



COASTAL AND OCEAN MANAGEMENT INSTITUTE
XIAMEN UNIVERSITY

NEWEST: New Advisory Committee Established
FOCUS: WOW 2009 Scientific Forum
RESEARCH: COMI Received Mega-project Grant
PEOPLE: Dr. Huasheng Hong Distinguished Scientist

From Watershed to Ocean From Science to Management

Different Voices Spark the Brains



With the simple combination of orange "Y" and blue "X", the Yingxue Forum logo is designed to stress the integrated study from watershed to ocean using a multidisciplinary approach from science to management. As the Executive President of COMI, Prof. Xiongzhi Xue, emphasized in his opening speech, Yingxue forum provides an excellent platform for researchers to learn experience from various fields and spark new ideas in discussions.

On the morning of March 19th, room 215 in Yingxue Building was crowded by faculties and students who came to attend the first Yingxue Forum, which was organized by the Coastal and Ocean Management Institute (COMI) and chaired by Director of Center for Integrated Watershed and Ocean Management of COMI, Assoc. Prof. Nengwang Chen. More than forty participants attended the forum, mainly from the Taiwan Strait Regional Environmental Oceanography and Watershed Management research teams. Prof. Zhuoteng Liu from Institute of Oceanography, Taiwan University, was also present at the forum and joined in the warm discussion.

The three-hour Forum was more like a Round Table. Eleven speakers presented their on-going programs and new interests. They were Yan Li, Weidong Zhai, Wenzhi Cao, Weidong Guo, Xinhong Wang, Jianyu Hu, Bangqin Huang, Caiyun Zhang and Deli Wang from College of Oceanography and Environmental Science and State Key Laboratory of Marine Environmental Science, Xiamen University, who shared their achievements and academic viewpoints respectively on ecosystem response, carbon cycling in the coastal system, water resource and environment, colored dissolved organic matter (CDOM), Persistent Organic Pollutants (POPs), physical oceanography,

marine phytoplankton, remote sensing technique, and behavior of dissolved cadmium. Assoc. Prof. Benrong Peng led a warm discussion on the topic of Institutional Arrangement and Scientific Support of Integrated Watershed Management. Each local political units acts on its own to serve its self-interest in the absence of incentives or laws to create coordinating mechanisms. Most watershed management programs are not effective because priority is economic growth and the horizontal and vertical political institutions are isolated.

Chief Scientist of COMI, Prof. Huasheng Hong highly appreciated the first Yingxue forum and pointed out that study of Regional Environmental Oceanography is supposed to focus on the Taiwan Strait and adjacent area, given the opportunity of national special policies for west strait construction. It is necessary to convoke all specialists from the two teams to carry out regional oceanography research ranging from Wenzhou to Shantou. Furthermore, promoting cooperation with Taiwan research institutes will benefit each other, and also the historical mission to protect the Taiwan Strait all together. The second Cross-Straits symposium on Marine Environmental Monitoring and Prediction which scheduled at the end of August 2010 will highlight such cooperation.



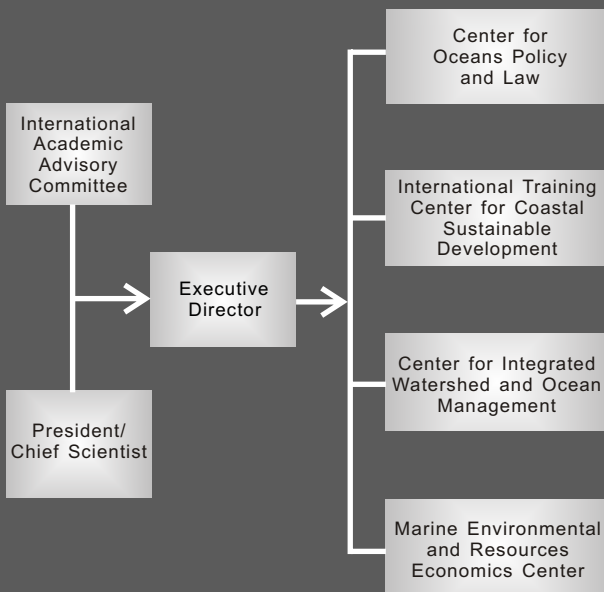
ABOUT COMI

The Coastal and Ocean Management Institute (COMI), Xiamen University, was established as a research organization of Xiamen University in Oct. 2005. It is dedicated to initiate research and higher education of ocean and coastal sustainable development science, with the support of relevant international organizations and Xiamen Municipality.

COMI's primary mission is to create a platform to encourage interdisciplinary programs through taking advantage of the multi-discipline resource within the university, and collaborating with other highly respected regional, national and global institutions. It also trains quality comprehensive talent, and provides science and technological support for decision-making towards ocean and coastal zone sustainable development.

COMI is devoted to scientific research on the frontier of the sustainable development of the ocean and coastal area. Currently four research directions are newly established: Center for Oceans Policy and Law (XMU-COPL); International Training Center for Coastal Sustainable Development (ITC-CSD); Center for Integrated Watershed and Ocean Management (CIWOM); and Marine Environmental and Resources Economics Center.

New Structure of COMI



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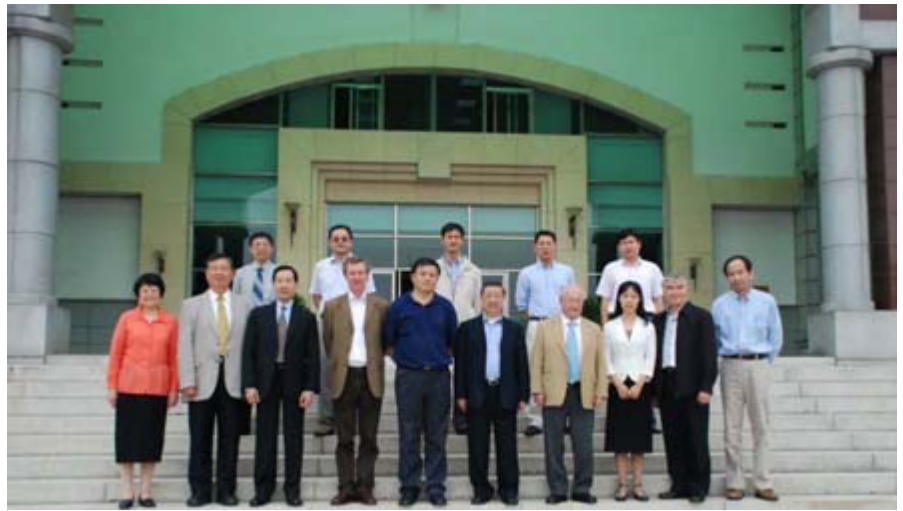
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The International Academic Advisory Committee of COMI (IAAC) has the brain trust role in COMI's development. It consists of leading experts in diverse research areas from all over the world, who are entrusted to provide guidance and suggestions to COMI on its development strategy, scientific research, education programs and capacity building activities. The IAAC members have a 3-year tenure and meet in Xiamen University annually to review the work progress and working plan in the coming year, while also giving numbers of lectures to the faculty and students of COMI during their visits. On 9th November 2009, the fourth IAAC Meeting was held as scheduled to elect its new chair and vice chair for the following three years. Dr. Chua Thia-Eng was elected as Chair and Ekko Ierland as Vice Chair.

New Advisory Committee Established



Participants in the fourth IAAC Meeting

The Second Committee Members of IAAC

Chair

Dr. Chua Thia-Eng	Partnership in Environmental Management for the Seas of East Asia (PEMSEA)
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Vice Chair

Prof. Ekko Ierland	Wageningen University
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Members

Dr. Biliانا Cicin-Sain	University of Delaware
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Prof. Chou Loke Ming	National University of Singapore
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Dr. Di Jin	Woods Hole Oceanographic Institution
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Prof. Gil Jacinto	University of Philippines
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Prof. Gunnar Kullenberg	Intergovernmental Oceanographic Commission, (IOC-UNESCO)
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Prof. Huasheng Hong	Xiamen University
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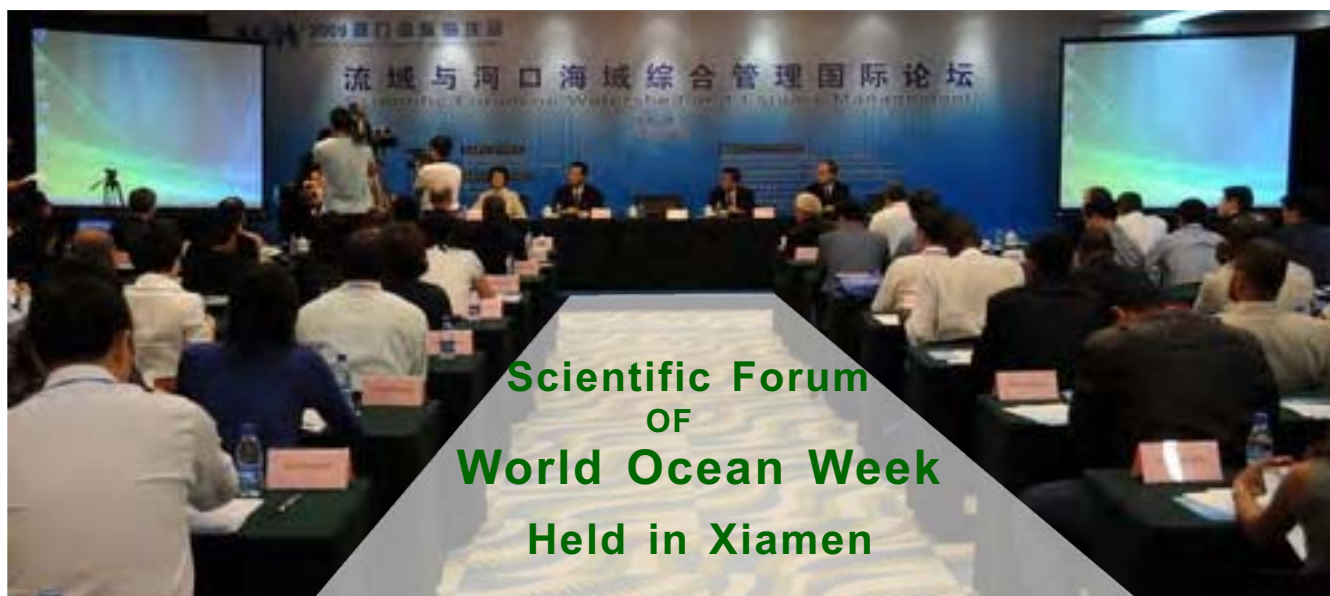
Prof. Kuenchen Fu	Shanghai Jiatong University
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Prof. Lawrence Juda	University of Rhode Island
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Mr. Li Haiqing	State Oceanic Administration, China
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Prof. Rudolf S. S. Wu	City University of Hong Kong
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Prof. Thomas M. Leschine	University of Washington
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Scientific Forum OF World Ocean Week Held in Xiamen

Freshwater runoff has a major impact on the health of coastal and ocean ecosystems, but it is governed by a different set of actors, policies and priorities from those in coastal zones. It affects ocean productivity, marine ecosystems, circulation patterns, and hydrological balances, which are also influenced by natural fluctuations of the increasingly variable global climate system. Billions of people are impacted by what comes downstream: 40 percent of the world's population lives within 100 km of the coast; 3 billion people rely on fish for essential nutrition and 500 million more depend upon fisheries and aquaculture for their livelihoods.

On 7th November, in the beautiful coastal city of Xiamen, the 2009 Scientific Forum of World Ocean Week gathered leading experts in the field to present and discuss the latest knowledge on the oceans most pressing issues. Over 200 participants representing academia, government, civil society organizations and UN bodies discussed ways to adapt to the impacts of global change on estuaries, offered insights from lessons learned in watershed resources and environmental management and analyzed the scientific basis for effective policies to integrate watershed, estuary and coastal management. International Scientific Forum 2009 was sponsored by World Ocean Week Organizing Committee and organized by Coastal and Ocean Management Institute (COMI), Xiamen University, and co-convened by the International Oceanographic Commission/WESTPAC (IOC-WESTPAC), the Land-Ocean Interactions in the Coastal Zone (LOICZ) - East Asia Node, Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) and the Stockholm International Water Institute (SIWI).



Prof. Jan Lundqvist on his topic of "Restoring the Water Quality of Lake Malaren—an Integrated Watershed Approach Benefitting Stockholm and Surrounding Waters"



Prof. Xiongzhi Xue, Executive Director of COMI being interviewed by media during an interval in the meeting

1. Integration and coordination between places, sciences and sectors is required on a historically unprecedented scale.

It is evident that the management of estuaries, river basins, and coastal lands, in isolation cannot address the growing pressures on the environment. Integrated management is commonly prescribed, but managers in all areas do not have many actual opportunities to learn how to approach interdisciplinary problems. Increased priority on training is needed.

2. Momentum for the holistic, integrated management along the continuum of land, water resources, estuaries, coasts and oceans is building in the scientific community. It is time to move towards policy implementation.

There are several examples, from the Delaware Estuary to the Manila Bay, where integrated management schemes have begun implementation and which offer lessons for improved practice. Essential steps to establish integrated management include: long-term collaborative monitoring and modeling of environment dynamics; regulation schemes for land based and human activities to lower pollution loads; information systems to map and share data results on water pollution; stakeholder education and participation in water and coastal protection as part of economic development.

Notable progress in China over the past decade to emphasize and implement measures for an integrated approach to land, sea, estuary, and watershed management also reveals the challenges shared by many nations. Operational frameworks and mechanisms are lacking, and a cross jurisdictional, multi-sector and multidisciplinary approach for managing coastal water systems must be put in place to address downstream impacts of river basins, estuaries and their associated marine habitats.

3. The climate change threat may be most serious in estuaries, ocean and coastal areas, whose marine ecosystems are particularly vulnerable to warming. This will exacerbate the impacts of human activities on estuarine ecosystems.

River-estuary-coastal systems face huge threats in the potential impacts of global climate and environmental change. Unified action plans are needed. There is great potential to improve capacity for forecasting, which could

enable better planning under higher climate variability. Participants claimed that the mitigation of climate change is of even greater priority than adaptation and the ocean community must push all major players in COP-15 for a strong outcome in the climate negotiations.

4. Adaptation to climate change in coastal zones requires effective implementation of Integrated Coastal Zone Management (ICM). But the potential impacts of climate change must be mainstreamed into ICM strategies.

Measures to improve resilience of coastal zones include the control of coastal developments, land-reclamations, and ground-water exploitation; zoning areas into high-, medium-, and low-risk categories; evaluating the cost-effectiveness of shoreline protection procedures; use of satellite imagery for observation of impacts of sea-level changes; and increased research for new data and modeling support to address key vulnerabilities. ICM plans must assess

these vulnerabilities and take early action on adaptation measures to compensate for the long lead times required for their implementation.

5. Concrete economic arguments on the value of water quality and ecosystems protection enable action through policy.

Reliable and targeted data creates impetus for rational decision-making. This is a strategic, scientific, and communication challenge that needs to be integrated into research proposals and analysis.

6. Pollution prevention and ecosystem protection are cost-efficient policies.

Water treatment and ecosystem restoration are crucial but require great investment and time for quality to be regained. Developing areas will face increased challenges to balance priorities between environmental protection and economic development. In the short-, medium-, and long-term, investment into reduce pollution loads from industry and agriculture upstream are much less costly than the treatment of pollutants in the water itself. But it is not just agriculture and industry: every individual is a diffuse point of pollution through their daily activities. We need to engage in serious thinking and regulation of what and how we produce that incorporates "downstream effects" of consumption.

A set of key message were concluded on the disconnected management of land, freshwater, coastal and ocean systems.

Coastal plains are of great demographic and economic importance with most mega-cities, and nearly half of humanity, living near coastal areas and estuaries. But estuary ecosystems are under threat from many fronts: overfishing, fishery habitat loss through shifting land use, salinization, freshwater intrusion, and from rising pollution and nutrient loads that cause eutrophication of coastal waters.

Studies of marine ecosystems show significant effects of warming, which will exacerbate these impacts. Global climate change induced problems are still rising: coastal nitrogen pollution; harmful algal blooms (HAB); mycobacterial fish habitat infections; squeezed fish habitat in between warm surface waters and bottom low oxygen zones.

Further projections of global climate change impacts include:

- 30% of species at an increasing risk of extinction with a 1-3 degree centigrade increase;
- Widespread bleaching of coral reefs;
- 30% of global coastal wetlands loss with a 3-5 degree centigrade increase;
- Loss of lives and livelihoods due to increased coastal flood and impact on Asian and African mega-deltas.

Impact of Climate Change On Estuaries

Adaptation to climate change is urgent needed and proposed as:

Global Ocean Governance

Global Ocean Governance is vast and complex: there are more than 300 regional agreements and regulations for the Ocean System. Ocean governance, as defined by UNCLOS (UN Convention of the Law of the Sea), was extended to coastal and adjacent land areas in 1992 and subsequently to conventions on climate change and biological diversity. Through another development, UNFCCC (UN Framework Convention on Climate Change), each signatory will be obliged to promote sustainable management of their coastal and marine ecosystems, marine biodiversity, and economically important migratory species. Each state signatory to the UN Fish Stocks Agreement will be obliged to ensure compatibility of conservation and management measures for their EEZ with those for adjacent high-seas areas. Additionally they will have to regulate their shipping as obliged by the increasing role of the Port State Control convention.

Speakers debated whether the global legal framework was flexible enough. Jean-Luc Simeon, Laboratory PACTE-UMR-CNRS, France, argued that legal structures failed to take adequate account of regional and local differences, hence they struggle to adapt to climate change. He cited the inability of the regional authorities to deal with anomalous rise in sea temperature from 29 to 32°C in the Caribbean Sea in 2005, an event that resulted in the bleaching of 40 percent of the Caribbean coral reef. To this day, legislative measures have not yet been taken to lessen impact of climate-related disasters in the future.

ICM is Strongly Needed

Adaptation to global and climate change, meanwhile, strongly requires Integrated Coastal Management (ICM). However ICM needs to take climate change into account in current planning, by adapting the vulnerability of key systems to climate-related changes and incorporating the long lead time required to implement most adaptation measures. Hydrology is an essential part of the process of managing the impacts of climate on estuaries.

With mechanisms present, ICM lacks implementation. It should put an emphasis on the management of the human factor and the involvement of local authorities, industries, science bodies, NGOs and communities. Integrated multi-disciplinary approaches are needed, and science should take the lead to propose management solutions that will initiate changes at the ecosystem level. This will require more efficient communication channels between the policymakers and the scientific community. It is essential to mainstream risk associated with uncertainty in ICM and to coordinate local, national, and global emergency preparedness for timely responsiveness.

Public Support

Public support to confront global scale natural resource problems is usually initiated when society's expectations for ecosystem services, such as fisheries production and potable water provision, go unmet at local or regional scales. But waiting for crises to take action is costly and not pragmatic. Raising public awareness on the importance of estuarine health is needed to achieve a social consensus, which is crucial to successful management campaigns.



Manufacturing, polluting industries in Stockholm till 1960s, and now the surface water is clean enough to drink

Photos provided by Prof. Jan Lundqvist

Insight

From the Lake Malaren in Stockholm

Just one half century ago, Stockholm's Lake Malaren was too dirty to swim in. Water and environmental degradation reached critical levels in the mid-late 1960's. This serious impediment to a stable development and quality of life has been largely reversed and today, the surface water is clean enough to drink. Point source pollution was brought under control through the reform and relocation of industry, enactment of effective legislation, control and monitoring and investment in efficient wastewater treatment plants. Most important, however, was the shift in attitude and human dynamics among the local population.

Several factors contributed to the successful transformation, namely: an integrated environmental legal system, effective from 1969, collaboration between the private sector (industry), monitoring authorities, market related incentives, an increasing consciousness among the consumers (pushed by the media), new water quality treatment technologies and plants, BAT (Best Available production Technologies) in industrial production, more comprehensive treatment of waste water and monitoring and evaluation programmes, principle for permits to industries/economic enterprises, methods

for control and monitoring of emissions done by the industry itself, self-financed improvements by industry, subsidized municipal treatment plants from national government, and the role of committed individuals and actions taken when the "time was ripe".

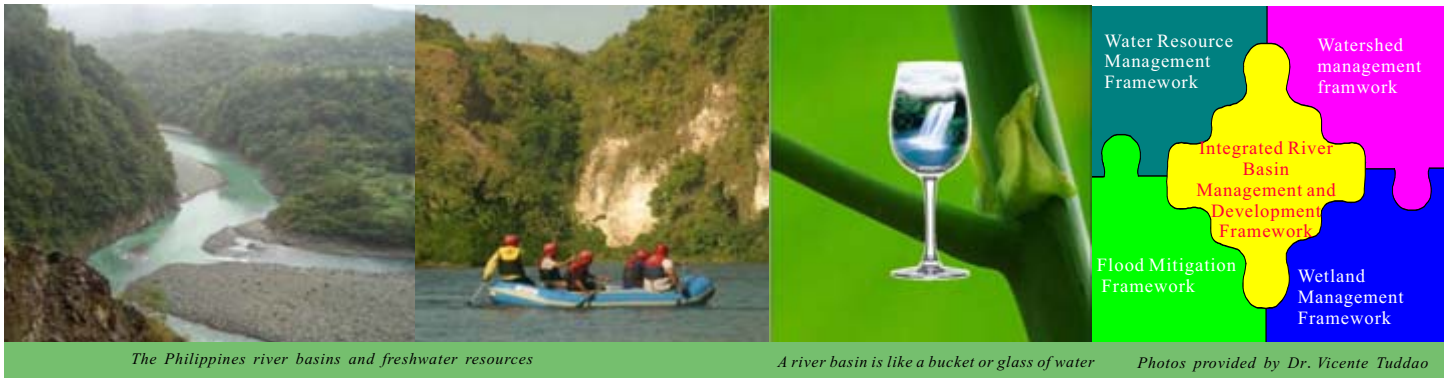
While Sweden has reined in pollution from industrial production, the region still faces environmental threats through the "slow emissions" from the technosphere, i.e. pollution from buildings, roads, and human consumption. Fast developing regions, especially large cities in coastal zones, should consider long-term environmental costs of their investments in the built environment, as they will be "locked in" to the pollution loads emitted by the buildings they construct for the next several decades.

Restoring water quality requires huge commitment and investment. It also brings large returns in economic and social benefits. Stockholm's Lake Malaren was valued at 5.7 billion USD, while activities in Manila Bay contribute 55% of the Philippine economy. Identification and assessment of the specific value of water and environmental services are crucial, but complex to do.

Keys to successful management in

Stockholm include comprehensive engagement over a long time period; legislation and compliance running in parallel; public pressure through educated citizen groups having multiple channels to raise environmental concerns and impact society; and the private sector taking the lead in environmental concerns as a business opportunity to improve brand image and competitiveness.

Prevention and planning are much more cost-effective than reliance on treatment. In Stockholm, for example, use of mercury in dental offices has been removed because the cost of removing mercury from water is 7,700 EUR per kg, which makes use of alternative substances more economical. It is expensive and fiscally irresponsible to exclusively rely only on end-of-pipe solutions to clean up after the fact. Overall, there is still limited knowledge of sources of diffuse pollution from heavy metals. Even if treatment plants are effective, some pollutants will end up in the sea. According to Prof. Jan Lundqvist, we will need to assess the total pollution loads we can stand prior to the production process: "If it cannot be poured down the drain, maybe it should not be used by society."



The Philippines river basins and freshwater resources

A river basin is like a bucket or glass of water

Photos provided by Dr. Vicente Tuddao

Integration

In Action in Manila Bay

Watershed and coastal systems are umbilically connected. Effective estuary management begins upstream with the terrestrial ecosystems. Momentum for the holistic, integrated management along the continuum of land, water resources, estuaries, coasts and oceans is building within the scientific community. Innovative policy to combine Integrated Water Resources Management and Integrated Coastal Zone Management approaches are promising but complex. The essential components to the integration of coastal and river basin management include: policy, strategies and action plans; institutional arrangements; legislation; public awareness and information management; and sustainable financing and capacity development.

Manila Bay demonstrates the multi-faceted challenges to sustainable river basin and coastal development. The region faces water pollution, toxic chemicals, hazardous wastes, over-extraction of groundwater and marine resources, habitat loss; uncontrolled reclamation and coastal development, multiple-use conflicts, and inadequate institutional and policy support mechanisms to address them. Addressing the combined threats requires coordination and partnerships of a large number of government departments, agencies and

scientific institutions.

Manila Bay has taken multiple steps to that end: The Manila Bay Coastal Strategy has established an operation plan to address water pollution, habitats and resources, and build partnerships and governance through an integrated land and sea-use plan. Targets for 2015 include 50% reduction in sewage discharge; increase in forest cover by 80% in the Manila Bay watershed, mobilization of 50% of the coastal communities in the operational plan. The strategy is based on input from stakeholder consultation at the municipal, city and provincial level. It provides a functional model for an ecosystem and integrated approach that combines refined risk assessment with institutional arrangements to strengthen project management, coordination, monitoring and decision making processes.

Innovative institutional structures include the recent establishment of the Manila Bay Coordinating Committee and a Core Technical Working Group, who are responsible for coordinating inputs from local, city, provincial governments and civil society organizations and reporting to the Project Management Office. The central task of the Manila Bay Coordinating Committee is to provide policy guidance and direction to the three sub-committees on pollution management, resources and

habitat protection and rehabilitation and partnership and governance activities for the implementation of activities in the Operational Plan of Manila Bay Coastal Strategy (OPMBCS). On-going and planned activities include: Coastal Land and Sea Use Zoning for Manila Bay, water supply expansion, increasing coverage of wastewater and sewage treatment facilities, demolition of illegal structures in waterways and lakes, reforestation and river bank stabilization.

Important steps to improve future institutional integration and operations include: stronger multi-sectoral stakeholder participation; active leadership role for the River Basin Organization; establishment of an efficient policy environment for investment on water supply development, pollution reduction and ecosystem protection; multi-agency collaborative and coordinative effort in the implementation of operational and developmental plans; active involvement and frontline support of the Local Governments Units; full recognition and adoption by the government and stakeholders of an integrated approach to River Basin and Coastal Area management leading to sustainable development; and strong judicial support and fast action towards a better policy environment through court litigation.

Integrated Watershed and Estuary Management: Scientific Support



Photo provided by Prof. Huasheng Hong

Learning From the Xiamen Case

The Jiulong River watershed -Xiamen Bay, located at Southeast China, faces issues shared by many coastal towns: the population, economy and urban areas have enjoyed continued rapid growth while the water sources have suffered increasing pollution and eutrophication and face impacts of climate change.

According to Prof. Hong Huasheng, the experience of Xiamen shows that long-term collaborative monitoring and modeling of environment dynamics are essential for developing realistic, ecologically sound, and cost-effective management strategies for the whole river-estuary-coastal system. Analysis of 30 years of water flow and quality data (1978-2007) in the Jiulong River watershed -Xiamen Bay enabled scientists to directly assess how rainfall and land use change affected the special and temporal variation of water quality from the basin to the bay. They found that changed land use for agricultural, industrial, and urban residential purposes combined with increased external nutrient loads to be the key drivers behind the water quality degradation in the area. Effective measures to control water pollution include more efficient use of fertilizer and manure during the growing season and trapping storm runoff in wetlands during the wet season. To mitigate the risk of eutrophication, strict limitation of nitrogen and phosphorous discharge and regulations to maintain ecological flow are essential.

But data itself does not solve problems. It must be made understandable and accessible to decision makers. GIS-based information systems, such as the one developed for the Jiulong River Watershed, makes information on water pollution clear. Those creating policy to combat the problem can see where and how pollution has penetrated the water, enabling them to decide upon best management options. Beyond data, a multidisciplinary and ecosystem-based approach is fundamental to govern the complexities of the changing social and environmental conditions of this century and to choose the policy path which will result in the highest benefit and least harm to people and the planet.

Negating Nitrogen:

An Ongoing and Urgent Task

Nitrogen pollution coming from human activities is and will be a growing challenge in China and across the world. Research in Changjiang highlights that the fraction of nitrogen exported from the landscape is increasing while the ability to retain it falls because of soil saturation, wetland disappearance, and other ecosystem disturbances. The nitrogen load flowing into the stream has increased over four-fold since 1970, mostly due to the large increase in use of chemical fertilizers, which now account for 63% of total nitrogen inputs. The dangers of nitrogen pollution and eutrophication are very real and well known. What is less understood is how the increased nitrogen interacts with other biogeochemical element cycles and how this may affect global climate change. More research is also needed on the impacts the river sediment and nutrient export has on coastal and estuary ecosystems. In Changjiang and elsewhere, securing methods to control nitrogen inputs and export are of the highest priority.

Dissecting the Delaware Discharge



Photo provided by Prof. Jonathan H. Sharp

Prof. Jonathan H. Sharp, College of Earth, Ocean and Environment, University of Delaware, the United States, presented new research on the influence of seasonal and periodic river discharge fluctuations on the biogeochemistry of the Delaware Estuary, one of the largest urban estuaries in the United States. Since the 1960s, the Delaware River clean-up has resulted in one of the greatest increases in dissolved oxygen in any urban river in the world. Major

changes in resource management strategy over the past few decades improved water quality, which has positively altered microbial biogeochemistry. Through an extensive research program, they have developed a good picture of “normal” seasonal and spatial patterns of the parameters that control the biology of the estuary. The daily records have revealed that some longer period variations give perturbations of “normal” distributions in the tidal river and down into the bay. There appears to be an increasing frequency of high-level summer discharges, possibly as a result of climate change. On June 29, 2006, the Delaware River discharge was the third largest on record and there appears to be a major change in lower estuary biology.

The study of the Delaware Estuary suggests that patterns and controls in other urbanized estuaries should be re-evaluated. Prof. Sharp concluded that to provide the scientific basis for integrated watershed and estuary management, there is urgent need for a cooperative effort between academic and resource management agencies to develop better and more comprehensive monitoring systems that can aid both research and policy. Delaware Estuary Watershed to Ocean Observing System (DEWOOS), which involves actors from state authorities, the river basin commission and academia, is model for establishing such a system.

Integrated Watershed and Estuary Management: Policies and Approaches

In Japan

According to Prof. Osamu Matsuda, we should begin by learning from those that have been successfully practicing ICM for centuries. In Japan, the movement towards integrated approaches at a national level have taken large steps with the introduction of the “Basic Ocean Law” (2007) and the following “Basic Ocean Plan” (2008). The new policy includes initial movements past the traditionally highly sectoral and vertical structures, and mandates comprehensive management of watershed and coastal waters beyond administrative sector borders and the integration of forest, river, land, agriculture, coastal environment, port and harbor management. While promising, progress in government agencies in making this connection from trees to seas is slow. Citizen and NGO activities have fared much better, largely because of the promotion of local ecological knowledge.

Osamu Matsuda explained a particular case in Japan where the Integrated Watershed and Estuary Management in Seto islands are known as Sato-Yama and Sato-Umi. For example, on the Seto Islands local residents have lived in harmony with their ecological environment through the principles of Sato-yama (traditional sustainable land use and landscape) and Sato-umi. Villages from the forest and mountains and those from the beach and coastal areas have coordinated their care for the connected ecosystem. Their management approach is a useful management tool to control pollution from up- to downstream, especially to limit the use of fertilizers in the mountains. On the islands there are many public activities held which local people can participate in, and appreciate scientific research and enjoyment of natural areas where pollution has been controlled. Their wisdom, combined with improved capabilities for scientific research, can provide insight for achieving integrated management at all scales.



Children restore sea grass bed in Sato-Umi Project (1 2 3)
Photos provided by Dr. Osamu Matsuda

(4 5) Photos provided by Dr. Bin Wang

In China

Dr. Bin Wang and Dr. Huming Yu pointed out that in China there is plenty of positive action but no full answers yet to address the magnitude of the challenges faced in China. Since 1999, the Marine Environmental Protection Law (MEPL) has increased its attention on land-based pollution control. Article 31, for example, requires the environment protection and water resources departments to enhance watershed management and control pollution to maintain the quality of the estuarine ecosystems. This includes specific a legal regulation to Prevent and Control Land-based Pollution Damaging Marine Environment. Resolving marine pollution is mainstreamed in national climate change strategies and a national action plan is being drafted to enhance the linkage between watershed and estuary management.

The new action plan will join two major national level environmental protection acts focused on marine environmental

protection: the Master Plan of Bohai Sea Environmental Protection and the Pollution Prevention and Control Plan of Middle and Lower Reaches of Yangzi River. Among the primary tasks of each of the plans is to integrate the management of the main river basin systems, and to protect water resources and environment based on pollutant flux through estuaries.

But speakers stressed that laws and regulations are not enough. Implementation mechanisms to ensure that standards are met are often lacking and sorely needed. The serious eutrophication problems of the Taihu and Dianchi lakes highlight that strong government measures to improve pollution control in China have not yet been able to restore the water bodies. As industrial development and urbanization advance even faster in coastal areas, the urgency and challenge of controlling the pollution load mount. Public awareness and participation in the protection of the water environment are essential to this effort.

Speakers and Speeches

Session 1 Impacts of Global Changes on Estuary Ecosystem

Chair: Dr. Ekko van Ierland, Professor Wageningen University, the Netherlands

Speaker 1: Prof. Gunnar Kullenberg, former Executive Secretary, Intergovernmental Oceanographic Commission (IOC-UNESCO).

Topic: *Addressing Impacts on Estuarine Systems Including from Climate Change in an Ocean Governance Framework*

Speaker 2: Prof. Robert John Wood, Director, the Cooperative Oxford Lab, National Oceanic and Atmospheric Administration (NOAA) USA.

Topic: *Connecting the Issues of Global Change to Estuarine Management Through Science: A Case Study Focused on the Chesapeake Bay Estuary, USA*

Speaker 3: Doctorate Jean-Luc Simeon, Laboratory PACTE-UMR-CNRS France.

Topic: *The Littoral & the Wetlands Need New Laws to Manage the Effects of Climate Change*

Session 2 Watershed Resources and Environment Management

Chair: Mr. Jakob Granit, Project Director, SIWI

Speaker 1: Prof. Jan Lundqvist, Chair, Scientific Programme Committee for the World Water Week in Stockholm.

Topic: *Restoring the Water Quality of Lake Mälaren: An Integrated Watershed Approach Benefitting Stockholm and Surrounding Waters*

Speaker 2: Dr. Vicente Tuddao, Jr., Executive Director, River Basin Control Office, Philippines.

Topic: *Integrated River Basin and Coastal Area Management Approach to Managing Bays: The Case of Manila Bay, Philippines*

Speaker 3: Dr. Di Jin, Senior Scientist, Marine Policy Center, Woods Hole Oceanography Institute, USA.

Topic: *The Health Costs Associated with Harmful Algal Blooms: The Case of Florida Blooms of *Karenia Brevis**

Session 3 Integrated Watershed and Estuary Management - Scientific Support

Chair: Dr. Gil Jacinto, Professor, Marine Science Institute, University of the Philippines

Speaker 1: Prof. Huasheng Hong, Xiamen University.

Topic: *Scientific Basis for Integrated Assessment and Management of the Jiulong River Watershed-Xiamen Bay Water Pollution*

Speaker 2: Prof. Weijin Yan, Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences.

Topic: *Increasing Anthropogenic Nitrogen Inputs to the Watershed and DIN Exports from the Changjiang River under Changing Human Pressures*

Speaker 3: Prof. Jonathan H. Sharp, College of Earth, Ocean and Environment, University of Delaware, the United States.

Topic: *Influence of Seasonal and Periodic River Discharge Fluctuations on the Biogeochemistry of the Delaware Estuary*

Session 4 Integrated Watershed and Estuary Management - Policies and Approaches

Chair: Prof. Huasheng Hong, Xiamen University

Speaker 1: Dr. Osamu Matsuda, Professor emeritus, Hiroshima University.

Topic: *New Approach towards Integrated Watershed and Estuary Management: Combining Concept and Activity on Sato-umi and Sato-yama in Japan*

Speaker 2: Dr. Bin Wang, Deputy Director General, Environment Protection Department, State Oceanic Administration, P. R. China.

Topic: *From the Mountains to the Seas-the Integrated Watershed and Estuarine Environmental Management Practices in China.*

Speaker 3: Dr. Huming Yu, Researcher, China Institute for Marine Affairs, State Oceanic Administration, P. R. China.

Topic: *China's Watershed and Estuary Management: Policies and Practices*

Summary and Conclusions

Chua Thia-Eng, Chair of Partnership Council, PEMSEA

On 15th March, 2010, Dr. Kim Jong-Deog, the director for Policy Planning Department, Planning and Coordination Division, Korea Maritime Institute (KMI), visits COMI and signs a Letter of Agreement with COMI on behalf of KMI. Prof. Huasheng Hong, Prof. Xiongzi Xue and other COMI core faculties attend the morning meeting.

For the first meeting in the 2009 EAS Congress and the second during OPINEAR Meeting between KMI and COMI, it is an intensive contact for both sides to further explore possible cooperation in academic and practical fields. KMI has shown great interest in co-convening the Ocean Forum during the World Ocean Week 2010 which is going to be held this November. With this visit to COMI, Dr. Kim gains further understanding about the forum and represents KMI to sign the LOA on the scheduled activity with COMI. Besides, in order to enhance the academic exchange and resources shared between COMI and KMI, they both agree to co-organize some other forums and workshops on the issue of ocean policy, South China Sea and capacity building.

COMI and KMI Signed LOA



Left: Dr. Kim Jong-Deog Right: Prof. Xiongzi Xue Photo by Peng Zeng

COMI Attended Third OPINEAR Meeting

Prof. Xiongzi Xue, Prof. Xiaoqin Zhu and Dr. Qinhua Fang are invited, on behalf of COMI, as observers to participate in the 3rd Meeting of the Ocean Policy Institute Network in the East Asian Region (OPINEAR) which is held in Seoul, Korea on 8th-9th February, 2010. This is the first time for COMI to be invited to attend the OPINEAR meeting. Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) are also invited as observer in the meeting.

OPINEAR, an inter-regional network consisting of numbers of international marine policy related research institutes, aims at sharing resources and experiences between countries in the East Asia Seas area, and building an interactive and cooperative research network. COMI has expressed its interest to join in the network on the meeting. Prof. Xiongzi Xue, the executive director of COMI, introduced the missions, objectives, organization, and research focus of COMI to the meeting, and listed possible areas of cooperation with OPINEAR which includes marine policy, capacity building, research cooperation and information, experience and knowledge exchange. COMI then will propose a formal application to further up being a member organization of OPINEAR after the meeting.

COMI Co-Convened EAS Congress 2009

On 25th November, Coastal and Ocean Management Institute (COMI) of Xiamen University and Plymouth Marine Laboratory (PML) in England jointly organized the workshop "The Science in Ecosystem-based Management", a branch workshop of the Third East Asian Sea Congress 2009 hosted in Manila, Philippines during 23rd to 27th November, which also served as an important platform for the first cooperation between COMI and PEMSEA.

"The Science in Ecosystem-based Management" highlighted how the various ocean and coastal sciences are utilized to improve ocean and coastal government efficiency on the way to sustainable development of coastal seas. During the meeting, Coastal and Ocean Management Institute (COMI) and Korea Maritime Institute (KMI), another partner organization of EAS Congress, held a tentative meeting agenda on potential research cooperation, academic capacity, official mechanism etc. It is reported that they will draft Memorandum of Understanding in the future.



Member institutes which attended the 3rd meeting include: Center for South East Asian Studies (CSEAS), Indonesia; Korea Maritime Institute (KMI); Maritime Institute of Malaysia (MIMA); Ocean Policy Research Foundation (OPRF), Japan; and S. Rajaratnam School of International Studies (RSIS), Singapore.



Faculties of COMI in the Philippines



COMI Received Mega-project Grant from 2009 Xiamen R&D

Co-initiated by Xiamen University and Xiamen Environmental Monitoring Central Station, the project “Scientific support platform to secure Xiamen source water in the north Jiulong River” successfully got financial support from Xiamen Science & Technology Bureau. The total budget of the project is 6.5 million Yuan, consisting of 3.4 million Yuan sustenance fund. The schedule of the project covers 2.5 years between Nov. 2009 and Mar. 2012. Led by Prof. Huasheng Hong, Chief Scientist of COMI, it is the first mega-project hosted by COMI since its establishment in 2005.

Using interdisciplinary approach and effective cooperation, the project convokes scientists, engineers, and managers together aiming at providing a scientific support platform to secure Xiamen source water. The research involves six special topics targeting

Jiangdong Reservoir in the North Jiulong River, including an integrated analysis of environmental dynamics in the Jiulong River watershed, a comprehensive investigation of algal bloom processes and associated mechanisms, development of a dynamic model for predicting water quality, improvement of water monitoring systems, and practical countermeasures responding to emergencies such as harmful algal blooms. A GIS-based information sharing system will be developed to act as a platform for real-time monitoring and effective management of source water quality. The project also stresses the holistic arrangements for ecological restoration and pollution abatement, and promotes the innovation of a coordinating management mechanism at the watershed scale. This project is expected to enhance Xiamen City's capacity to secure its source water.

Workshop

For ICM Postgraduate Curriculum

On November 9th, the workshop for development of Integrated Ocean Management Postgraduate Curriculum was held in Jiageng Building, Xiamen University. The workshop is co-organized by PEMSEA and COMI, and attended by experts and professors from PEMSEA, Xiamen University, National University of Singapore, Hiroshima University, University of Copenhagen, and University of Philippines.

The meeting focused on programming curriculum to build an education resource that could be shared between different countries and regions in Asia in the field of ICM. COMI engages in communicating with other universities around the world to cultivate more international talents in Xiamen University and China. The meeting produced an agreed report which will be presented in the East Asia Sea Congress being held in the Philippines this month.

Award

“Distinguished Scientist” For the “Distinguished Woman”

On 8th and 16th March, Prof. Huasheng Hong was honored “Distinguished” twice. She was awarded the Distinguished Woman on the International Women Day and Distinguished Scientist on the second Commendatory Meeting for Scientific Technology by Fujian Provincial Government.

Prof. Hong is the Honorary Director of State Key laboratory of Marine Environmental Science and Chief Professor of COMI, Xiamen University. She also serves as the Vice Chair of the International Scientific Committee on Oceanic Research (SCOR) (2007-) and Chair of China SCOR (2000-) etc. She was born in an unquiet times and got PhD at her 40s, but she never allow herself to stop thinking and contributing to the Chinese Marine Affairs. The feature story about Prof. Hong on her way to be "Distinguished" is followed at page 15-16.

VISITS



■ Dr. Chua Thia-Eng visited and worked in COMI as Guest Professor

Dr. Chua Thia-Eng, chair of the Partnership Council of PEMSEA, finished his second term of working with COMI for three months in mid December. Dr. Chua is a Guest Professor at Xiamen University and the chair of the International Academic Advisory Committee of COMI. During his work in COMI, Dr. Chua helped to work on the development strategy of COMI, the renovation of the MMA curriculum and also the cooperation and communication between COMI and international organizations, universities etc.



■ Josh Paglia from SIWI Visited and Assisted During Scientific Forum 2009

During 26th October to 13th November, Josh Paglia, the communication officer of the Stockholm International Water Institute (SIWI), came to visit and work for almost three weeks in COMI to assist the work of the International Scientific Forum 2009.



Third one from left is Prof. Chou

■ Prof. Chiu-Long Chou from Taiwan Sun Yat-sen University Visited COMI

On 16th March, a 10-member delegation from Taiwan Sun Yat-sen University, led by the President, Hongdun Yang, along with Dean of College of Marine Sciences, Jinyuan Liu, Head of Institute of Marine Affairs, Chiu-Long Chou and other professors visited and had a meeting with the College of Oceanography and Environmental Science of Xiamen University. Prof. Chiu-Long Zhou made a special visit to COMI discussing and sharing experience on training talents of Marine Affairs.



■ Dr. Jinliang Huang is Engaging in Academic Research in Clark University

From October 2009 to October 2010, Dr. Jinliang Huang, professor of COMI, will take one year to visit Clark University for further academic research in the field of Geo-Informatics Tech, Environmental Geography and land use (landscape pattern)-water quality at watershed scales. With this research, the methodology of Pontius and IDRISI software for measuring land change over time in the Jiulong River Watershed of China is expected to be developed.

LECTURES

On 7th November, Prof. Ekko C. van Ierland, full Professor of Environmental Economics and Natural Resources at Wageningen University and Head of the Environmental Economics and Natural Resources Group, was invited to deliver two lectures on topics of “Adjustment of fish quota: annual or multiannual?” and “Spatial planning of offshore wind farms: a windfall profit to the marine environment?”



Prof. Ekko C. van Ierland

On 10th and 13th November, Prof. Gunnar Kullenberg, former Executive Secretary of Intergovernmental Oceanographic Commission (IOC-UNESCO), delivered two lectures on “Comprehensive Human Security and Ocean Governance” and “Link ICM with Tourism and Insurance Industries” respectively.



Prof. Gunnar Kullenberg

On 15th December, Dr. Owen Tang, tutor in law from Hong Kong Polytechnic University, delivered a lecture for graduate students of Coastal and Ocean Management Institute, Xiamen University. Two topics in the three-hour lectures were Introduction to Bill of Lading and Introduction to Carriage Law by Ship: Hague-Visby Rules.



Dr. Chi-Wai Owen Tang



Dr. Hong at a glance

In 1944, Dr. Hong was born in the Philippines and returned to China in 1954. She undergraduated in the Chemistry Department of Xiamen University in 1967, and obtained a PhD in Oceanography from the Graduate School of Oceanography, University of Rhode Island, USA in 1984.

After that, she joined the faculty of Xiamen University in 1985 and became a full professor in 1992. From 1992 to 1996 she was Director of Environmental Science Research Center, and Dean of College of Oceanography and Environmental Science, Xiamen University from 1996 to 1999. Between 1998 and 2003, she was a member of the Scientific Steering Committee of Joint Global Ocean Flux Study (JGOFS); and has been a member of China National Committee-International Geosphere-Biosphere Programme (CNC-IGBP) and China National Committee- International Human Dimensions Programme (CNC-IHDP) since 2004.

Currently, Prof. Hong was selected Honorary Director of State Key laboratory of Marine Environmental Science (Xiamen University), and became Chief Professor of Coastal and Ocean Management Institute (COMI) of Xiamen University. She also serves as the Vice Chair of the International Scientific Committee on Oceanic Research (SCOR) (2007-) and Chair of China SCOR (2000-) etc.

Achievements: she was in charge of 23 national and provincial programs supported by National Natural Science Foundation of China, National High-tech R&D Program (863 Program), National Program on Key Basic Research Project (973 Program) and Key Projects of Fujian; has published 201 papers, 118 of which are indexed by SCI; and has trained 38 PhD students and 8 post-doctoral researchers; and received several national and provincial level awards.

Before being a scientist

A person always is remembered by “the first breakthroughs” he or she has made. Dr. Huasheng Hong is one of them. She was among the first group of students selected to study abroad in the 1980s and returned as the first female Doctor in Oceanography after four years of an anticipated study period of five years, as the country strongly needs its own intellectuals dedicated to Ocean Science.

Dr. Hong returned to Xiamen at the age of ten and spent most of her childhood by the beautiful Gulang Island. She says, “I was born and grew up by the sea; the close tie with the ocean makes me unable to live beyond them”. It is believed that in this little girl's heart, a dim dream about the ocean was planted and became clearer and stronger as she grew up day by day until the moment she received her PhD abroad and said, “I am a Chinese, I feel responsible for making a contribution to the Ocean of China.” These are the words that drove her home in 1984 right after obtaining the PhD in the USA, and the belief hovering in her mind that supports her on the long journey of pursuing her career in Chinese marine affairs.

It was in 1984 when Dr. Hong returned to China and joined Xiamen University, in her 40s. It is, maybe, nor an easy time for a woman to bloom again, but an exuberant time for a scientist to flourish. With the multidisciplinary background of chemistry and oceanography, Dr. Hong took the newly leading interdisciplinary of marine biogeochemistry and devoted herself to promote its development and utilization in China.

Leadership in the field of marine biogeochemistry

Marine biogeochemistry, a new method of exploring the mysterious ocean, was introduced in the late 1980s for its key role in understanding the circulation and interactivity of substances biologically, geologically, and chemically. Such understanding would throw a light on the control of the marine ecosystem. The International Geosphere-Biosphere Programme, a significant internationally programme proposed in 1983 and implemented in 1991, is generally considered to play a key role in driving scientists' attention onto the new interdisciplinary; and Dr. Hong is just one member of the China National Committee-International Geosphere-Biosphere Programme (CNC-IGBP).

It's been over twenty years since the introduction and utilization of Marine biogeochemistry, and Dr. Hong has made distinguished breakthroughs in this field. She found the active law of Iron Divalent existing in the water surface changing over day and night, and succeeded in determining different forms of ultra trace iron on site. The related paper resulting from the research has becomes a classical text in the field. In 1995, Dr. Hong set another successful example on the program of Persistent Organic Pollutants in the Southeast Coastal Estuary System, by utilizing marine biogeochemistry to prove that the Persistent Organic Pollutants (POPs) in Victoria Harbor were coming from Hong Kong but not the controversial Pearl River Estuary. Other national and provincial programs Dr. Hong has led include “Marine Biogeochemistry of Granular Material in Different Marine Environment” “Marine Biogeochemistry of Arsenic and Phosphor in Xiamen Harbor and Jiulong River” etc. In addition she has produced a number of valuable papers and materials that greatly benefit other scientists and students of the ocean world.



Prof. Huasheng Hong as a Chair in the meeting

Serving more positions than her titles

On the way to promoting the development of marine biogeochemistry in China, Dr. Hong not only focuses on its utilization in science, but lays equal stress on the construction of the interdiscipline itself and its talents. As she believed that “intellectual training is the key to develop independently and competitively for China”, a group of institutes and disciplines were founded with the great effort of Dr. Hong. In 1992, Environmental Science Research Center in Xiamen University was founded; in 1995, College of Oceanography and Environmental Science of Xiamen University was established and had its first environmental oceanography doctor degree; then in 2005, the Laboratory of Marine Environmental Science, Xiamen University was promoted to be a state key laboratory, serving as a research base of marine biogeochemistry in China; in the same year, Coastal and Ocean Management Institute (COMI), a collaborative platform for multidiscipline and integrated coastal management was founded and now has developed quickly thanks to her promotion.

There is a retirement age for every job, but she has not reached hers yet. Her enthusiasm to pursue her work has never lowered Dr. Hong's research interests cover a wide range, from marine biogeochemistry study to ocean and coastal sustainable development,

to studies related to integrated ocean and coastal management. Dr. Hong made great efforts to found COMI, and herself is the Chief Scientist leading COMI to advance in the related field as she once did for marine biogeochemistry. Dr. Hong is coming to the regular retiring age, 65, but her high-pitched laugh impresses her colleagues of COMI most, and shows the generosity embodied in a delicate body. She laughs the same way no matter who she is talking with, either the President of Xiamen University or her students. As a scientist, she never bent even a small principle in academic discussions. “To show the achievement ahead of being titled” is one of her principles, and a quality of a good scientist.

Prof. Hong serves more position than her titles. She is Professor of Xiamen University; Honorary Director of MEL (Xiamen University); Chief Professor of COMI; Vice Chair of SCOR and Chair of China SCOR (2000-); she also has been Vice President of the 8th, 9th, and 10th Fujian People's Congress Standing Committee and Vice President of Fujian Committee of the Sixth CPPCC; Recently, she won the honor of “Distinguished Woman” on the International Women's Day and was awarded “Distinguished Scientist” by Fujian Provincial government. However, these are not enough to demonstrate what she has done and will continue to do to make even more contribution to Chinese marine affairs.



Master of International

With improvements in our understanding of the natural environment and changes in human values, it has become clear that governance systems must incorporate consideration of ecosystems, resulting in the need for ocean policy makers and coastal resources managers to have a background in the natural sciences, social sciences and economics. The Master of Science in Marine Affairs programme (MMA) is designed for those interested in the study of the complex issues of coastal and ocean management.

Marine Affairs is an interdisciplinary major, taught by a faculty of specialists in the fields of geography, political science, law, anthropology, environmental planning, oceanography, environmental and resources economics, and general economics. This programme examines policy problems at local, regional, national, and international levels.

Objectives

- Fostering highly trained and multi-disciplinary specialists in research and management in marine affairs on behalf of marine communities.
- Providing for the needs of individuals who will be working in government departments, academic and research institutions, and consultancy companies.
- Promoting the building and development of the interdisciplinary field of marine affairs.

Three Research Directions

■ Ocean Policy and Law

Focusing on the fields such as international oceans law, domestic marine policy on resources and environmental protection and management, marine policy analysis and formation.

Students gain an understanding of the ocean policy context at the national and global level and a sophisticated appreciation of the dynamics that drive policy formulation and implementation, providing students with a "hands-on" experience in planning and developing a national ocean policy for a specific country.

The orientation is a combination of science and law, and includes methodology and integrated case study courses. Students will know how to integrate the scientific knowledge into policy making with a global perspective.

■ Marine Economics

Focusing on the fields such as Marine resource economics, marine environmental economics and marine industry economics

Student will be enabled to apply economic principles to the study of marine resources and the conflicts and problems which arise in the exploitation of marine environments. At the same time, students will hold the essential principle of marine industries economics and know how to promote the marine economic development through policy, programming and market approaches.



Marine Affairs

Postgraduate Programme



■ Ocean and Coastal Management

Focusing on the fields such as ICM, EEC management, Marine natural protection zone management and ecosystem-based regional marine management.

Academics, international community and a lot of countries called for developing a regional, ecosystem based governance to ocean and coastal ecosystem. This orientation will employ an evolutionary integrated approach to examine the nature of coastal ecosystems and the challenges posed by human activities and uses. Policy and other governance measures on coastal ecosystems from watersheds to the EEZ will be considered too. Students will receive multidiscipline training on natural science and social science.

Entry requirements

- * Prospective students should have a non-Chinese passport and be in good health;
- * Academic requirements: Prospective students must hold a recognized bachelors degree or above, or equivalent.
- * English proficiency: Minimum requirement is 550 points or above for TOEFL, a grade 6 or above for IELTS, or other certificate of English proficiency from an approved authority. Native English speakers are exempt from this requirement; other candidates whose university courses are taught in English will be considered case by case.
- * Professional backgrounds: Prospective students who are able to show relevant professional experience deemed appropriate to the programme applied for will be given prior consideration.

More Information

Programme duration

2 years full-time study

Programme commencement

Autumn semester

Teaching language

English

Tuition fee

72,000 RMB in total; 36,000 RMB per academic year

Academic calendar

1st Semester: Autumn semester from mid-September to mid-January

2nd Semester: Spring semester from mid-February to mid-July

Contact

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