

PEMSEA's Experience in the Use of Data/Information in ICM



**Partnerships in Environmental Management
for the Seas of East Asia**

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PEMSEA's Experience in the Use of Data/Information in ICM

Introduction

The Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) is a multisectoral regional partnership that promotes the application of integrated coastal management (ICM) for the sustainable development of marine and coastal areas in the East Asian Seas (EAS) Region. PEMSEA promotes improved coastal and ocean governance at the local, national and subregional levels through capacity-building initiatives and technical assistance covering a variety of challenges to sustainable development of coastal areas, including natural and man-made hazards (including climate change), habitat restoration and management, water use and supply management, food security and alternative livelihood management, and pollution reduction and waste management.

PEMSEA applies a number of tools and procedures as part of the ICM program development and implementation cycle. Two of these tools, namely the integrated information management system (IIMS) and the State of the Coasts (SOC) reporting system have been developed in order to facilitate the consolidation and integration of data/information on the physical, geographic, social, economic and environmental aspects of the ICM site. The results provide managers with a baseline of information from which to build a management program, as well as a systematic means to measuring the progress and impacts of ICM program implementation over time.

What are the uses of data/information in ICM?

Updated, relevant information is essential in coastal management. It facilitates improved planning and management by helping managers and decision-makers better appreciate the causes and severity of environmental issues and the linkages between environmental problems, social development and economic growth. Information can also be used to increase public awareness and participation in management interventions through information sharing and community education programs.

What is the value of integrated information gathering and management?

The need for comprehensive data and information as basis for effective management and planning requires the integration of diverse data from various sources. Oftentimes, however, data are collected, stored, analyzed and used separately by different government agencies and sectors to meet their individual needs and mandates. As a result, information is not utilized fully to provide a comprehensive picture of the ecological and socioeconomic conditions of the area. In addition, because of the lack of an integrated information gathering and utilization approach, there is often duplication of effort and inefficient use of available resources.

PEMSEA has developed the IIMS and the SOC reporting system to facilitate integrated information gathering, evaluation and use in an ICM program. The SOC design is based on a series of indicators that are measured or observed parameters that can be used to describe existing conditions at a site, or changes that occur over time, within the context of the Framework for Sustainable Development of Coastal Areas (SDCA, *Figure 1*). The IIMS was developed to capture comprehensive data sets relevant

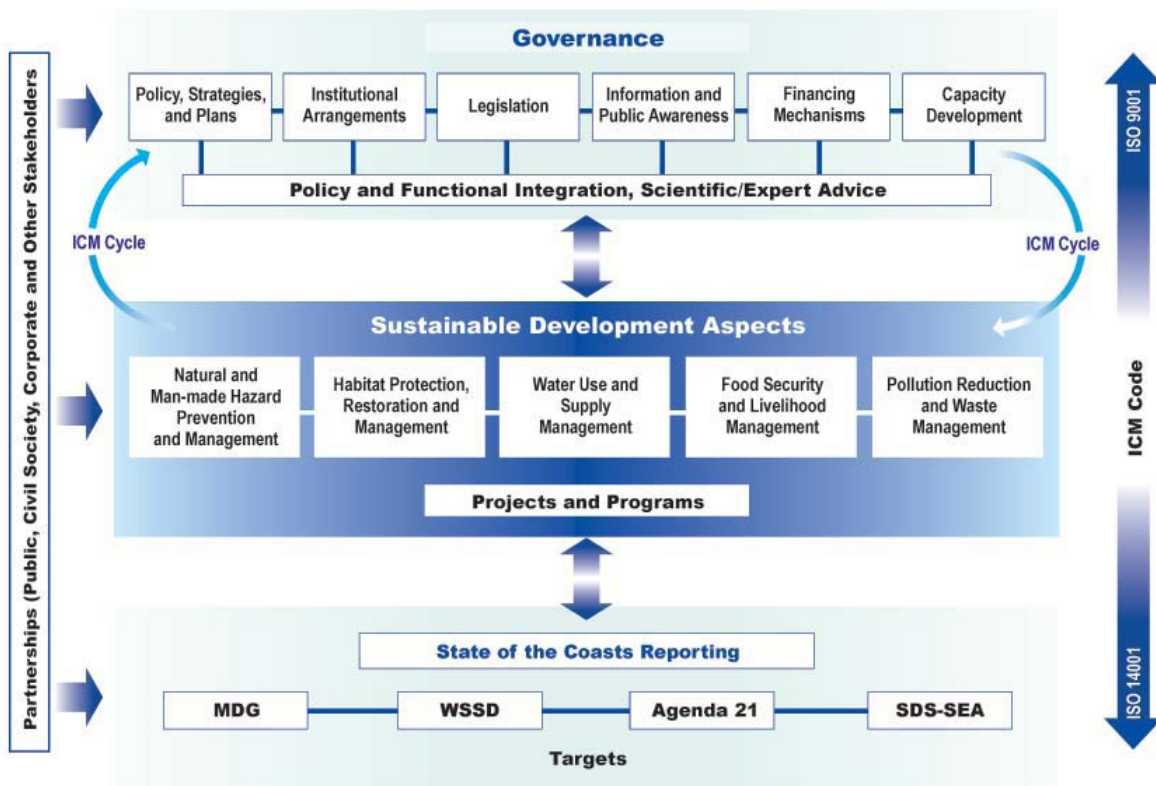


Figure 1. PEMSEA's Framework for Sustainable Development of Coastal Areas through ICM.

to marine and coastal areas and river basins. Both tools promote the process for integrated information gathering, analysis and validation from among the sectors. The SOC and IIMS complement each other to facilitate the generation of required information for management actions and decisions.

PEMSEA is currently working on integrating in the IIMS all the variables required in the SOC to facilitate and strengthen the implementation of the reporting system.

What is PEMSEA's integrated information management system and how is it unique from other information management systems?

The diverse and potentially large volume of data concerning coastal and marine resources and areas is normally available by searching the records and databases of different sectoral agencies. The IIMS is a comprehensive relational environmental

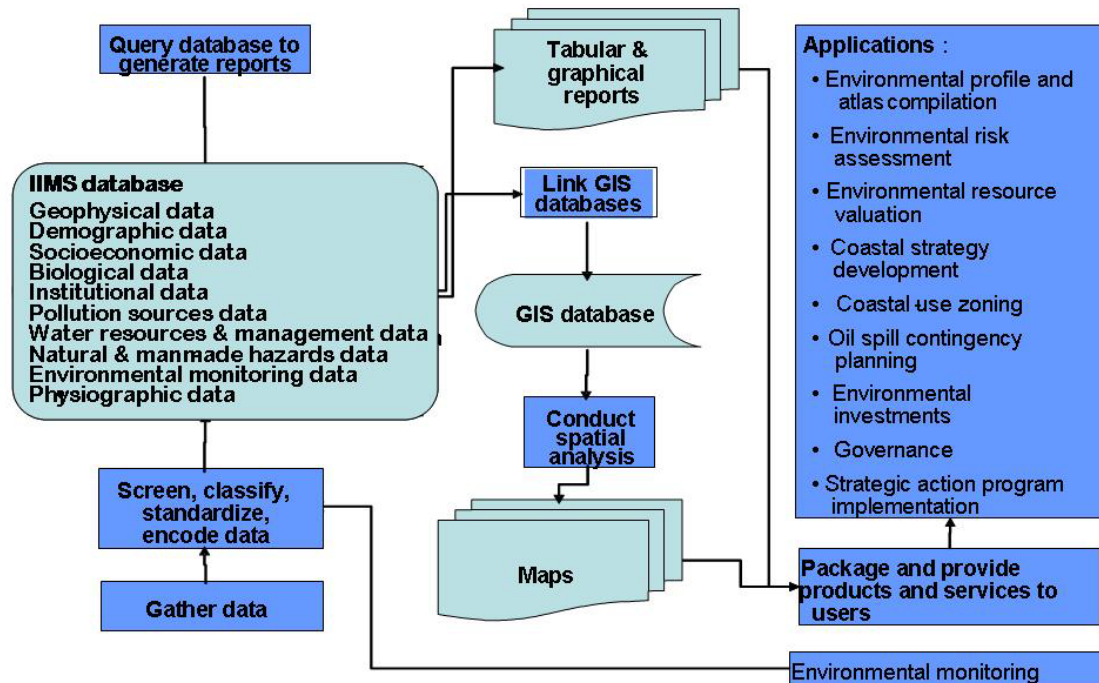


Figure 2. The categories of data in IIMS and applications to support planning and decision making in the marine and coastal areas.

database with a user-friendly query system. It contains technical and data needed for environmental management, planning and decision making. The IIMS can capture 10 categories of data as shown in Figure 2. It can handle temporal and spatial analyses,

enhanced by its linkages with GIS and ecological models. The IIMS also allows multi-user encoding and report generation through a local area network as well as networking of various sites (Chua, 2006). The IIMS can also be utilized as a web-based system, and therefore can be employed for sharing information among ICM sites and other data providers and users in a timely and cost-effective manner (PEMSEA, 2008a).

One of the primary objectives of IIMS was to standardize the format of data collected by within ICM sites as well as by various ICM sites of PEMSEA. This facilitates cross-comparison and analysis of data among data providers and users. Moreover, a query system was designed to support the retrieval of information in a format required by environmental planners, managers, decision- and policy-makers and other stakeholders.

What are the benefits of establishing IIMS in the ICM process?

The IIMS is normally established during the *Initiating Stage* of the ICM cycle (Figure 3) after the initial data has been collected (during the *Preparing Stage*). The IIMS serves as the repository of information for the ICM program, beginning with baseline

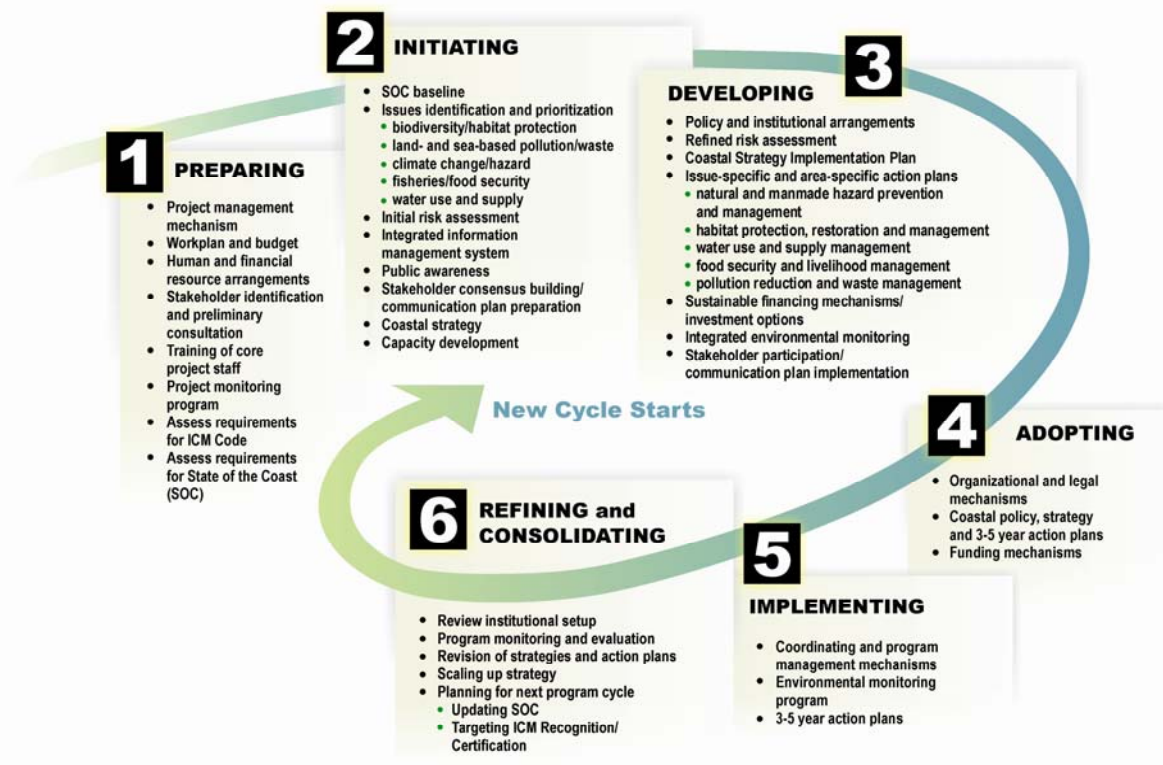


Figure 3. The ICM Development and Implementation Cycle.

conditions, and adding more data through subsequent stages of the ICM cycle. It is essential that the system is updated at various stages of the ICM process so that the necessary data are current. It should be emphasized that IIMS updating and provision of information based on sound data to stakeholders are continuous processes in the ICM cycle (PEMSEA, 2008a).

The IIMS has been designed to support various applications that are part of the ICM programs, including:

- Environmental profile/State of the Coasts
- Public awareness and civil society mobilization
- Coastal strategy and implementation plan development
- Environmental risk assessment
- Stakeholder analysis
- Coastal use zoning
- Environmental investments
- Environmental impact assessment
- Oil spill contingency planning
- Integrated environmental monitoring
- Others

How was IIMS applied in Manila Bay?

The functionalities and usefulness of IIMS were demonstrated in various PEMSEA projects in the East Asian region over the past six years, most notably the Manila Bay Environmental Management Project in the Philippines. Through the IIMS, data were stored, packaged and shared among the various concerned government agencies with mandates and responsibilities in the Manila Bay area, as well as local government units. The IIMS was used to complete a number of development and planning activities, including: completion of an environmental profile of the area; environmental risk assessment; coastal strategy development; coastal use zoning (Bataan Province); environmental and resource valuation; integrated environmental monitoring; oil spill contingency planning; and public awareness and education.

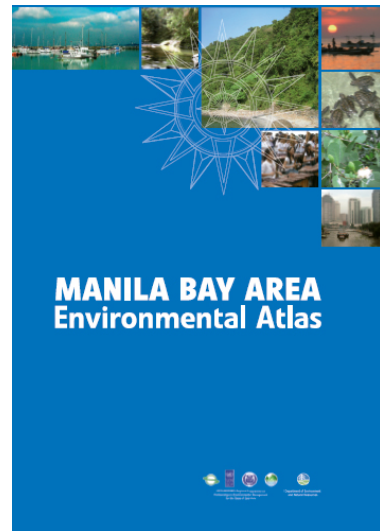
IIMS was also developed as a database platform for the Manila Bay Area Information Network (MBIN). The network was created to facilitate information sharing among the concerned government agencies and levels of government in the Bay area. This was achieved utilizing Internet access to the IIMS. The MBIN members work together to update data for the Manila Bay area, and particularly the data from ongoing environmental monitoring programs. The establishment of the web-based IIMS network, consisting of three regional nodes representing the three regions (National Capital Region, Region 3 and Region 4A) covered by the Manila Bay area and the central node, allows involved offices and institutions to access and update the IIMS.



One important spinoff from the MBIN was the establishment and operation of the Integrated Environmental Monitoring Network for Manila Bay. In Manila Bay, a number of government agencies were undertaking regular monitoring activities, covering the habitats, biophysical and ecological conditions of the Bay. However, the monitoring programs were, in some cases, duplicative, while other areas/concerns in the Bay were not being monitored adequately. Recognizing these gaps, the agencies agreed to adopt a cross-sectoral, integrated monitoring program and to utilize the IIMS as a common and shared database. This approach promoted closer coordination and cooperation, cost-sharing, and data and information sharing among the stakeholders. The result has been a more complete and comprehensive picture of the physical and ecological conditions of the Bay.

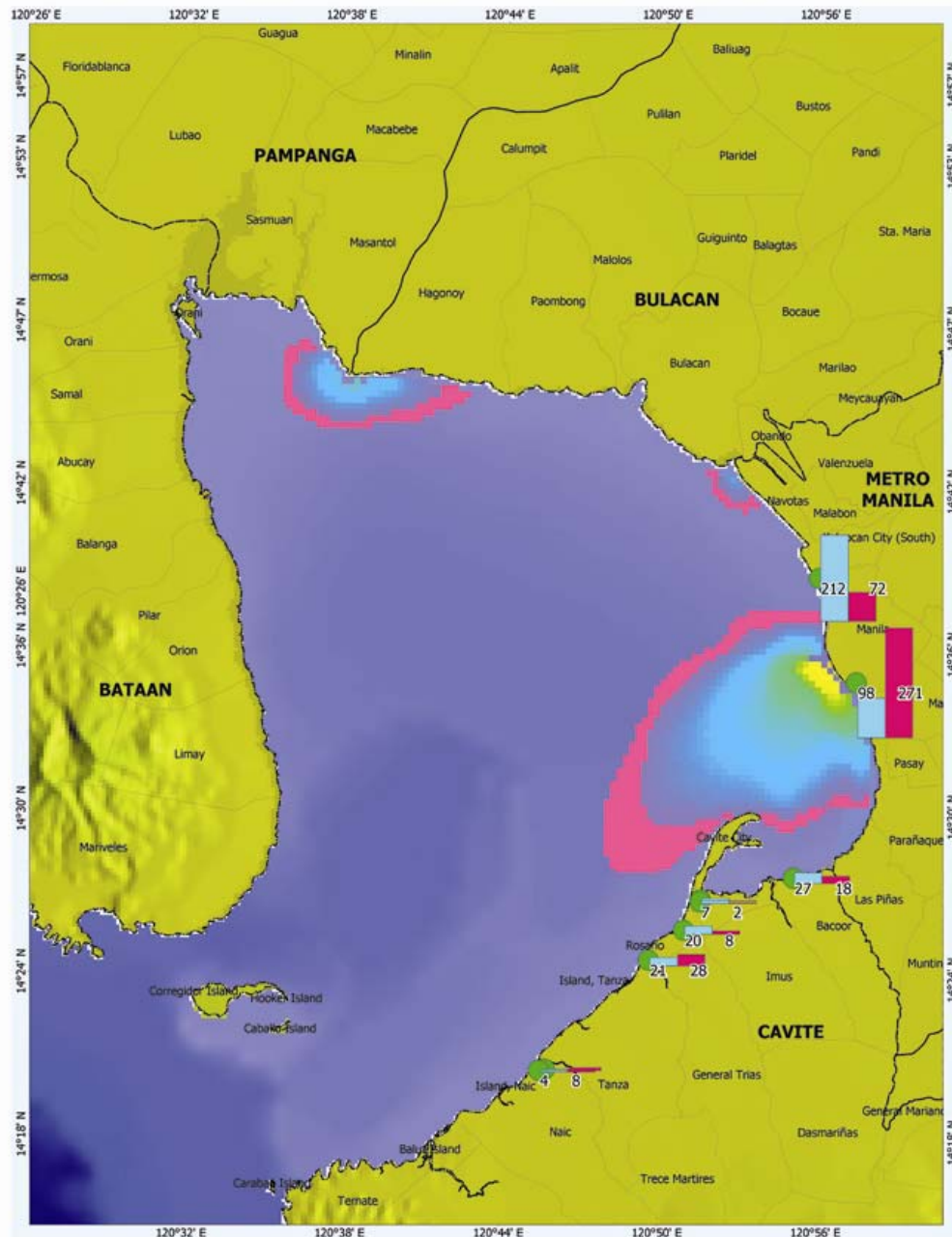
The Manila Bay Area Environmental Atlas is a principal product of this integrated approach to data management and use. The Atlas provides statistical and spatial data to stakeholders in the form of composite maps, graphs and tables that describe the physical, biological and socioeconomic characteristics of the area. It also presents

issues confronting the Bay, and actions that are being undertaken by the various stakeholders. It is intended to contribute significantly in the monitoring and evaluation of impacts and outcomes of interventions in support of the Manila Bay Coastal Strategy. It was designed as a functional cartographic tool in support to strategic planning, policy-making and decision-taking.

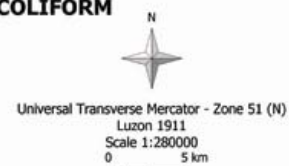
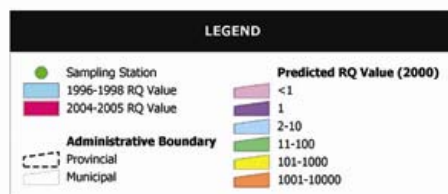


The implementation of a coastal use zoning scheme in the Bay is one of the identified management actions in the operational plan for the Manila Bay Coastal Strategy. The geographical maps of habitats and resources, economic uses such as tourism and recreation (beach resorts), industrial, navigation and shipping, fisheries, and the water quality condition of the Bay facilitates the preparation of a zoning plan for the area. In the case of Bataan, the Atlas has been an important resource in the formulation of their coastal use zoning scheme, which was adopted and is currently being implemented in the Province.

Maps presenting the risk and challenges in the Bay, particularly with respect to oil spills, sea level rise and flooding are proving to be a useful resource to concerned government agencies in developing oil spill contingency plan, flood mitigation and climate change adaptation strategies. In terms of pollution reduction, the geographical map of the beach resorts in the Bay allows the identification of priority areas for water quality monitoring particularly for bacteriological (coliform) counts, a parameter which identifies if an area is fit for swimming and recreation. Likewise, the map on the location of industries prioritizes the areas to be monitored with potential pollution discharges. In December 2008, the Supreme Court of the Philippines directed 12 national agencies to perform certain functions relating directly or indirectly to the clean up, rehabilitation, protection and preservation of Manila Bay. The Supreme Court decision stated that the target classification of the Bay waters was Class SB, i.e., waters fit for swimming and recreation. The Manila Bay Coastal Strategy, operational plan, integrated environmental monitoring program, IIMS and Atlas are key tools that will be used in the implementation of the Supreme Court Decision, and for monitoring progress towards the identified targets.

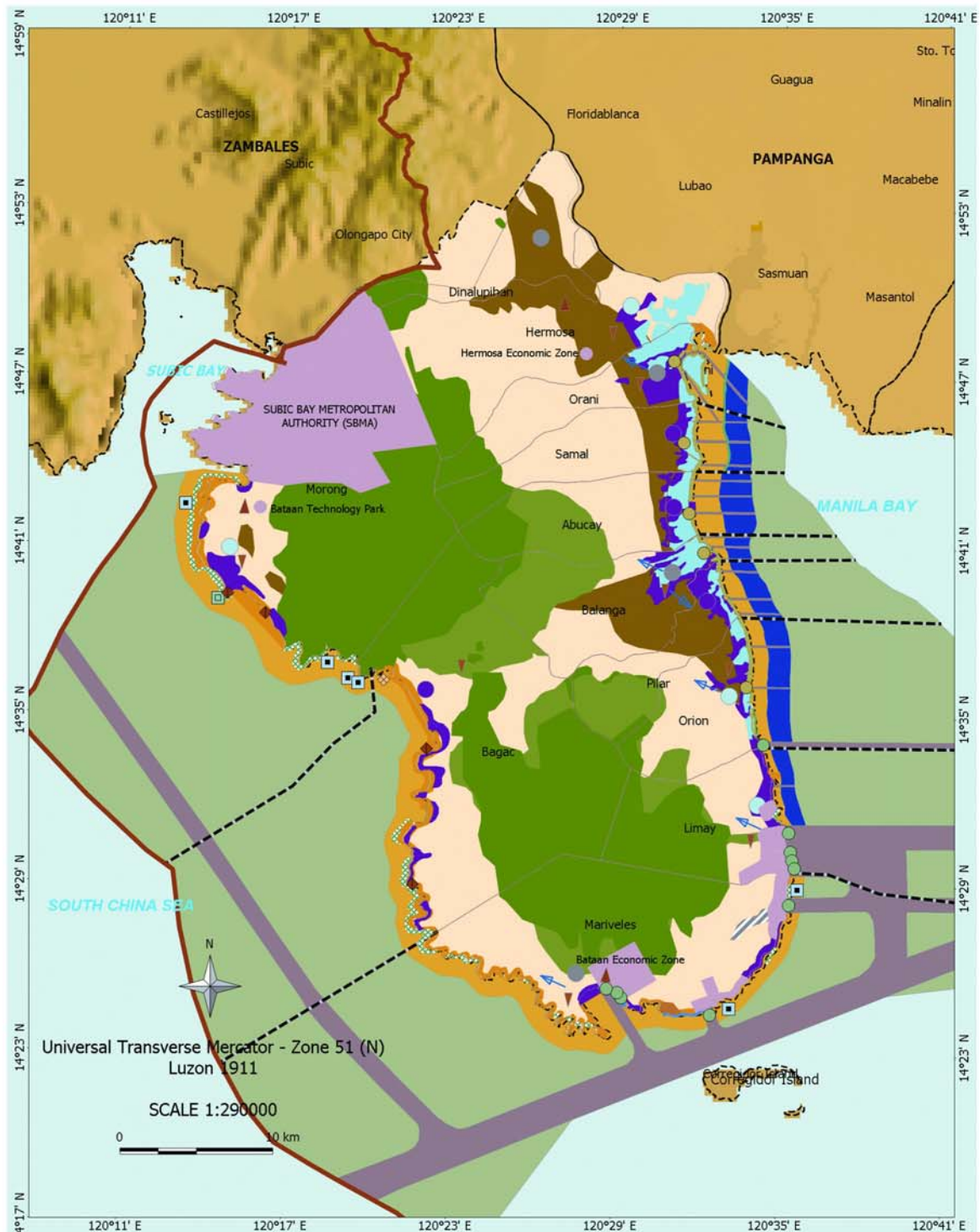


RISK QUOTIENT (RQ) FOR FECAL COLIFORM



Source: IEMP-MBEMP 2006
NAMRIA Topographic Map Scale 1:50000
Pasig River Rehabilitation Program (PRRP) 1996-1998
SEAINFO Water Quality Predictive Model 2001

Note: Administrative boundary should not be used for settlement of existing boundary conflicts.



INTEGRATED LAND-, COASTAL- AND SEA-USE ZONING MAP - PROVINCE OF BATAAN

LEGEND

Administrative Boundary

- Provincial
- Municipal
- Municipal Water Boundary
- Manila Bay Area Boundary
- Urban Center Growing
- Development Increase
- Development Decrease

Land-use

- Large Town
- Medium Town
- Small Town
- Protection Forest
- Production Land within Forest
- Production Land within A&D
- Restricted Agricultural Land
- NPAA/NAAD

Land-, Coastal- and Sea-Use Zones

- Port
- Port (minor)
- Fish Sanctuary
- Marine Sanctuary
- Turtle Sanctuary
- Seagrass
- Agriculture
- Aquaculture
- Built-up Areas
- Industrial Zone
- Tourism Zone
- Mangrove
- Coral Reef
- Seagrass
- Shipping and Navigational Zone
- Traditional Fishing
- Municipal Fishing

State of the Coasts Reporting System

What is the value of an integrated regular reporting system in ICM implementation?

Even if monitoring and evaluation is integral to effective ICM implementation, it is often the weakest of all aspects of implementation. In Batangas Province, Philippines, for example, stakeholders recognized that even in their 14 years of ICM implementation, a regular mechanism to monitor the process and evaluate the results and impacts of their ICM implementation and management interventions was still lacking. Although they regularly prepared their annual accomplishment reports, this was limited to the activities approved in their work plans. Government agencies had been producing individual annual reports of their respective activities and accomplishments. However, no one was providing an overall assessment of the Province's progress with regard to its adopted coastal management strategy, objectives and actions. Stakeholders recognized the need for a monitoring and reporting tool that would incorporate the efforts of the various sectors and their accomplishments with respect to ICM program implementation.

How is the SOC reporting system useful in ICM implementation and how is it unique from other environmental assessments?

The SOC was developed by PEMSEA as an operational tool for local government use in monitoring the progress and impacts of ICM programs. It serves as a scorecard for local governments with respect to meeting their local, national and international sustainable development targets.

The SOC is meant to be a regular reporting and updating process to facilitate the monitoring and evaluation of the different stages of ICM implementation. At the initiation of an ICM program, the SOC provides a framework for collecting and collating baseline information on the socioeconomic, biophysical and ecological situation within the ICM site, as well as legal and institutional mechanisms and ongoing programs. This baseline information provides managers with a good indication of the issues, challenges and gaps in coastal management, along with a sense of who the key players are and what they are doing. At the completion of the ICM cycle, the SOC can be employed to determine

the progress and impacts of ICM implementation and serves as basis for the refinement of the ICM program, including priority issues that will be addressed in the next ICM cycle.

The uniqueness of the SOC is that it gives a comprehensive account of the current status of the area in relation to the *Governance* elements and *Sustainable Development Aspects* of the SDCA Framework (Figure 1). As it is structured based on the SDCA Framework, it gives a complete picture of the socioeconomic and ecological condition of the area and allows the evaluation of the interactions of the governance mechanisms and the sustainable development aspects to explain a particular result or outcome. Table 1 lists some of the indicators being measured in the SOC.

Table 1. Selected indicators that are being measured in the State of the Coasts.

Elements of the SDCA Framework	Indicators for SOC (numbers in brackets is SOC indicator Code)	Data requirements
Governance		
Policy, strategies and plans	[001] Coastal profile and environmental risk assessment	• Total length of coastline • Coastal environmental profile/environmental risk assessment/other similar assessments • Length of coastline covered by environmental assessment
	[002] Coastal strategy and action plans	• Coastal strategy (CS)/coastal strategy implementation plans(CSIP)/strategic environmental management plans (SEMP) • Management boundary of the Plan • Scope of the Plan – aspects considered • Multisectoral participation considered in the development of the plan • CS/CSIP/SEMP adopted at the provincial/municipal level • Monitoring and evaluation of the plan (Frequency) • Updating and revision of the plan (Frequency) • Percentage accomplished of activities identified in the plan
Institutional arrangements	[004] Coordinating mechanism	• Coordinating mechanism/office established at the provincial/municipal level • Legal basis of the coordinating mechanism/office • Organizational structure of the coordinating mechanism/office • Number of staff allocated at the coordinating office • Budget allocation of the coordinating office
Legislation	[008] Environmental cases filed and resolved	• Total number of reported complaints (fishery-, zoning-, pollution-, extraction of resources-related) • Total number of violations where violators were arrested • Total number of violations penalized • Total value of fines collected for non-compliance with relevant legislations

Information and public awareness	[010] Stakeholder participation and mobilization	• Civil society and other stakeholders' organizations in the area • Number of membership per organizations • Programs and activities of civil society and other stakeholders' organizations • Stakeholder participation in environment-related programs and activities
Capacity Development	[012] Human resource capacity	• Number of people at the provincial/city/municipal level trained in ICM • Trainings can be conducted by the local government • Number of people trained by the local government
Financing Mechanisms	[013] Budget for ICM	• Total amount requested for coastal management • Total amount allocated for coastal management • Total amount actually spent for coastal management • Regular annual government budget for ICM at the provincial/city/municipal level • Grants from financing institutions • Loans • Government investment for environmental infrastructure • Co-financing with partner private sector and civil society organization
Sustainable Development Aspects		
Natural and man-made hazard prevention and management	[015] Level of preparedness for disasters	• Natural/man-made disaster/environmental response plan available • Scope of natural/man-made disaster/environmental response plan available • Mitigation strategies identified • Institutional mechanism for the implementation of the emergency response plan • Number of trained and non-trained personnel allocated • Early warning system in place • Adequate equipment available • Budget allocation for natural/man-made disaster
Habitat protection, restoration and management	[020] Protected areas for coastal habitats and heritage	• Number of terrestrial/marine/coastal heritage protected by law • Total terrestrial/marine/coastal heritage area protected by law • Management effectiveness rating of terrestrial/marine/coastal heritage protected areas • Percent and area of habitats under protection, by type • Area allocated for the protection of rare and endangered species
Water use, supply management	[023] Access to improved water source	• Population using improved water sources • Volume produced from piped water sources • Water pricing per cubic meter • Coastal area affected by saltwater intrusion
Food security and livelihood management	[026] Fishery	• Municipal fishery production • Commercial fishery production • Aquaculture production • Size and catch composition
	[028] Poverty incidence, employment and education	• Poverty threshold • Income per capita • Poverty incidence

		• Total employment • Unemployment rate • Education; proportion of population (primary/secondary/tertiary)
Pollution reduction and waste management	[034] Municipal solid waste	• Tonnage of municipal solid waste generated • Tonnage of municipal solid waste received in landfills/dumpsites • Tonnage of municipal solid waste received at recycling facilities • Tonnage of municipal solid waste materials, recovered and sold

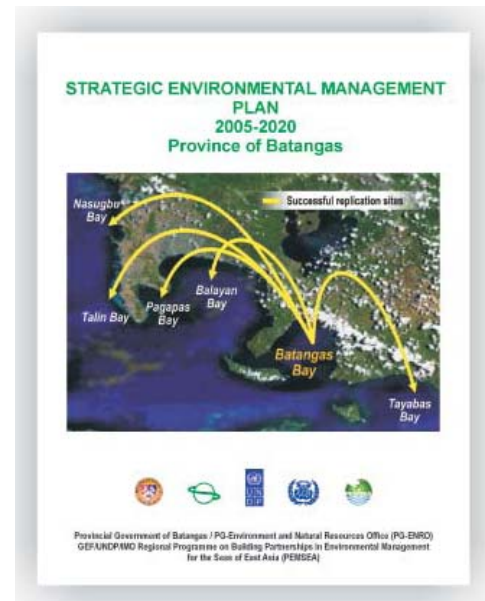
As the SOC is directed towards tracking progress toward sustainable development targets, it uses simple, meaningful and measurable indicators that complement those of the World Summit on Sustainable Development (WSSD) Plan of Action, the Millennium Development Goals (MDG), Agenda 21, the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA) and other relevant international/regional instruments. The indicators were determined from a matrix of commonly measured indicators and a series of discussions and workshops with regional and international experts on environmental assessments, and chosen and validated for their applicability in the region. A total of 160 indicators were determined to represent a comprehensive set of social, economic and ecological parameters for the SOC reporting system.

The SOC indicators were first pilot-tested in Batangas Province. The temporal coverage for the pilot SOC was 1990 to 2007, coinciding with the baseline year for the MDG targets. The pilot test was designed to provide Batangas not only with an assessment of their progress in ICM implementation, but also in achieving their MDG targets.

Early on the pilot-test, it was determined that data/information on many of the 160 indicators were not available. In response, a core set of 35 indicators was agreed upon (Table 1). These data were considered to be important indicators, which were normally available at the local government level and which provided essential information on various aspects of governance and environmental, social and economic concerns in the ICM site. It was further surmised that these core indicators would be a starting point only. Over time, as more experience was gained and the ICM program evolves, additional indicators would be included in the SOC reporting system as the local government proceeded through successive ICM cycles (PEMSEA, 2008b).

The 35 core indicators facilitate the evaluation of environmental and socioeconomic status as an outcome of ICM implementation in the coastal area. For example, indicator [002] *coastal strategy and action plans* (Table 1) under the governance element of the SDCA Framework determines the presence, scope, coverage and objectives of coastal management, as delineated in the coastal management action plans in the area. This indicator also considers the roles and responsibilities for specific stakeholders, the proposed management interventions with specified targets and timeframes, as well as the level of commitment of the local government to implement the management action plans. This is an important indicator as it determines the presence of a process and framework for integrated planning and management as well as a platform that facilitates interagency consultation, multisector cooperation and stakeholder participation.

However, the resulting strategy needs to be adopted by the stakeholders and translated into on-the-ground actions. In the SOC of Batangas Province, results for this indicator showed the progress of the Province from the adoption of the Batangas Bay Region Strategic Environmental Management Plan (SEMP 1996-2020) in 1996 to the adoption of the Batangas Province SEMP (2005-2020) in 2005. The SEMP covered the five sustainable development aspects identified in the SDCA Framework and considered the multisectoral participation in the process of SEMP development. However, the results for this indicator also revealed the lack of a systematic approach to monitor and evaluate the accomplishments and impacts of the SEMP interventions in Batangas. The SOC was the first effort to implement such a system in the Province.

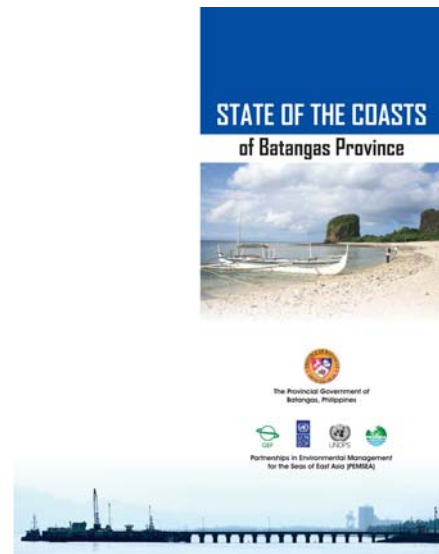


In terms of the sustainable development aspects under habitat protection, restoration and management, four indicators were determined including the presence of habitat management plans and implementing mechanisms, including *available budget and staff allocation* [018]; *the area coverage of the different habitats* [019]; *the*

implementation of protected areas for terrestrial, marine and coastal heritage [020]; and the extent of reclamation and conversion of habitats [021]. These indicators illustrate the commitment of the local government in protecting and conserving their coastal habitats as well as the outcome of their habitat management interventions. In the Batangas SOC, results for these indicators showed that the habitat management plan was integrated into the Batangas Province SEMP, while the extent of the habitats showed limited available data to assess trends. The Province has progressed in terms of number of declared marine protected areas, but there was very limited data on terrestrial and coastal heritages. Similarly, the reclamation and conversion of habitats appeared to be an emerging environmental issue in the Province. The SOC of Batangas Province (Provincial Government of Batangas and PEMSEA, 2008) describes in detail the results of the 35 core indicators as applied in the Province, as well as the implications of the results, and recommendations for addressing information gaps and identified concerns.

How was SOC implemented in Batangas Province?

In Batangas, the whole process of developing the SOC report took six months and involved the collaborative effort of various municipal, provincial and national government agencies, the private sector, nongovernmental and civil society organizations and the academe. Four stakeholder consultations were conducted to present the objectives of the reporting system, discuss the level of details (municipal and/or provincial) of data/information required, present and validate initial results, and present the draft SOC for concurrence by the stakeholders, including formulation of recommendations. Although data were gathered from concerned agencies and institutions, and presented and validated by the stakeholders during the consultation workshops, an on-the-ground validation exercise was also conducted in 10 coastal municipalities to confirm that the information was reflected on the ground. It was also an opportunity to determine how coastal communities participated in and benefited from the ICM program.



The buy-in of the stakeholders and their recognition of the need for a regular monitoring system facilitated the successful pilot implementation of the SOC reporting system in Batangas. It was essential to involve the various sectors at all stages of SOC implementation, in order to promote a sense of ownership among stakeholders and to allow them to fully appreciate the benefits of the reporting system as they go through the process.



What are the highlights of the Batangas SOC and how are these relevant?

The SOC report was designed as an operational tool to guide local Chief Executives, ICM managers and practitioners, coastal communities, and other stakeholders in the planning, implementation and evaluation of ICM. It features an assessment of trends or status of conditions using the 35 core indicators (*Figure 4*). In Batangas, the SOC report highlighted the significant progress of the Province in scaling up its coastal management efforts from a single bay in 1994, to the entire provincial coastline. However, the SOC report also emphasized that, in order to fully achieve the overall goals and objectives of the provincial SEMP, municipal governments needed to be encouraged to integrate the adopted action programs into their municipal development plans.

In addition, the SOC report highlighted that, although there were sufficient legal instruments in the Province to fully enable the implementation of ICM, there was still a need to strengthen the enforcement of laws. The action further suggested a more systematic monitoring and surveillance arrangement in marine and coastal areas, including the institutionalization of the coastal volunteers as partners of the Province in fisheries enforcement.

In terms of the sustainable development aspects, the Batangas SOC report put forward the recommendation for a province-wide coastal use zoning scheme. The rationale was that such a scheme would provide local Chief Executives, policymakers, resource managers and investors with clear direction on the developmental activities that would be compatible with sustainable use of the coastal areas. The report highlighted the many initiatives in the Province to protect the coastal habitats, but there was a continual decline in mangrove areas due to habitat conversion and reclamation. The strict enforcement of ordinances for the management of wastes was also raised as one of the recommendations. The report recommended that the Province take the lead in exploring innovative and cost-effective waste management approaches in partnership with the municipal governments, specialized institutions/organizations and the private sector.



Mangrove areas in Calatagan are being converted to fishponds. A quarry nearby serves as a source of soil for pond dikes.

Figure 4. Key findings for the core indicators determined in Batangas State of the Coasts Report.

Category	SOC Code	Indicator	Trend * (1990–2007)
Governance			
Policy, strategies and plans	001	Coastal profile/Environmental risk assessment	😊
	002	Coastal strategy and action plans	😊
	003	Local government development plan, including coastal and marine areas	😊
Institutional arrangements	004	Coordinating mechanism	😊
	005	Participation of stakeholders in the coordinating mechanism	😊
Legislation	006	ICM enabling legislation	😊
	007	Administration and monitoring of compliance to legislation	😬
	008	Environmental cases filed/resolved	😬
Information and public awareness	009	Public education and awareness	😊
	010	Stakeholder participation and mobilization	😊
Capacity development	011	Availability/accessibility	😊
	012	Human resource capacity	😬
Financing mechanisms	013	Budget for ICM	😬
	014	Sustainable financing mechanisms	😬
Sustainable Development Aspects			
Natural and man-made hazard prevention and management	015	Level of preparedness for disasters	😊
	016	Degree of vulnerability to disasters	😬
	017	Social and economic losses due to disasters	😬

Category	SOC Code	Indicator	Trend * (1990–2007)
Sustainable Development Aspects			
Habitat protection, restoration and management	018	Habitat management plan and implementation	
	019	Areal extent of habitats	
	020	Protected areas for coastal habitats and heritage	
	021	Reclamation and conversion	
Water use and supply management	022	Water conservation and management	
	023	Access to improved water source	
	024	Incidences/deaths due to waterborne diseases	
Food security and livelihood management	025	Fishery management plan and implementation	
	026	Fisheries Production	
	027	Malnutrition rate	
	028	Poverty, education and employment	
	029	Livelihood programs	
Pollution and waste management	030	Management plans	
	031	Water quality	
	032	Air quality	
	033	Sanitation and domestic sewerage	
	034	Municipal solid waste	
	035	Industrial, agricultural and hazardous wastes	
* Legend:  Improving  Deteriorating  Baseline data only or data not conclusive  No data			

How is SOC implementation scaled up?

To facilitate the implementation of SOC in other ICM sites in the EAS Region, a Guidebook for State of the Coasts Reporting (PEMSEA, 2008b) was developed based on the Batangas experience. The Guidebook outlines the steps and requirements for the preparation of the SOC report in ICM sites. Also included in the Guidebook is the SOC reporting template, which serves as a tool for data collection and collation.

As more and more ICM sites prepare their local SOC reports, it is envisaged that a clearer picture will emerge on the state of the region's coasts.

Conclusions

The SOC and IIMS are tools that are used in ICM to facilitate the gathering and usage of relevant data/information for managing marine and coastal areas. Both tools provide a process for collation and integration of data/information from the various sectors, as well as facilitate information and knowledge sharing.

The SOC and IIMS strengthen marine and coastal area, and river basin management, as seen in the two examples of Manila Bay and Batangas Province. The comprehensive coverage and data sets contained in the IIMS allow ICM managers to generate a number of outputs (e.g., coastal profiles, coastal strategy, risk assessment, coastal use zoning, etc.) that are vital to ICM program development and implementation. The SOC report consolidates data and evaluates it against selected indicators, providing a report card on trends in the area with respect to marine and coastal governance and environmental management programs.

The usefulness of IIMS had been demonstrated in the compilation of the Manila Bay Area Atlas, an output of PEMSEA's Manila Bay Environmental Management Project (2000-2008), as an important reference document for the monitoring of the implementation of the Operational Plan for the Manila Bay Coastal Strategy and the overall management of the Bay. Likewise, the SOC of Batangas Province provided local Chief Executives, ICM managers and practitioners, and stakeholders with guidance on the need, rationale and steps required for strengthening various aspects of ICM

implementation in the Province. These experiences have confirmed that, if used consistently over time, the two instruments will provide managers with time and resource savings, as well as facilitate sound planning, decision making and continual improvement of ICM programs.

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