

**From a Battleground to a Common Ground:  
The Experience of Integrated Coastal Management in Xaimen, China  
with the International Training Centre for Coastal Sustainable Development**

**By**

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**A practicum report submitted in partial fulfillment of the requirements for  
the Degree of Master of Arts in International Development Studies  
Saint Mary's University  
Halifax, Nova Scotia, Canada  
May, 2005**

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**Saint Mary's University**

**Halifax, Nova Scotia, Canada**

**2005**

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**Abstract**

Coastal regions of the world are a piece of precious land-and-sea interface, rich in natural resources and biodiversity, and yet the most complex and controversial, where conflicting interests and demands are constantly at play. Overpopulated coasts, use struggles over confined space, territorial and fishing disputes, transboundary marine pollution and degraded coastal ecosystems all suggest there is a thirst for better solutions to coastal development and management. These problems are no exception in the region of Asia Pacific, where unprecedented economic growth seen throughout the past few decades has posed an even greater threat to its already alarming coastal environment. The approach of integrated coastal management (ICM) considers the interconnectedness of the environment and development, underlies the significance of horizontal and vertical integration at various levels, encourages the participation of the local coastal community and obeys the ecosystem-based guiding principles to foster sustainable coastal development and management. This report presents a case study of Xiamen from personal working experience with the International Training Centre for Coastal Sustainable Development under UNDP/GEF/IMO, documenting the development outcomes as a result of the ICM implementation, and illustrating its capacity building efforts through ICM training programs offered to neighbouring coastal nations. In addition, the study discusses the shifting paradigm in the relationships between environment and development, while urging the greater need for partnership building and multilateral cooperation in international environmental development.

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## **List of Acronyms**

<b>ACOPS</b>	Advisory Committee on Protection of the Sea
<b>CBCM</b>	Community Based Conservation Management
<b>CIDA</b>	Canadian International Development Agency
<b>DPRK</b>	Democratic People's Republic of Korea
<b>EEZ</b>	Exclusive Economic Zone
<b>EPZ</b>	Export Processing Zone
<b>GEF</b>	Global Environment Facility
<b>GESAMP</b>	Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
<b>GFOCI</b>	Global Forum on Oceans, Coasts and Islands
<b>HDI</b>	Human Development Indices
<b>ICM</b>	Integrated Coastal Management
<b>IGO</b>	International Inter-Governmental Organizations
<b>IMO</b>	International Maritime Organization
<b>ITC-CSD</b>	International Training Centre for Coastal Sustainable Development
<b>IUCN</b>	International Union for Conservation of Nature
<b>METAP</b>	Mediterranean Environmental Technical Assistance Program
<b>NGO</b>	Non-Governmental Organizations
<b>PEMSEA</b>	Partnerships in Environmental Management for the Seas of East Asia
<b>SEA</b>	Seas of East Asia
<b>UNDP</b>	United Nations Development Programme
<b>UNEP</b>	United Nations Environment Programme
<b>UNESCAP</b>	United Nations Economic and Social Commission for Asia and the Pacific
<b>WCS</b>	World Conservation Strategy
<b>WSSD</b>	World Summit on Sustainable Development
<b>WWF</b>	World Wildlife Fund



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## **Section One – Introduction**

As reported in the latest global ecosystem assessment, the United Nations (2005) issued another failing report card on the health of our mother earth earlier this year, warning that two-thirds of earth's life-supporting ecosystems are at risk, particularly the creation of coastal "dead zones," collapsing fisheries, shifting water quality, and unpredictable regional climate. Unquestionably, we shall all feel sympathy for these sufferings, but who are indeed to be blamed for all of these troubles? Since the arrival of the Industrial Revolution in the 18th century, the history of human development has begun a new chapter: a chapter that is bringing economic wealth and technological advancement, yet at the cost of a sick earth, which suffers from greenhouse effects, acid rain, desertification, the depletion of ozone and a decrease in biodiversity. From the perspective of international development, it is also the beginning of the North-South divide, making the rich richer and the poor poorer. In many ways, the coastal regions around the world are a microcosm of the challenges that the world encounters in advancing towards development. They are an area of enormous natural riches, and of conflicting interests and competing demands for limited space and resources, which are likely to increase given burgeoning population growth with its associated impacts. This practicum report questions the delicate and complex relationship between the environment and development by looking at issues of coastal environmental management in the context of Asia Pacific's development. The discussions herein are presented with an objective to not only identify the key coastal development problems in Asia Pacific but also specifically to present the international cooperative efforts that seek to address the worldwide coastal development problems with integration, participation, sustainability and ecosystem in mind.

## **1.1 Rationale**

As coastal environment has always been a key component of the global life supporting system, there is a great deal of study that must take place in order to gain proper understanding of the coastal management approaches that place equal emphasis on both the social and ecological environments, while recognizing the two environments are indivisible. However, the great thirst for sustainable coastal development and management may remain unnoticed, if we never realize that the globe's narrow coastal strip is where the majority of the world's population calls home. In addition, the coastal ecosystem is even more fragile and complex than any other ecosystem, with a land-and-sea interface where deteriorating marine and coastal resources are under double threats from excessive resource consumption and severe marine pollution. While the right path to coastal development is not yet apparent to all, there is consensus that actions must be taken to change the way that coastal environment has been managed.

Therefore, the study reported herein tries to solve the puzzles of coastal environment and management with an examination of the development outcomes brought by the lately increasing popularized approach of integrated management. Despite the fact that Asia Pacific is not viewed as the least developed region of the world for development assistance, and environment issues seem not to pose immediate urgency compared to hunger and health problems in the field of development, the environment of Asia Pacific does present the best case for us to think about the approaches to environmentally sound development during this particular period of its rapid economic boom, before it is too late. We should also recognize that economic development can only be sustained if the environment which provides development conditions and resources can be sustained first. Environment may be the last to be thought of in development but never ever will it be the least important.

## **1.2 Methodology**

Many of the following discussions presented herein have originated from personal hands-on overseas working experience during the seven-month internship with the International Training Centre for Coastal Sustainable Development. As a programme assistant, I had the opportunity to assist with the preparation of four ICM training sessions in collaboration with Partnership in Environmental Management for the Seas of East Asia (PEMSEA), a regional programme on marine environment under United Nations Development Programme (UNDP), Global Environment Facility (GEF) and International Maritime Organization (IMO), as well as one international environment conference with United Nations Environment Programme (UNEP) held in Xiamen. Under supervision of the Centre's executive director, I was directly involved in the training curriculum arrangement and the coordination of site visits for each ICM study tour with the host city of Xiamen Municipality.

Through these international ICM training sessions, I acquainted myself, in an environment of cultural diversity, with international cooperative spirits and befriended an array of high level officials, city mayors, district governors, resource managers and researchers of more than twenty nationalities, allowing me to network internationally with member states of the regional seas programme in Asia Pacific, the Middle East and East Africa. In addition to the bonus knowledge gained through the participation in all training curriculum and study tours, I witnessed myself the positive changes that occurred as a result of the ICM implementation in Xiamen to be later discussed herein. Through conversations with participants, I was also able to better understand the socioeconomic conditions and special needs for coastal development in Asia Pacific, especially inside North Korea (DPRK) and Cambodia, while realizing the significance of new international cooperative initiatives

among the states of East Africa and the Middle East for the sustainable development in the Red Sea coastal regions.

In addition to the above, I had the chance to be involved in a series of research and analysis projects as a junior research analyst at the research centre based in Xiamen University. The ICM working paper series investigated sustainable development and environmental management issues in relation to environmental education development, institutional cooperation, coastal environment monitoring and conservation. Based on the model of Xiamen, the research aims to identify common concerns of the coastal regions and search for ICM solutions to the problems of coastal development. It also disseminates findings of work in progress to encourage the exchange of ideas about sustainable coastal development with international partner institutions. The findings were presented at the *International Conference on Environmental Concerns: Innovative Technologies and Management Options*, organized by the United Nations Environment Programme (UNEP) in October, 2004. Selected working papers are also to be published. Moreover, my responsibility at the Centre also included reviewing a development project proposal of ICM capacity-building to be submitted to the World Bank for funding. These practical lessons at work added immense value to my research later described herein, enabling me to gain key insights inside a development organization that may not be accessible in books.

### **1.3 Structure of the Report**

The thesis report contains five sections. The current section here begins with the introduction of the thirst for international environment development as well as the methodology and rationale behind this study. The second section first outlines the evolution of environment in development thinking, underlying the intricacy of environment and

development's love-hate relationship with a general health report of the world's coastal regions. In addition to a brief review of the theoretical basis of integrated coastal management (ICM), this section further identifies several pressing coastal problems in the region of Asia Pacific. In section three, the case study illustrates development outcomes as a result of the ICM implementation in Xiamen and details the ICM training programme offered to worldwide coastal development practitioners. Furthermore, analysis of Xiamen's community based management project and initiatives to refine ICM institutional arrangement are examined in the fourth section. The closing section concludes the findings of the report with personal recommendations and reflections of lessons learned in the field. Also, additional information on ICM training programme is provided at the annex to the end of this report.



## **Section Two— Review of the Literature**

### **2.1 Conceptualizing Development with Environment**

If development is said to be a relatively new field of study within modern Western thinking, then the environment dimension in development is one of the latest developments of that development thinking. Coming into existence in the 1950s, the Western perception about development has long been associated with economic, political and social aspects. For many years, early views about development were nothing but a simple equation that put economic growth and development on two sides of the equal sign. Much of the discussion was on the characterization of the Western path to development, and industrialization was generally agreed upon as the engine of development (McMichael, 2000). As far as the environment was concerned, the word rarely came across the radar screen of development practices and studies.

The experience of some of the world's industrialized states since the industrial revolution era may well have demonstrated what it takes to join the club of the so-called 'developed.' However, an argument could be made about this simplistic view of development that the beginning of industrial development was indeed the beginning of an environmental nightmare. While development seemed to be promisingly found in some parts of the world, this way of development had also translated into a total ecological disaster, causing problems of massive consumption of natural resources, harmful pollution created during the production process as well as increasing waste generated after consumption. The early thinking of development, that has long ignored the environment but emphasized industrialization and economic growth, has led to many previously unheard environmental

tragedies, including the Black Fog of London in 1952 and the Chernobyl nuclear disaster in 1986.

Despite the fact that resource exploitation was talked about in many early development literatures, the issue of resource scarcity around the world was generally conceived as a socioeconomic and political, rather than environmental, struggle in development studies. Indeed, the intellectual development traditions did not really have serious concerns over the environment, nor did the environmental theories and the naturalism tradition have any interest in development. To put it simply, development was the enemy of environment, making it almost impossible to reconcile the two.

With more unexpected and unprecedented environmental failures resulting from development, environmental concerns gradually began to appear in the discussions of development. In 1972, the Club of Rome published its landmark report, *"Limits to Growth,"* addressing issues of industrialization, population, food supply, natural resources and pollution in relation to development. This groundbreaking study (Meadows et al., 1972) particularly stressed environmental destruction, and argued the consequences of ultimately limited resources being consumed at an exponential rate and even predicted the forthcoming collapse of civilization caused by rapid economic growth. Even though none of the computer modelling from this report was right, at least in the time frame contemplated, the fair warning and messages about the fragile environment remain very valid. Indeed, this shift in development thinking and practice reflected an increase in international concern for the environmental aspects of development and the imperatives of mitigating global pollution.

With the widespread emergence of many ecological troubles from ongoing industrialization activities, the international development agenda began to recognize the significance of the environment in human well-being. In 1972, the United Nations

Conference on Human Environment, also known as the Stockholm Conference, deliberately argued the need to integrate environmental protection with development. It was the first time that the world's attention was drawn to a demonstration of how conservation could actually contribute to the development objectives of world-wide governments. As a leading international organization with traditional emphasis on international development, the UN soon established the United Nations Environment Programme (UNEP) in that same year as a specialized agency promoting "environment for development" (UNEP, 1972). In other words, development was and should be viewed as a means of achieving conservation rather than an obstacle to it.

The harmonization of development and environment is also evident in the Ecological Modernization theory. Emerging as a prominent neo-liberal theory, the theory suggests that the only possible resolution to the ecological crisis is modernization and development (Mol, 1995). Since the 1980s, the studies examined how the environmental crises were dealt with in the industrialized as well as the transitional economies, including Kenya (Frijns et al., 1997), Eastern Europe (Rinkevicius, 1999) and Southeast Asia (Mol & Sonnenfeld, 2000). With market mechanisms as the best regulator, the central idea behind the theory was that economic growth would eventually lead to environmental improvement. This approach to environmental development soon became the most acceptable and pragmatic theory for mainstream policy makers in managing environmental resources.

Subsequently, UNEP, along with International Union for Conservation of Nature (IUCN) and World Wildlife Fund (WWF), launched the "*World Conservation Strategy*" (1980), aiming to integrate the many efforts and voices of environment and development. As the WCS has pointed out,

"This is a kind of development that provides real improvements in the quality of human life and at the same time conserves the vitality and diversity of the

Earth. The goal is development that will be sustainable. Today it may seem visionary but it is attainable. To more and more people it also appears our only rational option” (IUCN, UNEP and WWF, 1980).

It is also worthwhile noting that the term “sustainable” development appeared in this document and later become the buzz word in the field of development to the present. However, coming into the debate of environment development with a fundamental belief in conservation, the WCS has failed to address issues of social and political structural changes required to meet its conservation goals. Nevertheless, the WCS (1980) not only highlighted the ecological struggles of the global ‘commons’, such as oceans, but also further emphasized the management of them. Moreover, it argues that conservation is compatible with people-centred development, encouraging indigenous knowledge and promoting local participation in environment management practices. These revolutionary approaches to carry out environmental development are unquestionably the essence of integrated coastal management (ICM) which will be addressed more in the later discussion of this thesis report.

Originating from the idea of renewable resources, the most popular word in development, ‘sustainability’ began to dominate much of development thinking since the late 1980s. Many viewed this as an apparent paradigm shift, or a notable turning point at least, in development history; that a mixed macro view of environmental-socioeconomic-political sustainability became the guiding principle in development. Since the term “sustainable development” was first defined in the “*Brundtland Report: Our Common Future*” (1987) as:

“Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs,”

it placed environment within the socioeconomic and political context of international development without separating them out. Following the World Commission on Environment and Development in 1983, the UN, rather than the UNEP— a less powerful subordinate agency— directly targeted environmental issues on its political agenda. The *Brundtland Report* (1987) also explicitly drew reciprocal links between environment and development, arguing that inappropriate development degrades the environment upon which it is based, while environment degradation would also undermine development. More importantly, with an attempt to recapture the spirit of previous concerns over the global commons, strong emphasis was placed on multilateralism and the interdependence of nations. Considering coastlines as a global common, the later discussions will illustrate the relevance and importance of these concepts to ICM. With the aim of solving the complicated dilemma of the environment and development, economic growth was identified in the report (1987) as one of the components to sustainable development. Expanding from the idea of interconnectedness of development and environment, the report further illustrated the close relationship between poverty and environmental degradation, arguing that economic growth was the way out of poverty and therefore growth should be the subject of environmental concerns.

Two decades after the first global environment conference, the UN Conference on Environment and Development, also known as the Rio Earth Summit, was held in 1992. Governments were gathered together again to rethink economic development while finding ways to halt the pollution of the planet and destruction of irreplaceable resources. The formal outcomes of the Earth Summit (1992) could be best summarized as the following: (1) “*Rio Declaration*” outlines principles for pursuing sustainable development, (2) “*Agenda 21*” (1992) defines strategies for implementing sustainable development and provides centrality

to issues of economic growth, environmental management, technical solutions, the need for international cooperation as well as an increased participation and (3) the Convention on Biological Diversity, the Framework Convention on Climate Change and the Forest Principles. Of these achievements, “*Agenda 21*” was seen as the most thorough and ambitious attempt to integrate the environment and development to date. Yet it has also been criticized with the suggestion that the document looked good only on paper because much of it was not legally binding. Still, “*Agenda 21*” has undeniably had significant relevance to coastal development and management, which we will revisit in the latter discussion in detail.

A decade after the Rio Earth Summit, the World Summit on Sustainable Development (WSSD) was held in Johannesburg in 2002 to move forward to the future of implementing “*Agenda 21*” and achieving sustainable development. The WSSD’s areas of debate were centred on global warming, water sanitation and renewable energy. The agreement was reached on water and sanitation to halve the number of people without access to safe drinking water by 2015. In addition, WSSD planned on restoring the world’s depleted fish stocks by 2015 (UN, 2002). More or less, it was seen as a reassurance to what previously was committed, while working on the detail elements of the action plans. In the absence of binding targets, schedules and sufficient funding mechanisms, doubts and disillusionment were revealed in the climate of WSSD. The summit showcased grand rhetoric with little or no confidence in real commitment. Nonetheless, the WSSD did demonstrate ongoing centrality of the environment as a development issue of global concern, urging more active involvement of the non-governmental actors in international development, including non-governmental organizations (NGOs) and the private sector.

## **2.2 Significance of the Coastal Zone: Development Problems and Opportunities**

In the previous section, the relationship between development and environment and the changes in development thinking towards environment were briefly discussed. Since most of the development activities could only occur on dry land, why should we bother to bring the development of ocean and coastal environments to our attention? The oceans are indeed the very foundation of our human life. It regulates air and water and has always provided the prime source of nourishment. Even life itself arose from the oceans. Two-thirds of the world's largest cities are located on the coast, and more than fifty percent of the world population lives within sixty kilometres of the coastline; this coastal population figure is expected to increase to three-quarters by the year 2020 (UNCED, *Agenda 21: Chapter 17.3*, 1992). This also suggests that human activities originating from this tiny land-sea interface would impose a greater and unbalanced amount of pressure to the entire ecosystem. With increased rural-to-urban migration in most regions of the world and the developing countries in particular, population growth within the coastal zone has always significantly outnumbered the inland areas. Despite this high population density, the coastal zone is compressed into only eight percent of the world's terrestrial surface that is considered to be habitable (Sorensen, 2002). In addition, the coasts are home to many of the world's poor. It is estimated that around seventy percent of the world's coastal zones are situated under the jurisdiction of developing and transitional economies (Sorensen, 2000), where the coastal resources and environment indicate an urgent need for sustainable development and management.

### **2.2.1 Understanding the Coastal Zone**

Coastal zones are defined in many ways, but many would consider choosing the words 'land' and 'seas' in their definitions. In general, the 'coasts' represent a unique and complex

geographical area where the waters of the seas meet the land. The area can also be further divided into inland areas, coastal lands, coastal waters and offshore waters (Cicin-Sain and Knecht, 1998). As the territorial extension of the states over the oceans, the coastal zone sometimes would also include the 200 nautical-mile Exclusive Economic Zone (EEZ) defined by the *UN Convention on the Law of the Sea* (1982). Although the area is often defined by its geographical locations, such as the land and marine environments, concerns and interests are concentrated on the human activities that are exercised within this confined space. In fact, it is without a doubt that almost all problems of the oceans that we see today originate from human activities on land, and the threat to the coastal ecosystem is increasing both in type and scale, if not in number of times.

### 2.2.2 The Overcrowded Coasts

Coastal urbanization and development are one of the main causes of coastal environmental degradation. Two thirds of the world's overpopulated metropolitan areas with over 2.5 million residents are on the coast and they show no sign of decline in population (GESAMP, 2001). If you think the coastal demographics are already alarming, they will be much more crowded by 2025. If the trend continues, approximately 6.5 billion people will crowd along the coasts (Hinrichsen, 1995). Throughout many of the developing countries, the coastal cities are dramatically exploding with people, while the majority of population growth in the coastal regions is within the lowest income groups. For instance, the annual population growth rate in Dar Es Salaam, on the coast of the Indian Ocean in Tanzania, scores 7.8 percent, well over twice the rate of population growth in the country as a whole. In addition, the population of Casablanca, on the coast of the Atlantic Ocean in Morocco, soared from 600 in 1839 to 29,000 in 1900 and to almost 5 million in 2001 (GESAMP, 2001).



For centuries, many coastal cities have served an essential economic function for trade and waterborne commerce. Regardless of the recent developments in roads and railway or even air transportation, ports and harbours for the shipping industries remain the mainstay of many coastal economies today. More noticeably, as part of the national development strategy to pursue the so-called 'export-led' growth, many developing countries have set up export processing zones (EPZs) on their coasts. With more potential job opportunities awaiting throughout the EPZs, the coastal areas soon become a powerful magnet to attract excessive in-flow migrants, creating problems of over-urbanization. In search of better economic opportunities for themselves and their families, nearly 100 million Chinese are thought to have migrated from the poorer provinces in the central and western regions to coastal areas. At any given time, approximately 40 million Chinese, 10 million more than the population of Canada, are on the move (Hinrichsen, 1995). The bulk of this huge "floating population" is concentrated in the coastal areas, particularly in the areas of EPZs with the highest economic growth rates.

### 2.2.3 Loss of Coastal Resources

Unquestionably, garbage is something that is produced only by human beings. The more population that crowd into the coasts, the more volume of waste is produced. However, why is the land-based waste pollution a problem of the coastal environment? Virtually all of the coastal pollution originates from land. It is estimated that seventy percent of the Earth's non-frozen land surface ultimately drains into the coastal waters and oceans (Sorensen, 2000). In other words, the coastal waters and the oceans are the planet's ultimate sink, taking in all the waste produced by us. Having rubbish dumped on vital coastal habitats, the contaminants are easily leached into coastal waters. The waste, especially the untreated

sewage, is increasingly getting into the ocean. For hundreds of years, there was no sewage treatment in Halifax and presently 180 million litres of untreated sewage flow into the Halifax Harbour every day (CBC News, 2003). Thinking of the sewage pollution to coastal waters, if this is the case in Canada, how are we expecting the sewage treatment in developing countries to better protect our coastal ecosystem? In many parts of the world, needs are generated for ever larger sewage treatment plants and expanded landfills for the disposal of waste on the coasts.

Many might think that the rainforest environment is the region to find the richest biodiversity on Earth. Yet, in comparison to all types of bio-geographical environments, including the great plains and continental mountains, the coastal zone, in fact, enjoys the greatest aggregation of ecological resources and systems (Sorensen, 2000). The coastal zone ecosystems are important for biological and economic productivity, storm protection and erosion control. Worldwide, over two thirds of all marine fisheries species depend on coastal systems (Cicin-Sain and Knecht, 1998). Lagoons, salt marshes, coastal wetlands, estuaries, coral reefs, mangroves, sea-grass bed as well as tidelands are all part of the most precious and vibrant coastal ecosystem, and where also are the vital breeding, nursery and feeding areas for the majority of the known marine species. Unfortunately, threats to coastal biodiversity are now further imposed by greater demands on the resources and more intense coastal development in these habitats. In many cases, the development of causeways, reclamation of the wetlands, modification of the coastlines and conversion of coastlands to aquaculture would undermine the sustainability of the coastal ecosystem at enormous economic and ecological cost. The studies conducted by GESAMP (2001) have revealed some of the most alarming statistics:

“Half of the world’s wetlands were lost during the course of the twentieth century... Over half of the world’s mangrove forests have been lost, too. Sixty

percent of them in Guinea and the Ivory Coast have been cut down... [and] seventy percent of them have been destroyed in Liberia. Seventy percent of coral reefs world-wide are threatened, while only five percent of the Europe's coastline still remains undisturbed" (GESAMP, 2001).

The rise in sea surface temperatures is a natural cause of coral reefs' death from bleaching. Nonetheless, it should be noted that increased water temperatures are part of the global warming effect and for which humans, rather than nature itself, is to be blamed.

#### 2.2.4 Multiple Uses of the Coastal Zone

No matter where you go, the coastal zones are highly valued and greatly attractive as sites for many different uses. In earlier discussions, the coasts are introduced as popular residential areas, sites for waterborne trade and commerce, the EPZs and dumping grounds. Should there be something important but still missing from the list, that will be tourism—the world's largest industry. With the greatest aesthetic value, coastal zones are certainly one of the favourite destinations for tourists. Countries around the world today, particularly the small island developing states and coastal developing countries, are turning towards tourism as a viable option for economic development, calling tourism the "passport to development" (de Kadt, 1992). This is because tourism has brought not only the tourists, but also enormous positive economic potentials and development opportunities, including the building of basic infrastructure, income generation, employment creation, and foreign exchange earnings. However, many have failed to recognize that tourism also brings us the reason to better protect the coastal environment for long-term prosperity. Sadly, tourism's gain is earned at the cost of the environment and rarely has tourism been well managed from an environmental perspective. As ACOPS (2001) suggests, the marine and coastal environments in Sub-Saharan Africa are impacted the most by the tourism sector and

especially in countries like Senegal, The Gambia, Kenya, Mauritius and Seychelles where coastal and beach tourism is primary dominated by western European tourists.

Massive in-flow of tourists adds even heavier pressure on to the already problematic and overpopulated coastal regions and the 'come-and-go' travel pattern of carefree tourists often leaves little concern for the local environment, if any. In addition, for developers—usually the wealthy multinationals— they wish their large-scale beach hotels and resorts could be built as close to the water and as isolated from the locals as possible. This is especially evident in many of the Caribbean Islands, advertising its sun and beach paradise vacations to North American tourists. Such inconsiderate development for tourism has undermined the viability of the industry, as many have been questioning whether tourism is really the right path to development. In Kenya, for instance, the coastal tourism business accounts for more than 60% of earnings from the entire tourism industry in the country, employing thousands of the coastal dwellers. Many coastal urban centres in Kenya, such as Mombassa, experience unprecedented waste problems because of inadequate waste disposal facilities (ACOPS, 2001). In fact, a great portion of the waste in coastal areas comes from the visitors rather than the local residents. While maritime tourism becomes increasingly popular, unplanned development of coastal tourism poses major threats to the shorelines and coastal habitats.

Furthermore, the coasts also represent the territorial frontiers of many countries and are considered to comprise unparalleled military and geopolitical strategic values. As of the year 2002, "there are 173 sovereign nations that either: open to an ocean, sea, gulf, bay or land-locked sea or lake of international significance or both" (Sorensen, 2000). The Pacific archipelagos, including Guam and many tiny but strategically prominent areas, have long been targeted as having defensive interests of the US and are stationed with significant

military forces. History lessons have also shown that international disputes over islands, canals and channels are one of the common causes of war. More importantly, the coastal states of world are now competitively engaged in identifying and pursuing their national development interests in the ocean arena, aiming at sea lanes and particularly new resources of offshore oil and natural gas. The extension of maritime jurisdiction to two hundred miles from shore would mean a great deal of benefit from ocean resources. In addition to the disputes over oil and gas, fisheries disputes are even more problematic to the coastal population of the developing world, where the majority of people usually depends on fish for nutrition, employment and their way of life. For instance, the failure to resolve the fishing rights dispute in a 1990 treaty signed between Venezuela and Trinidad and Tobago has resulted in the arrest of two Barbadian fishermen for illegally fishing in Tobago waters. Barbados then took the case of the fishing dispute with Trinidad and Tobago to the United Nations, seeking legal justification under the *United Nations Convention on the Law of the Sea* (Barbados Advocate, 2004).

It will not be an overstatement that the most valued and the most contentious area of real estate is to be found in the coastal area of any nation. The various characteristics of the coastal zone, including high population density, the number of different uses competing for the limited coastal space, the concentration of precious natural resources and sensitivity to environmental degradation and coastal hazards, have all underlined the management challenges and potential conflicts. Given the complexity and diverse interests in the coastal zone, the area is argued to be “the most difficult part of earth’s surface in which to prepare and implement any type of environmental planning or management programme” (Sorensen, 2000). In order to meet these challenges, it would require the integrated coastal management (ICM) approach for sustainable coastal development.

## 2.3 Integrated Coastal Management

### 2.3.1 The Evolution of ICM

The term “ICM” stands for Integrated Coastal Management, also known as “ICZM”—Integrated Coastal Zone Management. In its essence, ICM constitutes a geographically defined managing approach. It refers to a widely recognized environmentally friendly management mechanism that aims to provide solutions to coastal conflicts and challenges by taking into consideration the multiple dimensions of influences interplayed within the coastal ecosystem. It was first introduced as early as 1965 in the ICM programme of “*San Francisco Bay Conservation and Development Commission*,” and practiced in some small-scale management measures for the coastal areas of Australia and Sweden (WWF, 1994; Sorensen, 2000). Rather than a formalized policy or regulation, ICM was exercised, more or less, as a matter of course in its initial stage. During the late 1970s and early 1980s, as seen through the development of the *UN Convention on the Law of the Sea* (1982), setting up the international legal framework was the dominant approach to regulating environmental problems of the coasts and oceans.

By contrast, from late 1980s onwards, the concern and emphasis have shifted towards the development of the coasts and oceans with emphasis on sustainability, governance and integration. In 1987, the World Commission on Environment and Development stated that “sustainable development, if not survival itself, depends on the significant advances in the management of the oceans” (WWF, 1994). Since then, ICM has begun to take on a much higher international profile, with ICM implemented throughout the coasts of the world, especially through the “Regional Seas Programme” of United Nations Environment Programme (UNEP). Since the earliest Action Plan was adopted in the Mediterranean, the

Regional Seas Programmes have multiplied to cover the marine environment of more than 140 of the world's coastal countries, including the most recent initiative for the North-East Pacific in 2001 (UNEP, 2002). It may also be worth noting that in 1996, the first international conference focused on assessing the successes and failures of ICM efforts was held in Xiamen, P. R. China—the field study site to be discussed latter in this thesis report. As ICM efforts increasingly show optimism in achieving effective coastal management, it has also been further expanded to include catchments and watershed management.

### 2.3.2 Conceptualizing ICM

It will never be easy to understand the complexity of the coastal ecosystem, and needless to mention keeping the dynamics of this ecosystem in balance presents an even greater challenge. The definition and interpretation of ICM could vary considerably and are subject to the geographical scope, problems or issues concerned as well as the nature of activities involved. Generally speaking, the Integrated Coastal Management could be best defined as:

“a continuous and dynamic process by which decisions are taken for the sustainable use, development, and protection of coastal and marine areas and resources. ICM acknowledges the interrelationships that exist among coastal and ocean uses and the environments they potentially affect, and is designed to overcome the fragmentation inherent in the sectoral management approach. ICM is multi-purpose oriented, it analyzes and addresses implications of development, conflicting uses, and interrelationships between physical processes and human activities, and it promotes linkages and harmonization among sectoral coastal and ocean activities” (Cicin-Sain and Knecht, 1998).

The very authoritative and comprehensive definition of ICM above by Cicin-Sain and Knecht could be broken down for further explanations in that:

- “a continuous and dynamic process” reflects the ongoing changing nature of the coasts. Therefore, the management mechanism also needs to be adaptive to accommodate the changes presented at any given time.

- “for the sustainable use, development and protection of the coastal and marine areas and resources” refers to the many goals to be achieved through the implementation of ICM. The many uses of the coasts are met in a sustained manner.
- “decisions are taken... is designed to overcome the fragmentation” suggests that ICM is a coordinated action or strategy, requiring the involvement of various interest groups in planning the directions of coastal zone use.
- “interrelationships between physical processes and human activities... harmonization among sectoral coastal and ocean activities” implies the interconnectedness of the natural environment and socioeconomic environment within the coastal zone, while efforts needed to made for the balance of the ecological-human systems.

The key word “integration” in ICM underlines the importance of sharing the ‘power of influence’ among different stakeholders before a final decision is arrived in coastal zone management. In addition, others (CAMPNET, 1989) have also added that ICM should be developed and implemented with a balanced allocation of environmental, socio-cultural and institutional resources, suggesting the equitable benefits sharing as a result of the ICM implementation. In short, for physical and social environments, ICM aims to create a win-win solution for all in the management of coastal resources.

### 2.3.3 Relevance of “Agenda 21” to ICM and its Guiding Principles

Until now, “Agenda 21” (1992) is said to be the most significant document in defining strategies for implementing sustainable development of the oceans and coasts. This document also sets out the most influential international commitments to the integrated approach of coastal management. With an entire chapter devoted solely to the ocean and coastal environment, “Chapter 17— *Protection of the Oceans, All kinds of Seas, Including Enclosed and Semi-enclosed Seas, and Coastal Areas and the Protection, Rational Use and Development of their Living Resources,*” it well outlines the scope and objectives for ICM that:



- To identify existing and projected uses of coastal areas with a focus upon their interactions and interdependencies;
- To concentrate on well-defined issues;
- To apply preventive and precautionary approaches in project planning and implementation, including prior assessment and systematic observation of the impacts of major projects;
- To promote the development and application of methods such as natural resource and environmental accounting that reflect changes in value resulting from uses of coastal and marine areas; and
- To provide access for concerned individuals, groups and organizations to relevant information and opportunities for consultation and participation in planning and decision-making (*Agenda 21: Chapter 17*, 1992; GESAMP, 1996).

It is well recognized in “*Agenda 21*” that a new approach is needed “to marine and coastal area management and development, at the national, subregional, regional and global levels, approaches that are integrated in content and are precautionary and anticipatory in ambit” (*Agenda 21: Chapter 17*, 1992).

While ICM is viewed as a brand new instrument to better manage the coastal environment, it essentially shares many similarities with the strategies to manage other kinds of natural resources. Identified as the guiding principles of ICM, the basis of the ICM concept is already embodied in many international norms for environment and development (Cicin-Sain and Knecht, 1998), including:

- “Principle of interrelationship and integration” emphasizes the interdependence between physical environment and human society that environmental conservation and economic development are equally significant to our quality of life.
- “Inter- and intra-generational equity principles” ensures a fair distribution of the costs and benefits between generations. It incorporates a two-dimensional commitment to equity: between the current generation and those that will follow and also between the poor and the more affluent.
- “Principle of the right to develop” argues the basic right to live of every human being as well as the right to develop his or her potential so as to live in dignity.

- “Environmental safeguards principle” refers to the application of anticipatory measures to prevent environmental damages, rather than restoring it afterwards.
- “Precautionary principle” entails a response to uncertainty, in the face of risks to the environmental or human health. It involves acting to avoid serious or irreversible potential harm, despite lack of scientific certainty as to the likelihood, magnitude, or causation of that.
- “Polluter pays” principle” suggests shared responsibility into costs. Every actor is responsible for the real costs associated with the environmental impacts caused by their activities, whether it is towards air, water, soil or waste.
- “Transparency principle and other participatory approaches” refer to the commitment to greater openness with full public participation. Steps are taken to improve public access to information and involvement in decision making (Charles, 2004).

#### 2.3.4 Integration Dimension of the ICM

“Integration” is said to be the backbone of ICM, whereas “participation” is the underlying theme of the *Local Agenda 21*. Both words hold the key to the success of sustainable coastal development. The concept of ICM might be simple, yet the implementation of it in reality is often more complicated than one can expect. The integration dimension of ICM refers to the incorporated efforts, both horizontally and vertically, among the various sectors, planning interventions or administrative levels in the areas concerned. At different levels, there are different aspects of integration in ICM, including:

- Sectoral integration: voices about the specific concern of different interest groups are listened in the use of coastal zone;
- Intergovernmental integration: coordination among different levels of governments including the national/federal, provincial/state and municipal/local;
- Integration of environmental component into the socioeconomic context: the integration of physical environment and socio-cultural environment;

- Spatial integration: the connection between the land-based activities and the effects on the ocean. Two sides of the coastal zone are both taken into consideration;
- Science-management integration: an interdisciplinary approach to include both natural sciences and social sciences in the studies of coastal management; and
- International integration: bilateral or multilateral international cooperative efforts in ICM operated by the UN, IGOs or international NGOs (METAP, 1996; GFOCI, 2002; Xue et al., 2004).

One of the key ideas of integration in ICM is to encourage the participation of different stakeholders, particularly the local community. This participatory approach also serves to harmonize conflicting interests and remove inequalities, as the underserved and the socially excluded are being mainstreamed through the participation process. There has been increasing recognition of local knowledge in community based resource management, such that the local communities could be in a better position to manage the local environment than the national government. In order to succeed in the devolution of management responsibilities, the national government should make a commitment to back up local communities that are willing to take on environment duties (Wiber et al., 2004). Moreover, it is proven that direct involvement of all stakeholders and active participation of the community members would ensure the decisions are made to better reflect the local common interests, while leading to a stronger commitment to comply with the strategies of sustainable coastal development and management (Warburton, 1998).

#### 2.3.5 Participation Dimension of the ICM

For many developing countries suffering from the horrible colonial experience of resource exploitation, development programmes involving the management of natural resources have led to a new level of awareness and sensitivity. While the history lessons have

made it untenable for outsiders to control and manage resources on behalf of disadvantaged communities, the community-driven management approach seems to provide a promising alternative. As defined by the United Nations (1979), the meaning of “participation” suggests “sharing by people in the benefits of development, active contribution by people to development and involvement of people in decision making.” Given the unique life-sustaining characteristics of marine and coastal resources, participatory development is inarguably a key ingredient in its conservation and management. That for positive changes to take place and for livelihoods to be sustained in the community, the involvement of people in decisions concerning the resources which they own and the environment where they live becomes extremely crucial in achieving development success. As the community is often engaged, either directly or indirectly, with the local natural resources for living, having the voice of the local residents heard could help assure their particular needs are met in development projects. In recent years, the emergence of bottom-up community-driven development in resource management has taken a radical step to challenge the traditional practice of the top-down approach.

Community based development is most appropriately used for the provision of basic services and the management of natural resources. It is a process that empowers the local communities to assume control and authority over decisions and resources in development projects. This concept also reflects the observation of most ICM development projects that people who inhabit the coastal environment over time are often the ones most able to make decisions about its sustainable use. It is necessary for communities to be recognized as the real experts in local resource management as the potential of local values and indigenous knowledge in resource use can never be underestimated. In fact, no one other than the local community itself could be more fluent in the local languages, more sensitive to the socio-

cultural and spiritual milieu and more entitled to the rights and responsibilities over the management of local resources.

#### 2.3.6 The Need for ICM in Coastal Development

Despite the fact that the socioeconomic and environmental conditions of the coastal nations often vary considerably, the ecosystem challenges and development opportunities in store are not so different. As presented in the previous sections, the oceans and coasts of the world are facing pressing ecological struggles from multifaceted causes. Unfortunately, the accelerating coastal problems are often inadequately addressed when they are solved in isolation without considering the dynamism of the coastal ecosystem as a whole. The environments of land and sea are in fact closely intertwined by complex atmospheric, biological, geomorphologic and chemical interactions. The ICM approach, on the other hand, aims to meet all coastal challenges with a comprehensive solution, while taking into account the indivisible interrelationships among human activities, natural events, societal demands and resource conservation.

In many cases, the coastal zone is perceived as a battle ground among a variety of interest groups with conflicting objectives. Often, the competition is provoked by the many different uses within the confined coastal space for its limited coastal resources. The industrial development of a harbour competes with seaside housing projects, industrial pollution threatens marine creatures and fisheries, coastal wetlands and natural habitat are reclaimed for rapid urban expansion, whereas sand mining accelerates the erosion of popular tourism beaches and undermines seashore structures. As these ongoing conflicts are sadly present in most of the world's coastal regions today, it needs ICM, a conflict resolution and environmental mediation mechanism, to transform the battle ground into a common ground

in the coastal zone. It is believed that implementation of ICM would help “maximize the benefits provided by the coastal zone and to minimize the conflicts and harmful effects of activities on social, cultural and environment resources” (World Bank, 2002).

As the world’s largest coastal state, and with the longest coastline, *Canada Oceans Act* (1996) explicitly demands the “integrated management of oceans and coastal activities and resources.” Moreover, Canada’s *Foreign Policy Statement* (1995) provides a strong rationale for the involvement of the Canadian International Development Agency (CIDA) in ocean management and development assistance. In *CIDA’s Strategy for Ocean Management and Development* (1998), ICM is recognized as “an activity which calls for co-ordination among national agencies responsible for coastal and ocean management” and CIDA reaffirms that “sound environmental and resource management of ocean and coastal areas requires an integrated approach. In terms of management and development, coastal land areas and coastal waters are inseparable” (CIDA, 1998). After years of development in theory and practice, ICM efforts have received worldwide recognition and support in sustainable development and management of marine and coastal resources.

## **2.4 The Coasts of the Asia Pacific**

The oceans and coasts are increasingly appreciated as the common heritage of mankind and the significance of these global commons is no exception in the region and to the people of the Asia Pacific. With this in mind, the following section identifies the issues specific to the coastal regions of the Seas of East Asia.

### 2.4.1 Geography of the Seas of East Asia

The Seas of East Asia (SEA), a vibrant, interdependent and delicately balanced region, encompass not only one of the ecologically richest, but also one of the most socio-economically diversified regions in the world. Its body of water is shared by 14 Asia-Pacific nations, namely: Japan, North Korea (DPRK), People's Republic of China (PRC), South Korea (ROK), Cambodia, Vietnam, Taiwan, the Philippines, Thailand, Malaysia, Singapore, Brunei Darussalam, Indonesia and Timor-Leste. The SEA region is formed with a chain of large marine ecosystems, sub-regional seas, and coastal regions in the following 5 globally significant water systems, supporting substantially both the environmental and economic well-being of the Asia Pacific (*Large Marine Ecosystems of the World*, 2004):

- The Yellow Sea: situated between the Chinese Mainland and Korean Peninsula, the region covering 404,000 sq km forms one of the most important habitats in the world with its jagged coastlines, islands and inter-tidal flats. It also includes Bohai Sea—an innermost gulf of the Yellow Sea on the coast of north-eastern China. It is estimated that over 10% of the earth's total population (600 million) reside in the drainage areas of the Yellow Sea.
- The East China Sea: bordered with Japan, China, South Korea and Taiwan, the area, covering 1,243,200 sq km, is a vast and productive large marine ecosystem with shallow coastal waters that provide spawning and nursery grounds for many species of pelagic fish. Increasing overexploitation of the marine resources is accompanied by the rapid economic development in the region.
- The South China Sea: being the world's second busiest international sea lane, more than half of the world's super-tanker traffic passes through its waters. Moreover, the region holds valuable oil and gas resources strategically located near several large energy-consuming countries, adding tension to the competition of territorial claims over a number of partially submerged rocks, islets and undersized islands.
- The Sulu-Celebes Sea: surrounded by Malaysia, the Philippines and Indonesia, the region is characterized by its tropical climate. As one of the most important fishing grounds in the region, most of the coastal residents rely on fishing for not only the basis of their commerce but also the source of their staple diet. The two seas are separated by a deeper area and a chain of islands known as the Sulu Archipelago.
- The Indonesian Seas: located within the world's largest island nation of Indonesia and the world's newest country of Timor-Leste, the Indonesian Seas play a

significant role in global weather patterns and oceanic circulation, because of its location in between the Indian and Pacific Oceans as well as between the Asian and Australian continents. The region not only supports significant biodiversity, but also contains great migratory fish resources, including tuna and mackerel (IUCN, NOAA and IOC, 2004).

In addition, closely related with these international waters of East Asia are the coastal estuaries and river basins in the region, where concentrate most of the human settlement and uses. Before reaching the SEA, all major rivers of Asia Pacific, such as Yangtze River, Yellow River, Mekong River and Red River, pass through the most economically productive and densely populated regions, support important industries, agriculture irrigation and freshwater aquaculture, while forming the unique coastal ecosystems with extensive wetlands, mangroves and river deltas. The river basins, that cover a vast area of 6.25 million sq km in the coastal regions, are home to 1.5 billion people in Asia Pacific (PEMSEA, 2003), making the health of SEA coastal regions vitally linked to the well-being of the Asia Pacific population.

#### 2.4.2 SEA in the Development of Asia Pacific

The region of Asia Pacific is never easy to characterize and this complexity is played out by its mosaic culture and distinctive geography through its course of development. The region, with a total population of 1.9 billion (UNESCAP, 2004) consists of some of the most populated and the smallest as well as some of the most prosperous and impoverished states. According to the latest *Human Development Report 2004: Cultural Liberty in Today's Diverse World* (UNDP, 2004), countries in the SEA region are placed across the spectrum of different Human Development Index (HDI) rankings: 4 in high, 7 in medium and 1 in low human development categories (with DPRK and Taiwan missing from the study). Asia Pacific has experienced spectacular economic growth and is expected to continue the trend of rapid



growth. In comparison to other world regions, Asia Pacific's HDI value outperforms both the overall world average as well as the average of the developing countries (UNDP, 2004).

With a coastline of over 100,000 km surrounding the SEA, more than 70% of the population in Asia Pacific reside in the coastal regions and heavily depend on marine and coastal resources for their living (UNEP, 2000). The increase in coastal settlements and the creation of coastal mega-cities are accompanied by the enormous flows of rural-to-urban migration throughout the region. The coastal population, living within 100 km from the coast, ranges from 24% in Cambodia and China, to 100% in South Korea, the Philippines and Singapore and many close to high 90% (See the table below).

**Table 2.1: Coastal Population of Asia Pacific**

<b>Country</b>	<b>Coastline (km)</b>	<b>Population (millions)</b>	<b>Coastal Population (% within 100 km of the coast)</b>
<b>Brunei Darussalam</b>	161	0.3	99.9
<b>Cambodia</b>	435	12.49	23.8
<b>P. R. China</b>	32000	1287.75	24
<b>DPR Korea</b>	4009	23.15	92.9
<b>Indonesia</b>	81290	206.26	95.9
<b>Japan</b>	29020	127	96.3
<b>Malaysia</b>	9323	24.31	98
<b>Philippines</b>	18000	79.94	100
<b>RO Korea (South)</b>	11542	46.14	100
<b>Singapore</b>	268	4.16	100
<b>Thailand</b>	2600	62.31	38.7
<b>Vietnam</b>	3260	80.53	82.8

Source: modified from PEMSEA, Partnerships in Environment Management for the Seas of East Asia (2003). *Sustainable Development Strategy for the Seas of East Asia: Regional Implementation of the World Summit on Sustainable Development Requirements for the Coasts and Oceans*. PEMSEA, Quezon, Philippines.

As preferred sites for urbanization, coastal zones are centres of the human activities in Asia Pacific where people seek employment and economic opportunities. In 2000, six coastal mega-cities with a population of over 10 million are found in the region, and this coastal

population figure is anticipated to rise to three billion by the year of 2015 with eight coastal mega-cities (PEMSEA, 2003).

Much like many other regions of the world, the economy of Asia Pacific is strongly related to the activities of the coastal zone. It is regarded as one of the global centres of marine commerce, offering services in nine of the world's top 20 mega-ports (Chua, 2003) and through its busy sea lanes and straits to and/or from Pusan (South Korea), Shanghai (China), Hong Kong, Kaohsiung (Taiwan) and Singapore. The region's coastal and marine resources account for approximately 40% of the GDP, whereas a great portion of the low and middle-income nations in the SEA region is predominantly resource dependent (PEMSEA, 2003). Traditionally resource-based activities in the region, including freshwater aquaculture, mariculture, coastal fisheries, agriculture and forestry, are all found within a short distance from manufacturing, shipping, and tourism activities in the coastal zones.

Close to 40% of the world fish production is produced in the region of SEA, while aquaculture in China alone produces over 70% of world's farmed fish, occupying much of the world's fish market (Chua, 2003; Justi and Glazebrook, 2002). In addition, 28% of the animal protein intake of people in the SEA region comes from fish, whereas rural communities in Asia Pacific, in particular, are so heavily reliant on coastal and marine resources that "small-scale fishermen living in rural areas relying, at times solely, on these resources both as a source of income and for food" (PEMSEA, 2003; Burke L. et al., 2002). Yet not only food security, but also job security remains a severe struggle in the region with the increasing decline in fish stock. Fishery in the Straits of Malacca alone provides jobs to nearly a quarter million fishermen, while numerous species, including 52 species of fish, 13 species of coral and sea anemones and 12 species of crustaceans have been declared extinct, with more than 50 others are on the endangered list (Campbell, 2002).

### 2.4.3 Degraded Coasts of the SEA

While the nations of Asia Pacific begin to enjoy the fruits of astonishing economic transformation, the rapid coastal development in the region throughout these years is to be blamed for the alarming impacts on the coastal and marine environments. It is obvious that population increase is positively correlated with the increase of waste. For instance, garbage haul in the Philippines was second only to the US in the world; some 2 million pounds of garbage were collected from four thousand miles of shores and underwater of the Philippines in 2003, representing an increase of 82% over the 2002 figure (Bolido, 2004). Unwanted fishing nets, plastic bags and ropes found on the coastlines are durable threats to aquatic wildlife. However, what people are often unaware of is that the consequence of this coastal waste problem will ultimately hunt down the coastal residents themselves as well. In addition to the obvious danger of syringes and broken glass, personal hygiene and chemical debris would often end up as invisible bacteria and pathogens along the coasts. It is unlikely that people will avoid the contaminated seafood on a daily basis, if at all possible.

None of the large marine ecosystems in SEA shows sign of good health. The SEA region encompasses the highest coral diversity in the world, hosting 34% of the world's coral reefs with an extensive coverage of 100,000 sq km (Burke L. et al., 2002; UNEP, 2004). However, it will be no surprise to also know that many of the region's reefs have already been seriously damaged. Recent studies showed that around 88% of the region's reefs were at risk, with half of them suffering from high to very high stress levels (UNEP, 2004).

In addition, mangroves also form a natural protection of the coastal wetlands, where plenty of food and resting places for birds and marine creatures are found in the mangrove forests. The SEA region is home to 40% of the world's mangroves— the highest mangrove diversity in the world, while Indonesia alone contains 4.25 million ha (UNEP, 2000). Coastal

mangroves are of environmental and economic significance to the people of Asia Pacific by protecting the coastal embankments as a natural buffer zone from wave action, while reducing pollution from inland rivers by acting as a filter for the sediments. Recent studies have suggested that if the shores of the SEA region were still lined with the original mangroves rather than bricks or sand beaches, the deadly Tsunami impacts of this year would have been greatly minimized (Quarto, 2005).

In comparison to coral reefs, mangroves in the SEA are not in any better shape. The alarming destruction of the mangrove forests can be best understood in Thailand, where more than half of its mangrove forests have been lost since 1960. In the Philippines, mangroves have declined from an estimated 448,000 hectares in the 1920s to less than 110,000 hectares by 1990 (Quarto, 2005). It is clear that any growth in Asia Pacific would never compensate for the irreversible loss of the SEA environment, if the approach is not ecosystem-based coastal development and management.

## **Section Three— ICM Case Study**

### **International Training Centre for Coastal Sustainable Development**

#### **3.0 Introduction**

As discussed earlier, the Integrated Coastal Management (ICM) serves as the cutting edge instrument to strive toward the promising potential of sustainable development and management of coastal resources through a holistic, catalytic and integrated mechanism. This section aims to showcase the real world application of ICM by exploring the Xiamen ICM implementation experience, while questioning if any positive changes have really occurred for the benefit of both the environment and the people. More importantly, this section also discusses how the lessons of Xiamen ICM are shared with and transferred to the neighbouring nations of the SEA region through its study tour and capacity building programmes at the International Training Centre for Coastal Sustainable Development (ITC-CSD).

#### **3.1 The Training Institution**

In response to the growing concerns about Asia Pacific's deteriorating coastal environment, twelve states in the region (as illustrated in Figure 3.1) have come together with one common goal: to ensure sound management and sustainable development practices of their shared waters. Financially supported by the United Nations Development Programme (UNDP), organized by the Global Environment Facility (GEF) and executed by the International Maritime Organization (IMO), the regional programme of "Partnerships in Environment Management for the Seas of East Asia" (PEMSEA) was formed to support its partner countries with knowledge and technology in addressing various alarming transboundary problems of Asia Pacific's coastal environment.

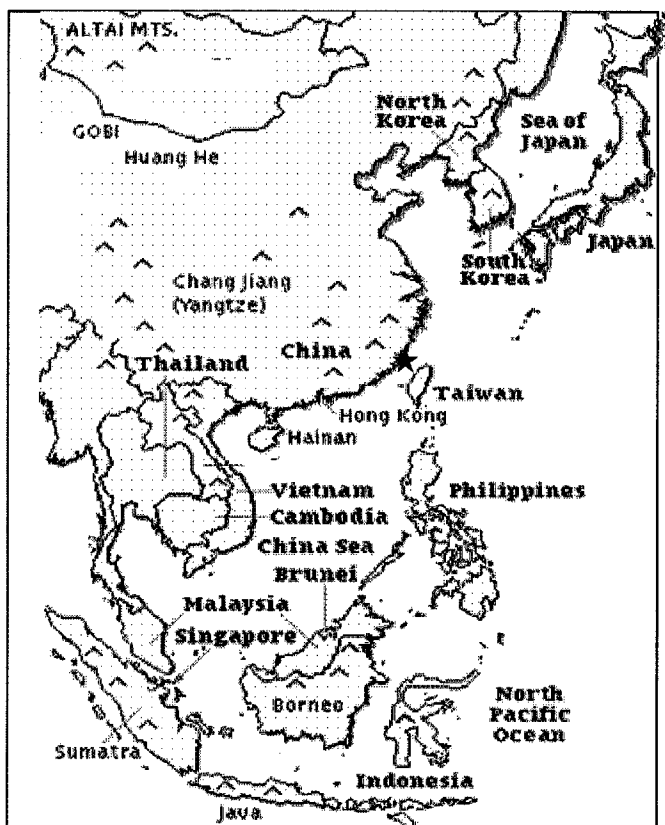


Figure 3.1: Partner Countries of PEMSEA in Asia Pacific

The star indicates International Training Centre for Coastal Sustainable Development.

PMSEA Partner countries include all states bordering the East Asian seas, except Taiwan and Timor-Leste:

1. Brunei
2. Cambodia
3. P.R. China
4. North Korea
5. Indonesia
6. Japan
7. Malaysia
8. Philippines
9. South Korea
10. Singapore
11. Thailand
12. Vietnam

Source: Author's synthesis of information learned from personal involvement in the ICM training programme. (2004).

Being in the forefront of regional initiatives to assist the SEA communities with the development of necessary capacity in the prevention and management of marine pollution on a long term and self-reliant basis, the five-year regional programme, operated by UNDP, GEF and IMO, was launched for its first cycle in 1994 with Xiamen (P.R. China) and Batangas, (the Philippines) designated as two ICM demonstration sites. At that time, Xiamen, an island off the southeastern coast of the Chinese mainland with fishery as the traditional staple industry, was in the middle of the environment-development struggle. It was experiencing unprecedented transformation and economic expansion as one of China's earliest Special Economic Zones, which was introduced in 1980. Upon the completion of its

first ICM cycle in 1995, Xiamen established a self-sustaining ICM programme and began to play a leading role in ICM implementation throughout China.

With the first-hand knowledge learned and resources gained, the coordination unit in Xiamen also began to expand its capacity to offer further research and training on ICM. Founded in 1997, the Xiamen International Training Centre for Coastal Sustainable Development (ITC-CSD), as PEMSEA's regional training centre of ICM under UNDP/GEF/IMO, began to provide a comprehensive course focusing on the practical approaches of ICM principles and guidelines towards coastal environment conservation and management. With resources and support from the State Oceanic Administration of China, the Xiamen Municipal Government and its home institute base of Xiamen University, the Centre is able to offer environmental and natural resource policy makers, managers and trainers broad-based, interdisciplinary training with field observation as well as regional and international case studies. Entering its second cycle of ICM for sustainable development, Xiamen, as a PEMSEA-designated demonstration site, well showcases the application of ICM for effective prevention, control and mitigation of marine pollution. As a major platform of ICM training institute in Asia Pacific, the Centre not only advances research and studies of coastal environment science, but also provides scientific support for social and economic development at national and international levels through domestic and international training sessions each year.

## **3.2 ICM Development in Xiamen**

### **3.2.1 Reconstruction of the Governing Body on the Coasts**

Under the first ICM project cycle, a multi-agency and cross-sectoral coordinating office, known as Xiamen Marine Management and Coordination Committee (MMCC), was first

established within the Xiamen Municipal Government in late 1995. Committee members include the heads of departments and agencies for city construction, science, environmental protection and fisheries. In 1996, MMCC was expanded to become the Marine Administrative Office (MMO) with the deputy secretary general of the municipality serving as the co-director of MMO to strengthen coordination and integration management capacity. MMO oversees the management of coastal affairs (Xue et al., 2004).

In addition, a consultative committee for ICM with science and technology support, known as the Marine Experts Group (MEG), was also incorporated into the organization to ensure the scientific-based implementation of ICM. The MMO was then further integrated into an official government institution, known as the Xiamen Oceans and Fisheries Bureau. This reconstruction of the governing body on the coasts strengthened the relationship, cooperation, and idea-exchange among related agencies for environmental protection as well as marine resources management. It is believed that implementing ICM within the framework of the local government was the most direct and effective.

### 3.2.2 Marine Function Zoning

Coastal problems are often deeply rooted in the conflicting interests and uses of the coastal zone. A marine functional zoning scheme is undeniably a critical component of the ICM, providing a scientific and institutional basis for the prioritization and coordination of multiple coastal zone uses, while supporting the management system for ocean zones and land areas of Xiamen. After identifying the dominant functions of the coastal segment, the best-suited and limited functions of four marine zones in Xiamen were clearly defined with stakeholder consultation conducted throughout the zoning process. Twenty-three agencies



were asked to apply the scheme to their respective sectoral programmes in an administrative order (Xue et al., 2004, b).

For instance, the Western Sea has been long used for its traditional fishing and aquaculture practices. Gulangyu Island, a prominent tourism attraction, is also located within this area, while its nearby ground has been classified as a natural habitat reserve for the endangered Chinese white dolphins and egrets. Owing to these multiple uses of the Western sea, conflicting interests arose among its various users. According to the Xiamen zoning scheme, shipping and seaport development was determined as the primary function in the Western Sea, whereas tourism and natural reserve was designated as secondary functions. Fishery and aquaculture activities were prohibited here and would be relocated to other areas. Settlements through compensation and a three-year phase-out period were granted for the aquaculture fishermen who were employed for other occupations. For the past three years, a change of activities in the West Sea area occurred with the removal of aquaculture rafts and fish cages. The zoning scheme not only made the previously blocked navigation channels become more accessible, but also enabled the environmental management project of Xiamen's coast to achieve considerable results.

### 3.2.3 ICM Policy Advisory Structure of Xiamen

As part of the Xiamen ICM integration, local regulations were further enacted with regards to resource management, environmental protection and transportation management. In addition to the regulations of national marine and environmental management, Xiamen Municipality has developed a set of appropriate measures for ICM resource uses and environmental protection, namely "*Regulation for Environmental Protection of Sea Area*", "*Regulation for the Use of Sea Area*," as well as "*Management Rules for Nature Reserves*" (Xue et al.,

2004 b). In order to strengthen integrated law enforcement, a special force was formed to bring together the harbour, fishery, environment and water police into an integrated law enforcement group. A number of coastal zone conflicts were able to be resolved successfully by the group. In particular, problems were solved in dealing with conflicts between aquaculture and transportation users, including (1) illegal fish farms in areas designated for harbour development and (2) unregulated eel fry gatherings in the navigational channels (Xue et al., 2004 b). Nowadays, the navigation channel in Xiamen harbour is open twenty-four hours daily with a guaranteed standard of maritime safety.

As mentioned earlier, the Xiamen Marine Experts Group, comprising marine scientists, legal experts and economists, was established in 1996 by the Municipal Government as a strategic means to integrate science into environment policy-making and management. The MEG provided essential socioeconomic, scientific and technical advice to policy-makers with the best available information to minimize the costs and maximize the benefits associated with a proposed coastal development project. More or less, it served as the mediator to further enhance institutional collaboration. In recent years, the Municipal Government has also increased its funding to the local scientists for research projects related to environment and resource management as well as the application of ICM.

#### 3.2.4 Participatory Approach in Xiamen ICM

Participation is often cited as the key to ICM success. The Municipal Government has kept citizens informed of its activities through public awareness events and community gatherings to address the needs of the communities. Efforts were made to take into account the key concerns of the public, including the damage and management of the beaches, illegal occupation of the beaches and blockage of the navigation channel. A number of workshops

and conferences on marine and coastal management were organized with the wide attendance of the public from all walks of life. Interest in the environmental protection of Xiamen has been greatly improved through raising environmental awareness among the general public, research and educational communities, and students and government officials. Offices within the Xiamen Municipality were set up to collect feedback on coastal concerns, and people were encouraged to freely express their views to the Government. Furthermore, scientists of the MEG have often played the role of presenting public opinion and interest through their direct communication with the Government.

In addition, the CIDA-funded Community-Based Conservation Management (CBCM) programme (1998-2003) in Xiamen led by Saint Mary's University, also made immense contributions to the enhancement of public awareness of marine environmental issues and public involvement in ICM activities (Xue et al., 2004 b). The conservation activities of CBCM Xiamen project greatly encouraged the involvement of a variety of community groups, including university students, youth and women. The project has enhanced the teaching capacity and applied research skills of the local training institutions. Also, with a focus on integrating the local secondary and post-secondary schools into environmental education plans, students' public awareness on environmental conservation were promoted through their community service activities on the coastal beaches.

### **3.3 Changes As a Result of ICM**

After a decade of ICM efforts, the realization of ICM for coastal sustainable development and management in Xiamen has caught many by surprise, including the local population. The coasts of Xiamen have written a new record in the ICM chapter by witnessing the improved environmental quality and resolved conflicts among stakeholders,

while continuing its enjoyment over the rapidly booming economy as the SEZ. It is all thanks to the great efforts made in achieving ICM through integration, participation and ecosystem-based development approaches with a mindset of local characteristic-oriented systems. In the following discussion, coastal environmental changes which occurred in Xiamen will be presented, with indicators from local examples of environment improvement and habitat protection.

### 3.3.1 Improvement of Water Quality

For many islanders of Xiamen, Yuandang, which naturally served as the harbour of Xiamen prior to the 1970s, has always been an integral part of their daily lives. With the construction of a causeway to connect the north and south of the island, the mouth of Xiamen Island was thus closed, forcing Yuandang Harbour to become a dead-water lagoon. The water quality of the Yuandang Lagoon deteriorated seriously during the period from 1980s to early 1990s as a result of its decreased water exchange capacity with the outer waters. Moreover, a large number of untreated sewage was also discharged into the lagoon. Initiated in 1991, the integrated treatment of Yuandang Lagoon was later incorporated as part of ICM. After the treatment project, the water quality of Yuandang Lagoon improved significantly. Water of the lagoon can now be exchanged with outer waters, making Yuandang Lagoon alive again. Today, the new look of Yuandang Lagoon has become a popular recreational water garden, whereas the area surrounding Yuandang Lagoon has also become the core of Xiamen's financial, cultural and administrative exercises.

Despite the rapid economic growth in Xiamen, deteriorating coastal water quality has shown signs of arrest. The sea area of Xiamen is divided into Western Sea, Southern West Sea, Eastern Sea, Tong'an Bay and Jiulongjiang River Estuary. Studies have found that with

the implementation of ICM, the water quality has been kept in good condition for most of the sea areas (Xue et al., 2004 a), except Western Sea and Jiulongjiang River Estuary, where water quality was heavily affected by land-based pollutants and the nutrients flowing from Jiulongjiang River.

As far as Xiamen's urban sewage treatment is concerned, five sewage plants were set up in compliance with the implementation of ICM. As a requirement, most of the urban sewage was treated before it was discharged into the sea. The growing population and economy in Xiamen has also led to a dramatic increase in urban sewage discharge, impacting on rapid deterioration of seawater quality. However, what is different now is the increased discharge of treated urban sewage. It is evident in the control of urban sewage discharge, the contributions to the improvement of sea water quality, and maintenance of relatively good standards.

### 3.3.2 Habitat Protection and Restoration

Rarely did the industrial development in Xiamen undermine the openings of more green recreational spaces for the public. In fact, the ICM approach heard what the local residents want to improve their quality of life. The number of public gardens and parks increased from 20 in 1993 to 36 in 2001, whereas the area of garden expanded from 168 ha in 1993 to 451.4 ha in 2001 (Xue et al., 2004 b). Through ICM planning of land uses, extensive public green land areas were deliberately saved to provide leisure and recreational places for the local community as well as the tourists, including public green land around Bailuzhou, Round Island Coastal Road, Conference and Exhibition Center and the Airport. As a coastal region, the sand beach areas of Xiamen are considered a valuable tourism resource. Keeping the sand beaches in mind for recreational uses throughout the ICM implementation, the

number of sand beaches rose from 4 to 14 between 1991 and 2001 (Xue at al., 2004 b). The integrated treatment of the East coast of Xiamen also preserved approximately a 20-km long sand beach for the public.

Xiamen is rich in biodiversity and enjoys several types of marine ecosystems, including the inner bay, estuary and coastal wetlands. Since 1994, while protecting the existing endangered mangrove forests, around 14 hectares of the mangrove have been planted to restore the original ecosystem (Xue at al., 2004). Xiamen Island is also home to many national endangered species, namely lancelet, egrets and Chinese white dolphins. The implementation of ICM in Xiamen focused on the protection of marine habitats and endangered species with the creation of nature reserves for these precious creatures. Although the designated Natural Reserve Zone for egrets was surrounded by the coastal urban area, more than 10 species of egret, with a quantity of exceeding 20,000, and the Chinese white dolphin were well protected.

The picturesque island of Gulangyu is off the main island of Xiamen, where tourism is the pillar industry. In order to fully employ its eco-tourism potentials, the district government adopted the ISO 14001 certification procedure and applied for certification. By January 2001, the district government was certified ISO 14001 compliant as the first tourist site with the local government in China to receive such an international distinction (Xue at al., 2004).

### **3.4 ICM Training Programme**

In view of forming international cooperative mechanisms to mitigate the transboundary coastal and marine challenges, the International Training Centre for Coastal Sustainable Development (ITC-CSD) in Xiamen strives to share its ICM experience as well as other

coastal sustainable development practices and strategies with other neighbouring partner nations of the PEMSEA through its comprehensive ICM training sessions.

### 3.4.1 Training Activities

In general, each training session is made up of two components, including lectures and field visits. The course activities may vary based on a particular interest of the participants and is subject to resource personnel availability. In 2004, four ICM training sessions were organized by the Centre in Xiamen, China.

Table 3.1: ICM Training Sessions in Xiamen

No.	Date	Training Session	Target Participants
1	June 24-29, 2004	National ICM Training	Domestic Participants
2	July 20-24, 2004	PEMSEA ICM Study Tour	International Participants
3	September 21-24, 2004	Xiamen ICM Training	On-site Trainers
4	November 22-December 10, 2004	PEMSEA ICM Study Tour	International Participants

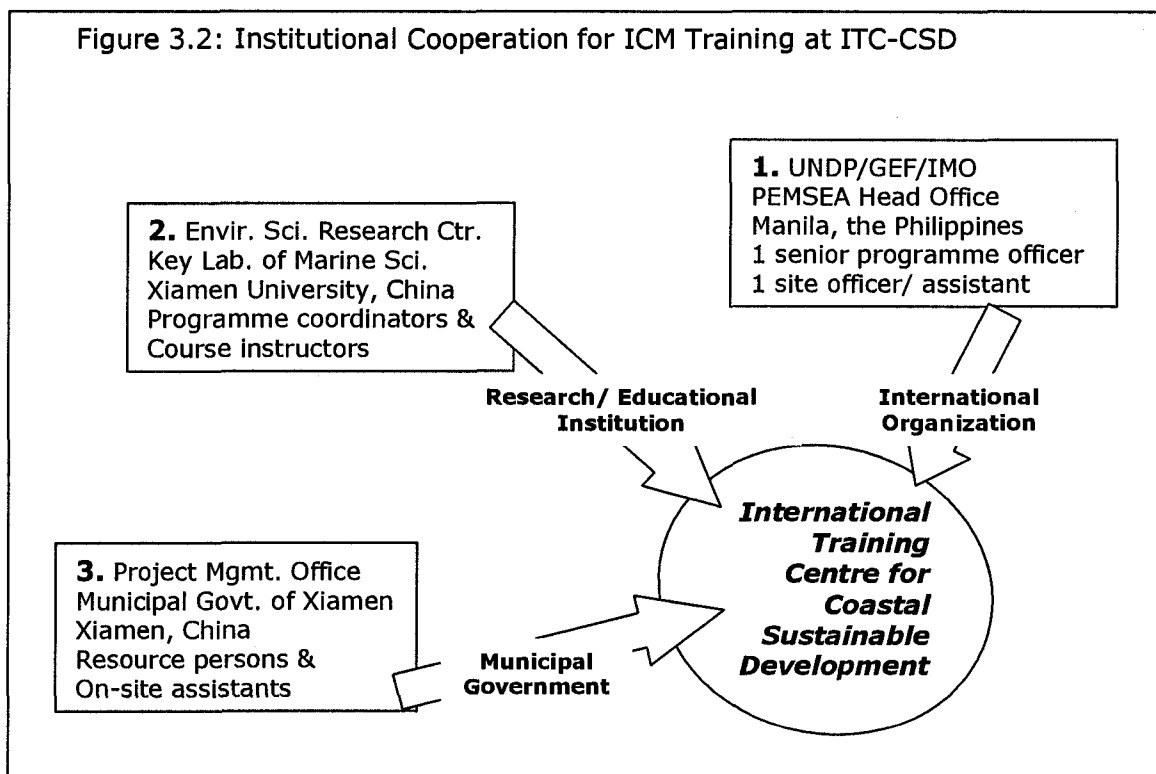
Source: Author's synthesis of information learned from personal involvement in the ICM training programme. (2004).

### 3.4.2 Project Objectives

The Centre aims to provide local government administrators, ICM trainers and practitioners an opportunity to witness environmental improvements and socio-economic benefits from the implementation of integrated coastal management in Xiamen, while learning lessons that can be applied in their respective sites. In addition, one training session is organized for on-site trainers to review and update curriculum materials and improve their teaching methodology and facilitating techniques.

### 3.4.3 Resource Persons

Each PEMSEA ICM Study Tour was accompanied by one senior programme officer and one site officer from the PEMSEA head office in Manila, the Philippines. In addition, course instructors and programme coordinators of the Centre were drawn from the State Key Laboratory for Marine Environmental Science as well as the Department of Environmental Science and Engineering at Xiamen University. In collaboration with the Xiamen Project Management Office, additional resource persons were provided by the host city—Municipal Government of Xiamen—to coordinate any necessary logistical arrangements for a site visit. The Centre has established a successful trilateral model of institutional cooperation to carry out the ICM trainings (see Figure 3.2 below).



Source: Author's synthesis of information learned from personal involvement in the ICM training programme. (2004).



An interpreter was provided by the Centre for translating the briefings when they were given in Mandarin Chinese. The list of ICM study tour organizers/ resource persons are provided in Annex 1.

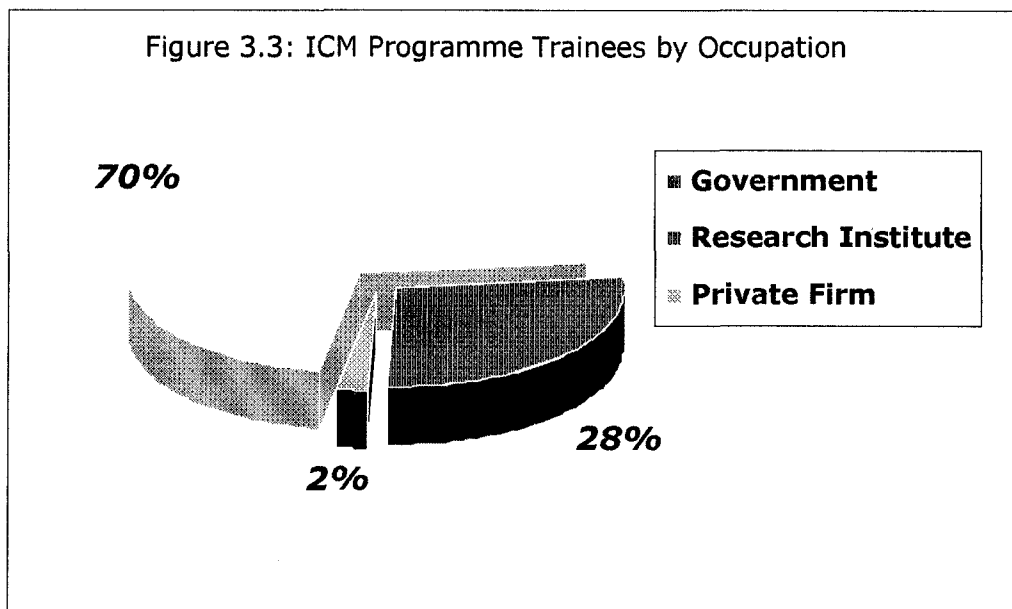
#### 3.4.4 Target Population

The Centre held its first national ICM training for thirteen domestic participants in late June, 2004. In collaboration with the State Oceanic Administration of China, marine management officials involved in the newly launched “Bohai Sea Environmental Protection and Management Project” in northern China participated in this training session.

Forty-seven participants in total coming from PEMSEA participating countries joined the 2004 ICM study tours. Participants included mayors and government officials from Sihanoukville ICM Project in Cambodia and Chonburi ICM Project in Thailand, trainers from the National ICM Training Centre in Democratic People’s Republic of Korea, and researchers from Korea Maritime Institute of the Republic of Korea. In addition to those Asia-Pacific member states, participants from the Middle East and East Africa took part in the second ICM study tour in December, 2004. After experiencing and learning from the PEMSEA/ Xiamen integrated coastal management success, countries surrounding the Red Sea region, including Sudan, Djibouti, Jordan, Yemen and Saudi Arabia were expecting to organize a similar organization of it own, making collective efforts to protect the Red Sea coastal environment.

Despite the fact that care was taken by the Centre to consider gender equality for both women and men’s participation in receiving the training programme, female and male participants accounted for 19% and 81% respectively. More men than women were enrolled in the ICM training programme offered at the Centre. This was mainly due to the condition

that the target participant was at a managerial level or above, including policy makers, government administrators and resource managers. In the case of Southeast Asia, Middle East and East Africa, males tend to dominate these managerial positions. The following Figure 3.3 illustrates occupational composition of the ICM trainees. The list of PEMSEA ICM study tour participants are provided in Annex 2.



Source: Author's synthesis of information learned from personal involvement in the ICM training programme. (2004)

#### 3.4.5 Study Tour Programme

The Study Tour program was finalized by PEMSEA, ITC-CSD and the Xiamen Project Management Office, building on the experience and lessons from previous ICM study tours. The program focused on highlighting the achievements of Xiamen through briefings and site

visits. During the site visits, the following course materials were provided to the trainees for their reference:

1. *"A Decade's Experience of ICM Implementation in Xiamen, China: A Path to Sustainable Development"*
2. *"How Scientific and Technical support has Contributed to the Achievement of ICM Program in Xiamen"*
3. *"Introduction to Xiamen Yundang Lake Integrated Treatment Project"*
4. *"Implementation of ISO 14001 Standards in Gulangyu District"*
5. *"Construction of Round-Island Road and the Protection and Development of Sand Beach and Shoreline"*

#### 3.4.6 Evaluation of Training Programme

By the end of each ICM training session, all participants were required to present a debriefing and complete a course evaluation. Discussion questions were focused on the following three themes:

1. Key factors for the success of the Xiamen ICM programme,
2. Lessons learned from the Xiamen ICM experience, and
3. The application of these ICM lessons to each country's respective coastal area.

The questions were discussed during the de-briefing on the last day of the training study tour. Participants were grouped per country and were given sufficient time to discuss and summarize their responses. Each group assigned a presenter to share their discussion with the rest. Here is the summary of each country's response:

##### **(1) Kingdom of Cambodia**

##### **1. What are the key factors for the success of the Xiamen ICM Program?**

- Good cooperation among key agencies
- Support from Xiamen government scientific community
- Good practice for ICM
- Support from national government
- Law enforcement
- Sufficient budget
- Good policy for local people

2. What lessons have you learned from the Xiamen experience?

- A master plan which serves as a guide for developing and implementing programs
- Success of ICM program lies in financial sustainability, availability of human resources and law enforcement.

3. How can you apply these lessons to your coastal area?

- Enhance public awareness on ICM program at local and national level
- Increase cooperation among key agencies
- Ensure commitment of local authority to develop and implement ICM program
- Training on enforcement of existing laws and developing new laws on environmental protection
- Build capacity of human resources
- Work towards goals which will show stakeholders that ICM can bring socio-economic benefits to the them

## **(2) Democratic People's Republic of Korea (North Korea)**

1. What are the key factors for the success of the Xiamen ICM Program?

The public's will to transform their town into a beautiful and environmentally sound area

2. What lessons have you learned from the Xiamen experience?

The confidence of the people working in the waste water treatment facilities to build Xiamen as the most beautiful and the cleanest city in the world.

3. How can you apply these lessons to your coastal area?

Enhancing the role of the National ICM Training Centre in DPR of Korea

## **(3) Republic of Korea (South Korea)**

1. What are the key factors for the success of the Xiamen ICM Program?

The success lies in building long-term efforts. It does not lie in developing the ICM plan, but in actual implementation of the plan.

2. What lessons have you learned from the Xiamen experience?

It is very important to have a coordinating mechanism to integrate laws, organizations, and forge partnerships among government, scientists, public and other stakeholders

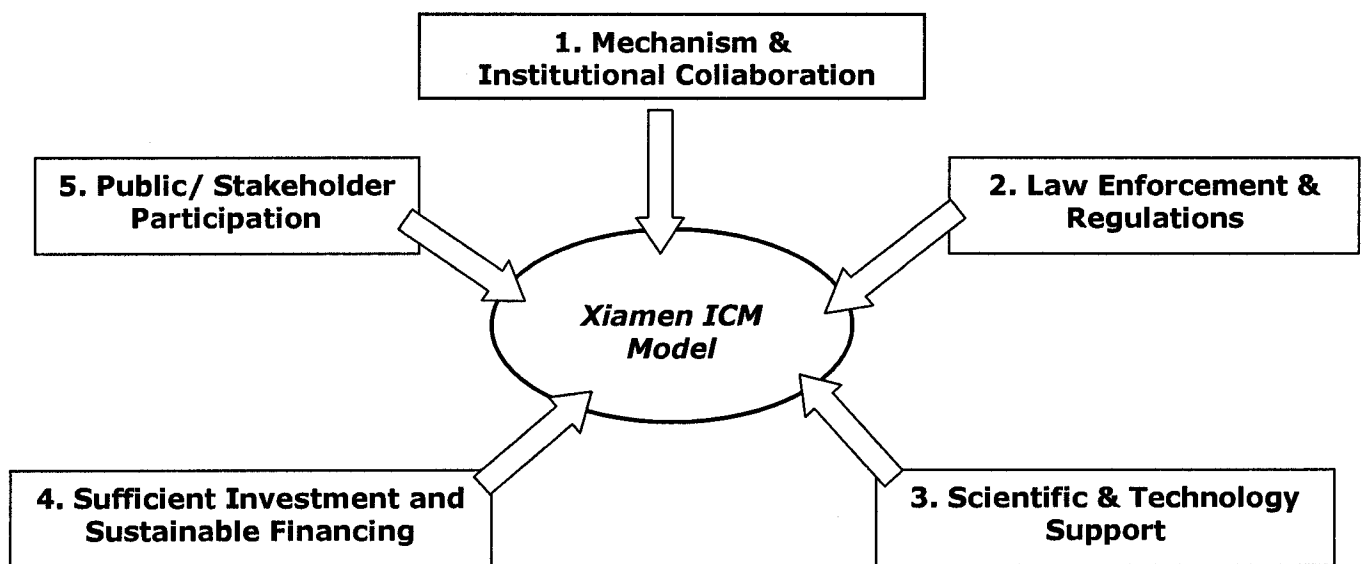
3. How can you apply these lessons to your coastal area?

We can apply coastal management with substantial tools, such as Geographic Information System and marine functional zoning scheme.

(4) Thailand

1. What are the key factors for the success of the Xiamen ICM Program?

Figure 3.4: Key Factors of ICM Success in Xiamen:



Source: Author's synthesis of information learned from personal involvement in the ICM training programme. (2004).

2. What lessons have you learned from the Xiamen experience?

- A good ICM program can bring benefits such as:
  - Social: better quality of life
  - Economic: rapid economic growth (increased GDP), industries flourished
  - Ecological: good environment, good water quality, increase in green areas
- Strong political will
- Good planning & management
- Good scientific support
- High public awareness

### 3. How can you apply these lessons to your coastal area?

- Site: Chonburi Province, eastern part of the Gulf of Thailand
- Shoreline: approximately 50 km and number of Municipalities: 5 sites
- Activities to be implemented under the ICM program:
  1. Zoning: using scientific and technological support
  2. Education: transfer to local people, public and private participation
  3. Convince the government to develop a national plan, provide financial support and develop laws for environmental protection
  4. Tourism Development: using scientific and technological support for Garden City and eco-tourism

To sum up, most of the participants attributed the success of the ICM program to the strong political will of the government in implementing the plans for improving their city. They also recognized the contribution of the other stakeholders, particularly the scientific community and the public, in making the ICM program successful. The lessons which they have learned are also related to the factors which contribute to the success of the program, such as having a good coordinating mechanism, financial sustainability, availability of human resources and law enforcement.

With regard to the application of these lessons to their respective coastal areas, the participants focused on specific activities that they are conducting in their own localities. It includes enhancement of public awareness and education through capacity building activities, and application of ICM in specific projects, such as coastal use zoning and tourism development. As suggested by the mayors, Chonburi Province of Thailand has started to look into the tourism development possibilities.

#### 3.4.7 Course Evaluation

To ensure effective delivery of the ICM training and improve future program output, participants were given a questionnaire to evaluate the quality of training courses. The course

evaluation questionnaire is composed of three sections, including: (a) course content, (b) training coordination and organization and (c) training facilities. Participant's responses and comments are summarized in the following. The course evaluation questionnaire is provided in Annex 3.

**A. In addition to the ICM course modules, other relevant topics to be included in the future training are:**

- Actual demonstration of the Sea Areas uses in Xiamen
- Rehabilitation of the ecological system and estimation of environmental capacity
- Experience and approaches for the management of Xiamen Sea Areas
- International ICM experience is expected to be introduced for references
- Discussions held should be based on the existing issues relevant to the Bohai Sea Area as well as other ongoing projects initiated by SOA.

**B. List lessons learned from Xiamen ICM training and that will be of the most value to my project site:**

- The coordination capacity is very significant for the success of ICM
- Community participation is a very important factor in the process of ICM, but its importance is often neglected.
- Application of advanced technology and scientific concepts would offer great support for the effective ICM program
- Scientific and technologic support for ICM (eg. Strategic Environmental Impact Assessment, Functional Zonation of Sea Area, etc ) to assist decision-making
- Development strategies, experiences, achievements and approaches of ICM
- Sustainable Financial Mechanism and Environmental Investment
- The application of integrated information management system, geographic information system in ICM and integrated environmental impact assessment
- Resources valuation and natural resources damages appraisal
- The concepts, approaches and implementation of integrated law enforcement
- The magnitude of ICM success heavily depends on the government's will, experts' scientific support and public participation, etc.
- Coordination of all government units to prevent the overlapping of management and to increase the efficiency.

**C. Considering the training aids, areas for improvement are:**

- Store all the training materials in a disk for long-term reservation
- More introductions about scientific research planning are expected.
- More case study materials abroad including some videos and photos are expected
- More sufficient reference materials

**D. Field visits are useful, because:**

- It increases the understanding and interest of theoretic knowledge
- It offered an opportunity for participants to witness what Xiamen has achieved and benefited from the ICM Programme.
- The field study to ICM demonstration sites further illustrates to the participants that ICM is achievable and beneficial for the sustainable development of coastal zones.

**E. Comments or suggestions on the coordination of the ICM training course:**

- Good coordination, enough preparation and taken care of participants' inconvenience and complaints
- The sites for field visits are well represented for the Xiamen's ICM Programme.
- The staff members are quite devoted to their work, all activity arrangements.

**F. Considering course lectures, areas for improvement are:**

- All the lecturers are quite experienced in their respective areas and have gained related achievements. It is suggested to add more actual examples.
- Instead of briefly mentioning the basic knowledge, some courses need to be further developed with relevant case studies.
- Some PowerPoint lecture materials were displayed in small size and difficult to read.
- The relevance of the courses is high, offering many solutions for problems encountered in the actual management situation.
- Interdisciplinary knowledge was incorporated into the courses, which would offer a lot of guidance for actual work. Advanced technology was also introduced.
- Most of the courses are based on the actual implementation of ICM Programme. It is much easier to be understood by the participants.
- It is suggested to make the lectures to be understood more easily.
- The courses are suggested to pay more attention to the local situation of the places where the training participants are from.

**3.4.8 Program Results and Conclusion**

Overall, the study objectives of providing local leaders, ICM trainers and practitioners an opportunity to witness environmental improvements and socio-economic benefits from the implementation of ICM in Xiamen were fully achieved. The program contributed to ICM training participants' cross-cultural know-how and, in particular, to management strategies through the implementation of ICM in their respective coastal sites. Forty-seven



international and thirteen domestic ICM training participants benefited from increased international exposure and mutual value through their involvement and efforts in the management of trans-boundary environmental issues at both national and local levels on a long term and self-reliant basis. The sustainability of the result is inherent in the ICM implementation process in member countries of PEMSEA. As seen in the establishment of a new ICM training centre in Kim Il Sung University, North Korea (DPRK); new coastal development of Chonburi Province located in the eastern Gulf of Thailand; and even the organization of a similar international cooperative institution in the Red Sea region for countries of the Middle East and Africa; participants from the government, research institutions and private sectors who have benefited from training have adopted new integrated coastal management strategies and sustainable development knowledge in their countries and regions. It is expected that the linkages of coastal cities and sharing of experiences will lead to ongoing research and development of coastal management strategies.

The participants' comments during the debriefing also pointed to the fact that they were able to learn from the Xiamen experience, and learn lessons that can be applied in their respective sites. Comments and suggestions from the participants are highlighted in the following:

- Senior government officials from related higher-level units are suggested to offer some of the lectures on the following subjects, such as the ICM Implementation in China, plans in next phase and planning in the future.
- If this type of training session could be arranged in other sites outside Xiamen, it can further promote the involvement of more coastal managers and scientific experts, while helping to obtain better results.
- Considering the background of the participants (mostly involved with administration and management but less technical experience), more courses related to the management practices should be included in the training.

- The selection of training materials should be more related to the background of participants. Coastal managers are mainly concerned about the achievements of science and technology instead of the research process.
- Xiamen ICM experience is suggested to be made into a multimedia version, making its success better known both domestically and internationally.
- The materials of Xiamen ICM Implementation are also suggested to be compiled and given to the participants and the training materials are suggested to be printed in double pages in the future to save paper and reduce other costs.
- The participants prefer to be informed of the training content before their arrival in Xiamen for the training so that they can collect information on the sea uses and ocean environments of their respective areas. Relevant information can be exchanged with each other and participants can seek guidance from lecturers during the training process.

In summary, the main consideration for improvement is the briefings given during the site visits. The local organizers should ensure that the briefings are comprehensive and well-prepared, and representatives who give the presentations are knowledgeable on the subject matter. Handouts and course materials should be translated into English and compiled prior to each site visit. The Centre may include these handouts in the study tour kit for the participants. As such, it will be more efficient if the Centre will be responsible for preparing the study tour kits in succeeding study tours. Related to this, some information in the existing study tour kit needs to be updated. The Centre and the Xiamen Project Management Office could give their input based on the reports and articles that they have recently prepared on the project.

On the logistics side, it is not advisable to hold the Study Tour in summer, as the high temperature made it very inconvenient for the participants to move around. Moreover, there was a government regulation to reduce electric power consumption, thus, the planned visit to the Music Fountain was cancelled. On the way to the airport, participants passed by the whole length of the coastal road. Local people could be seen enjoying the beach or relaxing in the bayside parks. It is recommended that this scenic route can be included in succeeding Study Tours.

## **Section Four— A Focus on Two Key Themes of ICM:**

### **Integration and Participation**

As discussed earlier, integration and participation are key to sound coastal management. The following section will focus on these two ICM critical elements by looking at the institutional arrangement as well as the community based conservation management in Xiamen, China.

#### **4.1 Institutional Arrangement and Application of ICM**

Integrated Coastal Management (ICM) is a feasible approach to address coastal issues, including resource use conflicts, ecological environment and management issues. The institutional arrangement is a precondition for the fulfillment of management functions. Therefore, a scientific institutional arrangement must be established as soon as possible for more effective implementation of ICM. In this section, theories on ICM institutional arrangement are analyzed first. In addition, characteristics and lessons learned domestically and internationally from the ICM institutional arrangement are summarized. Finally, based on the issues encountered in the first Xiamen ICM implementation as well as the major existing problems faced in Xiamen's coast, a new ICM institutional arrangement for Xiamen is proposed.

##### Introduction

Integrated coastal management (ICM) is a continuous process by which decisions are made within a suitable coastal management system. It aims to minimize the conflicts and harmful effects of activities on social, cultural and environmental resources through interdisciplinary and multi-sectoral approaches to the problem definition and solutions. Also, a great challenge of ICM is to maintain harmony among

institutions with respect to their coastal and ocean management actions, while maintaining consistency with the agreed ICM objectives. This tends to be very difficult as most government institutions are guided by different mandates, laws and agendas. Formation of a new agency with powers that override the authority of the existing agencies will encounter tough resistance. Therefore, most states will incorporate the ICM programme into the existing governmental structure. The design of an effective institutional arrangement for ICM is an important and challenging component to achieving full integration, which is critical to implementing ICM.

#### Models of ICM Institutional Arrangement

Generally, there are two dimensions to the ICM institutional arrangements: one 'vertical' and the other 'horizontal.' The 'vertical' institutional arrangement for ICM addresses the organization among levels of government, while the "horizontal" institutional arrangement addresses the organization among agencies within the same government. The challenge of coastal management is how to deal with horizontal issues rather than vertical issues. Thus, while some ICM programs may operate without a vertical dimension, every ICM program would have a horizontal dimension (Guo, 2001), which will be the focus of this section. International experience suggests that there are a number of institutional options to facilitate the process of moving towards more integrated approaches to coastal management (Sorensen and McCreary, 1990; EC, 1999). Three main models of horizontal institutional arrangements for ICM have been identified in the ICM literature (Sorensen & McCreary, 1990 and Cicin-Sain & Knecht, 1998): (1) to create an interagency as the ICM coordination committee; (2) to expand an existing agency to include the functions of ICM and (3) to establish a newly independent agency for ICM. The following section will provide a further discussion on the above models.

### Create an Interagency as the ICM Coordinating Committee

This model aims to establish a formal, interagency coordinating committee, which is regarded as the most common institutional arrangement selected for ICM promotion and implementation. It should also be noted that approximately 55% of national-level coordinating bodies for ICM are interagency bodies (Cicin-Sain and Knecht, 1998). The members of this kind of coordinating committee are usually the high-level government officials of different agencies in charge of coastal management related responsibilities.

Interagency bodies are very flexible and do not need to make a great adjustment within the agencies concerned. Sectoral agencies generally feel secure with respect to their status and authority when participating in such bodies. Nonetheless, the interagency coordinating committee model also encompasses several major disadvantages. To begin with, most ICM interagency bodies are consultative only and lack regulatory powers (Berkley, 1984). Second, many interagency bodies are not as powerful or influential as the well-established sectoral agencies, and lack adequate authority to resolve interagency conflicts. Third, the coordinating committee's effectiveness is dependent on the quality of their group leadership and the goodwill and enthusiasm of the agencies represented. Agency representatives may attend the meetings not so much for the management or conservation of coastal areas and resources, but to protect their own agency's powers and prerogatives instead. Fourth, high level interagency bodies tend to meet very rarely. Many of them are short-lived.

In practice, such a mechanism is often used for communication and study with respect to ICM. Coastal nations that have adopted this kind of model include, for example, Australia, Brazil, France and the Philippines. In general, such interagency bodies in planning and implementing ICM have not been

promoted widely.

#### Designate an Existing Agency to Implement ICM

Traditionally, many sectoral authorities have jurisdiction over coastal areas in a coastal management approach, but none of them has primary responsibility for the coastal areas and resources as a whole (Knecht, 1994). This model is often regarded as the “within-the-system” approach. Here the prevailing legal, institutional and policy structure for managing the coast remains, but the duties of an existing agency are further expanded and enhanced to lead and implement ICM. It is noted that the leading agency should be able to coordinate with other coastal management related agencies. If this cannot be done, the effectiveness of ICM will likely be weakened. However, being at the same level for this leading agency and other government agencies, how the leading agency fulfills its coordinating responsibility would be the key for this model to achieve the success of ICM.

#### Establish a Newly Independent Agency for ICM

This model requires a concerted effort to centralize the authority in a newly-formed leading agency with the primary responsibility of implementing ICM management tasks. For a full-scale comprehensive ICM program, it may be desirable to create a new agency provided it will have the enough government support, power, and resources necessary to perform its functions (Clark, 1996). Typically, this new agency, which enjoys a great advantage over many interagency bodies, is given comprehensive planning and regulatory powers over most coastal activities with a principle function to coordinate other planning and regulatory agencies. Implementing ICM under this model seems to take the highest effort and have the most beneficial effect on coastal management.

However, adopting this model will definitely cause great disruption of current institutional

alignments. Compared with the other two models, it sounds more desirable, yet is much harder and is not widely applied. From these experiences, it appears that an organization or “unit” specifically dedicated to ICM is instrumental in coordinating development and implementing policies. Human and financial resources can focus on specific coastal issues in a comprehensive, systematic and coordinated fashion, while providing as long-term commitment and continued support to ICM (Meltzer, 1998). It should be noted that these three types of institutional arrangement can exist simultaneously. For instance, an interagency coordinating committee is often developed to provide a much more coordinated effort.

### Proposal of ICM Implementation in Xiamen

#### Review of ICM Institutional Arrangement

Xiamen is a coastal city with beautiful scenery located in the southeast of China. The sea embraces a rich resource base for Xiamen’s economy to sustain, develop and boom. The Xiamen Municipality has set up the integrated coastal management system of “*legislation base, centralized coordination, scientific support and integrated enforcement*” through the efforts of integrated management of the coastal areas in the past years (author’s emphasis).

By late 1995, the Marine Management Coordinating Group and its office were set up with the Executive Vice-chairman of Xiamen Municipality as the chairperson. The institutional arrangement for integrated coastal management is illustrated in Figure 4.1. In September 2002, during the reform of Xiamen Municipal Government Agencies, the original Marine Management Office and the Fishery Bureau were united into a new government agency, becoming the Oceans and Fishery Bureau of Xiamen, the functional sector in charge of marine and fishery affairs for Xiamen city. Its primary

function is to integrate the administrative functions of the former Marine Management Office and Fishery Bureau in Xiamen Municipality. In addition, its function has been extended to include planning, protecting, exploiting and utilizing of coastal resources that endowed by-laws and regulations on marine and fishery management.

#### Identification of the Existing Problems

Although great accomplishments have been achieved during the first implementation of ICM in Xiamen, inadequacies still exist in its developing stage. The major problems are outlined as follows:

First, there are unclear jurisdictions over coastal management, such as overlapping in investigations, monitoring, surveillance and scientific research of marine environments, which leads to the unnecessary loss of human, material and financial resources. Second, administration arrangements are unreasonable. Due to the traditional management arrangements, the land-source pollutants are controlled by the environmental protection agency, and the marine governing agency is responsible for the major marine management issues. The severe dividing of land and sea management consequently results in the aggravation of land-source pollutions on the coastal waters, for the marine governing agency has no jurisdiction on coastal land.

Third, the office of the steering group for ICM in Xiamen Municipality used to be under the charge of the government office, which altered the traditional management approach and to some extent reduced the resource use conflicts and some negative impacts on coastal environment. However, in 2002 the uniting of the original Marine Management Office and Fishery Bureau into “Xiamen Oceans and Fisheries Bureau” made the status of the office to some extent fall to a secondary position in the agency’s hierarchy, further limiting the ability of the office toward integration and coordination.



### Proposals on Establishment of ICM Institutional Arrangement

To achieve real success toward implementing ICM in Xiamen, particular emphasis should be put on the establishment of ICM institutional arrangements in Xiamen, which mainly includes arrangements

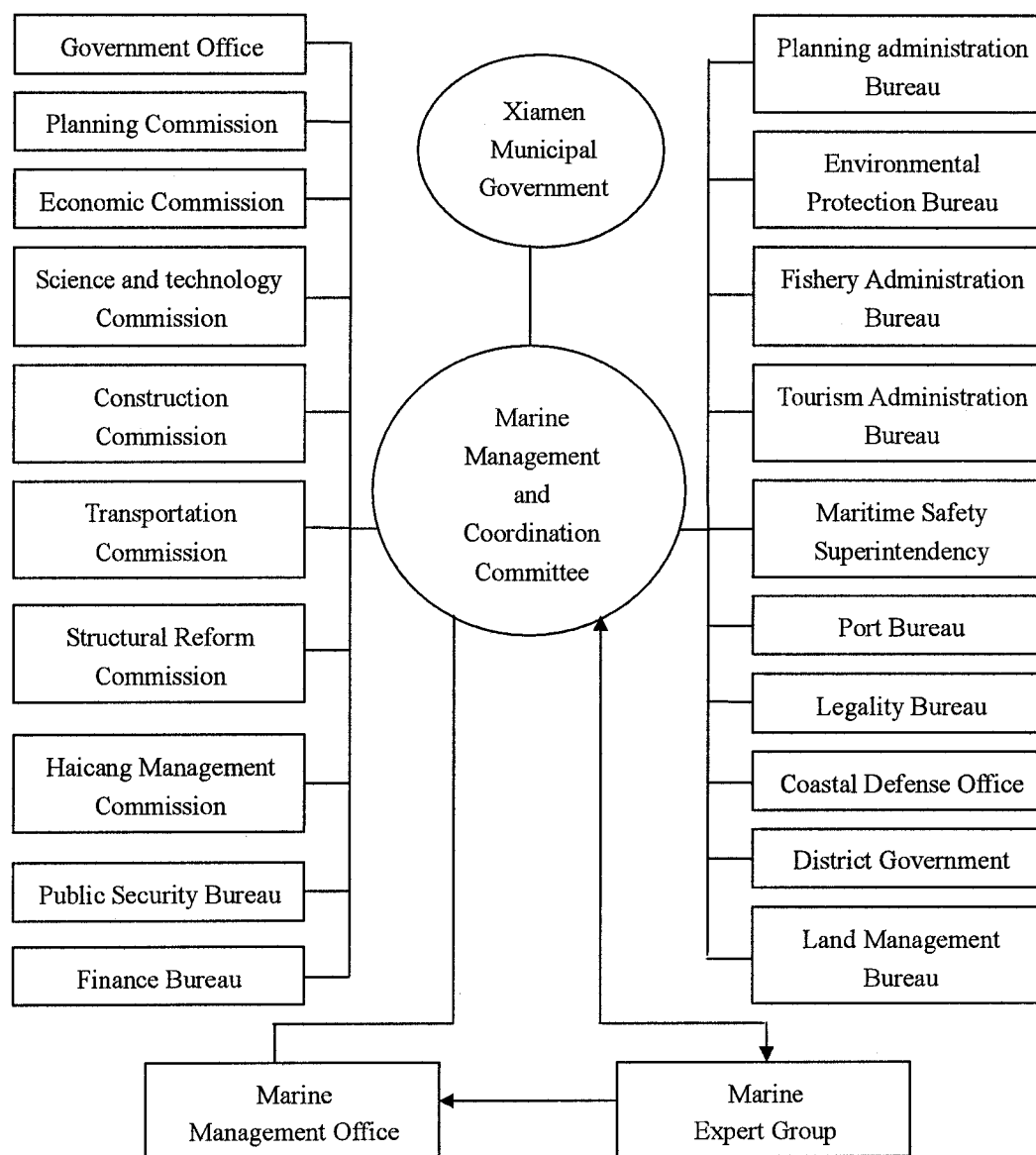


Figure.4.1. Institutional arrangement for integrated coastal management in Xiamen

Source: adapted from Xue, X., Hong, H., & Charles, A. T. (2004, a). "Cumulative environmental impacts and integrated coastal management: the case of Xiamen, China." in *Journal of Environmental Management*. 71: 271-283.

of jurisdiction and personnel, and coordination mechanisms as well. The marine governing agency should be able to coordinate with other coastal management related agencies. However, it is impossible for Xiamen Municipality to make this agency become superior to others. Therefore, as learned from the international experience, this governing agency has to be expanded with the existing functions to include ICM as well as strengthening its capacity of coordination and integration.

#### Expand the Administration Function

The management range of the marine governing agency named “Xiamen Oceans and Fishery Bureau” covers the sea areas below the high-tide mark and has no authority on land activities that may have influences on the marine environment. Some of the coastal related management functions should be stressed and also expanded to achieve coastal sustainable development. These are mainly demonstrated as the following:

##### (1) Selection of sewage outfall to the sea

Prior to the granting of permission for a sewage outfall setting by the Environmental Protection Agency, comments and suggestions from the marine governing agency should be considered, with surveillance and administration authority on situations where sewage is discharged directly into the sea or where the discharge has a higher concentration than the permitted national standard. Therefore, the increasing land-based pollution on the marine environment can be prevented. This is also described in *“Marine Protection Law of People’s Republic of China.”*

##### (2) Investigation, monitoring, surveillance and scientific research of marine environment

Since none of the coastal management related agencies has primary responsibility for coastal areas and resources as a whole, there still exists the overlap of jurisdictions and functions as well as

fragmented and conflicting policies, such as the repetitious investigation, monitoring, surveillance and scientific research of marine environments. However, according to the national marine environmental protection law, these activities should be carried out by the marine governing agency, which also has the responsibility to perform regular evaluation of marine environmental quality, while informing the environmental protection agency of the necessary monitoring data needed for the national environmental quality gazette. By doing this, it will strengthen marine environmental management.

#### Strengthen Coordination and Integration Capacity

Recently, Xiamen Municipality has set up the Marine Coordinating and Steering Group with the Mayor of Xiamen Municipality as the chairperson, indicating that Xiamen Municipality has placed significant importance on marine development and management. To strengthen its current capacity to coordinate with other agencies, several key points need to be further considered:

(1) Guarantee validity and authority of the steering group through its legal base:

The validity and authority of the steering group should be legally identified in the coastal special law or the relevant laws, including its power, responsibility and the organization of staff members. The legal status of this group should not be transformed with the change of government leaders.

(2) Advance the level of the Marine Management Office:

The office is responsible for the routine activities of the steering group, mainly for fulfilling its decisions and mandates to achieve the overall goal of ICM. This office should be neutral; for instance, belonging to the governmental general office. With the extended authority of the steering group, it is more appropriate for the name of the office to be changed from “Marine Management Office” to

“Coastal Management Office,” since the coast is linked closely to the overall development of Xiamen.

Apart from expanding its function for marine management, it is suggested that in the long-term the marine governing agency should gradually abolish its aquatic production function while keeping its management function, in order to fully play its integrated management role. When conditions permit, the name of the marine governing agency should be changed from “Oceans and Fishery Bureau” to “Marine Management Bureau,” and then to “Coastal Management Bureau,” which will focus the management on the entire coast, rather than the seas. As a result, integration of management will make more sense and achieve more success.

### Conclusion

This section examines the international studies and research of three principal models of the ICM institutional arrangements with a presentation on the application of such experience in Xiamen. Creating an interagency coordinating committee under a leading agency in planning and implementing ICM is not encouraged, while expanding the duties of an existing agency will be supported by setting up an interagency coordinating committee for more coordinated efforts. Creating a newly independent agency seems to be the most difficult arrangement, but it would have the highest effectiveness in achieving the success of ICM. Through the analysis of ICM institutional arrangements, the establishment of a new ICM institutional arrangement in Xiamen was proposed by expanding the administration functions of the marine governing agency and strengthening its coordination and integration capacity to improve the effectiveness of the ICM implementation.

## **4.2 Community-Based Conservation Management Project**

Community involvement in decision making processes for resource use is crucial to the success of conservation management and protection of ecosystem health. This section studies the experience of institutional capacity building in environmental education and the achievement of the participatory approach in environmental management on Xiamen Island for the Canadian International Development Agency (CIDA) funded project of “Community-Based Conservation Management (CBCM): China and Vietnam.” The project has enhanced teaching capacity and applied research skills of the local training institutions with integrated social and physical science lessons in multiple levels of a post-secondary environmental education programme. With a focus on integrating the local secondary and post-secondary schools into environmental education plans, the approaches to promote public awareness on environmental conservation are also illustrated. The study highlights the conservation activities of CBCM Xiamen project in encouraging the involvement of a variety of community groups, including university students, youth and women. In addition, it explores the social responsibility of the faculty as an essential linkage between the public and decision-makers for effective public involvement in environmental management. This section argues that public environmental education is key to sound practices of conservation management, because a good public environmental education program relies on institutional capacity building, interdisciplinary studies and community participation.

### **Introduction**

Environmental management is generally considered to be a government responsibility. Nevertheless, the formulation and implementation of the concerned government policies

could be dysfunctional and inoperative, if lacking the interest and active participation of the community in environmental management. Community participation in environmental management can be defined as a constant and reciprocal process, consisting of the following course of actions and objectives: (1) to increase public awareness of the decision-making process and related authoritative investigation mechanisms in solving ecological problems, (2) to inform the public of the formulation of action plans and related environmental policies, implementation of environmental assessments as well as research progress, and (3) to collect information from local residents on their views and priorities on resource use, development alternatives and management strategies, as well as other information relevant to decision-making.

In China, the public is involved in environmental management through the approaches of direct inspection and supervision, public environmental inquiries, and public opinion as well as direct or indirect involvement in governmental organizations, non-governmental organizations, and environmental lawsuits (Luo, 2000). Community participation could not only strengthen the effectiveness of environmental management, but also motivate the public to take initiative in environmental conservation. While the achievements of community participation are promising, it is worthwhile noting the problems we are facing: (a) Legislation on community participation employs vague and broad content, whereas the level of public environmental awareness remains elementary. Owing to specific cultural practices, the public understanding of environmental management is limited and insufficient. This further affects both the public's initiative and willingness to participate. (b) Because of the additional time, energy and expense required for community participation, environmental managers may choose to overlook or simplify the community participation or pay only lip

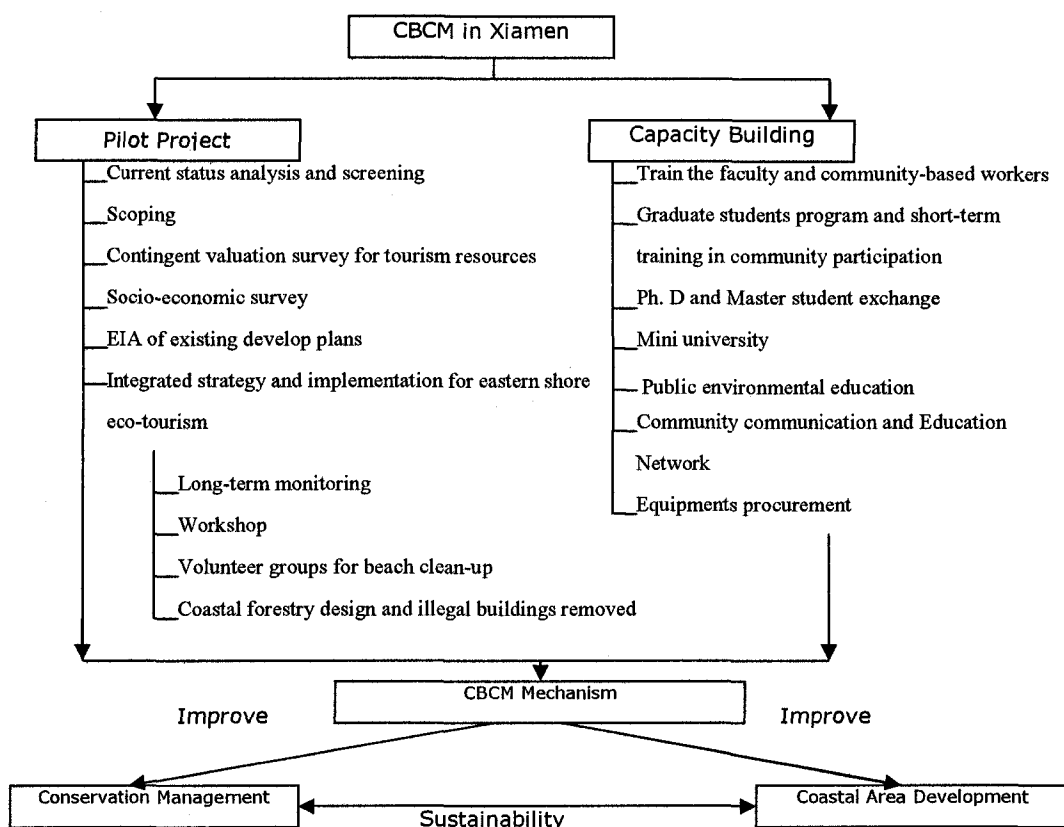
service instead. (c) The communication and exchange of thoughts in environmental management between the public and the government still need to be further promoted.

Development of public environmental awareness is the key to the success of community-based conservation management. In supporting this argument, this section explores the development of environmental education and the promotion of community-based conservation management in Xiamen for the Canadian International Development Agency (CIDA) funded project, "Community-Based Conservation Management (CBCM): China and Vietnam." This project operated from October 1998 until September 2003, involving seven participating post-secondary institutions from Canada, Vietnam and China. The project is intended to increase institutional capacity for training and applied research in ecosystem health and conservation management at three partner universities in China and Vietnam, while promoting the community-based initiatives and public understanding of sustainable consumption of natural resources. Framework of the CBCM Project is illustrated in Figure 4.2.

#### Multiple Levels of Environmental Education

Environmental conservation can never depend upon legislation alone. Only the people with environmental awareness would be concerned and act for the benefit of our environment (Xu, 1999). In view of this, great efforts should be made to strengthen environmental education in order to augment public environmental awareness and thus supplement the enforcement of the relevant laws. As one of the main objectives of the project, the CBCM project emphasizes public education and the development of environmental education on multiple levels through the following practices:

Figure 4.2: CBCM Project Structure in Xiamen



Source: Adapted from Xue, X., Xu X. & Shen, S. (2004). "Developing Public Environmental Education: Improving Community-based Environmental Management," in *Conference Proceedings of the UNEP International Conference on Environmental Concerns: Innovation Technology and Management Options*. October, 13-15, 2004.

### Capacity Building

From 1999 to 2003, thirteen Xiamen University faculty members were sent to Canada for advanced studies, including Environmental Sociology, Integrated Coastal Management and Sustainable Development. The in-Canada training greatly enhanced communication with partner institutions and improved knowledge and skills in research and teaching. New courses were developed (as illustrated in Table 4.1) and are now being offered to the university students. New environmental concepts were introduced and incorporated into the curriculum. In addition, thirty-one workshops were delivered by Canadian facilitators from participating universities on environmental management and project management. The



Project Team as well as other community members advanced their understanding on both CBCM concepts and interdisciplinary approaches to local conservation management.

#### Renovation for Course Design and Upgrading of Teaching Equipments

The application of state-of-the-art technologies to promote environmental education was one of the key objectives of the CBCM Project. The project focused on the inputs to better finance the teaching facilities and equipment. Over one million (RMB) was spent to upgrade teaching equipment. At this time, Xiamen University has developed long-distance courses (Table 4.1) on environmental planning and management. These courses built up an effective network among the participating universities.

**Table 4.1: List of Curriculum Development in Xiamen University**

<b>Course Offered</b>	<b>Long-distance Education course</b>	<b>For Under-graduate</b>	<b>For Graduate</b>
Introduction to Sustainable Development	√	√	√
Environmental Impact Assessment Environmental Planning, Environmental Management	√		√
Environmental Economics Introduction of Environmental Economics	√	√	√
Integrated Coastal Management Coastal Sustainable Development	√	√	√
Biodiversity			√
Environmental Accounting/Auditing			√
Environmental Sociology			√
GIS Application in Environmental Management			√
Gender and Development		√	√

Source: Adapted from Xue, X., Xu X. & Shen, S. (2004). "Developing Public Environmental Education: Improving Community-based Environmental Management," in *Conference Proceedings of the UNEP International Conference on Environmental Concerns: Innovation Technology and Management Options*. October, 13-15, 2004.

Environmental science is still a relatively new academic subject in China. The misconception of environmental science often leads to an overemphasis on physical science.

As one of the key notions insisted upon throughout the CBCM Project, the integration of physical and social sciences is vital for sound environmental management. Several new courses which strengthened the integration of multiple subjects were developed and adopted.

#### Middle School Environmental Education

Education aims to be a human cultivation process for enhancing character and skills. Environmental education plays an important role in this process and the middle school level is a critical time for this type of education. The local middle school, Xiamen Science and Technology Middle School (XSTM), was selected as the base for initiating environmental education for middle school youth. The concepts of environmental protection and sustainable development were introduced to the students and spread to their families and to the public at large. Hence, public awareness of their involvement in city construction and environmental protection has been improved. Moreover, some of the project funding was provided to XSTM for related activities. As a result, a specific course titled “Education and Practices for Environmental Protection” was fully developed and is currently being taught.

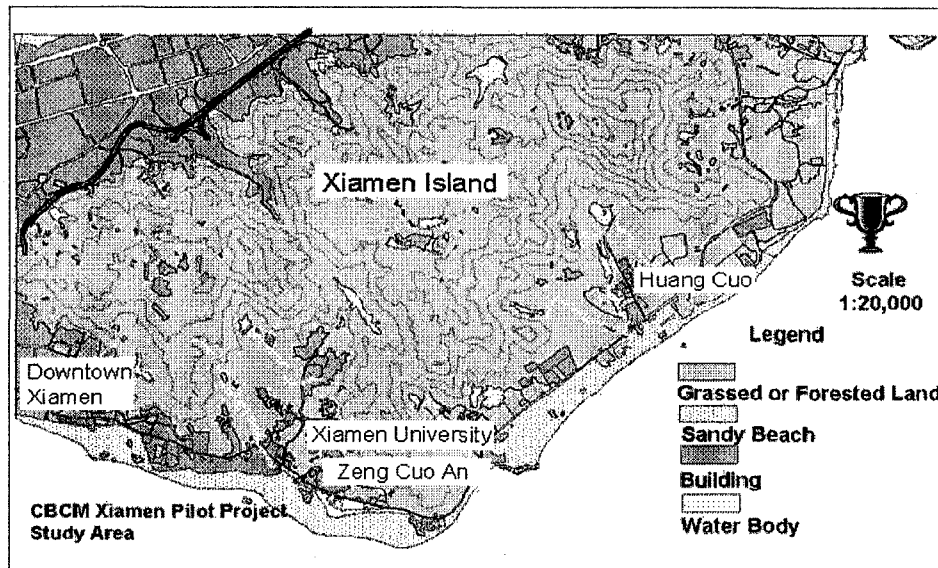
#### Integration of Environmental Education and Local Community Involvement

The eastern coastline of Xiamen Island as well as its adjacent land areas were selected as the study area of the pilot project (see Fig 4.3). As environmental education for the middle school youth was also incorporated into the pilot project, the CBCM Project has achieved many, even unexpected, positive outcomes.

Youth Education Initiative (YEI) activities included the establishment of a Student Environmental Protection Association at both Xiamen University and XSTM, the

incorporation of fieldwork and data collection in the school curriculum, and participation in three Mini-U summer camps in 2000, 2001 and 2002.

Figure 4.3: CBCM Project Area in Xiamen



Source: Adapted from Xue, X., Xu X. & Shen, S. (2004). "Developing Public Environmental Education: Improving Community-based Environmental Management," in *Conference Proceedings of the UNEP International Conference on Environmental Concerns: Innovation Technology and Management Options*. October, 13-15, 2004.

It was through a form of 'learning by doing' that the students took part in community environmental management. The Mini-U, with the length of one to two weeks, provided environmental and associated conservation training to middle school students. These students have voluntarily become promoters of environmental conservation. Linkages among universities and middle schools, universities and community, and students and community have been greatly enhanced.

#### Approaches and Methods for Community Involvement

Capacity building of communities in conservation management will greatly improve

public awareness of environmental protection and promote their involvement in conservation management. A series of activities were conducted in the study area of the pilot project.

#### I. University students' involvement in conservation management

As the large population size of China presents a challenge in environmental management, sound environmental education needs to be further developed in higher education. University students are expected to play a key role in the development of environmental conservation. In view of this, the Project Team has conducted various environmental activities on campus and in the wider community, including a survey on tourism resource value and public awareness of Xiamen's eastern coastal zone, promotional activities related to World Environment Day, Earth Day, Tree Planting Day and involvement in the Green City Exposition. The newsletter, "Green Wind," which highlights the activities with topics on conservation management themes is published four times every year and delivered to the community.

#### II. Youth and women's active involvement in conservation management

It was expected that youth involvement in conservation management would directly affect their families and promote the involvement of the public. Based on this kind of chain effect, the Project Team focused not only on the development of environmental education for the youth, but also on student environmental activities. XSTM published a book titled "*Blue Sky, Blue Sea*" in 2000. This book kept a detailed record of the student activities in community conservation as well as their achievements. The Xiamen Municipal Government paid great attention to these activities. The vice mayor of Xiamen, together with officials

from the related departments, visited the XSTM for a meeting with the students to find out the problems that the students had discovered during their environmental activities. From the meeting, the vice mayor and the officials had the opportunity to incorporate the voice of Xiamen youth into their tentative development plans of Xiamen city. Through these activities, youth have gradually become an important community group to promote the desire for a clean and healthy environment.

In addition, women also comprise an important group within the community. Because of the special roles women have played in the community, their environmental protection awareness affects the success of CBCM. The Project Team conducted a case study from December 2000 to March 2001. Forty villagers in twenty typical families, including rich and poor, both sexes, and representing different professions were chosen for interviews. Suggestions for addressing the problems were also offered by a gender task force. This case study greatly encouraged the involvement of women, advanced family education about environmental protection, and succeeded in applying some gender analysis tools.

From April 2001, four workshops pertaining to gender in development and education were organized, as well as a gender study tour in Canada, including the participation at a conference "*Women's Studies: Asian Connections*" in Vancouver. Furthermore, at Xiamen University, a new curriculum titled "Women and Development" was offered to the graduates and undergraduates with an aim to increase female students' and women's understandings on gender and environmental protection. The rapid increase in women's environmental awareness has produced a significant effect on the families. This is considered to be one of the most fundamental, direct and effective strategies of environmental conservation management.

### Implementation of Community Participation

In China, public involvement in environmental planning and management remains relatively weak. The Project Team conducted a Strategic Environmental Assessment (SEA) in the study area to explore the methods for community participation and to implement community participation mechanisms. Community participation is the main goal of the SEA. The mechanism of public involvement for SEA was developed in three steps:

First, identify the key stakeholders:

Good relations need to be established with multi-stakeholders, especially with those having weaker political powers, such as peasants, fishermen, seniors and women.

Second, carry out the action plan for community participation:

Throughout the pilot project, individual interviews, questionnaires, telephone hot lines, public meetings, announcement boards and CBCM activities were used as tools of public involvement. Also many meetings of government consultants, reviews on urban construction plan and SEA research were conducted together with three large-scale questionnaires and related surveys. Local people attended large-scale public activities on environmental protection activities. The SEA results and CBCM concepts were showcased by local media.

Third, assess, monitor and adjust the plan:

Public participation is a constantly changing process and subjected to adjustments based on the review of the community participatory approaches, the experiences and lessons gained as well as feedback from the public.

Through community involvement in the different phases of SEA, the linkages between environmental researchers and the community were strengthened, scientific expertise was integrated with the experience and knowledge of the community, the

assessment process was improved, and the scientists were offered more access to communicate with the government. Policy-makers have started to incorporate the public voice and strengthen public environmental education and public participation. A community involvement mechanism of conservation management with the framework of “community-scientists-managers” has been developed. Decision-making has progressed in CBCM towards protecting the environment of the southeast coast and expanding to the entire Xiamen city. Some significant outcomes are outlined in the following:

- (a) The greenbelt along the coastal road was re-planned to build the shelterbelt and to recover the capacity of a windbreak and sand settlement during storms.
- (b) Some buildings and drainage pipes that could cause sand beach erosion were removed or renovated.
- (c) A report titled “*Issues and Suggestions on Developing the Eastern Coastal Area of Xiamen Island*” was submitted to the government.
- (d) The construction of the coastal road in the third phase was moved inland in order to conserve the sand beach and shelterbelt.
- (e) Furthermore, regulations on Marine Management and the Marine Functional Zoning were enforced.

### Conclusion

The successful implementation of CBCM should emphasize not only environmental education, with an aim to improve public environmental awareness, but also the creation of opportunities for community involvement in environmental conservation management. The implementation of the Xiamen CBCM project has proved that environmental education should not only be interdisciplinary but also ongoing. Furthermore, community participation and public environmental education are the key factors for better environmental management.

## **Section Five— Concluding Remarks**

### **5.1 Reflections and Lessons Learned**

Owing to its geographical uniqueness, nowhere in the world would have ever faced more challenges, both socioeconomically and ecologically, than the coastal regions. Indeed, the area of this tiny water-edge strip offers fundamental life supporting systems far beyond its physical boundary, and yet it is also a zone of great instability, with the highest concentration of natural hazards that one can find on earth. Over the next few decades, with the expected rising sea level, extensive coastal changes in the Asia Pacific appear to be inevitable, with more erosion and flooding caused by its frequent visitations of typhoons and earthquakes. Perhaps there is no need to remind ourselves of the unprecedented aftermath of the deadly Asia Tsunami striking Indonesia, Thailand, Malaysia and many others at the end of 2004; nevertheless the lesson has taught us the need to better develop and manage the coastal regions. In view of this, the knowledge from ICM should be emphasized and used as a viable tool to assist with the rehabilitation, resurgence and reconstruction efforts for hundreds of thousands of heartbroken families.

Development is said to be the art of negotiation. The wish for change is based on a forward-looking dialogue and equitable partnership between the ones who need to develop and the ones who will assist with that process. In other words, cooperation is the key element to realize that positive change by addressing the specific development opportunities and problems with cooperative solutions. With regards to ICM, the word ‘integration’ of ICM at the local level, regional level and international level all means cooperation. At the local level, a huge cooperation effort is needed among the decision makers, the various



interests groups and the consulting academics with power and resources shared by all to create coastal win-win solutions. At the regional level, as seen in the case of the Seas of East Asia, it requires the cooperation of fourteen nations to mitigate transboundary marine pollution, to resolve territory and fishing right disputes and to share together the benefits brought by coastal and marine resources. The emergence of the relatively recent Asia Pacific economic realignment in development history has offered the opportunities and preconditions for further cooperation in coastal development and management, gearing toward prosperity for all member states.

At the global level, international cooperation is even more important, simply because most development problems are truly international. This is especially evident in environmental issues, because the environment is shared by all mankind. As seen in the collective involvement of UNDP, UNEP, GEF and IMO on the issues of marine and coastal environment in the SEA regions, the transfer of financial support and management knowledge from the international community is considered to be vital for areas undergoing development challenges. Further, from an even broader perspective, if our lives want to be orchestrated as a symphony, the interdependence between the environment and the development must be recognized. Only if cooperation between the environment and the development exists then there will be prospects for the sustainable human well-being.

The role of the ICM Training Centre in Xiamen is irreplaceable in developing the management knowledge required and building upon constructive use of research deliverables to promote coastal sustainable ecological and socioeconomic development. The Centre itself also represents a cooperative effort from various agencies of the Municipal Government, research students and the faculty of Xiamen University and the personnel for all ICM

implementation sites. As learned during the days of my stay, the Centre strives to be a learning organization, for others and for itself, being a support network for ICM by identifying the best coastal management practices and program efforts and to encourage lesson-drawing and interaction between the practitioners and academics. With an objective to enhance the opportunities for capacity building in coastal development and for collaboration among the Asia Pacific countries, it has provided a platform to support stronger linkages for better communication, information sharing and exchange of experience among existing networks of practitioners and academics to make sustainable coastal development possible.

## **5.2 Conclusion**

Capacity building is increasingly perceived as a means to foster development. Nevertheless, many have failed to recognize the time commitment that is required to gradually build up such capacity. Even though the ICM training programme has initiated the capacity building process for participants in their respective coastal management areas, the full implementation of ICM remains questionable. After all, short-lived training courses may work for awareness creation but will never guarantee the long-term development results. In other words, institutional sustainability, including counted knowledge and financial supports and flow-up monitoring and assessment of ICM efforts in the target participants' respective coastal regions is required. The Centre may have been aware of the reality of low level effectiveness in quick injection of the training sessions, but international programmes crossing political boundaries often pose many uncertainties and constrains beyond the Centre's resources and control.

In addition, ICM capacity building efforts at the Centre are mostly carried out by the staff and academics at the training base of Xiamen University. As noted during my stay, a drawback of this institutional arrangement is the strain it puts on human resources at the university. The personnel involved in ICM training preparations and teachings are also researchers and academics; this arrangement forces them to take time away from their regular teaching and research. The time spent on the training session was time not earning any income from the university. Their tremendous contributions and efforts for ICM capacity building and development networking for coastal regions are neither compensated nor credited by the university, while they are still held responsible for the regular workload demanded by the university. Considerable cost, both the real expenses as well as the opportunity cost associated with the project, is spent in their involvement in the training programme.

In Xiamen, ICM has been successfully applied to address several coastal management issues, solving the coastal use conflicts, protecting the degraded ecosystems and restoring the original coastal beauty of attractions. As indicated by the experience of Xiamen, ICM enhances sustainability of coastal resource systems, optimizes multiple uses of resources, promotes interdisciplinary approaches and intersectoral cooperation and formulates integrated development strategies. The experience of Xiamen ICM is envisioned to be transferred and replicated in other parts of the world. However, much of the ICM work is still done at the government level with little room for the locals. Power sharing is said to be the key to ICM success. However, to what extent is the power given in the first place, to be shared by all? It has also been questioned by others that the bottom-up approach seems never feasible in China, as the government authority dare not give away its power. In addition, regular leadership changes also present many doubts about the future of ICM. The

head of the municipality that is assigned by the central government from elsewhere changes the post every few years, making the sustainability of the ICM project questionable.

The world's coasts are a battleground between long term goals for conservation and short term goals for economic interests. In most cases, people care more about making their living at the moment, using illegal means to acquire coastal resources, while not knowing the damage caused to the habitats which will further aggravate coastal productivity. However, ICM changes the battleground to a common ground by involving all people in shaping the coasts, while stretching the boundaries of human and environment potential for flourishing coastal development. The ICM experience of Xiamen has also proven that environment and development in the coastal regions can exist in harmony, if the development approach cares about the survival of the entire ecosystem in which humans have the responsibility for all living creatures and future generations.

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## **Annex 2**

### **PEMSEA Training Course on Integrated Coastal Management**

**Manila, Philippines and Xiamen, PR China**

**July 21-23, 2004**

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**PEMSEA Training Course on Integrated Coastal Management**

**Manila, Philippines and Xiamen, PR China**

**November 22 – December 10, 2004**

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### Annex 3

## **COURSE EVALUATION**

### **Training Course on Integrated Coastal Management**

**International Training Centre for Coastal Sustainable Development**

#### **A. Course Content**

1. Overall, I find the training session...

No value

Little value

Valuable

Very valuable

2. On a scale of 1-5, 1 being the lowest and 5 being the highest, how would you rate the **relevance** of the various training program modules?

Module No.	Title	Rating				
		1	2	3	4	5
Module 1	ICM Concept and Framework					
Module 2	ICM Approaches and Application					
Module 3	Data Gathering, Environmental Profiling/Rapid Appraisal Methods					
Module 4	Coastal Strategy Development					
Module 5	Institutional Arrangement and Legislation for ICM					
Module 6	Implementation of International Conventions					
Module 7	Communication Strategies, Public Awareness and Participation					
Module 8	Environmental Quality Standards/Monitoring					
Module 9	Integrated Information Management System and GIS Application to ICM					
Module 10	Risk Assessment and Risk Management					
Module 11	Resource Valuation and Natural Resources Damage Appraisal					
Module 12	Integrated Environmental Impact Assessment					
Module 13	Sustainable Financing Mechanisms and Environmental Investments					
Module 14	Marine Functional Zonation					
Module 15	Capacity Building for ICM					



Module 16	Field Visits to Selected Sites highlighting the ICM Successes and Lessons Learned in Xiamen					
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3. Given the objectives of the ICM training, were these objectives achieved?

Objectives	Fully Achieved	Somewhat Achieved	Not Achieved
To explain the basic concepts, principles, methodologies and guidelines of ICM			
To explain the policy and technical requirements for implementing ICM			
To apply the techniques in conducting stakeholder consultation as well as preparing and presenting a coastal strategy			

Please explain your answer briefly...

4. Apart from the modules given, what other topics do you consider appropriate to the training?

5. The most important lessons that I have learned from the training session and will be of the most value to my work and my project site are:

6. Were the training aids adequate? Please check in the boxes below.

	Yes	No
ICM Training Manual		
Lecture notes		
Reference materials		
Audio-visual aids		

My suggestions for improving the training aids are...

7. Were field studies useful? Yes \_\_\_\_ No \_\_\_\_  
Please briefly explain your answer.

### ***B. Training Organization and Coordination***

	<b>E</b>	<b>HS</b>	<b>S</b>	<b>LS</b>	<b>US</b>
<b>1. How were the following activities organized and implemented?</b>					
a. Lectures					
b. Exercises, group work and presentations					
<b>2. How would you rate the following?</b>					
a. Overall coordination of training activities.					
b. Training staffs and coordinators					
c. Attention given to non-technical needs such as socials, travel arrangements, lodging, etc.					

**E – Excellent**

**LS – Less satisfactory**

**HS – Highly satisfactory**

**US – Unsatisfactory**

**S – Satisfactory**

1. If applicable, was the class sufficiently informed about changes in activities and scheduling?

Yes or No (please explain)

2. Please use the space below to provide other comments or suggestions you may have regarding the **coordination** of the ICM training courses:

### **C. Training Facilities**

	<b>E</b>	<b>HS</b>	<b>S</b>	<b>LS</b>	<b>US</b>
1. Lecture room					
2. Audio-visual					
3. Transportation					
4. Accommodation					
5. Food/Catering Services					

**E – Excellent**

**HS - Highly satisfactory**

**S – Satisfactory**

**LS - Less satisfactory**

**US - Unsatisfactory**

1. What are the lecturer's strong points?

2. What are possible areas for improvement?

3. Other comments/suggestions:

**Upon completion, please return to the training group coordinator.  
Your feedback is greatly appreciated.**