to the site, provision of fuel and start-up electricity through inter-connection facilities with MERALCO, the biggest distribution facility in the country, and the connection of power lines necessary for the transmission of the plant's output.

The advantage of having government guarantees is the risk is spread between the two key players in implementing projects, the government and the private sector. The private sector takes the commercial risks involved, but that is mitigated by the provision of government guarantees. Hence, the risks are diversified.

By 1998, with the power plants lined up for construction and operation, there will be more than enough baseload power that can supply the country's energy demand. Because of this, the government has decided to decrease the guarantees it offers to BOT power projects. The private sector is now expected to bear more of the commercial risks involved. Despite this, the BOT Centre, the one-stop shop for all BOT proposals, reports that there is still a

significant number of bidders that are willing to undertake power generation projects. Hence, despite the new cap on guarantees, the private sector still finds it profitable to participate in the BOT scheme in energy provision.

Political Will

Finally, probably the most decisive of all factors, is the political will asserted by the government during the power crisis. It had to veer away from its traditional role of being the sole provider of basic infrastructure and services. Because it recognized the potential of the private sector to participate in such activities, it was able to meet the demands of the public, at the same time divert its meager resources to less profitable sectors. On the other hand, the private sector was able to earn profits while simultaneously undertaking a crucial role of providing a necessary service to the public.

As the BOT scheme has proven its success, the government has decided to increase the range of activities for its application in the transport sector, the water supply sector, and other local government initiatives that can be subjected to the BOT process.

In sum, the government played a very important role in the BOT process:

- a) The sharing of risks at the initial stage provided the impetus for the private sector to develop confidence in the system, until such time that they were willing to bear more risks in power infrastructure projects;
- b) Bureaucracy and red tape were reduced, and the government took on a more business-like attitude in

- delivering services in the energy sector;
- c) The government took on long-term commitments, thus allowing a reasonable return on investment or ROI for the private sector; and
 - d) Finally, the idea of a partnership between the private and public sectors proved feasible, and the notion that their roles in society were dichotomous was dispelled.

Factors that Hinder Investments in Marine Pollution

The problem of marine pollution is fast approaching a crisis situation now, not just in the Philippines. In fact, it is a problem that most countries have been seriously addressing in the last few years. The need to come up with sustainable financing mechanisms to solve marine pollution problems cannot be overemphasized. With this in mind, the BOT process serves as a promising scheme, one that can solve problems of marine pollution.

Despite the existence of such financial mechanisms, there are still a number of policy conflicts that hinder investments in the area of marine pollution prevention and management.

Legislation

One of the most crucial conflicts concerning legislation is the manner of devolution of environmental management and control to local government units (LGUs). The Local Government Code enumerates the functions that have been transferred to local units. However, it explicitly states that these functions are still subject to the supervision, control and review of the Department of Environment

and Natural Resources (DENR). As such, it treats the LGUs as subordinate officers. The DENR can further revoke any or all acts of the LGU, preventing the finality of decisions made by the latter. In imposing fines and penalties, the Code limits the powers of the LGUs in the amount it can stipulate in its ordinances. For municipal governments, there is a maximum fine of PhP2,500.00 (US\$1 = PhP26.50) for a period of violation not exceeding six months. For city and provincial governments, the maximum fine it can impose is PhP5,000.00 for a year. Again, the problem of low compliance because of low penalties is exacerbated. Furthermore, the source of funds of LGUs for environmental protection has been severely limited by this, creating a mismatch between the functions devolved and the corresponding powers transferred to them.

Technical Know-How in Performing Environmental Protection: Capability Building for Implementing Agencies

Probably even more important is the actual capability existing in the local units and in national government agencies as well. Because of their lack of capability, most LGUs tend to shy away from performing devolved functions that they feel they are not competent enough to undertake. Related to this, LGUs have had very limited experience in mobilizing their own financial resources, given the traditional big brother relationship they had with the national government. In recognition of this, the national government has been continually developing training programs, not just for the officials, but for the technical staff members of the units as well.

On the part of the national government, there is still a lack of

capability at the technical level, such as the Environmental Management Bureau (EMB) of the DENR. The Bureau is tasked to monitor water and air quality. However, laboratories to conduct tests and analyze samples are sorely lacking, as well as people to perform the tests. The abundance of legislation and environmental rules and regulations is not matched by an adequate number of competent personnel to implement and enforce them.

Overlap of National Agencies' Functions

Furthermore, environmental rules and regulations in general, although abundant in nature, are not well understood or coordinated among the various government agencies. For instance, both the Philippine Coast Guard and the DENR are tasked to enforce all laws pertaining to marine pollution. However, there is no clear delineation of responsibilities between the two, and overlaps of activities often ensue.

Information Asymmetry

Finally, financial mechanisms are only as good as how often they are used for environmental programs and projects. One factor seen as inhibiting investments in pollution control equipment is the lack of information on the presence of these incentives and mechanisms. There should be a conscious effort on the part of government to advertise these mechanisms, so that more members of the private sector can avail of them. Information on credit windows available in financial institutions, technologies in waste management and waste minimization, incentives in investing in pollution control equipment should be made as public as possible.

The Way Forward: Recommendations

Other papers in the Conference have already identified economic mechanisms and market-based instruments for marine pollution programs. Unfortunately, the history of application of EIs is rather limited in the Philippines and elsewhere in the region. However, there are some important lessons to be learned from the Philippine experience in the power sector, and these lessons show the way for public sector-private sector partnerships in marine pollution and the use of BOT schemes.

Institutional Clarity

In the power sector, the NPC played the role of national authority dealing with the private sector. This reduced bureaucracy and allowed negotiations with project proponents to be conducted in an efficient manner. The situation in the marine pollution area is somewhat more complicated by the fact that there are two levels of government involved.

However, it is the Programme's view that the role of the local government should be strengthened, in such a way that they act as the principal focal point for project proponents and national authorities involved in BOT schemes for marine pollution programs. To enhance LGU capability as the principal focal point, national programs should be developed in a number of areas including strengthening the administrative, technical, planning, and legal capacities of LGUs. The Regional Programme on the Prevention and Management of Marine Pollution recognizes this need, and has conducted training activities at its demonstration sites in Batangas and

Xiamen. As part of its undertaking, the Regional Programme has assisted in drafting a Management Plan for Batangas Bay, and has supported planning activities of the Xiamen demonstration site. Land zonation schemes are also being prepared and action plans developed and implemented at both of these sites under the Programme. Finally, two training programs in integrated coastal management have been completed, in which local government planners and administrators have participated.

In the Philippines, a recently-concluded workshop involving government agencies in public investment programming had as one of its recommendations the establishment of a BOT Facility Fund. The Fund would be used for in-house project proposal preparations, hiring of consultants to prepare the proposals, and capability building for BOT feasibility preparation and project negotiations. The Fund would be used principally to support LGUs in project proposal development and tendering processes. This is a positive step in providing the necessary assistance to capacity building of LGUs.

Legislation and Enforcement

The enforcement of environmental regulations and controls creates a market for environmental services by eliminating "low-cost" and "no-cost" options, for example in waste disposal. Furthermore, regulatory control over operating facilities and services ensures that all stakeholders are playing by the same rules. In other words, a level playing field is established. Once the market is created, the private sector will automatically seize the opportunity to participate in it, especially if they are assured that their investment

will be protected with rules applying throughout and across sectors, including their competitors.

A case in point is the power sector. The huge demand for power could not be met with adequate manpower and technical know-how by NPC. Realizing this, the private sector was allowed to enter the market, and the demand for power was adequately addressed. Well-defined requirements were imposed on the private sector, thus allowing a substantial number of interested parties to participate in the transparent and fair process of bidding of projects. The same scenario can apply to marine pollution. Once environmental laws are firmly imposed, there will be a demand for facilities and services that will allow industries to comply with those laws. And if market forces are allowed to work freely, the private sector will seize the opportunity to enter the market.

Once the facility is provided, the government must ensure that the standards of operation are reasonable and equal for all. Due consideration must be given to the fact that it will take some time for investors to recover their capital outlay if the product or service being sold is a new entrant in the market. Unrealistically high standards will not give the new facility or service a proper chance to break into the market. On the other hand, very low standards will just defeat the larger objective of protecting the environment.

Risk Sharing

Aside from coming up with reasonable standards, the government can encourage the private sector to provide facilities by sharing in the risks involved. It can be recalled that one of the features

that made the BOT process in the energy sector successful is the sharing of risks between the government and the private sector. The NPC guaranteed a minimum amount of power to be bought, thus assuring the investors of their baseline revenues. It is acknowledged that the highest risk is normally in the early years of operation. If the enterprise has just been established, and the conditions for its existence have just been set, the demand for such a service or facility may be initially low. As such, the investor will try to break into the market by introducing a low price for the service or facility in order to attract users to patronize the product. Hence, it should be given ample time to recover its investment, whereby the payback period may even be longer than an investor would normally expect.

One way of risk sharing is for the government to lead by example, simply by requiring all its facilities and operations to use such services. It can further require all new facilities and operations to do the same, in order to assure the investor of a market. A caveat is in order here, though. Long-term agreements and contracts with the government may sometimes lead to monopolistic tendencies and inefficiencies. This can be avoided by licensing and fee control procedures which can be established during the early stages of negotiations.

A more direct form of risk sharing would be the provision of financial support and/or incentives. Subsidies for capital investment in the form of differential interest rates, or actual provision of land, roads, utilities, tax benefits, import benefits, all these have been tried and tested and have worked in achieving the objectives of public sector-private sector partnerships.

To ensure that economies of scale are achieved, integration and coordination of sectors or geographic entities should be promoted. For instance, an industrial estate containing industries that discharge wastes which can be treated in a similar fashion, and at the same time cuts across several municipalities and/or provinces, may be handled at a single central waste treatment facility. Other examples include regional solid waste facilities serving several neighboring municipalities. Physical and land-use planning will thus play a very important role in this approach.

Political Will

Many of the issues cited here are politically difficult to achieve. However, there is scope for innovation in developing the appropriate approaches and solutions. Each country will need to develop its own approaches, based upon its marine pollution management needs, policy objectives and requirements of the government and the private sector. There is no need for a "big bang" approach, whereby governments will attempt to solve its marine pollution problems overnight. A transitional approach involves less risk, lower costs, and is more likely to encourage investors to invest, and users to comply.

The basic premise is the need to protect and manage the marine and coastal waters. Therefore, the government must be committed to play the role of enforcer of environmental rules and regulations; facilitator in creating the proper investment climate; regulator of licensing operations and controlling user charges; and finally, educator of their staff, the private sector and the general public.

PUBLICATIONS OF THE MPP-EAS

On Integrated Coastal Management

- Integrated Coastal Management in Tropical Developing Countries: Lessons Learned from Successes and Failures
- Enhancing the Success of Integrated Coastal Management: Good Practices in the Formulation, Design and Implementation of Integrated Coastal Management Initiatives
(Available in English, Vietnamese, Bahasa Indonesia, French, Portuguese, Swahili, Korean, and Chinese)

On the Batangas Bay Demonstration Project (BBDP)

- Strategic Environmental Management Plan for the Batangas Bay Region
- Coastal Environmental Profile of the Batangas Bay Region
- Integrated Waste Management Action Plan for the Batangas Bay Region

On the Xiamen Demonstration Project (XDP)

- Strategic Management Plan for Marine Pollution Prevention and Management in Xiamen
- Coastal Environmental Profile of Xiamen

Regular Publications

- Marine Pollution Updates (*quarterly publication*)
- Tropical Coasts (*bi-annual newsletter*)
- Annual Report

COPIES ARE AVAILABLE FROM THE MPP-EAS REGIONAL PROGRAMME OFFICE:

GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas

Department of Environment and Natural Resources (DENR) Compound, Visayas Avenue,
Quezon City 1101, Philippines • P.O. Box 2502, Quezon City 1165, Philippines
Telefax: 926-97-12 • Email: imo@klink.com.ph • Internet Email: imo@skynet.net
Internet Webpage: <http://www.skynet.net/users/imo>