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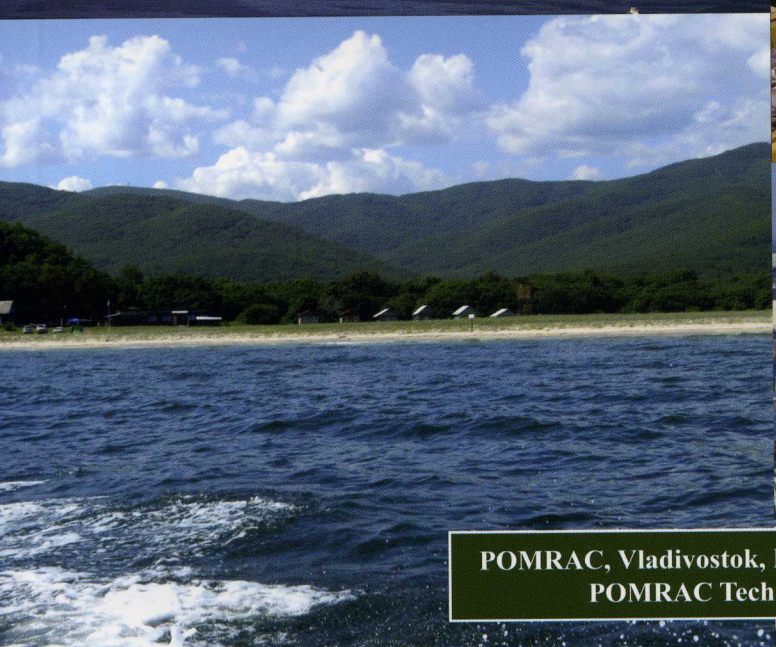
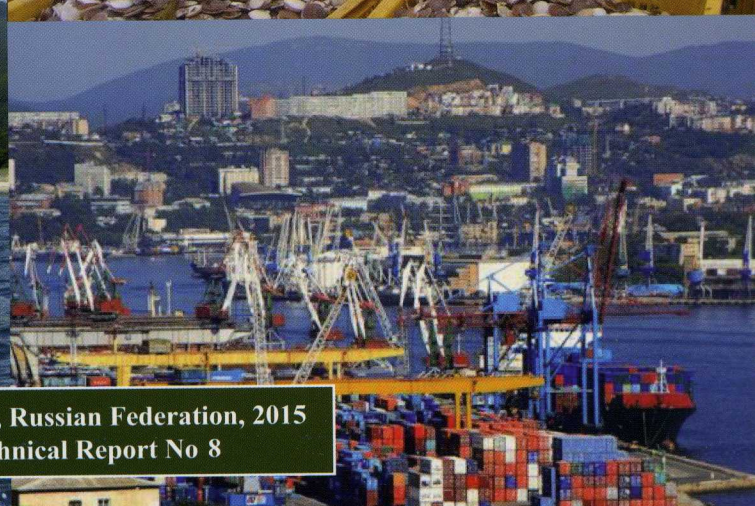
UNEP Regional Seas

INTEGRATED COASTAL PLANNING AND ECOSYSTEM-BASED MANAGEMENT IN THE NORTHWEST PACIFIC REGION





POMRAC, Vladivostok, Russian Federation, 2015
POMRAC Technical Report No 8

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POMRAC, Vladivostok, Russian Federation
2015

POMRAC Technical Report No 8

Pollution Monitoring Regional Activity Center of UNEP Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP POMRAC)

Региональный Центр по мониторингу загрязнения окружающей среды Плана действий ЮНЕП по охране, управлению и развитию морской и прибрежной среды в регионе северо-западной Пацифики (NOWPAP POMRAC)

Pacific Geographical Institute, Far Eastern Branch of the Russian Academy of Science
Федеральное государственное бюджетное учреждение науки Тихоокеанский Институт Географии Дальневосточного отделения РАН

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LIST OF ACRONYMS AND ABBREVIATIONS

ASEAN	Association of South East Asian Nations
BOD	biochemical oxygen demand
CEARAC	Special Monitoring and Coastal Environment Assessment Regional Activity Centre
CITES	Convention on International Trade in Endangered Species of Wild Fauna and
COD	chemical oxygen demand
CRMP	Coastal Resources Management Project
CS	coastal strategy
CSIP	Coastal Strategy Implementation Plan
CZM	Coastal Zone Management
DIN	dissolved inorganic nitrogen
DINRAC	Data and Information Network Regional Activity Centre
DO	dissolved oxygen
EA	environmental accounting
EBM	ecosystem based management
EEZ	exclusive economic zone
EIA	environmental impact assessment
EQS	environmental quality standard
FEB RAS	Far Eastern Branch of Russian Academy of Sciences
FP	Focal Point
FPM	Focal Points Meeting
GDP	gross domestic product
GEF	Global Environment Facility
GPA	Global Plan of Action
GRP	gross regional product
HAB	harmful algal bloom
HNS	hazardous and noxious substance
IAD	Integrated Area Development
ICARM	integrated coastal and river basin management
ICM	integrated coastal management
ICOM	Integrated Coastal and Ocean Management
ICZM	Integrated Coastal Zone Management
IGM	Intergovernmental Meeting
IIMS	Integrated Information Management System
IMCAM	Integrated Marine and Coastal Area Management
IMO	International Maritime Organization
IRA	initial risk assessment
IRD	Integrated Rural Development
ISO	International Organization for Standardization
LFA	logical framework analysis
LME	large marine ecosystem
M&E	monitoring and evaluation
MAP	Mediterranean Action Plan
MARPOL	International Convention for the Prevention of Pollution from Ships
MERRAC	Marine Environmental Emergency Preparedness and Response Regional Activity

MLTM	Ministry of Land, Transport and Maritime Affairs
MOERI	Maritime and Ocean Engineering Research Institute (of KORDI)
MOMAF	Ministry of Maritime Affairs and Fisheries
MPA	marine protected area
MPC	maximum permissible concentration
MSP	marine spatial planning
NEAC	Northeast Asia Conference on Environmental Cooperation
NEASPEC	Northeast Sub-regional Programme of Environmental Cooperation
NGO	non-governmental organization
NIES	National Institute for Environmental Studies
NOWPAP	Northwest Pacific Action Plan
NPA	National Program of Action
NPEC	Northwest Pacific Region Environmental Cooperation Centre
OVI	objectively verifiable indicator
PCC	Project Coordinating Committee
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PGI	Pacific Geographical Institute
PMO	Project Management Office
POMRAC	Pollution Monitoring Regional Activity Center
RAC	Regional Activity Centre
RCU	Regional Coordinating Unit
RFE	Russian Far East
ROK	Republic of Korea
RSP	Regional Seas Programme
SDCA	sustainable development for coastal area
SDS-SEA	Sustainable Development Strategy-Seas of East Asia
SEA	strategic environmental assessment
SEMP	Strategic Environmental Management Plan
SMA	Special Management Area
SOC	State of the coasts reporting
TMDL	Total Maximum Daily Load
TMS	Tele Metering System
T-N	total nitrogen
T-P	total phosphorus
TPLCS	Total Pollutant Load Control System
TPLMS	Total Pollutant Load Management System
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Conference Development Program
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
US	United States
USA	United States of America
USAID	United States Agency for International Development
WG	Working Group

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INTRODUCTION

Globally, the notion of Integrated Coastal Area and River Basin Management (ICARM) was highlighted in 1992. In the "Agenda of 21st Century" adopted at the United Nations Conference on Environment and Development (UNCED) that was held from 3 to 14 June 1992 in Rio de Janeiro, Brazil, the countries with marine or ocean boundaries were advised to organize ICARM initiatives. Agenda 21 is a comprehensive plan of action to be taken at various levels (globally, nationally and locally) by agencies of the United Nations (UN) System, governments, and major stakeholder groups in every area in which human impacts on the environment are significant. It was adopted by more than 178 Governments.

Agenda 21 espouses integrated management. Chapter 17 specifically promotes the integrated management and sustainable development of coastal areas. As a consequence, the concept of ICARM came out. The United Nations Environment Program (UNEP) and the Priority Actions Programme Regional Activity Centre (PAP/RAC) of the Mediterranean Action Plan jointly prepared the "Conceptual Framework and Planning Guidelines for Integrated Coastal Area and River Basin Management" (UNEP/MAP/PAP, 1999). As such, ICARM is the methodology being promoted to efficiently apply a high level of development of marine sciences and great progress in the study of coastal - offshore regions to attain sustainable development. Its final objective is to reach the sustainable development of the offshore-coastal regions. In the context of this report, ICARM and integrated coastal management (ICM) are used interchangeably.

The Regional Seas Programme (RSP) was initiated by the United Nations Environment Program (UNEP) in 1974 as a global programme implemented regionally in the wake of the 1972 United Nations Conference on the Human Environment held in Stockholm, Sweden. The RSP aims to address the accelerating degradation of the world's oceans and coastal areas through the sustainable management and use of the marine and coastal environments, by engaging neighboring countries in comprehensive and specific actions to protect their shared marine environment (http://www.nowpap.org/). Currently, over 140 countries participate in 13 regional programmes established under UNEP auspices. Hence, the RSP is one of the most globally comprehensive initiatives for the protection of marine and coastal environments.

The Northwest Pacific Region is a part of UNEP RSP. The Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP) and three Resolutions were adopted at the First Intergovernmental Meeting, IGM (Seoul, Korea, 14 September 1994). The implementation of NOWPAP is financed mainly by contributions from the four Member States.

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[1] The Special Monitoring and Coastal Environment Assessment Regional Activity Centre (CEARAC) is hosted by the Northwest Pacific Region Environmental Cooperation Centre (NPEC) in Toyama, Japan. Its main activities are to monitor and assess harmful algal blooms, to develop new monitoring tools using remote sensing and to assess land-based sources of marine litter. The Data and Information Network Regional Activity Centre (DINRAC) is based in the China-ASEAN Environmental Cooperation Center of the Ministry of Environmental Protection (MEP) in Beijing, People's Republic of China. The objectives of DINRAC are to develop a region-wide data and information exchange network, to promote regional cooperation and exchange of information on the marine and coastal environment in the NOWPAP region and eventually to serve as a NOWPAP Clearinghouse. The Marine Environmental Emergency Preparedness and Response Regional Activity Centre (MERRAC) was established in the Maritime and Ocean Engineering Research Institute within Korea Institute of Ocean Science and Technology (MOERI/KIOST) in Daejeon, the Republic of

Four Regional Activity Centres (RACs)[1] were established between 2000 and 2002 and are responsible for carrying out individual NOWPAP activities and projects approved by the IGM that are coordinated by the Regional Coordinating Unit, RCU (http://www.nowpap.org/). Although ICARM-related actives were envisioned since the establishment of the NOWPAP, practically the ICARM activities were started by POMRAC only around 2007.

Based on the NOWPAP Action Plan, wise management strategy for the Northwest Pacific coastal and marine environment should be developed. The strategy for wise management of the Northwest Pacific coastal and marine environment consists of various elements, two of which relate to: (1) integrated coastal area planning, and (2) integrated coastal area management. The third and fourth Objectives in the initial Action Plan for the Northwest Pacific region are as follows: to develop and adopt a harmonious approach towards coastal and marine environmental planning on an integrated basis and in a pre-emptive, predictive and precautionary manner; and to develop and adopt a harmonious approach towards the integrated management of the coastal and marine environment and its resources, in a manner which combines protection, restoration, conservation and sustainable use.

POMRAC has started activities related to integrated coastal and river basin management (ICARM) in 2007 by establishing the ICARM Working Group (WG). Some of the activities undertaken relate to ecosystem valuation, marine spatial planning, biodiversity conservation and climate change adaptation. Under close coordination of RCU, these activities have been implemented in close collaboration with all NOWPAP RACs and with the GPA or Global Programme of Action for the Protection of Marine Environment from Land-Based Activities.

The 1st Meeting of ICARM WG (10-11 July 2007, Toyama, Japan) decided that the main objectives of the Working Group for ICARM would be as follows: (1) to collect and compile existing ICARM methodologies being used by NOWPAP member states; (2) to prioritize issues related to ICARM activities in NOWPAP member states (including transboundary ones); and (3) to assist member states in applying efficient ICARM methodologies, including coastal area and river basin planning (landscape, urban and marine spatial) and risk management, by disseminating tools and good practices, organizing training courses, among others. The 5th POMRAC FPM (Vladivostok, Russia, 8-9 October 2007) adopted preparation and publication of the National Reports and Regional Overview[2] on ICARM as one of the main activities of POMRAC in 2008/2009 biennium. These documents were published in 2010. Although ICARM efforts have resulted in improvements of both the human and natural dimensions in the NOWPAP region, more work is still needed. Hence, ecosystem valuation, marine spatial planning and ecosystem-based management form part of ICARM-related initiatives to further promote sustainable development in the NOWPAP region.

Korea. MERRAC is a joint effort of UNEP and IMO to develop effective regional cooperative measures in response to marine pollution incidents including oil and hazardous and noxious substance (HNS) spills. MERRAC is also working on marine-based sources of marine litter. The Pollution Monitoring Regional Activity Centre (POMRAC) is located at the Pacific Geographical Institute (PGI) of the Far East Branch of the Russian Academy of Sciences in Vladivostok, Russian Federation. POMRAC is responsible for cooperative measures related to atmospheric deposition of contaminants and river and direct inputs of contaminants to the marine and coastal environment. Since 2007, POMRAC started a new project on integrated coastal zone and river basin management and compiled the state of marine environment report for the NOWPAP region.

[2] Regional Overview Report on Integrated Coastal and River Basin Management (ICARM) in the NOWPAP Region, POMRAC Technical Report No. 5.

The POMRAC Technical Report № 8 ***"Integrated Coastal Planning and Ecosystem-Based Management in the Northwest Pacific Region"*** continue two parts:

Part 1 "Marine Spatial Planning and Ecosystem-Based Management in the Selected Areas of the NOWPAP Region (Regional Overview)" provides a synthesis of some experiences and lessons learned in integrated coastal and river basin management (ICARM) among the four countries in the NOWPAP region, namely: (1) People's Republic of China (PRC) that is also referred here as China; (2) Japan; (3) Republic of Korea that is alternately referred as South Korea or simply Korea; and (4) Russia, which is also officially known as the Russian Federation. Focus is given on marine spatial planning and ecosystem-based management, with a few notes on ecosystem/ economic valuation.

Part 2 – "Regional Guidelines for Integrated Coastal Planning and Management in the Northwest Pacific Region". The objective of this guidebook is to assist the member states in applying efficient ICARM methodologies and best practices including coastal area and river basin planning (landscape, urban and marine spatial). It also provides a synthesis of experiences and lessons about ICM/ICARM in many of the world's regions and individual countries alike. Case studies among NOWPAP member countries (China, Japan, Korea and Russia) are given emphasis. An innovative feature of this guide is in directing the readers to ICM/ICARM materials and references that are now freely available in the web. It is hoped that this document will be a useful guide not only to NOWPAP users but also to other academicians, civil society organizations, policy makers and practitioners outside of the region who are engaged in ICARM-related activities.

PART 1

Marine Spatial Planning and Ecosystem-Based Management in the Selected Areas of the NOWPAP Region (Regional Overview)

Authors: M. D. Pido, Xin Xie, Hiroshi Koshikawa, Jungho Nam, Ivan S. Arzamastsev

1.1 Introduction

1.1.1 Goal of the Regional Overview

This report provides a synthesis of some experiences and lessons learned in integrated coastal and river basin management within the countries in the NOWPAP region. Focus is given on ecosystem valuation, marine spatial planning and ecosystem-based management at these four case study sites: Jiaozhou Bay, China; Hakata Bay, Japan; Masan Bay, Korea; and Peter the Great Bay, Russia.

1.1.2 Institutional arrangements for developing of this report

This regional overview report was collaboratively prepared by the national authors from the four participating countries. Report preparation was facilitated by an international consultant (Prof. Michael Pido from Palawan State University, Philippines). Those experts who participated in report preparation are as follows:

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1.2 GEOGRAPHICAL SCOPE OF THE SPECIFIED CASE STUDY AREAS

Four case study areas – in four countries within NOWPAP region – were chosen based on agreed bio-physical and socio-economic criteria. These demonstration areas have undertaken ICARM-related initiatives including marine spatial planning and ecosystem-based management. These four case study areas were finally chosen: (1) Jiaozhou Bay, China; (2) Hakata Bay, Japan; (3) Masan Bay, Korea; and (4) Peter the Great Bay, Russia (Figure 1.1). Among others, the reasons and/or justifications for choosing the study areas included: development problems and opportunities, nature of environmental issues, geographical coverage, climatic features, landscape structure and land-use features.

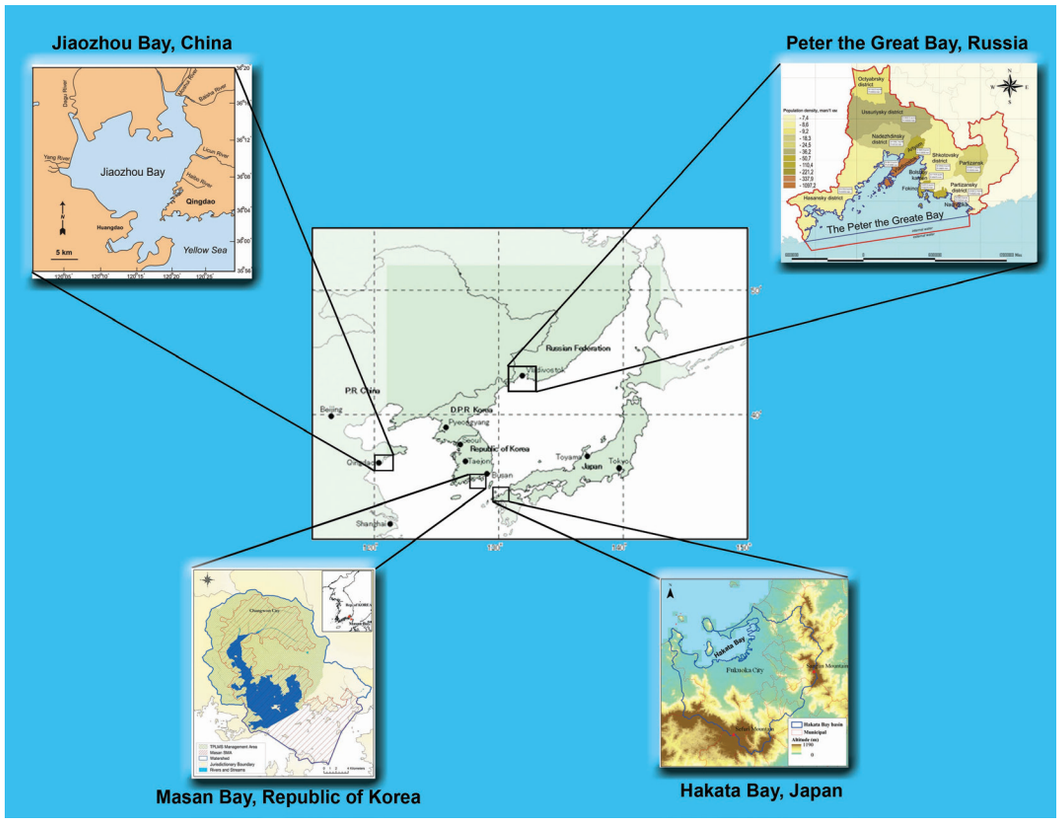

Figure 1.1 Location map of the four case study areas in the NOWPAP region

The significance of the NOWPAP region – as a dynamic regional coast – cannot be overemphasized from various human and natural resources perspectives. It is characterized by varying and contrasting social, economic, geographical and geopolitical features. Collectively, the lands, coastal fringes and seas provide the natural resource base for varying economic activities that include agriculture, coastal industries, energy development, fisheries, maritime trade and tourism. There is also a long history of diverse peoples sharing together the oceans and the coasts through trade and cultural activities. Given these diverse political, geographic, demographic and ecological features – coupled with high degree of urbanization and rapid population growth – ICARM is deemed as the most suited for the region's integrated management.

1.3 COMPARATIVE ANALYSIS OF PRESENT SOCIAL, ENVIRONMENTAL AND ECONOMIC SITUATION IN NOWPAP MEMBER STATES AND SPECIFIED CASE STUDY AREAS

1.3.1 Environmental / natural resources conditions

1.3.1.1 Environmental / geographical setting

Jiaozhou Bay, China, is situated in the western coast of the Yellow Sea and the southern coast of the Shandong Peninsula in East China. It separates Huangdao District from Qingdao City and borders on Jiaozhou City and Jiaonan City. Jiaozhou Bay is a shallow (10 to 15 meters[1] depth) semi-closed body of water that occupies an area of 352.94 km^2. The bay is 32 kilometers (km) long and 27 km wide. It has dredged channels in three major ports around the bay, namely: Qingdao, Huangdao and Hongdao. Its location in relation to its major river systems is provided in Figure 1.2.

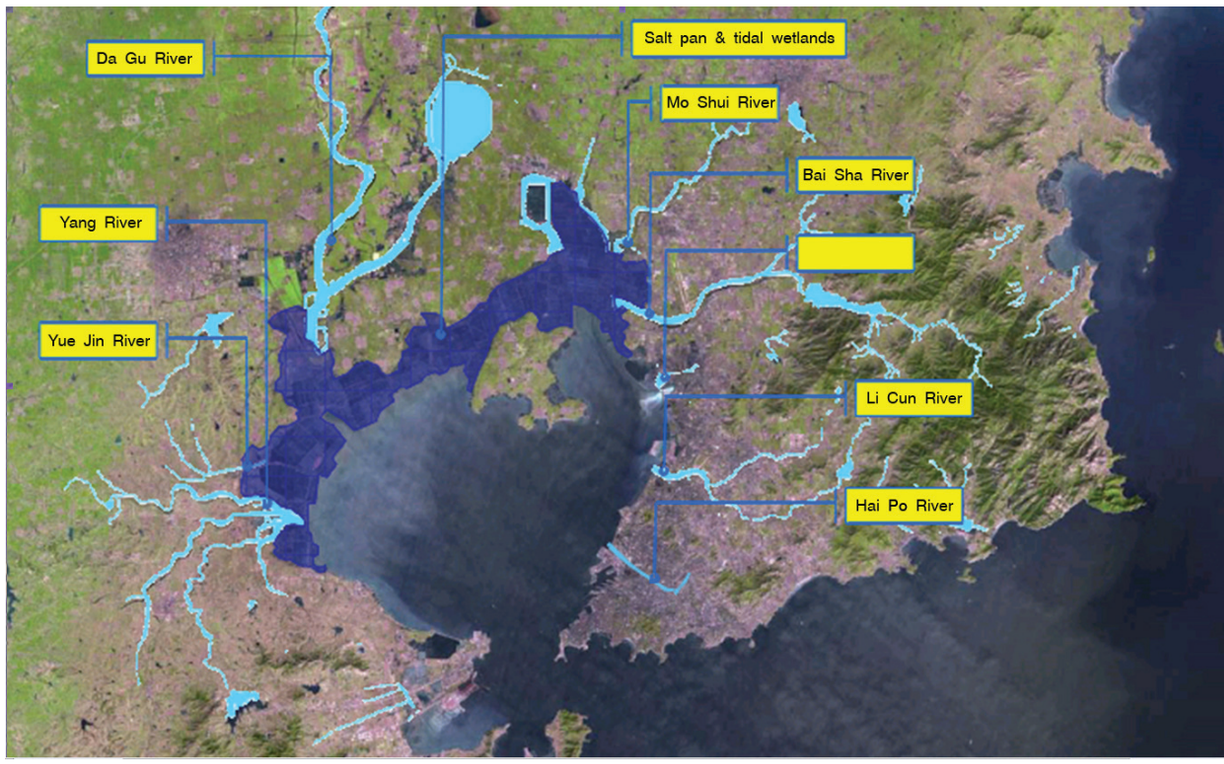

Figure 1.2. Seven rivers flowing into the intertidal zones and salt pans of Jiaozhou Bay, China.

Hakata Bay - which is a semi-enclosed sea area - is located in the northern part of the Fukuoka Plain on the Japanese Island of Kyushu and Itoshima Peninsula (Figure 1.3). The bay is roughly 20 km from east to west, 10 km from north to south, and it covers an area of about 133 km^2. The coastline stretches to about 120 km. The mouth of the bay connects to the Sea of Genkai, which is only 7.7 km wide. The bay is shallow throughout with an average depth of 6.6 m in the mouth.

[1] m is used as the abbreviation of meter

Because of the narrow mouth, the exchange of seawater is slow. The sediment runoff from the land is easily deposited to the seabed. The Wajiro tidal flat (80 ha) and Imazu tidal flat (80 ha) extend out at the northeast head and the western area, respectively. The southeastern area, meanwhile, consists mainly of man-made structures, such as port facilities.

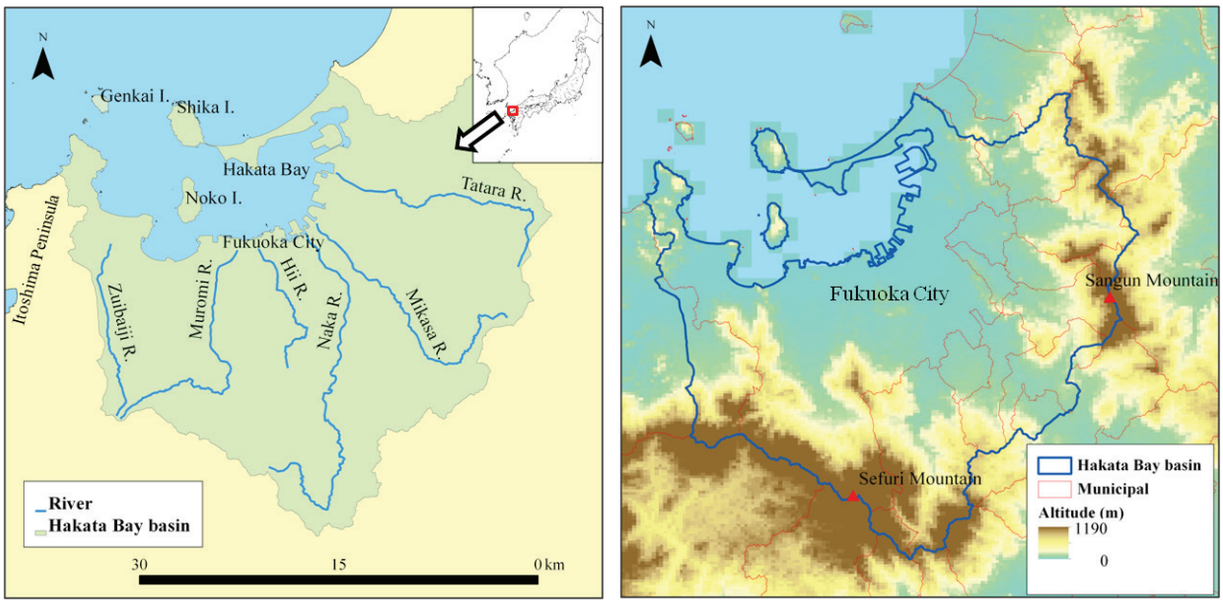

Figure 1.3. Geography of coastal and major river basins around Hakata Bay, Japan.

Peter the Great Bay in Russia is located in the southern part of the Primorsky Krai (Figure 1.4). The land part occupies north of East Manchurian mountain range and south-west Sikhote-Alin branches. The upper part of the bay is adjacent to West-Primorie plain. Peter the Great Bay is one of the largest marine bodies of water in the Japan/East Sea region. It is located in the north-western sea area between the parallels of 42° 17' and 43° 20' N and the meridians of 130° 41' and 133° 02' E. Water area of the Peter the Great Bay from the sea is bounded by a line joining the Tyumen'-Ula River mouth within the Povorotny Cape. Given this line as the reference point, the width of the Bay is about 196.6 km. The maximum length perpendicular from this line to the mainland is 90.5 km. The length of the entire coastline (including the adjoining islands) is approximately 1,350 km. The area of the bay including island territories is 9,090 km^2, while the volume of seawater is about 500 km^3. There are 11 smaller bays, 125 coves, 5 harbors and 1 inlet. The largest among these is Ussurisky Bay, followed by the following marine bodies of water in descending order: Amursky Bay, Posyet Bay, Kitoviy Bay, Nakhodka Bay, Strelok Bay, Slavyansky Bay, and Vostok Bay. There are 54 islands (most of which have no official names) with a total aggregated area of 194.25 km^2.

Figure 1.4. The coastal zone and major rivers in the basin of the Peter the Great Bay.

Water temperature on the surface of Peter the Great Bay is characterized by significant seasonal variability due to the interaction of the surface layer with the atmosphere. Annual salinity changes are characterized by minimum salinity in summer time and the maximum salinity occurs in winter time. Water currents are constantly influenced by tide, wind and runoff currents. In terms of tide, semi-diurnal tidal wave enters the bay from the south-west and propagates to the secondary Bays – Posyet, Ussuriisky, and Nakhodka. Although icy in winter, ice does not prevent the regular marine navigation during the whole year round.

Masan Bay is located on the southern coast of the Korean Peninsula (Figure 1.5). It is a relatively small semi-closed bay with an average depth of 9 m and total area of 142.9 km^2 including the entire Masan Special Management Area. As shown in Figure 5, the geographical boundary for the total pollution load management system (TPLMS) is limited to blue color, which covers 70.9 km^2. The bay has a length of 8.5 km at its longest part and the width of 5 km at its widest part.

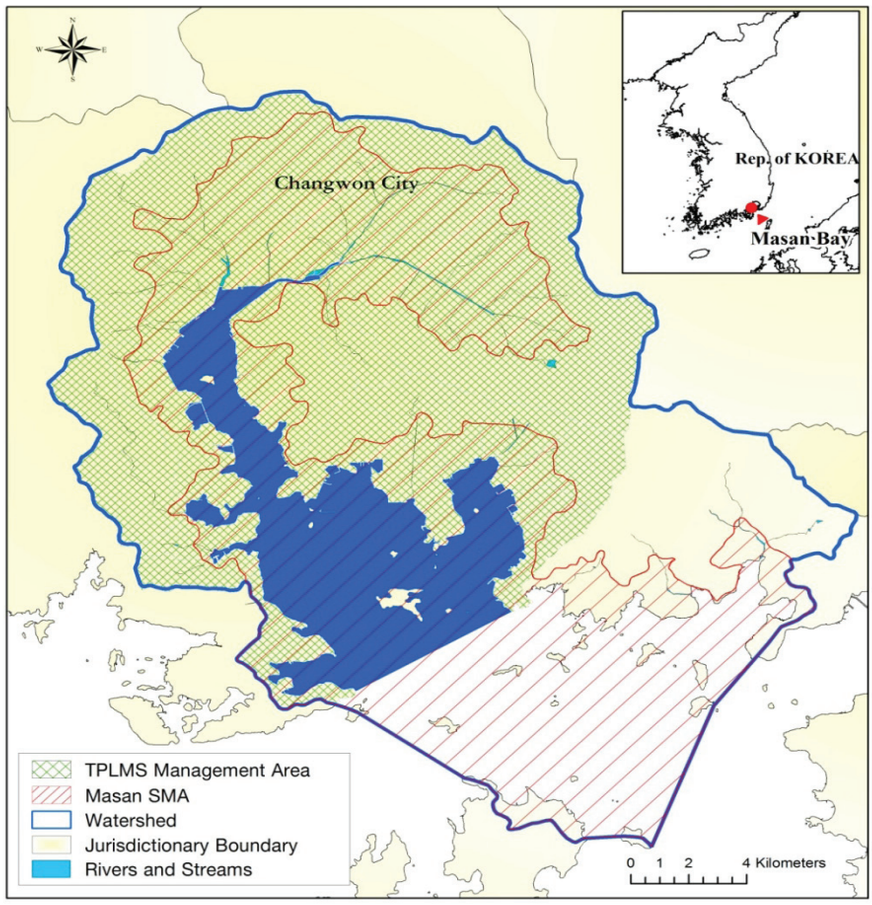

Figure 1.5. Map showing geographic and management boundaries of Masan Bay.

1.3.1.2 Major river basins / watersheds

Dagu River, Yang River, Moshui River, Loushan River, Licun River and Haibo River are the six major rivers that flow into China's Jiaozhou Bay. Rainfall pattern of these rivers is uneven. Dagu River is the biggest with an annual average runoff volume of 0.661 billon m^3. Laoshan Mountain and Zhushan Mountain border the bay's eastern and southern portions, respectively. The western and northern parts are planked by the plain and hill of Jiaolai River.

The river basins around Hakata Bay are comprised mainly of the Fukuoka Plain, the Sangun Mountains with a 936 m peak, and the Sefuri Mountains with a 1055 m peak. The total catchment area is roughly 690 km^2. Fukuoka City lies in the middle of the Fukuoka Plain. Although there are no large rivers that are classified as "class A" in the entire basin, about 40 medium and small rivers drain into the bay. The major river systems include: Tatara River system (168 km^2), Naka River system (124 km^2), Muromi River system (99 km^2), and Mikasa River system (94 km^2). All of these rivers are relatively short; Muromi River, which is the longest, has a length of only 16 km. These rivers run through the flat Fukuoka Plain.

Some 405 rivers and streams drain into Peter the Great Bay. The catchment basin of the Peter the Great Bay has an area of 72.735 km^2. The Russian part of the catchment area is only about 31,535 km^2. Tumen River is the largest in the area with a length of 516 km and a catchment area of 33,168 km^2. Large portions of Tumen River, though, belong to the People's Republic of China

and the Democratic People's Republic of Korea. Large part of Razdolnaya River basin belongs to China as well.

Seventeen small rivers from its watershed areas drain into Korea's Masan Bay. Tidal range in the bay is observed at about 1.3 m, showing a semi-diurnal pattern. Turn over time – or the residence time of particles in the bay – is estimated to be about 40 day (Park et al., 2011).

1.3.1.3 Climate

Being located in the North Temperate Zone, Jiaozhou Bay has a temperate zone monsoon climate with four distinct seasons. In summer, it is wet, hot (no intense heat) and rainy. In autumn, there is less rainfall but with high evaporation. The winter lasts longer than other seasons, with strong wind and cold temperature. The average temperature is 12.7°C. Annual average rainfall is 662.1 millimeter (mm) while the annual average wind speed is 5.2 m/second.

Hakata Bay and the associated river basins belong to the Asian monsoon system. The climate is relatively mild, with an average annual temperature of 17.0°C. The average precipitation was recorded at 1,612 mm from 1981 to 2010. The rainy season is from June to July, whereby some 33% of the total precipitation falls during this period. After the rainy season, a hot and humid summer lasts until September. The prevailing wind is the north wind from spring to autumn (March to October) and the southeast wind in winter (November to February).

Meteorological mode of the Peter the Great Bay is conditioned by the: atmospheric monsoon circulation, geographical location of the region, and influence of the cold Primorye Current. From October-November to March, the cold continental air is transported from the continent to the sea (winter monsoon). This results in frosty low-cloud weather. In spring, the wind mode is not stable, the air temperature is comparatively low, and the long periods of dry weather are possible. Summer monsoon occurs from May-June to August-September. The autumn season is the best time of year that is warm and dry, with predominantly clear sunny weather. In certain years, warm weather lasts until the end of November. Monsoon weather type is periodically disrupted by intensive cyclone activity. Cyclones are accompanied by the ultimate increase of cloudiness, strong cloud-burst precipitation, worsening of visibility and strong storm activity. During winter monsoons, from October-November to March, the winds of the northern and north-western direction predominate.

The Korean peninsula is located in temperate area. Hence, it is characterized by monsoon climate. Average annual precipitation is 1,274 mm, whereby about 75% of annual precipitation occurs in summer season. Typhoons arrive at the southern part of the Korean Peninsula in August and September. Given these climatic patterns, storm surge is one of factors that affect the circulation pattern of Masan Bay. The average air temperature in its watershed is reported at approximately 15°C. Such air temperature has a relatively small annual range when compared with land-locked areas of Korea.

1.3.1.4 Land-uses / land cover

In 2006, cultivated or farming land was the most dominant land use around Jiaozhou Bay. This accounted for an area of 422.35 km^2, which was about 36.63% of the total land area. Other major land uses include city and town land-use (built-up areas), aquaculture base and salt pan, grass land, intertidal zone, land river basins and other uses. The geographical coverages of these land uses were 398.45 km^2, 146.86 km^2, 80.63 km^2, 68.83 km^2, 33 km^2 and 3.04 km^2, respectively. Driven by economic interests, the area of intertidal zone was reduced by 28.3 km^2 from 1989 to

2000. City and town land use increased in area; aquaculture base and salt pan likewise increased in geographical coverage.

In 1998, the extents of land use in Japan's Fukuoka City were as follows: 46.2% were urban areas including commercial and residential establishments; 10.1% were agricultural lands, comprised mainly of rice fields in the western area of the city; the rest were natural areas, particularly primary forest or pristine vegetation. The comparison of land use between 1955 and 1998 clearly shows that the amounts of agricultural and forested areas have largely decreased. On the other hand, the urban area has expanded in geographical scope. It is estimated that this change in land use over the past 40 years has approximately reduced the amount of natural rain penetration by almost 40%. Moreover, such change in land use has disrupted the natural hydrological cycle in the basins (Fukuoka City, 2008b).

Masan Bay's land area has been designated as "Urban Areas." As such, it consists of four sub areas, namely: (1) residential, (2) commercial, (3) industrial and (4) green areas. It means that the watershed of the bay should be managed by Urban Plans based on a zoning mechanism. Highest proportion of the Masan Bay watershed is allocated to green area, which occupies some 76.42%. This is followed in descending order by the following land use categories: residential area (8.08%), industrial area (6.64%), and commercial area (1.65%). In terms of land uses, the watershed can be divided into seven categories: dry fields, rice fields, ranches, forestry lands, towns, industrial areas, and non-specified areas. The largest portion of the watershed is the forest land that occupies 59.5% of total land area. This is followed by the following land uses in decreasing area coverages: non-specified (14.5%), rice fields (13.2%), and towns (5.6%). Land uses that heavily affect the marine environmental condition are towns and industrial areas. The annual rates of increase of these areas were 0.68% and 1.81%, respectively.

1.3.1.5 Coastal habitats and biodiversity

Jiaozhou Bay's marine species decreased by two-thirds during the last 50 years. This is due to urban expansion and industrial development around the bay area.

Hakata Bay's bottom sediment is almost completely mud in the eastern and the central area; however, fine and coarse sands are the predominant substrates toward the bay's mouth from the western area. In the western and northern areas around Shika Island and Umi-no-nakamichi, there are rocky shores and sandy beaches. Hakata Bay is also rich with marine life that included 104 species of fish, 151 species of shellfish, and 9 species of cephalopods (squids and octopi). Among the rare species present are horseshoe crab (*Tachypleus tridentatus*) and ice goby (*Leucopsarion petersii*), which migrates upstream for spawning. Wild birds abound in the area, some of which are classified as endangered or vulnerable species in the IUCN Red List of Threatened Species. Notable examples are the black-faced spoonbill (*Platalea minor*), Chinese egret (*Egretta eulophotes*) and saunders's gull (*Larus saundersi*).

Peter the Great Bay is rich in both terrestrial and marine biodiversity. In the land part, there are nearly 1,500 species of vascular plants, 370 birds and 85 mammals. Prominent mammalian species include the Sika deer, Amur leopard and Amur tigers. Out of the 3,000 invertebrate species from the Russian part of the NOWPAP region, 2,900 of them inhabit Peter the Great Bay.

Masan Bay has been designated as Port Area and Special Management Area as well. In the past, the bay was so renowned for its natural landscape and seascape. The marine ecosystem was quite healthy that provide many socio-economic benefits including artisanal fisheries until the early

1970s. Coastal habitats - such as tidal wetlands and sandy beaches – were lost due to the development of coastal waters and hinterlands. Most of the natural coastlines have been modified into artificial coastlines over the past four decades. An estuarine wetland, called "Bong-Am" tidal wetland, has been managed and protected in a very cooperative manner between the Masan Port Authority and the environmental non-governmental organizations (NGOs). Sesarmid crab (*Sesarma intermedium*), an endangered species, has been observed in the bay since 2008. The wetland was designated in 2011 as Wetland Protection Area under the Wetlands Conservation Act. People of the bay consider the return of the above estuarine crab as a sign of ecological rehabilitation of the bay.

1.3.2 Social conditions

1.3.2.1 Population

The population of Qingdao has been growing since 1978. In 2010, the population was estimated at 7.64 million as compared to 1.78 million people in 1978. This is equivalent to an increase of 30.4% between the two time periods. Conversely, the population density has also increased to the current statistic of 717 persons/km^2. The growth of Qingdao's population is mainly attributed to the influx of people who are engaged in non-agricultural activities.

Fukuoka City, which is the administrative center of Hakata Bay, lies in the heart of the Fukuoka Plain. The city has a population of approximately 1.4 million people. Such number constitutes about 75% of the population in the entire basin. The land in the main plain is therefore used for commercial and residential purposes.

Peter the Great Bay's coastal area includes the administrative districts of Khasansky, Nadezhdinsky, Ussuriisky, Oktyabrsky, Shkotovsky and Partizansky and the urban territories of Vladivostok, Artyom, Partizansk and Nakhodka. Collectively, these constitute a total area of 20, 873.7 km^2 and a total population of 1,351,063 people.

The population within Masan Bay's watershed has continuously increased. Comparatively, it has a higher rate than average rate of increase in the entire coastal area of Korea. As of 2008, the population was recorded at 914,375 persons. Conversely, the population density was 3,167 person/km^2 which exceeded the national average of 410 persons/km^2. Changwon city has drawn attention from adjacent people and enterprises in terms of residential and business development.

1.3.3 Economic conditions

1.3.3.1 Overall economic development and major industries

Qingdao, as one of China's open port and vibrant coastal city, has been rapidly growing economically. Since 1997, the growth rate of its gross domestic product (GDP) has been more than 10%. Until 2010, the primary industry is increasing much slower than the secondary industry and tertiary industry. As a result of accelerated economic development, more agricultural lands have been converted into urban areas. Jiaozhou Bay's surface area has decreased from 560 km^2 in 1928 to 352.94 km^2 by 2006 due to sustained land reclamation activities in recent decades.

The gross regional product (GRP) of Fukuoka City - which is a core area of the basin – was valued at US $71 billion in 2008. This amount is equivalent to about 1.4% of the GDP of Japan

[1] Regional Overview Report on Integrated Coastal and River Basin Management (ICARM) in the NOWPAP Region, POMRAC Technical Report No. 5.

(US $5,043 billion in 2008). The breakdown of GRP by economic sectors was reflected as follows: the tertiary sector comprising mainly of wholesale and retail was computed at 91.75%; the secondary sector such as the food manufacturing industry was estimated 8.13%; and the primary sector was the least that accounted for only 0.12%.

Peter the Great Bay's economy is based on combined fisheries and forestry, non-ferrous metal industry, sea transport and engineering industry (including ship repair). The economy is unique by its high degree of dependence on the sea: highly developed fishing industry and marine culture, sea transport (50,140 million tons/km of annual freight turnover) and ship repair. Non-ferrous metal industry (extraction and processing of tin, lead, zinc and tungsten ores), chemical industries (boron-containing ores workshop), logging and timber industry, and machinery engineering are all important components of the bay's economy. Other natural resources being extracted are coal and cement. The bulk of industrial production (82.5%) is concentrated in the cities. This is particularly true in Vladivostok, the capital of Primorsky Krai, where 35.7% of the total industrial output is produced. Other cities that provide smaller percentages of total industrial outputs are as follows: Nakhodka – 13.5%, Ussuriisk – 7.6%, Arsenjev – 5.1%, Spassk-Dalny – 4.7%, Dalnegorsk – 4.1%, Artyom – 3.5%, Bolshoy Kamen – 2.3%, Partizansk – 2.1%, Dalnerechensk – 2.1%, and Lesozavodsk – 1.9%. The most socially and economically developed is the southern part of Primorsky Krai, which is inhabited by nearly 57% of the Krai's population. It includes some 80% of the krai's industrial enterprises and organizations. Industrial enterprises provide 44% of the generated electricity and 72% of commercial fish products (including canned production) in Primorsky Krai.

Masan Bay's social and economic development has been recorded at such a remarkable speed since the area was designated as Masan Free Export Zone in 1970. The port of Masan, a trade port in the bay, opened in 1899 to facilitate trade with Japan. Throughput of the port has increased with the expansion of the nearby industrial complexes that was recorded at 15 million tons. As of 2007, there were a total of 63,029 industrial and commercial companies. These are located in the two national and one local industrial complexes that occupy 88% of entire companies in the city. The per capita GDP of Changwon City was valued at US$21,752 in 2007. This was a relatively rapid increase because the per capita GDP in 2003 was only US$ 13,198. The manufacture of machines and industrial services are the economic engines of the bay.

1.3.3.2 Agriculture and Forestry

Overall, the cultivated land areas in Qingdao have decreased over the last few decades. After 2003, the actual cultivated land has been maintained at around 420,000 ha. Qingdao's forest cover was on decline until 2000. In 2003, however, a forest production (through plantation) was initiated. This forms part of the Qingdao government's aim to build an ecological city and participate in the "Green Olympics" of 2008. Since then, the forest cover of the city has been on the rise.

Major agricultural services and/or sectors have been developing around Peter the Great Bay. These include dairy cattle, beef cattle, pig breeding, poultry farming, vegetable growing, potato growing and the production of berries. Hence, the areas devoted to agriculture have been increasing.

Masan Bay's Changwon City is classified as a highly urbanized and industrialized area. As such, it has been facing shortage of residential, industrial and commercial sites or complexes.

Much of the rice fields and forests have been converted into urban uses to meet the spatial demands for social and economic development. Rice fields were converted first as these have the least values when compared to other land uses. The remaining forest areas have been protected by prohibiting logging. Accordingly, agriculture and forestry have declined substantially and are no longer dominant economic sectors.

1.3.3.3 Fisheries and Aquaculture

Qingdao's fisheries production has been increasing from 1997 to 2010. However, the increase is largely attributed to aquaculture in both marine and estuarine areas. Capture fisheries has been on a relative decline during the same time period.

Coastal fisheries in Hakata Bay and the adjacent areas involve fishing with gill nets, capture of wild shellfish and aquatic plants, and culture of laver, brown seaweed and oysters. Those engaged in coastal fisheries were approximately 860 persons in 2006, which was a decline of 25% when compared to a decade ago. The catch was 1,687 tons inside the bay, while the volumes of 3,707 tons were harvested in the bay's mouth and the adjacent marine areas in 2006. These catches have gradually been decreasing with the corresponding decrease in the number of fishery workers.

In Peter the Great Bay, 68 fish species and over 40 species of invertebrates and seaweeds are commercially important. The top three species in terms of volume of stock are: macroalgae ahnfeltia – 47,300 tons; flatfish – 32,000 tons; and crabs – 20,000 tons. In terms of value, though, the top three are: crabs – US$213,166,000; prawns – US$ 109,340,000 and macroalgae – US$66,636. The relatively rich fishery resources and the modern transportation system have resulted in the rapid growth of the fishing industry. The well-developed infrastructure facilities and services include: presence of refrigerators for fisheries storage, a considerable quantity of manufactures, workers and ship-repair factories. Fish catch from the Bay and within the RFE are processed in southern Primorsky Krai. Marine and land transport hubs are located there to transport the fisheries produce for export and domestic market. The fishing industry involves about 527 enterprises.

In terms of aquaculture in Primorsky krai, there are 58 fishery enterprises. These farms are located in the eastern and western coasts of the bay as well as in some adjoining islands. Species most commonly cultured include scallop, mussel, oyster, sea cucumber and salmon. There are two operating fish breeding farms – one specializing in salmon and the other one farm specializing in sea cucumber. Some 500 tons of seafoods (primarily scallop) are produced, excluding the production in salmon factories. The national government is currently developing relevant policies, rules and regulations for aquaculture development.

Most of coastal waters in Masan Bay have been designated as port district. Hence, capture fisheries or aquaculture are largely prohibited. The eastern part of the bay, outside the port district, is utilized for limited shellfish aquaculture.

1.3.3.4 Mineral resources

There is no commercial exploitation of mineral resources in either Jiaozhou Bay or Hakata Bay. In Peter the Great Bay, oil refinery and gas liquefaction factory are planned for construction in Primorsky Krai. Oil and gas pipelines are located in the land parts of the basin. Several marine oil transshipping terminals operate in this area. Moreover, there is a large-scale railway transportation

of oil products. An oil terminal operates in Kozmina Bay, which is the final point of the Siberia-Pacific oil pipeline. Average monthly amount of transported oil is over one million tons. The port facilities are expected to provide loading of tankers with displacement from 80 to 150 thousand tons on the berth. By 2015, the port is expected to export 50 million tons of oil annually. There are no mineral resources that are commercially exploited in Masan Bay.

1.3.3.5 Transportation, Ports and Shipping

The transport sector in Jiaozhou Bay, China, has been rapidly modernizing. In 2010, the transport revenue was two times when compared to the 1997. The rotation volume of goods transport was about 12 times when compared with the 1997 statistics. Volume of goods for water transport increased by nearly 100 times. In particular, the port capacity of Qingdao from 1997 to 2010 had an exponential growth. The volume of cargoes unloaded was 350,120 tons, which increased by 5 times over the last 14 years.

The Port of Hakata is one of the 23 "Specially Designated Major Ports" in Japan. Hence, this port is particularly important in promoting foreign commerce and trade. In 2009, the volume of international seaborne containers handled was ranked 1st in Kyusyu Island, 6th in Japan and 123rd in the world. The port serves many international cruise lines that cater to both domestic and international passengers. Since 1991, Japanese ports have been ranked 1st in terms of the number of passengers traveling internationally. The number of international passengers who used the Port of Hakata in 2008 was approximately 0.85 million; more than 58% of the passengers were Korean nationals. On the other hand, to develop and support these active transportation services, a coastal area of 1,170 ha has been reclaimed to construct the pertinent port facilities.

The region around Peter the Great Bay is linked with adjoining regions via a comprehensive transportation system of railroad, sea and air. Primorsky Krai takes the lead in the Russian Far East (RFE) in terms of transport network density and number of transport vehicles. The Trans-Siberian Railway, the longest in the world, ends near Golden Horn Bay in Vladivostok. The Trans-Siberian Railway links the large seaports of Primorye (Nakhodka, Vostochny and Posjet, as well as Vladivostok) with the entire Russian territory.

The port of Masan is playing a substantial role in exporting goods manufactured in the industrial complexes. At the same time, it serves as a hub in importing raw materials and fuels. Annual cargo volume through the port accounts for 15 million tons in 2011. Regular liner services are provided only for cargos between Korea and Japan, South East Asia and North East Asia.

1.3.3.6 Tourism

Tourism – both domestic and international – has been a booming industry in the Jiaozhou Bay area. Qingdao's tourism income, as well as tourist arrivals, has exponential growth from 2001 to 2010. Domestic tourists' income and arrivals contribute more (above 80%) compared with the income and arrivals from overseas tourists. Tourism has been contributing to about 10% of the GDP. The only exception was year 2003 when the severe acute respiratory syndrome (SARS) medical phenomenon hit all over China.

Generally, Hakata Bay and the associated basins are not very rich in natural attractions to tourists. The contribution of tourism to the GRP of Fukuoka City (4.4%) was slightly lower than

the GDP ratio of Japan (5.3%) in 2008. More than 85% of the visitors to Hakata Bay come to visit the urban areas for shopping and dining as well as to use the leisure and sports facilities. More than 40% of the visitors reside within Fukuoka prefecture. The number of foreign tourists is about 8% of the total number of visitors. The numbers of visitors that come through Fukuoka Airport and Hakata Port in 2008 were 426,000 and 272,000 people, respectively.

At present, the tourism industry in Primorsky Krai ranks No. 4 in Russia (after Moscow, St. Petersburg and Krasnodarsky Krai). Primorsky Krai has great tourism potential from geographical and geopolitical perspectives. There are more than 2,000 historical and cultural monuments, 184 museums, over 30 recreation camps, and some 170 hotels. Vladivostok has direct air traffic links with large cities of Japan, Republic of Korea, Republic of China, Thailand and Vietnam. Currently, 274 tourist organizations operate, some having cooperative agreements with foreign countries. In the first half of 2010, Primorsky Krai was visited by 52,952 foreign tourists. Tourism services include outdoor recreation, sightseeing and recreational fisheries.

Changwon City is regarded more as an industry-based area. Tourism has not drawn much attention from people, both residents and non-residents. Tourism industry has not been grown much; therefore, tourism resources are relatively limited when compared to the other sites having national attention. Amenities and facilities, however, are prepared to accommodate occasional tourists. Small size and meaningful tourism sites are easily available, though.

1.4 EXPERIENCE OF MARINE SPATIAL PLANNING AND ECOSYSTEM-BASED MANAGEMENT IN THE SELECTED AREAS OF THE NOWPAP REGION

1.4.1 Analysis of situation in NOWPAP countries and identification of existing ICARM issues

1.4.1.1 Major threats to ecosystem health and human

The previous chapter provides a comparative summary of the present social, environmental and economic situation within the four case study areas. In this chapter, the major problems/issues are summarized in Figure 1.6. The constraints in integrated management of the river basins and coastal areas are manifested by the following key issues/problems: habitat degradation, pollution, non-optimal use of resources, and cross-cutting issues. The institutional/governance ramifications are likewise depicted.

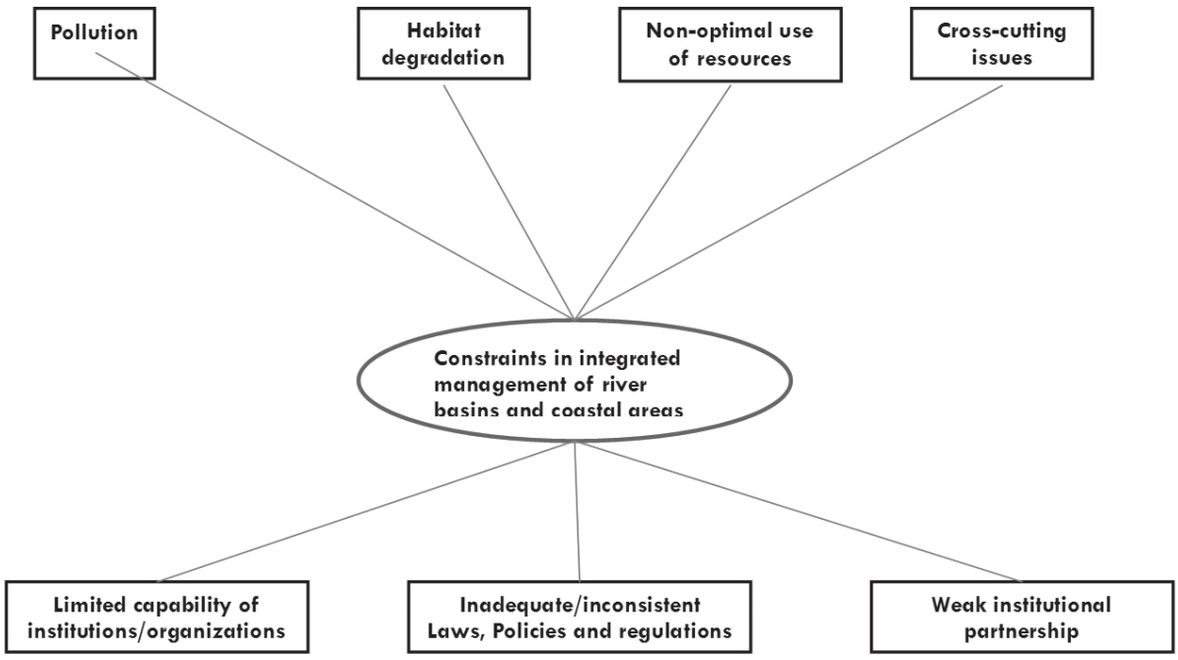

Figure 1.6. Key environmental issues/problems and their institutional/governance linkages.

4.1.1.1.1 Habitat destruction

The destruction and alteration of habitats are considered to be the greatest of all threats to biodiversity, and the most widespread human impact on the coastal zone (GESAMP, 2001). Coastal forests and marine habitats have been degraded in varying degrees in Jiaozhou Bay (China), Hakata Bay (Japan), Masan Bay (Korea) and Peter the Great Bay (Russia). Human activities that have either degraded the habitats or have transformed them into other land uses include: expansion

of human settlements; reclamation of inter-tidal areas; creation of navigation channels; actual construction of manufacturing establishments; and construction of port-related facilities. Coastal economic activities may be also negatively impacted by pollution, such as oil spills and increase in nutrient loadings. Destruction and degradation of such critical habitats are strongly correlated with the decrease in marine biodiversity and productivity. Unregulated human activities may contribute to the impairment of the functional integrity of coastal and marine ecosystems, thereby reducing the natural goods and services that they provide.

1.4.1.1.2 Pollution (air, land and water)

Several forms of pollutants are found in the NOWPAP region. They occur in liquid and solid forms, and are present in terrestrial, riverine and marine environments. Air pollutants are present in the atmosphere.

1.4.1.1.2.1 Water quality

China's national standard for sea water quality is classified into five levels. These are levels IV through IV , and worse than level IV . Level I has the best sea water quality; the water quality deteriorates as the level goes up. In Jiaozhou Bay, the percentages of these five levels of water quality are 30.8%, 23.1%, 10.3%, 7.7% and 28.2, respectively. Water quality of the northern and northeastern parts - from Licun River mouth to Moshui River mouth - is worse than Level IV.

Water quality of Jiaozhou Bay showed improvements between the Tenth Five-Year Plan (2000-2005) and the Eleventh Five-Year Plan (2006-2010). From 2000-2005, the water quality of Jiaozhou Bay was kept stable. Over 40% of the bay's area had water quality that was worse than IV. At that time, Jiaozhou Bay was seriously polluted. Values for pH, DO, COD, DIN, active phosphate, oils and fecal coliform were above the national standard. Nonetheless, DIN and fecal coliform were the main pollutants. During the Eleventh Five-Year Plan, the bay's water quality recorded significant improvement. Since 2008, the percentage of area that is worse than Level IV has been under 30%. Only the value of active phosphate in 2006 exceeded the level II standard. Although DIN was still the primary pollutant, its value has continuously declined.

Due to the industrial setting of Japan's Hakata Bay, most of the anthropogenic pollutants such as COD, T-N and T-P originate in domestic wastewater. As such, these are primarily discharged through the wastewater treatment plants. The other sources are non-point sources from agricultural fields and forested areas, as well as point sources from livestock wastewater and workplaces.

In Peter the Great Bay, water quality is affected by an array of pollutants that drain into it. These include metals, pesticides, oil, phenols, nitrates and phosphates. Accumulation of some pollutants in marine hydrobionts has been documented, making these organisms unfit for human consumption. A considerable volume of pollution comes with river runoff. Spatially, most polluted coastal waters are close to the urban areas with highest population density, sewage discharges and coastal dumping.

In Masan Bay and its adjoining watersheds, land and sea use patterns and rapid industrial development have led to the decline in marine water quality. When industrial complexes were intensively built and manufacturing companies were operated in 1970s, legal and institutional mechanisms for environmental protection were not adequately prepared. Waste treatment facilities were only established in the late 1980s. Masan bay was classified as Class III sea water area. The

Korean government used COD concentrations as a key indicator for water quality classification. Class III means that the COD concentration has fallen into a range of 2.0 mg/L to 4.0 mg/L. Average concentration of COD in summer season of the bay was reported 2.6 mg/L; hence, the bay is classified into Class III water area. Introduction of TPLMS contributed to the lowering of COD concentration to 1.85 mg/L in summer of 2011. Hence, Masan Bay has been re-classified as Class II water area. It implies then that the water quality is improving.

1.4.1.1.2.2 Air pollution

Currently, air pollution is not a serious concern in Jiaozhou Bay and Hakata Bay. There are 328 industries in the coastal zone of the Peter the Great Bay that emit pollutants to the atmosphere. These industries are spread out in Artyom, Bolshoy Kamen, Vladivostok, Nakhodka, Partizansk, Ussuriisky, Fokino, Nadezhdinsky, Oktyabrsky, Partizansky, Khasansky and Shkotovsky. The amount of trapped and neutralized pollutants was estimated at 12,675,000 tons.

The Korean government is operating six stations for air pollution monitoring and TMS (TeleMetering System) in Changwon city. These facilities provide real-time monitoring results through web-based information system. Information on these major six parameters are provided: CAI, PM-10, O_3, NO_2, CO and SO_2. In recent years, despite the increasing concentration of O_3, continuous monitoring and strict enforcement of regulatory measures contribute to maintaining an air quality level that is still suited for everyday life.

1.4.1.1.2.3 Nutrients

Jiaozhou Bay's annual average concentration of active phosphate was recorded at 0.019 mg/L in 2010. This value met the level II standard for seawater quality. The higher concentration of active phosphate was located in the north of Moshui River mouth, Loushan River mouth and Dagu River mouth. The highest value of 0.064 mg/L was recorded in the mouth of Loushan River.

In Hakata Bay, urbanization has led to the increase in the bay's level of nutrients. In this regard, Fukuoka Prefecture and Fukuoka City jointly developed the "Basic Plan of Advanced Treatment for Specific Water Areas of Hakata Bay" in 1998. The regulatory bodies/agencies began to apply the technologically-advanced wastewater facilities which can remove not only nitrogen but also phosphorus. Because of these efforts, the concentrations of COD and T-N in the bay ceased to increase around 1993 and have remained stable until now. The concentration of T-P has shown a gradually decreasing trend since 1994. Consequently, the concentration of T-P has been within levels of environmental quality standard (EQS). Meanwhile, the concentrations of COD and T-N have only partly exceeded the EQS.

Nutrients relevant to coastal environment in Korea are nitrogen and phosphorous, which directly influence algal bloom. Installation of tertiary treatment devices into the wastewater treatment facilities resulted have in lowering the T-N and T-P concentrations in the bay. Annual average concentrations of two parameters are within the range of Class II water area categories (0.03~0.05 mg/L for T-P and 0.3~0.6 mg/L for T-N). Concentrations in summer season showed water quality exceeding Class II sea waters. Phosphorous rather than nitrogen was identified as a limiting factor in the bay. As such, T-P will be controlled under TPLMS from 2012.

1.4.1.1.2.4 Oil spill

Jiaozhou Bay's annual average concentration of oils was recorded at 0.027 mg/L in 2010. This value was within the level I standard. Notwithstanding, the higher concentration exceeding level II was recorded in the northeastern part of the Bay, near the river mouths. Values beyond the standard occurred only during summer time.

Serious oil spills have not occurred for the last two decades. This is due to the fact that navigation channels with Masan Bay are controlled by computer-aided vessel traffic service (VTS). Small amount of oil leakages or spills have occurred sporadically. Once reported, however, it is effectively responded due to well-prepared oil spill contingency protocols.

1.4.1.1.2.5 Red tides / harmful algal blooms

During the 1990s, the occurrence of red tide declined due to the decrease in chlorophyll concentration in Japan's Hakata Bay. This was attributed to the use of advanced wastewater treatment facilities that are capable of removing phosphorous. Hence, there has been a reduction in primary production. In recent years, however, the occurrence of red tides has increased again. The major causal phytoplanktons have become dinoflagellates instead of diatoms and Rhaphidophyte. The latter two groups of phytoplanktons were commonly seen before the use of the advanced wastewater treatment. It is speculated that the shift of red tide species could be attributed to the intensive phosphorus removal in the wastewater treatment facilities. Such action may have drastically changed the ratio of nitrogen to phosphorus in the bay. Hence, it has been proposed to control not only the quantity of nutrients but also the quality to conserve the species and ecosystems in Hakata Bay.

As an exceptional case, the water surface of Hakata Bay was reported to have milky white color in the spring of 2004 and 2007. This was primarily due to blooms o*f Gephyrocapsa oceanica* (classified as Haptophyte), which possesses white exoskeleton of calcareous plates called coccoliths. This species occur naturally in the open ocean. This phenomenon will be closely monitored if this could be correlated with some changes in the environmental conditions inside the bay, or the rising of the seawater temperature in the East China Sea that may in turn be related with the global climate change phenomenon.

In Peter the Great Bay, 32 species of potentially dangerous microalgae are recorded. In Amur Bay, some 30 species of the microalgae causing harmful blooms were documented from 1991-2010. Among them, 21 species are considered as red tide-causing organisms and 9 species are recognized as potentially toxic. These species belong to these six taxonomic groups: dinoflagellates, diatoms, raphidophytes, cryptophytes, chrysophytes and euglenophytes (Orlova, 2005). During this time in Amursky Bay, including the Golden Horn and Rynda Bays, 85 cases of harmful algal blooms were documented. The maximum number of cases was recorded in July and August, while the greatest number of cases when 13 toxic phytoplankton species occurred was recorded from June-October. In Vostok Bay, 20 cases of red tides were registered from 2001 to 2009. Nonetheless, majority of the documented cases of harmful algal blooms did not involve human poisoning or direct ecological damage.

Masan Bay was used to be known for occurrences of red tides and hypoxia since the early 1980s. These issues contributed to the bay's designation as a "Special Management Area" in

1982. The continuing environmental investments, such as the installation of wastewater treatment facilities, have played a role in decreasing the frequency of red tide occurrences. A total of 52 red tide cases were reported from 2000 to 2005. Since 2006, however, the frequency of red tides have continuously decreased due to the concentrated efforts to reduce pollutions load from land-based activities. Red tides were not reported in 2011.

1.4.1.1.2.6 Wastewater / sewage

In 2010, the total amount of direct wastewater discharge in Jiaozhou Bay was $1{,}77x10^8$ tons. The amount of COD and ammonia nitrogen discharge were 107,505 tons and 11,879 tons, respectively. The main sources of discharges are rivers that flow into the bay, which account for more than 80% of the volume. The second source is sewage treatment plant. Influence from direct input from factories can be ignored. Among the eight rivers, Moshui River and Dagu River contribute to about 87.6% of the total discharges. The three main pollutants carried by these riverine systems include COD, ammonia nitrogen and total phosphorous.

Hakata Bay is still affected by wastewater discharges. In 2005, some 94.8% of the population was served by the sewer system for domestic wastewater. Nonetheless, domestic wastewater still contributes the most to the discharge of pollutants in Hakata Bay.

Sewage flows to the Peter the Great Bay emanate from 301 commercial enterprises. These include 97 industrial firms, 56 agricultural farms, 10 railway stations, 9 ports and 11 water service stations. The amount of the wastewater annually discharged into the bay is about 491 thousand tons.

In the case of Masan Bay, industrial and domestic wastewaters are discharged into the bay through two wastewater treatment plants (WTPs). As of 2009, the sewerage service rate was 97% for the watershed households. COD loads through the WTPs is estimated at 4,321 kg/day, which represents 58% of total load of COD (7,450 kg/day) (MLTM, 2011). The COD concentration at outfall of the plant with COD load of 3,710 kg/day has been maintained below about 13 mg/L since the introduction of TPLMS.

1.4.1.1.2.7 Hypoxia / Oxygen depletion

Oxygen depletion is another pollution-related issue in Hakata Bay. Hypoxia refers to a condition with low concentration of oxygen when quantitative and qualitative changes occur in the ecosystem. In most cases, hypoxia occurs due to the joint impacts of natural and anthropogenic factors. In addition to the sedimentation of suspended particles produced mainly through red tides, large amounts of organic matter have already been deposited on the seabed of the bay that have accumulated through the years. These sediments and organic matter have kept on utilizing large amounts of oxygen, especially in summer time. In the dredged depression and sea bottoms with a low current velocity in the bay, the oxygen concentration was recorded at < 2 mg/L. Such low oxygen level is an extremely unfavorable condition for the benthic organisms. In spite of such environmental conditions, Hakata Bay is within the EQS for DO. This is because the current regulation does not cover the problems related to the vertical structure of the sea.

Amursky Bay, which faces Vladivostok City, has experienced the most number of cases of seasonal hypoxia. The enrichment of coastal areas with biogenic elements (nitrogen and phosphorus) has contributed to hypoxia. Within Peter the Great Bay, phytoplankton development occurs due to input

of biogenic elements and organic substance from the following sources: household wastewater of Vladivostok; river discharge; and atmospheric precipitation. The primary source of biogenic elements (from March to September) being deposited into the bay is the Razdolnaya River.

Oxygen depletion is one of the critical ecological issues at the bottom layer of Masan Bay. In this context, it is defined as a state whereby the DO concentration at the bottom layer is below 2 mg/L. The oxygen depletion is reported to be driven by increased water temperature and stratified water column. Oxygen depletion in the bay has been decreased due to intensive investment for pollution load reduction facilities. Thus, only nine events were observed during the last eight years from 2004 to 2011 (MLTM, 2012). Oxygen depletion was not reported during these years: 2007, 2009 and 2011.

1.4.1.1.3 Non-optimal use of resources

Non-optimal use of resources largely relate to the poorly-regulated or wanton use of coastal and marine resources. This particularly relates to the overexploitation of the fishery resources. Productivity and profitability of fisheries may have been declining due to the decrease in fishing grounds with the proclamations of neighboring countries of their EEZ boundaries, as well as stock depletion from overfishing.

Poaching (including illegal trade) may be considered also as a non-optimal use of resources particularly in the RFE. Poaching of the most commercially-valuable marine flora and fauna has continued due to the high price being commanded by the species and stable market demand. Forms of poaching in ranked order include: illegal shooting of hoofed animals, illegal shooting and catching of game birds, shooting and catching of fur animals and shooting of rare species of mammals and birds. Among hoofed animals, Sika deer is the most hunted. Among fur animals, poachers often kill the raccoon dog and fox. Hunting of mammalian and avian species listed in the Red Book of Russia also occurs. On the marine side, salmon, crabs, scallop, trepang and grass shrimps are the key species being poached. The principal causes of mass poaching include poverty of local population, unemployment and difficulty in enforcement of regulations.

Masan Bay was designated as a Special Management Area under the jurisdictions of various mandated institutions. Hence, capture fisheries or hunting of wildlife are not directly relevant concerns.

1.4.1.1.4 Cross-cutting concerns

Climate change and sea level rise are two of the global cross-cutting concerns. Climate change is a global phenomenon that will affect the NOWPAP region. Climate change's negative impacts may include increasing sea water intrusion and/or freshwater flooding in heavily populated coastal mega/sub regions.

Sea level rise is of particular concern in China. On the average, the sea level of the Yellow Sea arises at 2.5 mm per year. From 2004 to 2006, the sea level of the Yellow Sea was higher than the last years. The Korea Hydrographic and Oceanographic Administration (KHOA) analyzed the sea level data of Korea's coastal areas. The analysis was based on the observation data that were recorded from the 1970s up to 2008. According to KHOA (2009), the sea level rises of the western coasts (Yellow Sea) and southern coasts of the Korean peninsula during the four last decades were estimated at 2.4 mm/yr and 2.9 mm/yr, respectively. Coastal facilities – such as industrial

complexes and wharves of the port in Masan Bay - could effectively adapt to the natural and gradual sea level rise. The issue of sea level rise is often associated with climate change.

Natural disasters may be included as cross-cutting concern. Storm surges associated with typhoons, for examples, are regarded as crucial threats in Masan Bay. In 2003, when a typhoon called "Maemi" attacked the bay, 32 deaths were reported due to storm surges. Most of the victims were residing in the low-lying coastal fringes. Instant height of the surge was reported to be 2.3 m (Nam et al., 2009).

1.4.1.1.5 Major institutional/governance issues

The key environment and resource problems – habitat degradation, pollution, non-optimal utilization of resources – still persist because of various reasons. One, they still exist because of global cross-cutting environmental events (that are partly brought about by anthropogenic events) such as climate change and sea level rise. Secondly, there is still lack of integrated management. Among the causes of institutional failures in managing the coasts are: inadequate legal and policy support, lack of technical 'know-how' on the part of managers and political leaders, lack of coordination among sectoral agencies and limited involvement of coastal stakeholders, particularly the private sector and marginalized groups (Scura et al., 1992; Chua et al.,1992; Chua ,1996, 1998).

The institutional/governance problems may be arbitrarily classified into three. The first is limited institutional or organizational capabilities. There are complex issues in river basins and coastal areas that cannot be addressed adequately and simultaneously. The capacities of the management agencies vary across sectors. Some management agencies may be hampered by inadequate technical personnel, limited equipment and/or infrastructure facilities, and lack of operational resources.

The second constraint relates to inadequate and/or inconsistent policies. Many laws, policies and regulations have strong sectoral orientation. Examples are policies related to agriculture, forestry, fisheries, mineral resources and water resources. Environment-oriented policies may be in conflicts with laws and regulations related to economic development. Thirdly, there may be weak institutional partnerships among concerned agencies and stakeholders. There may be limited coordination of efforts – horizontally or vertically – among management agencies. National regulatory agencies may not work closely with their local counterparts. Many government agencies have strong tradition for sectoral management. Conversely, some civil society organizations may have adversarial relationships with government bodies. Conflicts emerged as a hot issue in the late 1990s in terms of the coastal development and protection of marine environment.

1.4.1.2 Examples of existing schemes of land-use management (or functional zoning) in coastal areas and river basins in case study areas

1.4.1.2.1 Jiaozhou Bay, China

China's national marine area is classified into 10 marine functional zones. These are as follows: (1) port shipping area, (2) fishery resources utilization and conservation area, (3) mineral resources utilization area, (4) tourism area, (5) water resource utilization area, (6) marine energy utilization

area, (7) area for projects, (8) marine preserve, (9) special utilization area, and (10) reserved area. Jiaozhou Bay and vicinities (including marine areas belonging to Qingdao city and Rizhao city) are regarded as important maritime areas. As such, the key functional zones include: Qingdao, Rizhao and Lanshan ports and related shipping channels, Lanshan and Shanhaitian tourist spots, and culture zones in north coast. Given this zonation, the corresponding program interventions are comprised of constructing container terminals of Qingdao port; ensuring sustainable fishery resources utilization and establishment of fishery conservation areas; developing coastal tourism; carrying out artificial propagation and culture of commercially-important shellfish species; and strengthening the foundation for maritime industry as well as science and technological development. In China, the coastal (nearshore) and oceanic seas are also divided according to environmental functions.

Jiaozhou Bay is a multifunctional zone. The five key functions – with examples in specific geographical sites – include: port (south coast), tourism (Laoshan head to Tang Island), capture fisheries/aquaculture (north coast), environmental protection and salt pan. ICM/ICARM in Jiaozhou Bay could be strengthened if the local governments will undertake several of these management measures: developing ports shipping capacities; protecting the migratory species and conserving the existing fishery resources; carrying out environment-friendly activities in intertidal zones; limiting the expansion of salt pan areas; restricting the fishing effort in inshore marine areas; restricting coastal sea sand mining operations; and strengthening marine environmental protection and pollution prevention.

The development of Jiaozhou Bay's functional marine zonation has been an evolutionary process. As early as 1995, Qingdao government had proposed the initial zoning scheme for Jiaozhou Bay and adjacent coastal zone. The five major zones are as follows: (1) development and utilization zones; (2) improvement and protection area; (3) natural reserve; (4) special functional zone; and (5) reserve zone. Firstly, development and utilization zones – which is further divided into three sub-zones – refers to areas where economic development activities are permitted. Spatial resources development zones include areas for maritime shipping, tourism, and industrial development. There are 10 industry regions, including 5 general regions and 5 special regions. Biological resources development and utilization zone include areas for marine culture and capture fisheries area. Salt pan and pond culture mixed areas include Dongying salt pan and Yijiashan salt pan.

Secondly, improvement and protection area include sites for resources recovery and environmental protection area. Thirdly, natural reserve covers areas that are home to rare and endangered species. Examples are natural reserves in Changmenyan and Shilaoren. Fourthly, special functional zone relates to special areas, such as marine science experiment laboratory, dumping area and flood discharge area. The last category is the reserve zone.

Zonation planning consists of five interactive phases/activities: (1) researching/understanding the overall environmental capacity of Jiaozhou Bay as well as assessing scientifically the bay area's urban development scale; (2) formulating regional environmental policies, management division of ecological environment space, and forming the environmental control system of industrial development; (3) formulating standards of regional industrial introduction and forming an ecological industrial system dominated by high technology and featured with circular economy; (4) establishing a benign interaction between development and protection, and coordinating the relations between regional economic development and natural cultural relic protection; and (5) balancing the conflicts between regional development and protection, and forming regional compensation mechanism.

Zonation planning in Jiaozhou Bay entails both protection and development endeavors. Protection involves several facets. One aspect is protecting natural seashore and strictly prohibiting illegal reclamation. Another is protecting river system and maintaining ecological corridor. There are seven rivers that flow into Jiaozhou Bay, intertidal zones and salt pans (Figure 1.7). Thirdly, there is a need to protect the so-called ecological wetlands, making them more resilient to climate change impacts.

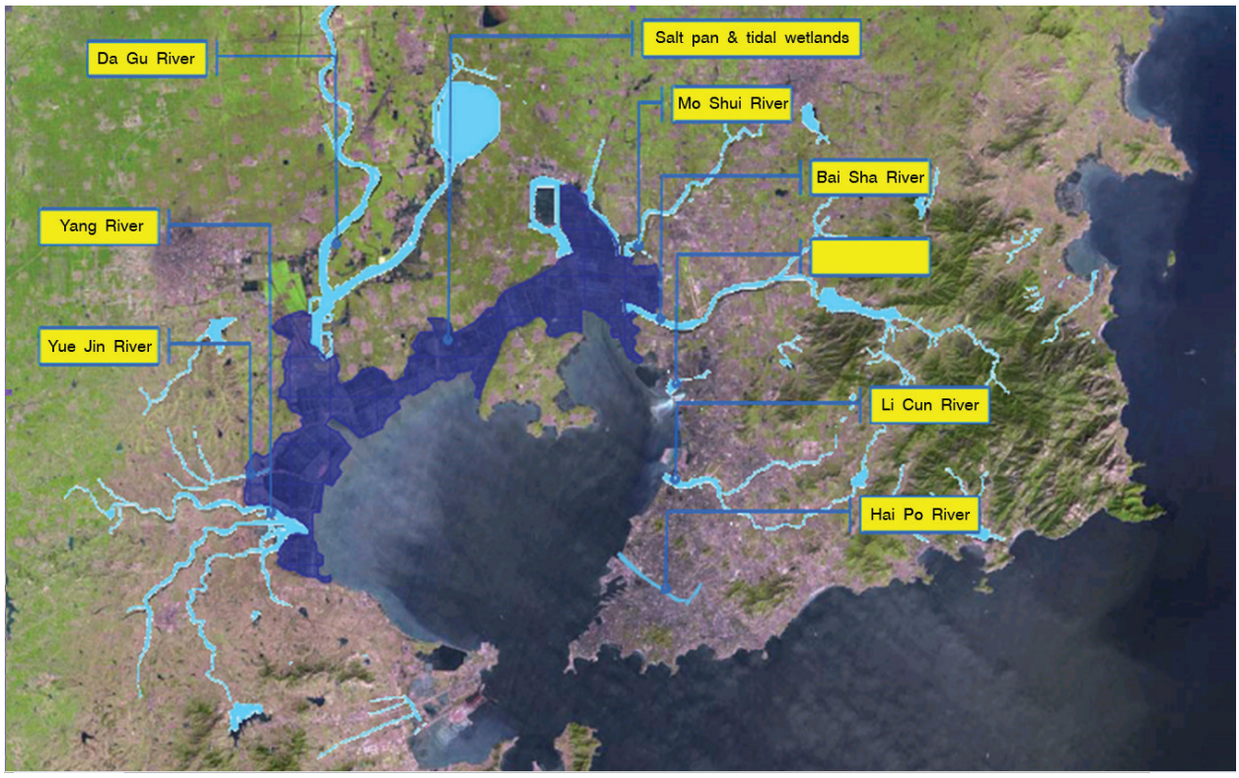

Figure 1.7. Seven rivers that flow into Jiaozhou Bay, intertidal zones and salt pans.

Improvement is the third dimension of protection. Included here is comprehensive watershed improvement and regional emission reduction target. It also requires sewage interception around the bay area as well as improvement in sewage treatment efficiency (Figure 1.8). Associated with this measure is controlling pollutant discharge in the bay area. Regeneration is another dimension of protection. Corollary with this initiative is getting through Hongdao Island's waterway and forming northern water network system as well as construction of an ecological interval. This requires strengthening the agencies in biological conservation, which may ultimately lead to an increase in biodiversity.

The development component relates to four elements. The first element refers to the 'Industrial Layout' around Jiaozhou Bay. As such, various parts of the bay will be associated with certain development endeavors. The North Coast will be allocated for hi-tech/high-end industries that will include Qingdao and other cities in Shandong Peninsula. The West Coast will be devoted to secondary industry, focusing on the industrial functions that are associated with the port. The East Coast will concentrate in tertiary industry such as finance, information technology, trade and tourism. The second element relates to the functions of inshore area. Such functions would

Figure 1.8. Sewage collection, handling, regeneration and recycle system around Jiaozhou Bay.

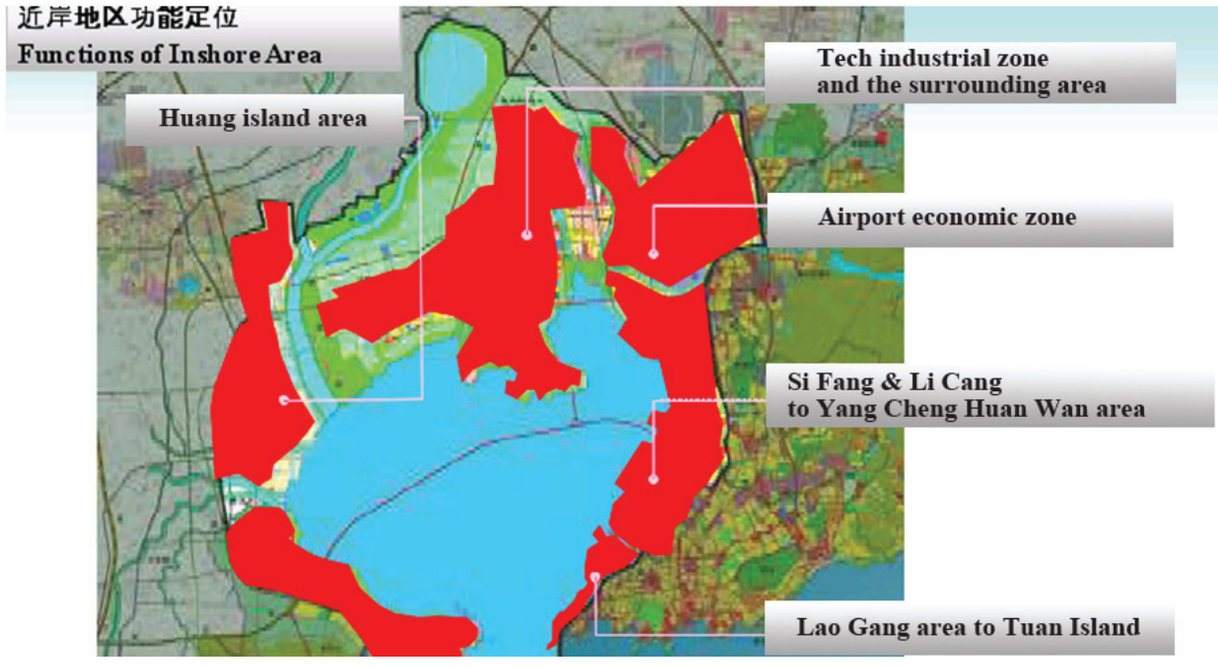

Figure 1.9. Six functions of inshore area (red area) around Jiaozhou Bay.

essentially cover ecology, environment, transportation, infrastructure and styles of urban area. This is schematically depicted in Figure 1.9. The third aspect relates to tourism development around the bay. Among the tourist spots that will be established and/or enhanced are Tangdao Bay Center Area, Jiaozhou Shaohai New City, Dagu River Wetland, Hongdao Ecological City and Sifang Coastal New Area. Transportation planning is the last element. The transportation system is an integration of express way network, track network and transportation hubs. It is an urban transportation system with efficient public transportation, to be complemented with bicycling and walking.

1.4.1.2.2 Hakata Bay, Japan

The case of Hakata Bay demonstrates Eco-park Zoning. Development of the port has been associated with land reclamation over several decades. To satisfy the increase in port demand, a reclamation project of the man-made island called "Island City" started way back in 1994 in the shallow sea area in front of the Wajiro tidal flats. The Island City was projected to cover a total area of 400 ha. As of 2009, about 70% of the projected area has been filled, and the port facilities have started the relevant services. The western part of the island is mostly occupied with the port facilities such as a container terminal. Meanwhile, the eastern area bordering the tidal flat is utilized largely as a residential zone with public parks.

The initial landfill plan in the early 1970s had a wider area to be connected to the surrounding coast line. Such plan did not materialize, however, due to a public opposition against the landfill because of the anticipated ecological damage to the Wajiro tidal flat. Moreover, the city decided to leave a channel 500 meters wide between the tidal flat and the reclamation field. As a result, island-type land reclamation was adopted and the tidal flat remained. The Wajiro tidal flat was not reclaimed given the projection that the seawater exchange in front of the tidal flat might be affected and the natural purification capacity of the tidal flat might be lessened. To mitigate the environmental damage that might result in the Island City Project, the city instituted the "Basic Plan for Eco-park Zone Development" in 1998. As such, the eastern area of the man-made island was assigned as a part of the "Eco-park Zone."

The eco-park zone aims at "harmonization with nature and man." This covers a total of 550 ha (both land and sea areas) around the Wajiro tidal flat and the Island City. The areas are divided into four zones according to environmental and socio-economic characteristics (Figure 1.10). These are the: (1) Wajiro tidal flat zone – for conservation of marine life; (2) Kasumigaoka zone – for accessing the waterfront and park; (3) Umi-no Nakamichi zone – for accessing the sandy beach; and (4) Mishima zone – recreation area with historical background. Environmental measures adopted for relevant zones include: sand covering to prevent leaching of nutrients from the seabed, creation of tidal creeks to promote seawater exchange, reclamation of sea grass and seaweed beds expected to improve the quality of seawater and bottom sediment, and creation of mildly-sloped shore protection using not concrete blocks but natural stones. The latter measure is intended to provide a resting area for wild birds and physical high access for seashore animals such as crabs. The city is also creating a "wild bird park" at the eastern area of Island City as component of mitigating measures for the migrating birds.

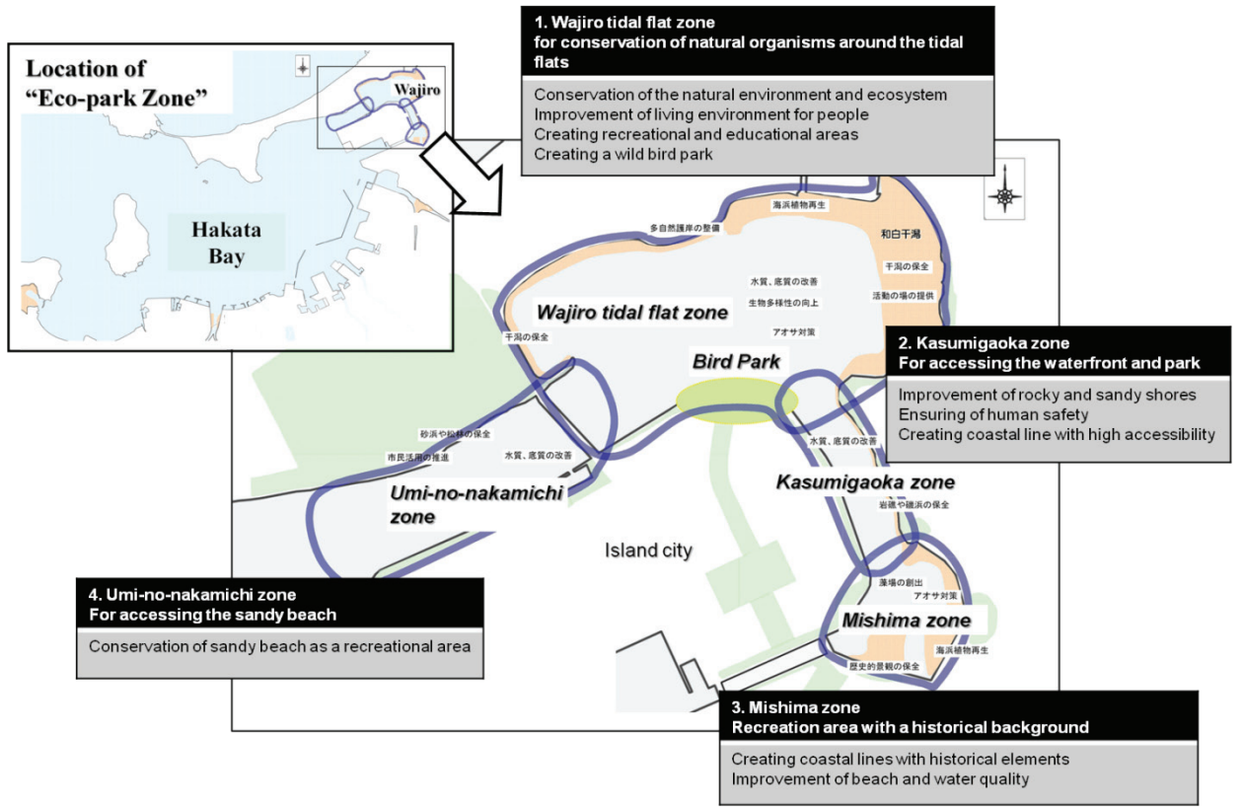

Figure 1.10. The zoning scheme of the "Eco-park Zone" in Hakata Bay.

In recent years, however, the decrease in population of wild birds has been noted. Foul smell has often been reported in some portions of the bay. Such obnoxious odor is caused by the serious proliferation of ulva (sea lettuce) and the ensuing decay process in the Wajiro tidal flats. The decrease in quantity of sea water exchange by the emergence of the man-made island in front of the tidal flat might have contributed to the proliferation of sea lettuce. The implementation of sand covering shows it is somewhat effective in recovering the habitat density and diversity around the tidal flat. The zoning scheme is also intended to address the issues of eutrophication.

The Total Pollutant Load Control System (TPLCS) forms part of zoning in Japan. Under this set-up, the governor of each prefecture makes Total Pollutant Load Control Plan to achieve the pollutant load reduction target. Associated management measures include: (1) reducing pollutant from household; (2) reducing pollutant from industry; and (3) reducing pollutant from agricultural land. As a measure for reducing pollutant from industry, regulation of pollutant load through Total Pollutant Load Control Standards has been implemented.

1.4.1.2.3 Peter the Great Bay, Russia

Zoning for Peter the Great Bay involves several interlinked activities. The spatial boundary of the zoning system was delimited first. Such geographic delimitation was largely based on the areas covered by the various administrative units. It was likewise undertaken in connection with the agreed goals for the regional development of the Russian Far East. This zoning was developed based on the best available scientific information that were provided and/or analyzed by the key research institutions in the RFE. It was designed to determine the trajectory of developmental

programs of the region. Zoning was also aimed to establish the most appropriate multi-sectoral management of the coastal zones.

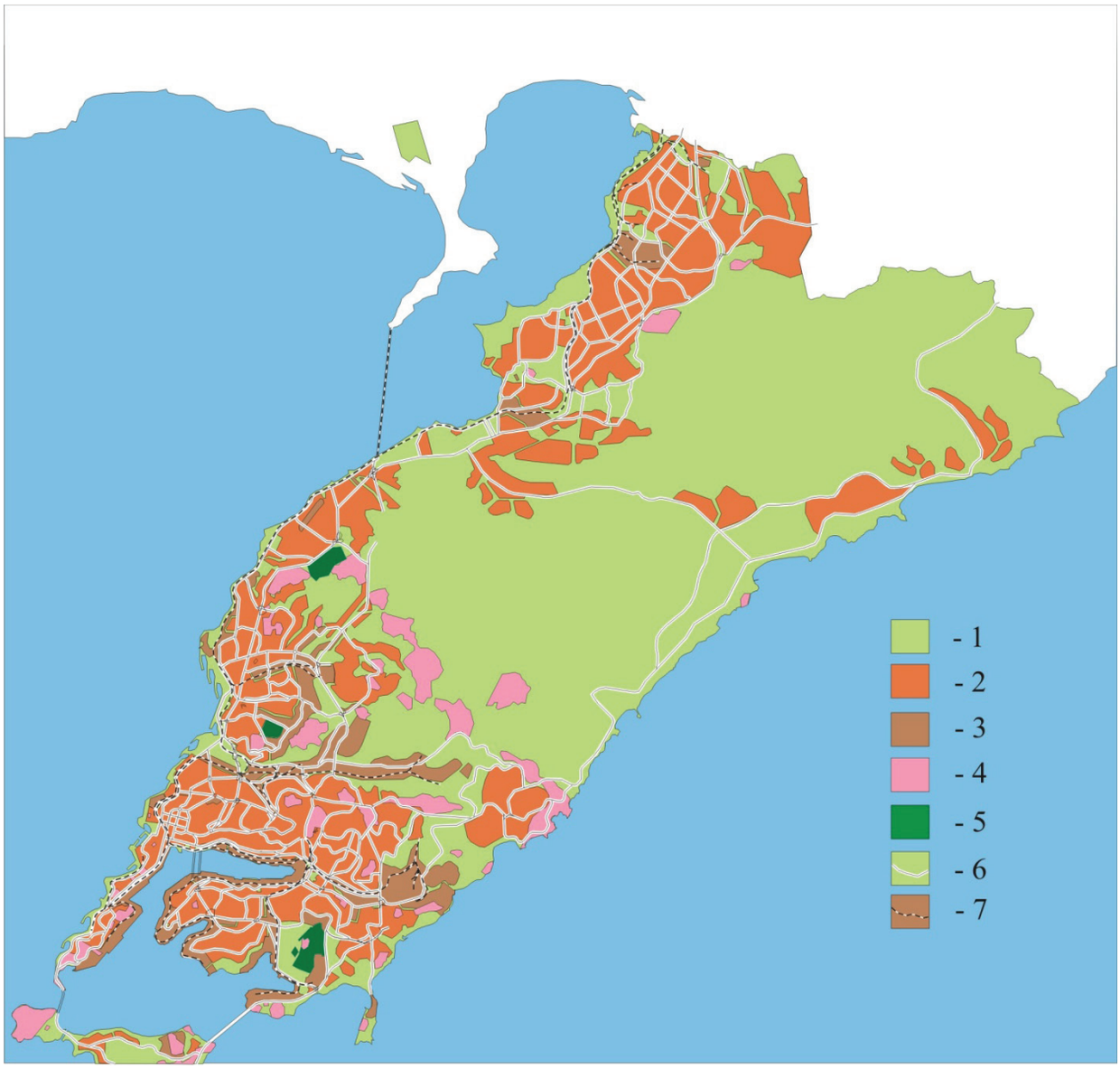

Figure 1.11. The map of functional zoning of Vladivostok.
1 – recreation area, including the area of urban forests and recreation; 2 – social, business and residential areas;
3 – industrial zones and areas of engineering and transport infrastructure;
4 – buffer zone of cultural monuments combined with landscape protection zone 5 – cemetery;
6 – major roads, 7 – the railroad.

Functional zoning was developed for Vladivostok and Russky Island following several technical and administrative considerations. Desk works include the evaluation of archival records as well as analysis of databases. Variables or parameters that were considered in zoning include

the level of economic development, socio-demographic characteristics and peculiar features of the natural environment. The functional zoning of Vladivostok reflects the land uses as well as allowable activities (Figure 1.11). Russky Island (309 ^{2}km) of Vladivostok is a popular tourist destination. Russky Island Tourism & Recreation Zone was created in Primorye Territory pursuant to the Russian Government's Resolution No. 201 dated March 31, 2010 (http://eng.oao-oez.ru/special_economic_zones/tourism_recreation_zones/russian_island/). The tourism zoning of Russky Island is reflected in Figure 1.12.

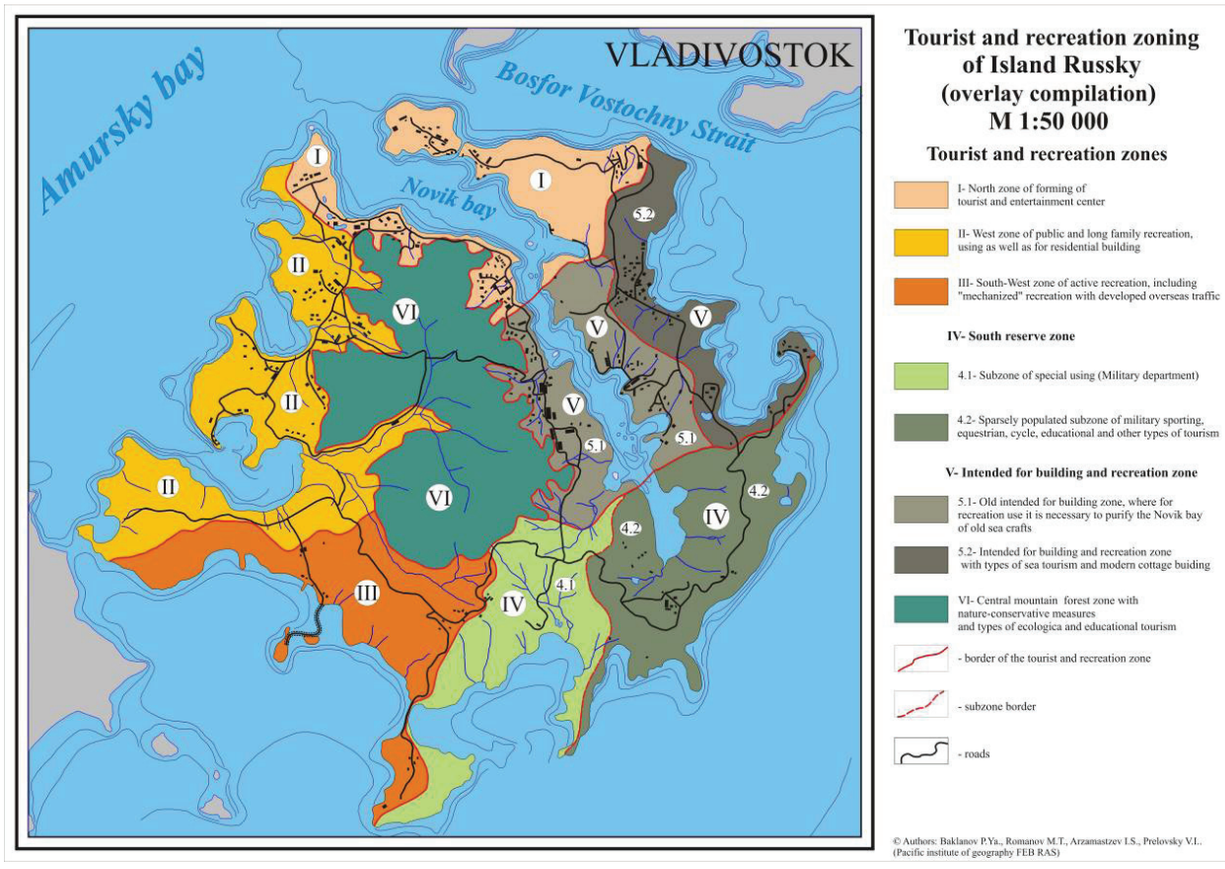

Figure 1.12. Generalized touristic and recreational zoning of Russky Island.

1.4.1.2.4 Masan Bay, Korea

Functional zoning mechanism is applied to all territorial areas under the jurisdiction of the Korean government, which is based on National Land Planning and Utilization Act. As such, the land area of the bay is also divided into four special purpose areas, namely: (1) urban areas, (2) control areas, (3) agricultural and forest areas, and (4) natural environment conservation areas. Each special purpose area, in turn, has relevant sub-categories. As earlier mentioned, about 97% of the watershed is designated "Urban Areas" which is composed of residential, commercial, industrial and green areas. Green-colored part on Figure 1.13 represents "green area" in the watershed, where uses and development of land are strictly prohibited. Meanwhile, "residential and commercial, industrial areas" are represented by red-colored parts.

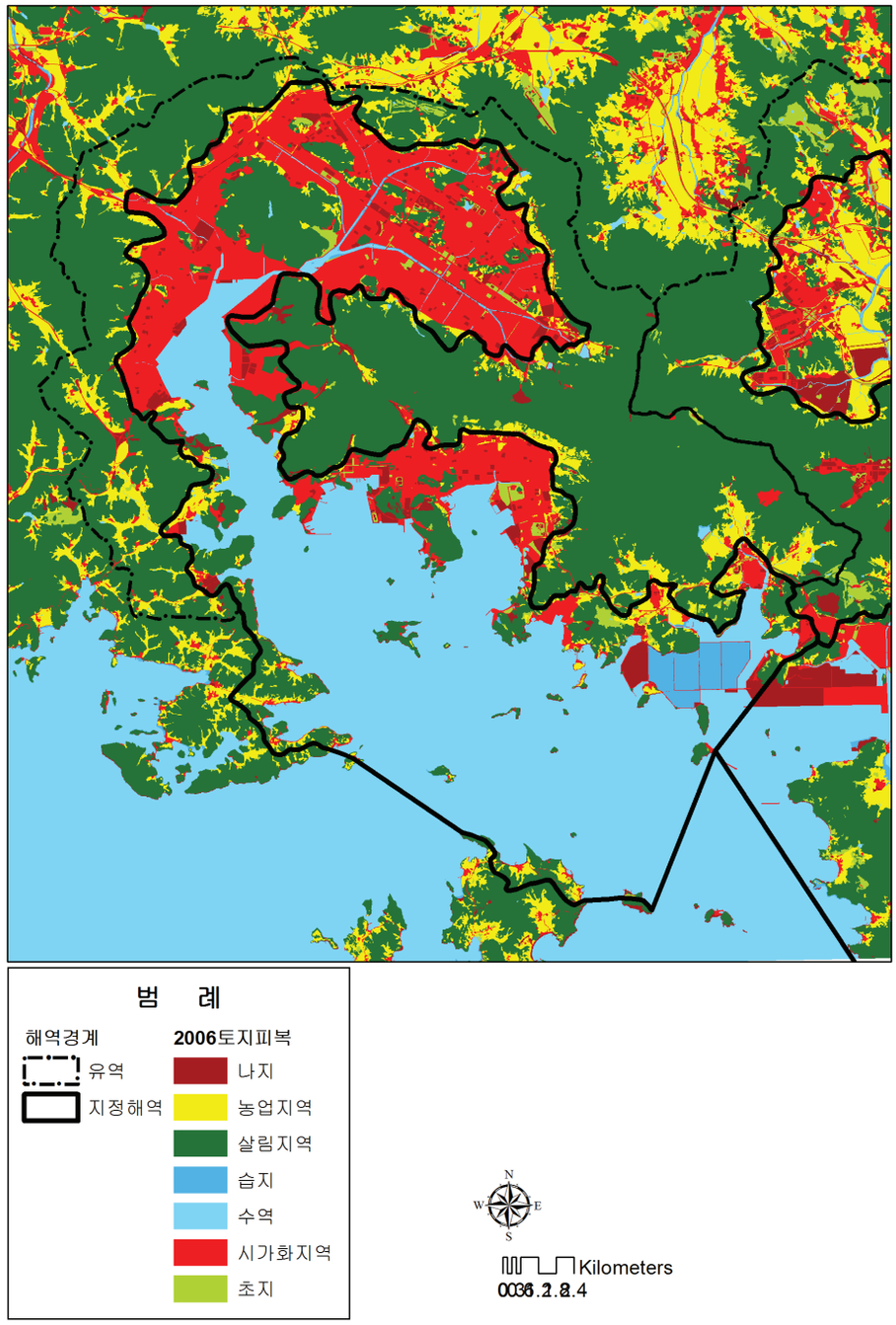

Figure 1.13. Map showing land use and coverage in the Masan Bay Watershed (MLTM, 2012).

Changwon city has its Urban Management Plan to manage land areas and utilize spatial resources. Since the introduction of TPLMS into the watershed, all development projects with additional pollution load shall be reviewed and assessed. If pollution load of specific development project could not be accommodated within the allowable development load, the project shall be either cancelled or postponed until the next TPLMS target period. It can only be implemented after approval of reduction measures for the additional pollution load.

In addition, zoning mechanism for coastal areas has been required since the enactment of Coastal Management Act of 1999. Local governments established and have implemented integrated coastal management (ICM) plans within their areas of jurisdiction. In 2009, amendment of the act became a turning point in terms of application of legally binding zoning mechanism. Changwon City, therefore, has to revise its plan to take into account and/or harmonize the various land and sea uses. The ICM plan for the bay is scheduled to be revised at least until 2013 as its schedule was articulated on the 2nd National ICM Plan of 2011.

1.4.1.3 Ecosystem evaluation and/or economic valuation of relevant land, coastal and marine resources

1.4.1.3.1 Jiaozhou Bay, China

The case of Jiaozhou Bay's ecosystem evaluation involves several interlinked steps: from diagnosis to selection of options. Several data sets and/or information from relevant government agencies were used in ecosystem evaluation exercise. These documents include: Qingdao Environmental Quality Bulletin; Qingdao Marine Environmental Quality Bulletin; Qingdao Statistical Yearbook; Qingdao Marine Environmental Protection Plan (2005~2020); Jiaozhou Bay Wet Land Protection Plan (2005~2020); Jiaozhou Bay Main Pollutant Total Emission Control Plan (2005~2010); Pollution Control of Either Rivers Flowing into Jiaozhou Bay Plan (2005~2010); and The Eleventh Five-Year Economic and Social Development Plan of Qingdao. The following years consisted the evaluation period: 1988, 1995, 2001, 2003, 2005 and 2007. Based on the available information, changes that occurred within Jiaozhou Bay ecosystem were analyzed.

Given the situation in Jiaozhou Bay, 25 ecosystem evaluation factors were chosen (Table 1.1). These factors include land ecosystem evaluation factors, marine ecosystem evaluation factors, economic and social system evaluation factors, and management system evaluation factors. In terms of evaluation method, the Analytic Hierarchy Process (AHP) was chosen. (This method was developed by T.L. Saaty, an American operations research expert at the University of Pittsburgh in the 1970s).

The results show that the four sub-evaluation indexes have different trends over the twenty year period (Figure 1.14). Land ecosystem and marine ecosystem conditions have generally deteriorated. On the other hand, the socio-economic and management systems have improved. The comprehensive/summary index has the same pattern as land ecosystem index and marine ecosystem index.

Principal components analysis (PCA) method was undertaken to analyze which factors have influenced the most to the current situation in Jiaozhou Bay ecosystem. The analysis resulted in two principal components. The first principal component explains that intensive land-use, population pressure, environment pollution and economic development play important role in the current configuration of Jiaozhou Bay ecosystem. The second principal component illustrates that marine reclamation area, marine fishery, and biological pollution carry great weight in Jiaozhou Bay ecosystem. Overall, the most important influencing factors are environmental pollution, land-use, population pressure and marine fishery. These factors are useful information for future initiatives in integrated coastal and river management.

Table 1.1. Jiaozhou Bay costal ecosystem evaluation factors data from 1988 to 2007.

Factors	Unit	1988	1995	2001	2003	2005	2007
Forest cover	%	13.02	23.50	20.5	23.20	29.80	33.76
Biological abundance index	-	0.153	0.128	0.115	0.105	0.119	0.132
Landscape fragmentation index	-	0.59	0.68	0.73	0.74	0.84	0.86
Clean water*	%	39.80	43.60	55.20	74.60	71.90	65.10
Cultivated land area per capita	Mu/person	1.16	1.07	0.99	0.89	0.86	0.82
Accumulated reclamation area	Km^2	165.10	177.64	195.60	196.60	200.10	205.08
Decontamination time	day	24	29	33	34	36	36
Variation factor of wet land	%	0.00	1.54	4.70	5.08	3.57	1.03
Sea water quality composite index	-	0.36	0.46	3.25	2.88	4.53	4.04
Pollution risk index of heavy metal in sediment	-	85.11	120.10	38.54	78.85	29.75	67.53
Coastal function zone passing rate	%	35.00	43.00	59.20	84.44	75.90	71.90
Evaluation index by biological	-	0.40	0.90	0.89	0.92	0.83	0.96
Phytoplankton biomass	$tons/Km^2$	36.19	38.97	60.11	98.66	89.23	70.42
E_x**	-	13510.5	4581.0	6008.4	16099.7	20139.9	19049.8
E_{xst}**	-	149.78	148.20	127.24	117.24	109.84	112.59
Amount of marine fishery	Ten thousand tons	13.4	26.83	46.17	44.32	40.60	37.51
Per capita GDP	Yuan	2113	9293	18573	23398	33188	49954
Percentage of tertiary industry	%	27.88	35.60	39.80	39.10	41.60	43.00
Engel coefficient	%	86.00	56.60	41.85	39.27	37.60	37.10
Popularity density	Person/Km	612	643	667	677	695	711
Percentage of water environmental capacity satisfaction***	%	100.0	95.30	90.27	67.23	58.77	55.41
COD cut rate	%	0.00	3.40	9.08	11.80	13.90	14.90
The percentage of protection zone	%	8.00	10.00	12.00	13.00	14.00	14.40
The percentage of environment investment	%	9.20	11.38	10.42	12.75	14.29	18.55
Treatment rate of domestic sewage	%	8.00	23.55	50.23	52.90	63.55	80.30

*: Clean water means the water quality meet the National standard class three.
**: Calculated by amount of phytoplankton, benthos and fish in Jiaozhou Bay.
***: Calculated by DIN and COD data.

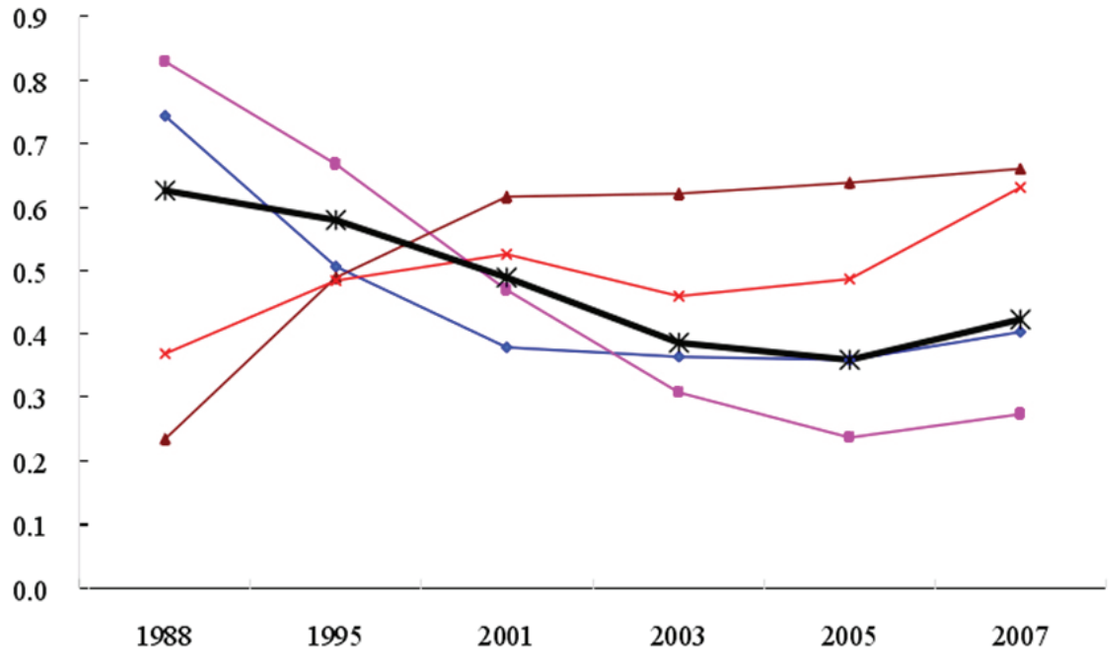

Figure 1.14. Jiaozhou Bay coastal ecosystem evaluation index from 1988 to 2007 .

(Note: Representation for colored lines are as follows: blue line - land ecosystem; rose pink line - marine ecosystem; brown line –socio-economic index; red line - management system; and black line – comprehensive/summary index)

1.4.1.3.2 Hakata Bay, Japan

Ecosystem valuation in Japan is correlated with environmental accounting (EA). The Ministry of the Environment provided the guidelines for EA to identify the costs and benefits of environmental conservation activities introduced to many municipal organizations in Japan. Fukuoka City has also promoted the EA system to various sectors. For example, the wastewater department has annually disclosed the total EA results. However, the current EA system does not cover quantification of the economic values associated with the ecosystem services. Hence, ecosystem valuation is yet to be fully operationalized.

1.4.1.3.3 Masan Bay, Korea

Ecosystem valuation has been extensively used as an assessment tool in Korea since 2000s. From the late 1990s to the early 2000s, some development projects, such as wetlands reclamation, have become controversial issue. Hence, research and studies on valuation of marine and coastal ecosystem development were conducted in order to incorporate the values of environment and/or ecosystem into decision-making process. Thus, for development projects that require public funds over US$ 33 million that will potentially degrade the environment and ecosystem, non-use value of ecosystem should be assessed according to “A National Guideline for Pre-feasibility Assessment.”

Several studies were conducted to estimate the values of coastal and marine ecosystems. Nam and Lee (2010) carried out a collaborative valuation study and reported that the annual service value in 2009 that were provided by the coastal ecosystems accounted to at least 6% of national

GDP of Korea. Contingent valuation methods (CVM) and Emergy were applied for the coastal waters valuation. Not to be confused with energy, emergy is the energy that is used directly and indirectly to make a product or provide a service.

The above approaches were also applied to evaluate the implementation of TPLMS for the last five years from 2007 to 2011. Output from the studies was represented as benefit-cost (B/C) ratio and value of ecosystem. Benefits by doing TPLMS and cost for TPLMS were assessed and the B/C ratio was estimated at 1.44. It was also reported that ecosystem of Masan Bay, as of 2011, provides a service equivalent to US$ 50 million/year (MLTM, 2011).

1.4.1.4 Singling out international (transboundary) issues, priorities and alternatives of problem solving

Integrated management of Tumen River is an issue of great significance to the NOWPAP region. This is the largest river that drains into the Sea of Japan. In terms of political jurisdiction, 70% of Tumen River belongs to People's Republic of China, 29 % to Democratic People's Republic of Korea and less than 1 % to Russia (only 16 km of total 549 km length). Marine pollution is brought about by the domestic, agricultural and industrial wastes – both in solid and liquid forms – that are transported into the sea through Tumen River. Hence, cooperative agreements must be forged among these countries to promote sustainable coastal development.

1.4.1.5 Experiences of ICARM/EBM implementation in case study sites

1.4.1.5.1 Jiaozhou Bay, China

In the case of Jiaozhou Bay, China, a comprehensive evaluation of socio-economic and bio-physical environment was first undertaken. An economic/ecosystem evaluation was done and functional zonation was developed. Based on the results of various assessments, three categories of management measures were implemented to promote ICARM/ecosystem-based management.

The first category of management measures relate to water pollution control and prevention. This category is further divided into four sub-categories as follows: (1) point source pollution control and prevention measures, (2) area source pollution control and prevention measures, (3) urban river ecological restoration and pollution control, and (4) marine culture pollution control. Point source pollution control and prevention measures are applicable in factories and towns around the vicinity of Tuan Island, Haibo River, Licun River, Loushan River and Moshui River basins. Hence, pollution control and prevention in these basins should put focus on point source pollution. Controlling and preventing area pollution in agriculture, meanwhile, is more applicable in Dagu River basin.

Point source pollution control and prevention measures are further classified into three: (1) source control, (2) cutting down pollution in the production process, and (3) treatment - the final line of pollution prevention. Source control involves the relocation of highly-pollutive industries as well as optimizing industrial structure. Such measure will encourage factories to develop low energy consumption, high economic value and low-polluting products. Factories associated with pollution treatment facilities should conform to the national emission standards. It also entails the banning of new pollutive factories - such as those engaged in dyeing mill, tannery, electroplating and pesticides. Part of source control measure is strengthening the enforcement of existing rules and

regulations. Moreover, there should be coordinated efforts among different government bureaus and other regulatory agencies.

Cutting down pollution in the production process may be achieved in two ways. First, factories must be encouraged to adopt cleaner production technology. International Organization for Standardization (ISO) 14000 certification must be pursued more judiciously. ISO 14000 refers to a family of standards related to environmental management that help industries minimize their operations' negatively impacts to the environment. Secondly, water recycling could be enhanced through some technical innovations.

In this context, treatment refers to the final line of pollution prevention. One way of achieving this objective is to improve the capacity of urban sewage centralized treatment. More nitrogen and phosphorous must be removed in the treatment process to better control the eutrophication of Jiaozhou Bay. Another way is to improve the sewage treatment for water reuse. Improving the price system increases price gap between sewage treatment water and tap water. It is desirable to consider sewage treatment for reuse when drawing up national social and economic development planning.

Area source pollution control and prevention measures involve three modalities. One approach is to develop ecological agriculture. In this context, agriculture production, rural economic development, environment protection and resources utilization are interlinked to reduce pollution load that emanate from the agriculture sector. Secondly, more judicious or limited use of chemical fertilizer in agricultural production must be encouraged. Application of chemical fertilizer may involve a combination with conservation tillage and crop rotation as well as improving the fertilizer utilization ratio. The third approach is to improve animal breeding and enhance technology for more effective utilization of livestock wastes.

Urban river ecological restoration and pollution control may entail several measures. Examples of such measures are cleaning the sludge of urban river courses and improving the drainage pipe network. Urban river pollution control likewise needs to strengthen its current management system. Moreover, environmental education and public awareness program must also be enhanced. In the case of marine culture pollution control, key measures that may be instituted include promotion of non-pollutive culture system, improved feeding techniques and operation of various ecological restoration projects for different culture areas.

The second category of management measures relates to ecological restoration and protection management. Geographically, this focuses on land (terrestrial) ecosystem and river mouth (estuarine) wetland ecosystem. The restoration of terrestrial ecosystem consists of three key activities: reforestation of denuded areas (including the establishment of plantation forests); protection of existing natural forest; and conversion back into forest of some existing croplands or agricultural areas. Conservation of wetland ecosystems in the estuarine areas require stricter control in the approvals of physical structures to be established and/or projects to be undertaken in the area. Wetlands that are situated in the estuary of Dagu River (western Jiaozhou Bay) are quite important for biodiversity and provision of ecosystem services. Hence, these must be protected from unregulated aquaculture activities, expansion of cultivated lands and water pollution. Specifically for the northeast coastal wet land ecosystem, these three measures are proposed: clean the mudflat in estuary of Loushan River; control the total amount of pollutants flowing into Jiaozhou Bay through the completion of sewage treatment plant; and undertake the necessary restoration works in the polluted wetlands.

Fishery ecosystem management – also called as ecosystem approach to fisheries management – follows four principles. These are: avoiding ecosystem degradation, minimizing irreversible negative impacts of pollution, keeping the long-term economic value of Jiaozhou Bay and undertaking pertinent research projects to understand the impacts of human/ anthropogenic activities. In this regard, four measures are suggested to improve fisheries management. Pollution prevention is needed to protect the fishery stocks and ensure that the fishery products are fit for human consumption. Secondly, conservation of habitat is needed as coastal habitats are needed by the fish as their spawning grounds and growth areas. The third measure relates to fishery stock enhancement. Jiaozhou Bay is a natural sea inlet with good natural environmental conditions that make it suitable for various stock enhancements and releasing activities. Fourthly, there is a need to strengthen fisheries management within the sector. Some measures include area closure, stricter enforcement of fishery laws and regulating the fishing effort through the number of fishing boats.

1.4.1.5.2 Hakata Bay, Japan

The experience of ecosystem-based management in Hakata Bay, Japan, takes a different route. In 2008, Fukuoka City adopted the "Hakata Bay Environmental Conservation Plan" with a planning period of 10 years until 2018. This document serves as the guiding plan for an integrated management of Hakata Bay and its associated river basins. The precursor of this plan was called as "Hakata Bay Water Quality Conservation Plan" that was adopted in 1998. Fukuoka City, under the previous plan, mainly relied on the utilization of the advanced wastewater treatment facility.

To some extent, the use of the above modern infrastructure facility has led to some improvements in water quality of Hakata Bay. During the previous plan's implementation, however, two conclusions were reached. First, the control of the amount of pollutants from non-point sources – such as agricultural fields – is necessary in order to improve the condition of Hakata Bay's coastal environment. Secondly, there is a need to improve the sediment bottom quality as well as reclaim the sea grass beds and the tidal flats. These measures are needed to sustain the functional integrity of the coastal ecosystems. These concerns and the required management measures are already in conformity with the "Total Pollutant Load Control Plan" of the Ministry of the Environment that was instituted at the onset of the year 2000. The plan has already taken into account these concerns, making it an ICARM-oriented plan. Since this plan's implementation is on-going, its performance cannot be evaluated yet. The various elements of the plan are described below.

The 2008 "Hakata Bay Environmental Conservation Plan" contains various goals and measures. Broadly, it aims for the achievement of Environmental Quality Standard (EQS). More specifically, the plan aims at: (1) establishing a suitable natural environment as habitats for marine life; (2) sustaining material cycles and ecosystems services; and (3) ensuring the availability of natural and/or pristine environment for leisure and recreational activities. The management measures are classified into 18 categories. Measures for land management may comprise greater utilization of the sewerage system and advanced wastewater treatment facilities, control of factory effluents, and control of agricultural and livestock wastewaters. Measures for riverine management include the reclamation of the vegetative cover in the riparian zone as well as dredging and cleaning of riverine waterways. Management measures for the marine areas include the restoration of sea grass and seaweed beds, conservation of

tidal flats and coastal clean ups. On the human side, some measures include involving the local people in environmental conservation activities as well as undertaking information disseminations and educational campaigns.

The implementation of the plan's measures for all basins is multi-sectoral in approach. A system of cooperation is required between neighboring municipalities (7 cities and 9 towns), even though a large part of the area belongs to Fukuoka City. Therefore, Fukuoka prefecture would play an important role to support such inter-municipal cooperation. The prefecture has already incorporated the many measures described in the plan of Fukuoka City as prefectural measures for Hakata Bay and the basins in the "Fukuoka Environmental Pollution Control Program" (instituted in 2009). The detailed or operational modalities of the inter-municipal cooperation works will be discussed in the "Council for Promoting Environmental Administration in Fukuoka Metropolis," which was established by the relevant municipalities.

The monitoring and evaluation of the ecosystem's integrity is one of the unique features of the city's plan. In addition to the conventional items comprised in EQS, the plan has proposed the long-term monitoring of the "indicator organisms." As such, 67 organisms are specially-listed, which are expected to reflect or detect changes in the environmental conditions. Criteria for selecting the indicator organisms include the life-cycle, characteristics of marine habitats, and the relevance for fisheries of the species. The data on the indicator organisms will be used to evaluate food chains and ecosystem integrity.

Evaluation of costs and benefits is being done through environmental accounting (EA), the guidelines of which were provided by the Ministry of the Environment. Such EA system identifies the costs and benefits of environmental conservation activities that have been introduced to many municipal organizations in Japan. Fukuoka City has also promoted the EA system and some of the sectors (e.g. wastewater department) have annually disclosed the total EA results. However, the current EA system does not compute the economic values associated with the ecosystem services (such as protection value of coastal habitats). Given this limitation in data/information, the economic costs and benefits are not fully evaluated in the plan.

Some problems remain in full operationalization of ICARM. The "Hakata Bay Environmental Conservation Plan" includes various measures for integrated river and coastal management. However, several issues are not fully addressed up to now. For example, to reduce the direct pollutant load into the bay, a discharge method of the treated sewage outside of the bay (into the open sea) was proposed during the preparation stage of the conservation plan. This proposal has not been adopted, however, due to the difficulty in reaching consensus among competing stakeholders.

Since 2005, there is also the issue of Fukuoka City's operation of its seawater desalination plant to prevent a chronic water shortage. The high-salinity water - which is a by-product of freshwater production - has been discharged from the wastewater treatment facility at the Wajiro area to the bay after mixing with aerated treated sewage. The appropriate control of the salinity (i.e. density) of the effluent would be effective in reducing the occurrence of hypoxia in sea areas. The adoption of such an operation, however, has not been thoroughly considered until now. An upcoming issue relates to the wastewater treatment plant that will start to operate in some parts of the western area of the Hakata Bay basin where the sewage system is presently inadequate. The new plant is planned to discharge the treated sewage not to Hakata Bay but to the Zuibaiji River. This coastal area is quite important for marine biodiversity. The tidal flat is also an important spawning ground for horseshoe crab which is one of the rare invertebrate species.

1.4.1.5.3 Peter the Great Bay, Russia

The case of ICARM/EBM in Peter the Great Bay, Russia, is a recognition that many of its coastal problems and issues cannot be effectively addressed in a sectoral manner. The ICARM/EBM approach requires that all coastal-marine geographic systems should be considered as a whole in conjunction with human activities. The experience of ICARM/EBM in Peter the Great Bay consists of nine interlinked activities.

One, there was a delimitation of the bay area's geographical boundaries. This was largely based on the responsibilities of the country's management bodies. The basic division is between the area of responsibility of the Russian Federation and administrative units of Primorsky Krai. Two, coastal and marine cadastral maps were prepared based on underwater landscape mapping. Besides landscape mapping, the cadastral mapping included geochemical studies on water pollution, bottom sediments and hydrobiological samples. These led to the development of special information system of oceanographic and geographic characteristics of the Peter the Great Bay.

Associated with this endeavor is systematic monitoring of some environmental parameters that include standard hydrometeorological monitoring, measurements of vertical microstructure of the water column, sampling of bottom sediments for granulometric and geochemical analyses, and observations of sea animals and birds. Key agencies involved in the monitoring are the: Far Eastern Regional Hydrometeorological Research Institute (FERHRI), Pacific Research Fisheries Center (TINRO) and Pacific Geographical Institute (PGI).

Fourthly, territorial planning models were developed in three parts. Part I relates to the complex economic and geographical characteristics of a municipal area. Part II pertains to the system of goals and objectives for social and economic development of the district. In addition to the development goals and objectives, elements included here are the: basic factors of district development, main obstacles for socio-economic development and basic functions of the district in implementation of national interests in the Russian Far East. Part III relates to the predicted estimations and the system of indication of socio-economic development of Nadezhdinsky District. Included here are directions of structural changes in the district - as well as financial resources and the mechanism for implementation of the program for development.

Functional zoning schemes were developed for Vladivostok and Russky Island. These formed part of the initiatives for 2012 Asia Pacific Economic Cooperation (APEC) summit. The seventh key activity relates to the construction of new treatment facilities and reclamation of the landfill. With the full operation of the wastewater treatment facilities in Vladivostok, pollution in Peter the Great Bay may be substantially reduced. Vladivostok city is the largest source of pollution in the area.

The maintenance and development of reserves, natural parks and wildlife refuges form part of the ICARM initiatives. The general area is quite significant from biodiversity standpoint as the number of rare and endangered species included into the Red Book of Primorsky Krai include 2 amphibians, 4 reptiles, 112 birds and 33 mammals. Three types of nature protection areas are proposed in the region: national reserves, state wildlife refuges ("Zakazniks") and national natural park. The Far Eastern Marine Reserve that was established in 1978 covers some 64,360 ha, with 63,000 ha of marine waters.

The reconstruction of transport infrastructure of the Vladivostok has been a key initiative. As part of the 2012 APEC summit in Vladivostok, three main bridges are being constructed. One of them connects the mainland to the Russky Island; the second bridge will cross the Zolotoy Rog (Golden Horn) Bay; and the third will cross the Amur Bay. These infrastructure projects will

shorten the distance between Vladivostok and the airport and the south-west coast of the Peter the Great Bay.

1.4.1.5.4 Masan Bay, Korea

The implementation of integrated coastal management for Masan Bay and its watershed formally started only in the late 1990s. It is stressed, however, that the area was designated as "Special Management Area (SMA)" as early as 1982. Experiences for ICARM can be divided into three stages based on the change of environment management policies and investment level (Kang and Nam 2003). These are: 1970s-1982 – perception of coastal environmental management; 1984-1999 – implementation of management measures; and 2000-present – watershed-based and integrated approach.

An amendment of Marine Environment Management Act (named Marine Pollution Prevention Act by 2007) was the legal basis for integrated management of Masan Bay. It was only in 1999 that the adjoining watershed became part of the SMA. Although 17 years has passed since the bay's designation as an SMA, the relevant plans and policies were only prepared in the late 1990s. The management plan was prepared in 2001 and was duly adopted on December 2004. Through a participatory consultative process, the priority programs for implementation were identified.

A core part of the framework plan is the introduction and implementation of the total pollution load management system (TPLMS). This approach is similar to the TMDLs of USA and TPLCS of Japan. The TPLMS was accepted as the last and the most effective countermeasure to promote sustainable development and environmental planning in Masan Bay. In Korea, it could be regarded as the first step to manage the marine environment by controlling land-based activities. Despite limited knowledge and experiences in integrated management, concerted efforts have been made to introduce TPLMS. Legally binding technical protocols and guidelines regarding TPLMS were likewise prepared.

More emphasis needs to be given to establishment of an institutional framework, i.e. governance regime. The Ministry of Maritime Affairs and Fisheries (MOMAF) is a key player that formulated sustainable and workable governance regime; MOMAF has likewise played a substantial role in preparing and as well implementing the TPLMS plan. The concept of integration was also applied to the governance formulation that include, among others, the following elements: science and policy, coastal land and water areas, bottom-up and top-down approaches, and social and natural sciences.

The established governance regime for TPLMS has successfully evolved through the years. Community-based approach to building management capacity and raising public awareness deserves to be appreciated as a model case for national proliferation of TPLMS. The framework has been applied to introduce TPLMS to Shihwa SMA and Busan SMA. The TPLMS plan for Shihwa SMA will be established in the end of this year.

Meanwhile, US$ 336 million was invested to implement the TPLMS plan, which achieved its goal of COD concentration of 2.5 mg/L. According to national environmental monitoring results, the average COD concentration in summer of 2011 was reported 1.85 mg/L. Change of COD concentration as a target parameter and other major parameters implies that the marine environmental quality has improved. The Korean government is currently establishing the second TPLMS plan that covers COD and T-P as among the management priorities based on the First Framework Management Plan of 2004.

1.5 OVERVIEWS OF NEW NATIONAL AND INTERNATIONAL POLICIES AND LAWS RELATED TO ICARM

1.5.1 National policies

Enactment of laws and policies are usually brought about by a stimulating factor or a 'trigger' event. Given different political systems, there is a considerable variation on how a national coastal and marine policy is developed among the countries in the NOWPAP region. Such national policy provides the guidance and/or basis in developing legislation at the local level. Examples of relevant policies and laws for the four countries are provided in the succeeding sections.

1.5.1.1 Republic of China

In China, the legal system of environmental protection is primarily based on its constitution. The Law of Environmental Protection (1989), however, serves as the main legal framework for environment-related concerns. The Law of Marine Environmental Protection (1999) provides specific guidelines in protecting the marine environment, conserving the ocean's resources, preventing pollution, maintaining ecological balance, safeguarding human health, and promoting sustainable development. In 2001, the Sea Area Use Management Law of the People's Republic of China was enacted. The legal instruments are expressed in terms of laws, legislations and standards.

The Chinese government has developed an associated system of supervision and monitoring In implementing the relevant laws pertaining to coastal and ocean management. Relative to pollution control, many laws and policies at the national and local levels are set to regulate discharges at the point sources. The state authorities have 'implemented' punitive measures to some establishments that have committed polluting and/or environmentally destructive activities.

Some 13 major laws – related to the contaminants inputs on the environment – were approved by the People's Representative Committee of China. These cover both terrestrial and marine environments as well as specific resources, such as wildlife and fisheries. Sixteen key legislations were approved by the State Council of China. These include the following legislations: 'Managing Guidelines to Keep Contamination and Damage from Pollutants in Terrestrial Sources (1990),' 'Management Ordinance of Environmental Protection on Projects (1998),' and 'Detailed Rules on Implementation of the Law of Prevention of Water Pollution (2000).' There are 11 national standards that were approved by the respective ministries or national government such as the: 'Water Quality Standard for Fisheries (1989),' 'Integrated Wastewater Discharge Standard (1996),' and 'Standard for Pollution Control of Sewage Marine Disposal Engineering (2000).' At the local (like some provinces), some local laws were enacted and duly implemented. Examples are Coastal Zone Planning Management Regulation of Qingdao City and E: Sea Area Use Management regulation of Qingdao City. Appendix 1.1 provides a list of pertinent national laws and regulations in China.

1.5.1.2 Japan

Over the last half of the century, Japan has enacted a comprehensive array of environmental policies and legislations. These initially relate to pollution problems, water management and rapid industrialization. Among others, the 'Basic Law for Environmental Pollution Control' was enacted in 1967 while the 'Water Pollution Control Law' was enacted in 1970.

Legislations pertaining to river basin management and coastal management consist of three categories. The first category is the 'basic law,' which is directed primarily to policy considerations, institutions, environmental standards and disciplines. Included in this category are the 'Basic Environment Law', 'Basic Act on Ocean Policy' and 'Fisheries Basic Act.' Enacted in 2007, the Basic Act for Ocean Policy is the first legislation that defined the integrated coastal and river basin management. Such concern is clearly stipulated in Article 25 as follows: "The State shall take necessary measures for the coastal sea areas and land areas, where recognized suitable for the measures to be implemented in a unified manner upon the natural and social conditions, to be managed properly, by the regulatory and other measures to the activities implemented in the integrated manner, in consideration of the fact that there are difficulties in keeping on enjoying the benefit brought by the resources, natural environment and others of the coastal sea areas in the future only by implementing the measures with respect to the coastal sea areas when issues in the coastal sea areas are originated by the activities on land." Hence, this legislation provides a strong rationale for the on-going ICARM-oriented management measures for relevant economic sectors as well as implementation of the future ICARM-related initiatives in the country.

The second category of legislation relates to the 'management of national land and environment.' Examples are the 'Water Pollution Control Law,' 'Sewerage Law,' 'Law to Ensure Sustainable aquaculture Production' and 'River Law.' In 2011, the 7th Basic Policy for Area-wide Total Pollutant Load Control (TPLC) was enacted given the planning period from 2011-2015. This policy contains several management measures to reduce the pollutant loads from both point-sources and non-point sources. The key measures that are aimed to reduce pollution include: (1) dissemination and improvement of the sewerage system, the johkaso (private sewage system) and the rural community sewerage; (2) appropriate application of the TPLC standard in accordance with the circumstances of each workplace; (3) promotion of sustainable agriculture; (4) appropriate treatment and promotion of high-level use of livestock manure; (5) improvement of aquaculture ground; (6) conservation and restoration of tidal flats and sea grass bed; (7) promotion of sustainable aquaculture; and (8) improvement of sediment bottom by dredging and sand covering.

The trend now in Japan is towards environment-friendly agriculture. The "Good Agricultural Practice" for farmers was established in 2005 to dramatically reduce the use of chemical fertilizers. Moreover, the "Act on the Promotion of Organic Agriculture" was instituted in 2006 to support agriculture without chemical fertilizers. The "Basic Plan for Fisheries" was approved during a Cabinet meeting in 2007. Such plan promotes the improvement of fishery grounds by environmental restoration, the development of low-environmental-load feeds for aquaculture, and the establishment of complex aquaculture technology to enhance the biological material cycle and sustainability of the ecosystem at the aquaculture fields.

Appropriate policies are also being developed to improve EQS in enclosed sea areas. An "Experts Committee for the Development of the Mid-and-long Term Vision of the Enclosed Sea Area" was established by the Ministry of the Environment to tackle the existing problems and the

future of the present EQS system. In the recent report, the "DO in bottom layer" and "transparency" have been proposed as new indices given that the present EQS system is comprised primarily of COD, T-N and T-P. These three parameters, however, do not always account for environmental deterioration. The standard of DO in the bottom layer may help promote the restoration of bottom sediments and habitats for benthos, particularly during summer time when stratification is conducive to the emergence of hypoxia. The standard of transparency would be necessary to protect and restore sea grass beds, which have important roles not only in the reproduction of aquatic organisms but also in natural water purification. Also, transparency is an intuitive way for people to measure water quality.

The third legislative category pertains to the 'protection and conservation of environment.' During 1970s, the 'Waste Disposal and Public Cleansing Law' and the 'Law Relating to the Prevention of Marine Pollution and Maritime Disaster' were enacted as domestic legislations for protection of the marine environment in the wake of international adoptions of the 'London Dumping Convention' in 1972 and the 'MARPOL73/78.' The domestic law for wildlife protection dates back to the 'Wildlife Protection and Hunting Law' enacted in 1918. Nonetheless, the old law lacks the provisions to protect natural habitats or plant and insect species. The 'Law for the Conservation of Endangered Species of Wild Fauna and Flora' that was enacted in 1992 is the current comprehensive law for the protection and conservation not only of specific animals and plants but also natural biodiversity and ecosystem. The implementation of the environmental impact assessment (EIA) systems started for large-scale public work projects in the early 1970s. The EIA system in Japan, however, had been implemented not on the basis of legislation but the cabinet approval or the administrative guidance (Gyoseishido). The national law was enacted in 1997 as the 'Environmental Impact Assessment Law' and revised in 2011 aiming at strategic environmental assessment (SEA) found in some leading countries that have EIA systems. Through effective complementation of the EIA Law and the Law for the Conservation of Endangered Species of Wild Fauna and Flora, ICARM-oriented marine spatial planning and ecosystem-based management are anticipated to be more successful.

1.5.1.3 Russian Federation

The Maritime Doctrine of the Russian Federation (2001) for the present period up to the year 2020 provides the overarching legal framework. This legal instrument contains the provisions for the marine activities that are related to the concept for national security, foreign policy, military doctrine and functional directions of the national sea policy. Other relevant national policies include the following: The Federal Law on Russian Continental Shelf; The Federal Act on the Internal Maritime Waters, Territorial Sea and Adjoining Zone of the Russian Federation; The Federal Law on the State Border of the Russian Federation; and The Federal Law about Exclusive Economical Zone of the Russian Federation. Further, there are numerous departmental regulatory documents concerning specific maritime activities.

A key limitation is the apparent lack of direct legal regulations in the Law of the Russian Federation concerning enforceability of ICARM and sustained nature management in the marine coastal areas. Even the Maritime Doctrine of the Russian Federation (2001) does not define the boundaries of the coastal zone (Aibulatov, 2005). The prevailing legislations do not specifically characterize the coastal zone (a strip of land and sea, closely bounded by environmental, economical, social and geographical factors) as a whole entity. Moreover, these legislations have not yet fully-defined the geographical boundaries or institutional responsibilities of federal, regional and

municipal level agencies. Hence, Russia needs more laws pertaining to river basin and coastal area management.

1.5.1.4 Republic of Korea

Identification of national policies and laws regarding ICARM needs to start from outlining the history of national marine and coastal management policies. In terms of legal and institutional mechanisms, integrated coastal management in Korea has been strengthened by the evolution of marine environment protection (Nam and Kang, 2006). As such, integrated coastal management was initiated by that loss of coastal habitats and degradation of marine environment by land-based development and pollutants, which were critical issues in the late 1990s. Introduction of watershed-based management through the amendment of Marine Pollution Act and enactment of Coastal Management Act in 1999 provided more solid legal basis for integrated coastal and river basin management. Wetlands Conservation Act of 1999 has also functioned as a strong pillar to implement ICM.

The 'establishment stage' of ICM evolution in Korea could be described as implementation phase of legal and institutional arrangements at national and local levels established in the 'preparatory stage.' Experiences and lessons at the second stage gave the Korean society new policy direction for the late 2000s, including formulation of new policies as well as amendment and enactment of laws. Specifically, for Masan Bay, several technical guidelines were prepared and implemented in terms of controlling land-based activities and pollutant based on its environmental carrying capacity. The Marine Environment Management Act enacted by wholly amending the previous Marine Pollution Prevention Act provided the legal base for ICARM of Masan bay.

In the context of EBM and ICM, attention needs to be placed on enactment of two laws for protection of marine ecosystem and uninhabited islands. Unique ecological systems of the islands are very vulnerable to human intervention. Ecosystem degradation of uninhabited islands was a crucial issue in the mid 2000s. To effectively address this issue, the Law on Conservation and Management of Uninhabited Islands was enacted in 2007. Wetlands Conservation Act covers geographically both wetlands - coastal and inland - and its target habitats are limited to tidal wetlands. Although the Korean government had an act to protect ecosystem, priority on marine ecosystem was not given much attention. This is the rationale why the marine ecosystem-specific act, more specifically the Law on Conservation and Management of Marine Ecosystem, was enacted in 2007. In addition, the enhanced public awareness and interest on marine ecosystem have led to more scrutiny of coastal development projects, especially land reclamation. Evaluation of ecosystem value lost by the developments has become a necessary item for environmental impact assessment (EIA). As a consequence, the value to be lost is regarded as cost in implementing development projects.

The Coastal Management Act was also revised to introduce new management tools in 2009. Such tools include coastal zoning mechanism and natural coastline protection. The zoning mechanism before the revised Act was based on non-legally binding ministerial order. However, the zoning mechanism secured very strong legal base by incorporating the provision into the Act. The natural coastline protection policy is intended to protect the natural environment from wanton development of the coastal area. Each local government has to set a protection target of natural coastline in quantitative manner. In order to achieve the target for every five-years, they have to cancel, postpone, relocate or resize development projects. During the 'development stage,' three national plans regarding ICARM were developed; the Framework Plan on Conservation

and Management of Marine Ecosystems (2009), the National Comprehensive Plan on Marine Environmental Management (2011), and the National ICM Plan (2011). The newly established legal and institutional arrangements are as follows:

Area of concern	Laws	Policies including national plans, guidelines, regulatory measures etc
Ecosystem Valuation	ν Framework Act on Environmental Policy ν Environmental Impact Assessment Act ν Marine Environment Management ν Public Waters Management and Reclamation Act	• Prior examination of environmental nature (SEA) • Consultation on utilization of sea areas • National Comprehensive Plan for Marine Environmental Management
Marine Spatial Planning / ICARM	ν Integrated Coastal Management Act ν Law on Conservation and Management of Uninhabited Islands	• National ICM Plan • Local ICM plan • Coastal waters zoning mechanism • Classification of uninhabited islands (islands and adjacent sea areas) • Coastal Environmental Management Areas including SMA
Ecosystem-based Management	ν Law on Conservation and Management of Marine Ecosystem ν Wetlands Conservation Act	• Framework Plan on Conservation and Management of Marine Ecosystems • MPA management plans for each site • Framework Plan on Coastal Wetlands Conservation • Wetlands Management Plans for each site

On the other hand, the acts and statutes relevant to the protection of the marine environment and ecosystem inclusive of living resources could be identified based on its geographic jurisdiction. Figure 15 shows geographic coverage of laws related to marine ecosystem protection and ICM.

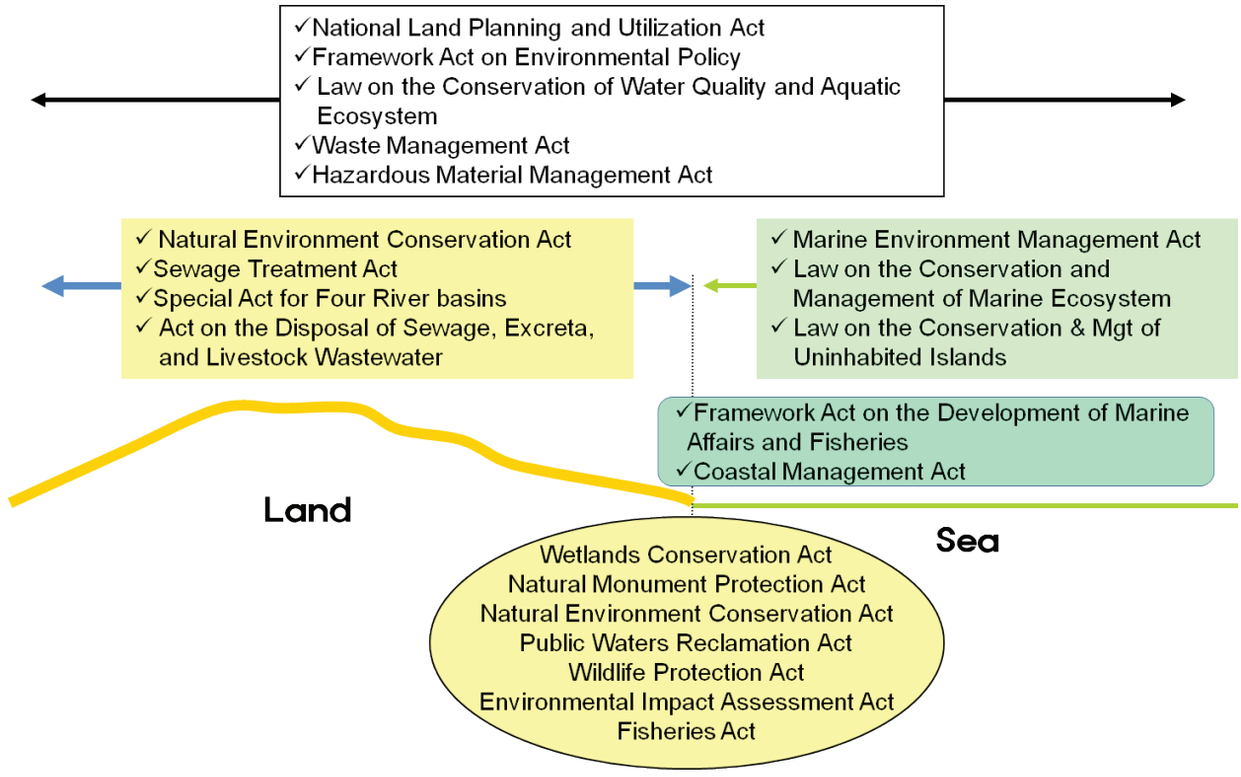

Figure 1.15. Geographic boundaries of laws and acts on marine ecosystem protection (modified from Nam and Kang, 2003).

1.5.2 International policies

A treaty is an expressed agreement under international law entered into by actors in international law, namely sovereign states and international organizations (http://en.wikipedia.org/wiki/Treaty). Among other terms interchangeably used with treaty are international agreement, protocol, covenant, convention or exchange of letters. International conventions provide globally-accepted standards for protecting and managing the marine environments (Chua, 2006). Treaties can be loosely compared to contracts: both are means of willing parties assuming obligations among themselves, and a party to either that fails to live up to their obligations can be held liable under international law (http://en.wikipedia.org/wiki/Treaty).

International conventions' national and local implications must be properly contextualized. International legal instruments may serve as the standards or basis for the development of national policies, as well as ICARM plans and/or programs. Appendix 1.2 provides the major international conventions as they relate to various facets of coastal and marine governance.

Note that the implementation of international conventions and "soft laws" on coastal governance involves certain legislative instruments. For example, the legislation of a national coastal and/or marine policy is ideal as it establishes a cross-sectoral framework. This is essential to the appropriate on-the-ground implementation of an ICARM program. Furthermore, such a policy would provide the guidance - as well as courses of actions - for the sub-national or local governments in the management of their respective coastal and ocean environments. Appendix 1.3 lists the major international instruments relating to the coastal and marine environment.

China has signed some important international conventions. These include the "United Nations Convention on Law of the Sea in 1982," "International Convention on Civil Liability for Oil Pollution Damage in 1969," "Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Material in 1972," "International Convention for the Prevention of Pollution from ships 1973 (MARPOL 73/78)," "Convention on Biological Diversity Pacts in 1992," and "Ramsar Convention on Wetlands in 1971." The two other countries (Japan and Russia) have likewise ratified many of the international conventions listed in Appendix 1.3. Interest on global environmental issues and international cooperation to address them has grown since the mid 1990s. Ratification of international convention or treaties on marine environment protection was also increased from the late 1990s. As of 2011, a total of 49 international conventions on environment protection convention was ratified by the Korean Government. Among international conventions, Japan has ratified, accepted, or acceded the 1982 United Nations Convention on the Law of the Sea (UNCLOS), the 1992 United Nations Framework Convention on Climate Change (UNFCCC), the 1992 Convention on Biological Diversity (CBD), the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Regulation of Whaling, the Ramsar Convention, the World Heritage Convention, the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78, the London Convention, the Basel Convention, the 1990 International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC), the 1992 International Convention on Civil Liability for Oil Pollution Damage (CLC), the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (FUND), and the International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties.

USSR/Russia has signed the following international conventions: International Convention for the Regulation of Whaling, the Ramsar Convention, the World Heritage Convention, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78, Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972), UNECE Convention on Long-range Transboundary Air Pollution (1979), the 1982 United Nations Convention on the Law of the Sea (UNCLOS), the Basel Convention, the 1990 International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC), the 1992 International Convention on Civil Liability for Oil Pollution Damage (CLC), International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (FUND), the 1992 United Nations Framework Convention on Climate Change (UNFCCC), the 1992 Convention on Biological Diversity (CBD), the 1992 Convention on the Transboundary Effects of Industrial Accidents, the 1992 Convention on the Protection of the Marine Environment of the Baltic Sea Area, the 1992 Convention on the Protection of the Black Sea Against Pollution, The 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, the 1996 International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, the 2001 International Convention on Civil Liability for Bunker Oil Pollution Damage (CLC), and Stockholm Convention on Persistent Organic Pollutants (2001).

CONCLUSIONS

The regional overview presents the highlights of experiences and lessons learned in activities related to marine spatial planning and ecosystem-based management. A few concerns related to economic/ecosystem valuation are also incorporated in this report. The evaluation was largely based on these four case study sites: Jiaozhou Bay, China; Hakata Bay, Japan; Masan Bay, Republic of Korea; and Peter the Great Bay, Russia. These initiatives have been instrumental in promoting ICARM in the region.

There are management measures and/or initiatives that could be undertaken directly by the NOWPAP countries. One set of measures relates to direct actions and/or on-the-ground interventions. These may relate to pollution control as well as physical infrastructure development for tourism. Secondly, institutional development and organizational strengthening remains a necessity. There is a need to strengthen the institutional capability for ICARM in general and coastal environmental management in particular.

Likewise, policy and legal reforms need to be pursued. These are in addition to the existing national policies, rules and regulations pertaining to ICARM. Examples include the proposed amendment to China's "Law of Marine Environmental Protection (1999)" and Japan's Environmental National Strategy (2007). Fourthly, scientific research and further studies need to be continued. Strategic researches are needed for modeling of the carrying capacity of the coastal areas as well as quantitative monitoring works for human-environment interactions. Strengthening decision-making support system must be based on solid science.

Site-specific recommendations are also provided in this regional overview. Many of these are already contained in the four case study reports. In the case of Jiaozhou Bay, China, more economic valuation studies are necessary to complement the results of the earlier ecosystem evaluations and/or ecological assessments. There is also a need to improve the establishment of infrastructure facilities, particularly in the use of modern technologies in either the construction of new sewage treatment plants – or in rehabilitation of the old units. As a complementary measure, the wetlands in the river mouths could be systematically restored or rehabilitated to reduce the loads of effluents (wastewaters) to Jiaozhou Bay. The bay's integrated management may also be facilitated by improving the zoning of the surrounding industrial areas. In order to further promote the ecosystem-based management in Hakata Bay, Japan, greater institutional collaboration is needed between and among the various management bodies. The evaluation of ecosystem integrity could be enhanced through the use of the so-called 'indicator organisms' that shall reflect or detect changes in the marine environments. There is also a need for a more detailed evaluation of costs and benefits with the proposed coastal management programs, projects or activities.

In the case of Masan Bay, Republic of Korea, there is a need for a more participative and/or inclusive conflict resolution mechanisms. More recently, the resource conflicts in Masan Bay have been highlighted among the various competing stakeholder groups. More valuation studies are also needed to determine the various costs and benefits that are associated with the economic activities and other management interventions in the area. For Peter the Great Bay, Russia, more scientific investigations are required to refine the system of delimitation of its coastal areas. These could be closely associated in the development of detailed marine spatial plans and/or functional zoning schemes. Further, there is a need for a more rational integration of biodiversity concerns – such as marine reserves, natural parks and wildlife refuges – with industrial and transport infrastructure development, particularly around Vladivostok and Russky Island areas.

The transboundary nature of many marine environmental problems calls for collaborative cooperation among the NOWPAP member countries. Appropriate regional strategies and action plans must be jointly developed and managed to address the priority environmental issues. Some multilateral agreements were developed and regional environmental cooperation bodies were formed such as the Northeast Asia Conference on Environmental Cooperation (NEAC) and the Northeast Sub-regional Programme of Environmental Cooperation (NEASPEC).

There are various areas/activities to enhance regional collaboration. More collaborative regional trainings could be pursued. Another key area is pollution control and management that cut across geographical boundaries of the individual member states. These include sharing of advanced techniques and experiences on marine pollution prevention to reduce and/or further prevent pollution, setting up computerized coastal data management system, and standardizing pollution monitoring methods and assessment standards. A regional response mechanism for oil spills has been existing for some time. The relative success of mechanism, however, may need to be evaluated in terms of the degree of efficiency or effectiveness. The Nakhodka oil spill clearly demonstrated individual countries cannot deal effectively with catastrophic oil spills.

Another regional proposal is greater public involvement. As emphasized in 1992 Agenda 21 and the 2004 Plan of Implementation of the World Summit on Sustainable Development Plan, an effective and sustained resource management requires great interest and support from local communities and relevant stakeholders. The civil society groups and/or environmental NGOs have played key roles in raising public awareness and pressing the government to adopt more environment-friendly policies and decisions.

Experiences of ICARM planning and implementation in the NOWPAP Region indicate some levels of initial successes and significant contributions in integrated management. These particularly relate to marine spatial planning and ecosystem-based management. More emphasis may be given later to economic/ecosystem valuation. Existing situations and/or conditions in the four study sites were documented. Existing ICARM issues were identified and systematically analyzed. Appropriate program and/or project interventions have been undertaken and/or being undertaken to address the above key management problems/issues. These led to the development and/or adoption of suitable of land-use management schemes (or functional zoning) in coastal areas and river basins. Somehow, some program/project interventions were able to reduce pollution, conserve the remaining coastal habitats/ecosystems, and promote more optimal/judicious utilization of resources.

Although ICARM has significantly improved the socio-economic and bio-physical conditions in the three case study sites, some recommendations have been forwarded to address more effectively national priorities as well as regional transboundary issues. These management recommendations include some on-the-ground interventions, institutional strengthening, policy development, and catalytic researches/studies. The experiences and lessons learned in the four case study sites will become the basis then towards adoptive management. Given many development opportunities, as well as capable institutional systems, both at the national and regional levels, the continuation of ICARM in the NOWPAP Region is indeed justified.

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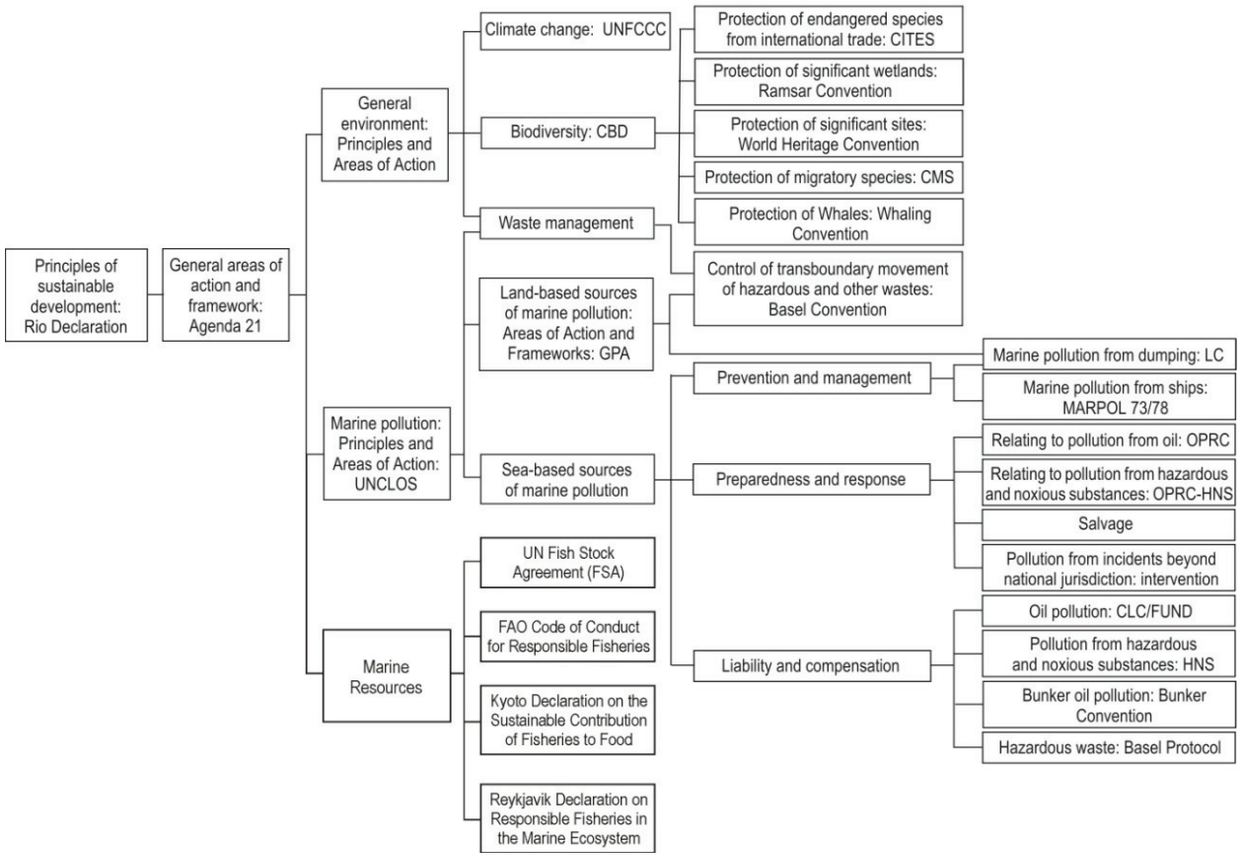
APPENDICES

Appendix 1.1. Main Laws and Regulations Related to the Contaminants Inputs on Environment in China

Type	Name and Published Year of Document	Approved by
Law	Law of Fishery (1986)	People'srepresentative Committee of China
	Law of Reservation for Wild Animals (1988)	
	Law of Environmental Protection (1989)	
	Law of Water and Soil Conservation (1991)	
	Law of Mines Resources (1996)	
	Law of Marine Environmental Protection (1999)	
	Law of Water (2002)	
	Law of Promotion on Clean Production (2002)	
	Law of Environmental Influences Assessment (2003)	
	Law of Prevention on Environmental Pollution by Solid Wastes (2004)	
	Law of Prevention and Control of Water Pollution (2008)	
	Circular Economy Promotion Law of the People's Republic of China (2008)	
	Energy conservation law of the People's Republic of China (2009)	
Legislation	Managing Guidelines to Protecting on Propagation of Aquaculture Resources (1979)	State Council of China
	Managing Guidelines to Prevention Marine from Shipping (1983)	
	Managing Guidelines to Keep Contamination and Damage from Coastal Construction and Engineering (1990)	
	Managing Guidelines to Keep Contamination and Damage from Pollutants in Terrestrial Sources (1990)	
	Rules on Implementation of the Law of Prevention of Terrestrial Wild Animals (1992)	
	Technical Guidelines on Environmental Impacts Assessment (1993)	
	Rules on Implementation of the Law of Prevention of Water and Soil (1993)	
	Rules on Implementation of the Law of Prevention of Aquicolous Wild Animals (1993)	
	Guidelines on Natural Preservation Zones (1994)	
	Guidelines on Preservation of wild Plants (1996)	
	Management Ordinance of Environmental Protection on Projects (1998)	
	Detailed Rules on Implementation of the Law of Prevention of Water Pollution (2000)	
	Implementation Guidelines on Law of Forests (2000)	
	Regulation of the management of levy and usage of pollutant discharge fee (2003)	
	Regulation of the management of prevention and control of the coastal project pollution on marine environment (2007)	
	Regulation of the management of prevention and control of the maritime project pollution on marine environment (2006)	
Standard	Sanitary Standard for Drinking Water (1985)	National or Ministries
	Water Quality Standard for Fisheries (1989)	
	Quality Standard for Agricultural Irrigation (1992)	
	Wastewater and Sludge Disposal Standard for Municipal WTP (1993)	
	Integrated Wastewater Discharge Standard (1996)	
	Sea Water Quality Standard (1997)	
	Discharge Standard for Municipal Wastewater (1999)	
	Environment Quality Standard for Surface Water (2002)	
	Standard for Pollution Control of Sewage Marine Disposal Engineering (2000)	
	Technical Specifications Requirements for Monitoring of Surface Water and Waste Water(2002)	
	Specification for offshore environmental monitoring(2008)	

Appendix 1.2. International conventions in an integrated implementation network



Source: PEMSEA (2003)

Appendix 1.3. Major international instruments relating to the coastal and marine environment

1. Rio Declaration
2. United Nations Convention on the Law of the Sea, 1982 (UNCLOS)
3. United Nations Framework Convention on Climate Change, 1992 (UNFCCC)
4. Convention on Biological Diversity, 1992 (CBD)
5. Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973 (CITES)
6. International Convention for the Regulation of Whaling, 1946
7. Ramsar Convention on Wetlands, 1971 (Ramsar Convention)
8. Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972 (World Heritage Convention)
9. Convention on the Conservation of Migratory Species of Wild Animals, 1979 (Convention on Migratory Species)
10. Code of Conduct for Responsible Fisheries
11. International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 Relating Thereto (MARPOL 73/78)
12. Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 and Its 1996 Protocol (London Convention)
13. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1989 (Basel Convention)
14. International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC)
15. International Convention on Civil Liability for Oil Pollution Damage, 1969 and Its 1992 Protocol (CLC)
16. International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 and Its 1992 Protocol (FUND)
17. International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996 (HNS)
18. Basel Convention Protocol on Liability and Compensation, 2000
19. International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 (Bunker Oil Convention)
20. International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969 and Protocol Relating to Intervention on the High Seas in Cases of Pollution by Substances Other Than Oil, 1973 (Intervention)
21. International Convention on Salvage, 1989 (Salvage)

Source: PEMSEA (2003)

PART 2

Regional Guidelines for Integrated Coastal Planning and Management in the Northwest Pacific Region

Author: M. D. Pido

EXPANDED SUMMARY

Titled as "Regional Guidelines for Integrated Coastal Planning and Management in the Northwest Pacific Region," this document is not another elaborative or comprehensive guidebook on integrated coastal management (ICM) and/or integrated coastal and river basin management (ICARM). This contention is stressed at the outset.

There are already existing excellent guides (see list of references) about ICM and/or ICARM that include – but not limited to – the following: Post and Lundin (1996), UNEP/MAP/PAP (1999), Henocque and Denis (2001), Chua (2006) and UNESCO (2006). The ICM materials and/or references that have been developed at the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), a regional ICM program based in the Philippines, are given emphasis here for three reasons: (1) Northwest Pacific Action Plan (NOWPAP) is a non-country partner of PEMSEA; (2) three countries (China, Japan and Korea) are intricately involved with PEMSEA; and (3) PEMSEA has extensive experiences in ICM in the region.

Hence, this regional guidebook does not intend to duplicate the existing literature but rather supplement them. In terms of content, this regional guide may be viewed as a document in-between full methodological guide and the few pages of laymanized policy briefs, primers or brochures about ICM. The regional guide is not: (1) intended as detailed manual or procedural guide on how to undertake ICARM/ICM programs; (2) a reference for scientific/technical publications; and (3) exclusive to NOWPAP region and/or Asian countries. The geographic setting is focus on NOWPAP/Asian region with applicable worldwide experiences as illustrative examples. It is simply another practical guide that may provide technical and managerial guidance for future ICARM/ICM activities in the NOWPAP member countries. In this guide, the terms ICARM and ICM are used alternatively or synonymously.

This Regional Guide's audience would include (but not restricted to) a range of users: academicians, civil society organizations, decision-makers, donors, ICARM/ICM practitioners, local government officials, managers of coastal projects, planners, policy makers and researchers. Its language is semi-technical and the type of document is more of an educational report. Attempts have been made to make the document a light reading as possible. In terms of geographic setting, it is focused on NOWPAP/Asian region with applicable worldwide examples. Its presentation format is less wordy with amplification and/or elaboration through appendices, boxes, figures and tables. An innovative feature of this guide is to refer the readers to invaluable references, resource materials and publications related to ICM/ICARM that are readily available in the internet. These include academic papers, journal articles and links of ICM-related organizations, as well as regional projects and international programs.

In the context of the Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP), the need for a document called "Regional Guidelines for Integrated Coastal Planning and Management" has long been recognized. After various discussions and deliberations, POMRAC Focal Points (FPs) and other NOWPAP Regional Activity Centers (RACs) approved its preparation. As contained in the Pollution Monitoring Regional Activity Center (POMRAC) archive, the objective of this document is to assist the member states in applying efficient ICARM methodologies and best practices including coastal area and river basin planning (landscape, urban and marine spatial). These guidelines should take into account the positive and negative experiences of the countries with more advanced ICARM practices in Europe and North

America. At the same time, the specific features of the different NOWPAP countries should be taken into consideration.

This regional guide consists of eight chapters. In turn, each chapter is divided into several sections. Some sections are further divided into smaller units or sub-sections.

Chapter 2.1 is titled 'Towards Integrated Coastal Planning and Management in NOWPAP Region.' It describes the establishment of NOWPAP and the evolution of integrated coastal planning and management in the region. The Regional Seas Programme (RSP) was initiated by the United Nations Environment Program (UNEP) in 1974 as a global programme to address the accelerating degradation of the world's oceans and coastal areas through the sustainable management and use of the marine and coastal environments, by engaging neighboring countries in comprehensive and specific actions to protect their shared marine environment (http://www.nowpap.org/). Currently, over 140 countries participate in 13 regional programmes established under UNEP auspices. The Northwest Pacific Region is one of these RSPs.

In NOWPAP, ICARM has slowly evolved over the last two decades. The Action Plan for NOWPAP was adopted in 1994. Four RACs were established between 2000 and 2002 that are responsible for carrying out individual NOWPAP activities and projects approved by the IGM that are coordinated by the Regional Coordinating Unit (RCU) (http://www.nowpap.org/). Although ICARM-related actives were initiated since the establishment of the NOWPAP, it was only in 2005 when ICARM was formally initiated during the 10th Intergovernmental Meeting or IGM. As such, POMRAC directly handles the ICARM-related endeavors. In 2007, the ICARM Working Group (WG) was eventually established and the formal ICARM activities were started by POMRAC.

Section 2.1.2 relates to the various documents produced that are related to ICARM. From 2008/2009, the four National Reports (one each from China, Japan, Korea and Russia) and one Regional Overview on ICARM (synthesis of these four documents) were initiated. In 2010, these four National Reports and Regional Overview on ICARM were eventually published.

Thirdly, the Case studies on ICM/ICARM in NOWPAP member countries are presented. From 2011/2012, five documents were prepared: four 'Case Study Reports' and one 'Regional Overview on Ecosystem Valuation, Marine Spatial Planning and Ecosystem-Based Management.' The four case study reports covered the following coastal areas: (1) Jiaozhou Bay, China; (2) Hakata Bay, Japan; (3) Masan Bay, Korea; and (4) Peter the Great Bay, Russia. The detailed description of the work is presented in Part 1 of this book.

In Section 2.1.3, the purposes of the ICM/ICARM regional guide are presented. Based on the meeting documents, the guide is "intended to assist member states in applying efficient ICARM methodologies, including coastal area and river basin planning (landscape, urban and marine spatial)." There are limited guides, however, that are: (1) regional in scope (Chua (2006) is an outstanding reference in both depth and breadth in the East Asian region), and (2) presented in a layman and/or semi-technical language. Hence, this guide has been developed to be a useful/handy reference across a range of stakeholders (including non-specialists) in the NOWPAP region who is interested in ICM/ICARM. It is reiterated here that this ICM/ICARM guide is not meant to duplicate the existing literature – published or internet-based resources - but to serve as a supplemental reference document.

Chapter 2.2 provides an 'Introduction about coasts.' Section 2.2.1 gives some definitions of the word 'coast' and related terms that include: 'coastal,' 'coastal zone,' 'coastline,' 'coastal strip,' 'coastal zone,' and 'coastal and marine area.' This is followed by the geographical context of coast. Spatially, the coast may range from the tip of the watershed down to the open ocean.

Within this spatial continuum, there is a range/variety of political boundaries, socio-economic/ sectoral activities, planning and management levels as well as property rights regimes. Section 2.2.3 focuses on the 'Values of coasts,' which describes the generic significance of coasts from economic, environmental and social standpoints. Included here is a narrative of the relevant NOWPAP's coastal regions in China, Japan, Korea and Russia.

Chapter 2.3 relates to the various 'Elements of integrated development and management.' Section 2.3.1 provides some key definitions associated with the integrated river basin and coastal management. These terminologies include: (1) Coastal Resource Management (CRM); (2) Coastal Zone Management (CZM); (3) Integrated Coastal Area Management (ICAM); (4) Integrated Coastal Area and River Basin Management (ICARM); (5) Integrated Coastal Management (ICM); (6) Integrated Coastal and Ocean Management (ICOM); (7) Integrated Coastal Zone Management (ICZM); and (8) Integrated Marine and Coastal Area Management (IMCAM). There has been a substantial evolution of integrated planning and management of the terrestrial and coastal/marine areas over the last half century. More recently, the terms Ridge to Reef (R to R) and Highlands to Oceans (H_2O) have come into the fold to refer to the integrated planning and management of watershed and coastal areas. In this context, ICM or ICARM is the preferred terminology – and both are used interchangeably or synonymously. Meanwhile, Section 2.3.2 elaborates on what is 'Integration' in ICM/ICARM. There are essentially five elements/dimensions of integration: conceptual, spatial, organizational, functional and temporal.

Section 2.3.3 deals with the 'ICARM/ICM and sustainable coastal development' that traces the advent of sustainable development and/or sustainable coastal development. Efforts towards integrated management were somehow dictated by the environmental movement and efforts towards sustainable development. This began in the 1960s and was catapulted by the publication of "Silent Spring" in 1962, an epic environmental science book written by Rachel Carson. The book documented the negative impacts or detrimental effects of indiscriminate use of pesticides on the environment, particularly on the population of birds. A decade later, the United Nations Conference on the Human Environment (popularly called as the 1972 Stockholm Conference) was held in Sweden. Given the participation of some 113 countries, 19 inter-governmental agencies, and more than 400 inter-governmental and non-governmental organizations, it is widely recognized as the beginning of modern political and public awareness of global human and environmental problems.

Globally, the notion of ICARM was initiated in 1992 during the United Nations Conference on Environment and Development (UNCED) held in Brazil from 3 to 14 June 1992. In that event, Agenda 21 was adopted by more than 178 Governments as a comprehensive plan of action to be taken at various levels (globally, nationally and locally) by agencies of the United Nations (UN) System, governments, and major stakeholder groups in every area in which human impacts on the environment are significant. Agenda 21 espouses integrated management. Chapter 17 specifically promotes the integrated management and sustainable development of coastal areas. As a consequence, the concept of ICARM came out. The United Nations Environment Program (UNEP) and the Priority Actions Programme Regional Activity Centre (PAP/RAC) of the Mediterranean Action Plan jointly prepared the "Conceptual Framework and Planning Guidelines for Integrated Coastal Area and River Basin Management" (UNEP/MAP/PAP, 1999). As such, ICARM is the methodology being promoted to efficiently apply a high level of development of marine sciences and great progress in the study of coastal - offshore regions to attain sustainable development. Its final objective is to reach the sustainable development of the offshore-coastal regions.

Section 2.3.4 highlights some 'Principles associated with ICARM/ICM' that cover several economic, environment and social dimensions. In terms of the environmental dimension, key

principles include the precautionary principle, ecosystem-based management and "polluter pays" principle. With regard to the social dimension, some principles relate to inter-generational and intra-generational equity, participatory management and accountability. Economically, the principle of profitability/efficiency remains. Section 2.3.5 provides a narrative of various efforts 'From sectoral to integrated management.' A few examples from several countries and regions are provided. In section 2.3.6, the 'ICARM/ICM initiatives goals and objectives' are described. Key goals/objectives relate to: area planning; promotion of economic development; stewardship of resources; conflict resolution; protection of public safety; and proprietorship of public submerged lands and waters. Section 2.3.6.1 relates to 'Sectoral fisheries management in Context of ICARM/ICM.' It argues that ICM provides a useful framework to make fisheries management more effective thereby promoting sustainable coastal development.

Chapter 2.4 summarizes the 'Major Threats/Issues in River Basin and Coastal Management.' There is a host of major threats/issues in the coastal areas and adjoining watersheds that are broadly categorized into five: (1) environmental degradation and/or habitat destruction; (2) pollution of various kinds; (3) non-optimal/not-sustainable use of natural/environmental resources; (4) natural hazards; and (5) global events/phenomena.

Habitat destruction relates to the following: degradation of coastal habitats such as coral reefs, mangroves and seagrass beds; destruction of terrestrial ecosystems such as natural vegetations and primary forests; and land use changes whereby natural habitats (like pristine lakes) are transformed into other land uses, such as agricultural plantations and human settlements. Pollution issues covered here include: water quality; air pollution; nutrients; heavy metals, hazardous substances and sediments; oil spill; red tides/harmful algal blooms; marine debris, solid wastes and ocean dumping; and wastewater/sewage.

Non-optimal use of resources include overfishing, overharvesting of terrestrial resources (such as timber and other forest products), and poaching/illegal trade in endangered marine species. Natural hazards cover cyclones/typhoons, droughts, earthquakes, flooding, forest/bush fires, land subsidence/landslides, storm surges, tsunami and volcanic eruptions. Global events/phenomena relate to the following: ballast water and invasive/exotic species, climate change, global warming, extreme weather events, ocean acidification and sea level rise.

Chapter 2.5 is focused on the 'Contextual Elements of ICARM/ICM.' Section 2.5.1 illustrates the 'ICM management framework' and the new sustainable development for coastal area (SDCA) framework that was developed at PEMSEA in 2007. This is an articulation of a "complete" framework framed by the goals of sustainable development in coastal areas in terms of the necessary procedures, techniques and tools for program planning, development and implementation. The framework likewise includes the processes which allow a systematic and integrated planning and management approach in addressing current and emerging issues that threaten economic development and environmental sustainability. The SDCA Framework likewise ensures more focus and accountability in coastal governance.

Section 2.5.2 follows with the ICM/ICARM program development and implementation cycle. Although there are many models/types, there are two commonalities: first, the process is cyclical; and secondly, the starting point is usually a certain initiation and assessment while the end point is a sort of monitoring and evaluation (M&E). The PEMSEA's ICM program development and implementation cycle was developed based on experiences and lessons learned worldwide (Chua, 1998). It operates in a systematic manner, whereby several steps and/or outputs are pre-conditions before moving from one stage to another.

Section 2.5.3 provides the 'Other elements/dimensions of ICM.' Section 2.5.3.1 is on 'ICM project proposal development,' which provides some fundamentals (such as tools and techniques) of project development and management. Included here are the project cycle, concept proposal and logical framework analysis.

This is followed by 'Institutional arrangements' in section 2.5.3.2. The areas covered here are: government involvement in an ICM program; stakeholder participation in an ICM program; and establishment of a coordinating mechanism in an ICM program. The next section deals with the 'Monitoring and evaluation of an ICM program.' Key topics included here are the fundamentals of monitoring and evaluation as well as the relevant indicators in an ICM program. ICM indicators for effective M&E of ICM programs are needed that include: process indicators, state indicators, response indicators, sustainability indicators, and impact indicators.

The chapter winds down with Section 2.5.3.4 about 'Legislation.' Elements included here are: legislation in the ICM Context; international conventions; legislations that support ICM; and enabling legislations that support ICARM/ICM in NOWPAP Region.

Chapter 2.6 deals with some of the 'Tools and techniques in ICARM/ICM.' Seven tools are elaborated. Economic valuation (Section 2.6.1), in the context of natural resources, is the process of assigning measurable value (monetary) to any particular natural resource. Environmental impact assessment is a process of evaluating the possible impacts or effects that a proposed activity or project may have on the socio-economic and bio-physical environments. Profiling is simply preparing a 'snapshot' of a particular area or event - in the context of ICM/ICARM, it usually leads to the publication/production of a coastal environmental profile. Participatory/rapid appraisals are practical or short cut techniques to facilitate the diagnosis of problems, issues and opportunities in a given area.

Section 2.6.5 'State of the coast (SOC) reporting' is an integrated and comprehensive approach that documents the status of the socioeconomic, governance and biophysical features/facets of an ICM program. It traces its roots in the State of the Environment (SOE) reporting. This is followed by the section on MSP: Marine Spatial Planning. MSP relates to functional zoning or segregation of coastal areas to achieve the best economic results, reduce multiple use conflicts and minimize negative environmental impacts. The last section deals with problem analysis/diagnosis.

Chapter 2.7 presents the 'Web based ICM/ICARM resource materials.' As ICM or ICARM has become a global phenomenon, there are now many useful guides, materials or references that are freely available in the Internet. Among others are selected organizations, institutions and programs dealing with ICM/ICARM. These include: Bay of Bengal Large Marine Ecosystem (BOBLME) Project (http://www.boblme.org); Chilika Development Authority (http://www.chilika.com/iczm-projects.php); Coordinating Body on the Seas of East Asia (COBSEA) (http://cobsea.org/); Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF) (http://www.coraltriangleinitiative.org/); PEMSEA (www.pemsea.org); USAID Coastal Resource Management Project (CRMP) in the Philippines (www.oneocean.org). There are also technical references or scientific journal articles that include but not limited to: Journal of Integrated Coastal Zone Management (http://www.aprh.pt/rgci/index_eng.html); Marine Policy http://www.journals.elsevier.com/marine-policy; and Ocean and Coastal Management (http://www.journals.elsevier.com/ocean-and-coastal-management/). Other key internet links are provided in relevant appendices.

Chapter 2.8 – as the final chapter – winds down with a 'Reflections on way forward for ICM/ICARM.' Since integrated coastal zone management began in the US in the 1970s, ICARM/

ICM is becoming an over-arching framework for sustainable development. Some core elements of ICARM/ICM relate to the following: guiding principles, management framework, processes and tools/techniques. Other ICM/ICARM concerns include certification system, scaling up, adaptive management, and international/transboundary issues.

This guide winds with regard to the NOWPAP key activities and key outcomes on ICM/ICARM to provide a perspective of what will be undertaken in the coming years. The Twelfth NOWPAP POMRAC Focal Points Meeting that was held in Busan, Republic of Korea (4-5 September 2014) reviewed the key activities related to ICARM. For 2014, a key activity of ICARM WG was the finalization of this regional guideline for integrated coastal planning/management. For 2015, the main planned activity is the regional workshop and training course in cooperation with PEMSEA for implementation of regional guidelines for integrated coastal planning/management combined with the 13th POMRAC FPM.

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Prof. Michael Pido (from Palawan State University, Philippines) facilitated the report writing and packaging based on the structure/outline provided by POMRAC. Those national experts who prepared the various reports that form part of this guide are as follows: Ms. Xin Xie (Engineer, Department of Water Environmental Monitoring, China National Environmental Monitoring Center (CNEMC), Beijing, People's Republic of China); Dr. Hiroshi Koshikawa (Senior Researcher, Center for Regional Environmental Research, National Institute for Environmental Studies (NIES), Ibaraki, Japan); Dr. Jungho Nam, Director, Research Department of Marine Environment and Climate Change, Korea Maritime Institute, Seoul, Korea); and Dr. Ivan S. Arzamastsev, Senior Researcher, Center for Landscape and Ecological Studies and Development of Methods for Complex Ecological Monitoring, Pacific Geographical Institute, FEBRAS, Vladivostok, Russian Federation.

PEMSEA (through Ms. Ingrid Narcise) has reviewed the earlier draft of this regional guide. Dr. Patrick Regoniel and Engr. Maria Rosario Aynon Gonzales contributed to the section on tools, particularly on economic valuation.

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2.1 Towards integrated coastal planning and management in NOWPAP region

2.1.1 Establishment of NOWPAP and evolution of integrated coastal planning and management

The Regional Seas Programme (RSP) was initiated by the United Nations Environment Program (UNEP) in 1974 as a global programme implemented regionally in the wake of the 1972 United Nations Conference on the Human Environment held in Stockholm, Sweden. The RSP aims to address the accelerating degradation of the world's oceans and coastal areas through the sustainable management and use of the marine and coastal environments, by engaging neighboring countries in comprehensive and specific actions to protect their shared marine environment (http://www.nowpap.org/). Some 140 countries participate in 13 regional programmes established under UNEP auspices. In effect, these make the RSPs among the most globally comprehensive initiatives for the protection of marine and coastal environments.

The Northwest Pacific Region – that operationally covers China, Japan, Korea and Russia - is one of these RSPs. The Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP) was adopted at the First Intergovernmental Meeting (IGM) held in Seoul, 14 September 1994.

Four Regional Activity Centres (RACs) were established between 2000 and 2002 that are responsible for carrying out individual NOWPAP activities and projects approved by the IGM that are coordinated by the Regional Coordinating Unit (RCU) (http://www.nowpap.org/).

A key objective of the NOWPAP Action Plan is to develop a wise management strategy for the Northwest Pacific coastal and marine environment. Such a strategy should consist of these main elements: (1) monitoring and assessment of the environmental condition; (2) creation of an efficient and effective information base; (3) integrated coastal area planning; (4) integrated coastal area management; and (5) establishment of a collaborative and cooperative framework. More specifically, the third and fourth Objectives in the Action Plan for the Northwest Pacific region aim: to develop and adopt a harmonious approach towards coastal and marine environmental planning on an integrated basis and in a pre-emptive, predictive and precautionary manner; and to develop and adopt a harmonious approach towards the integrated management of the coastal and marine environment and its resources, in a manner which combines protection, restoration, conservation and sustainable use.

Although activities related to conservation – as well as sustainable development – of river basin and coastal areas were initiated/undertaken since the establishment of the NOWPAP in 1994, the formal ICARM activities were started by POMRAC only around 2007. POMRAC has started activities related to ICARM in 2007 by establishing ICARM Working Group. These activities were implemented in close collaboration with all NOWPAP RACs and with the UNEP/GPA and under close coordination of RCU. Broadly, ICARM Working Group's thematic areas of concerns include (but not limited to) biodiversity conservation, climate change adaptation, ecological assessments, economic valuation and marine spatial planning. The mandates and/or functions of ICARM WG were agreed during its First Meeting held at Toyama, Japan, from 10-11 July 2007 (see Box 1). The current list of ICARM WG is reflected in Appendix 2.1.

Box 1. Mandates/Functions of the Working Group (WG) for Integrated Coastal Area and River Basin Management (ICARM)

1. To collect and compile existing ICARM methodologies being used by NOWPAP member states;
2. To prioritize issues related to ICARM activities in NOWPAP member states (including transboundary ones).
3. To assist member states in applying efficient ICARM methodologies, including coastal area and river basin planning (landscape, urban and marine spatial) and risk management, by disseminating tools and good practices, organizing training courses, etc.

Hence, compared with other regions, NOWPAP has a relatively short history/experience in ICARM/ICM. During this period, the ICARM Working Group (WG) was established under the direct supervision of POMRAC. Some of the activities undertaken relate to ecosystem valuation, marine spatial planning, biodiversity conservation and climate change adaptation. Under close coordination of RCU, these activities have been implemented in close collaboration with all NOWPAP RACs and with the UNEP's GPA or Global Plan of Action.

2.1.2 National reports and regional overview on ICARM

The 5th POMRAC Focal Points Meeting (FPM) held in Vladivostok, Russia, on 8-9 October 2007 adopted the preparation and publication of the National Reports and Regional Overview on ICARM as a key activity of POMRAC in 2008/2009 biennium. As a result, the four National Reports (one each from China, Japan, Korea and Russia) and the 'Regional Overview Report on Integrated Coastal and River Basin Management (ICARM) in the NOWPAP Region' were eventually published in 2010 under the auspices of POMRAC.

The above documents/reports showed that ICARM planning and implementation in the NOWPAP Region gained some initial success stories with regard to the member-countries sustainable development and environmental protection. Existing socio-economic, governance and environmental situation in the NOWPAP region was documented. Moreover, the existing ICARM-related issues were identified and systematically analyzed. Opportunities or positive conditions for development were likewise diagnosed.

Key management issues in the region are related to pollution, habitat/ecosystem degradation and non-optimal use of resources. Cross cutting issues include natural disasters, sea level rise and climate change. Some problems were noted only in specific countries, such as localized depletion of fishery resources. Other problems, however, are regional in scope, such as those that are related to oil spills. These problems/issues may be correlated in part due to governance constraints and/or inadequacies in integrated management.

Appropriate program and/or project interventions have been undertaken to address the above key management problems/issues. These included initiatives and/or interventions that were designed to reduce pollution, conserve the remaining coastal habitats/ecosystems, and promote more optimal/judicious utilization of resources. Although applying the ICARM methodology has somehow improved both the human and natural environment in the NOWPAP region, much still needs to be done. Hence, these documents provided some recommendations to better address national priorities, as well as international (transboundary) issues.

2.1.3 Purposes of the ICM/ICARM regional guide

The NOWPAP's need for a "Regional guidelines for integrated coastal planning and management" has long been recognized. After various discussions and deliberations, the FPs and other NOWPAP RACs approved its preparation. As contained in the NOWPAP/POMRAC document, the objective of this document is to assist member states in applying efficient ICARM methodologies and best practices including coastal area and river basin planning (landscape, urban and marine spatial). These guidelines should take into account the positive and negative experience of the countries with more advanced ICARM practices in Europe and North America. At the same time the specific features of the different NOWPAP countries should be taken into consideration.

The Regional Guide is not: (1) intended as detailed manual or procedural guide on how to undertake ICARM/ICM programs; (2) a reference for scientific/technical publications; (3) exclusive to NOWPAP region and/or Asian countries. There are already existing ICM/ICARM guides that include: Post and Lundin (1996), UNEP/MAP/PAP (1999), Henocque and Denis (2001), Chua (2006) and UNESCO (2006). Hence, this shall not duplicate the existing literature but shall provide a practical guide for future ICARM/ICM activities in the NOWPAP countries.

This Regional Guide's audience would include (but not limited to): academicians, civil society organizations, ICARM/ICM practitioners, local government officials, managers, planners and policy makers. Its language is semi-technical and the type of document is more of an educational report. In terms of geographic setting, it is focused on NOWPAP/Asian region with applicable worldwide examples. Its presentation format is less wordy with amplification and/or elaboration through appendices, boxes, figures and tables. This document will be published and become available for the public, government organizations and experts.

The preparation of this ICARM/ICM Regional Guide was a collaborative undertaking among several organizations and individuals. They are duly mentioned in the 'Acknowledgement' (see 'Expended Summary').

2.2 Introduction about coast

2.2.1 Definitions of coast and related terms

The terms 'coast', 'coastal', 'coastal zone', 'coastal zone' or 'coastal and marine area' have been used interchangeably. Sample definitions are provided below:

'Coast' - a geographic location or region where land meets the sea or ocean. (http://en.wikipedia.org/wiki/Coast; accessed June 24, 2013).

'Coastal' – The region extending seaward and inland from the shoreline that is influenced by, and exerts an influence, on, the seas and their resources and biota (Zann, 1995, p. 107).

'Coastal Zone' - interface where the land meets the ocean, encompassing shoreline environments as well as adjacent coastal waters. Its components can include river deltas, coastal plains, wetlands, beaches and other coastal features (Post and Lundin, 1996).

'coastline' - The area where land meets the sea or ocean (Wikipedia).

'coastal strip' – The area extending three kilometers inland (or further inland where there are marine sediments) from the low tide mark (Zann, 1995, p. 107).

'coastal zone' – The area of land and sea, extending landward to the edge of the coastal-draining rivers, and seaward to the edge of the 200 mile EEZ (Zann, 1995, p. 107).

'coastal and marine area' – The area and resources starting from the point of land where it interacts with the land, up to the point at sea where human activities affect it (Chua, 2006).

Whatever definition is adopted, it could be visualized as the dynamic interface between the land and sea. The operational extent of this geographical interface varies among nations. It could be from as high as the tip of the watershed and/or headwater of a catchment, down to the continental shelf or open ocean.

2.2.2 Geographical context of coast

The visual representations of a coastal may vary among countries, even among their smaller political/administrative units. Australia's coastal zone and ecosystems range from temperate to tropical regions (Figure 2.1). It could also be confined to a smaller coastal space, such as the Malampaya Sound in Palawan, Philippines (Figure 2.2).

The coastal area is not only a dynamic geographical spectrum. Within this spatial continuum, there is a range/variety of political boundaries, socio-economic/sectoral activities, planning and management levels as well as property rights regimes (Figure 2.3). The connections between the land and the sea could be expressed in a variety of ways. In Australia, for example, the connection may be between catchments and coral reefs (Figure 2.4).

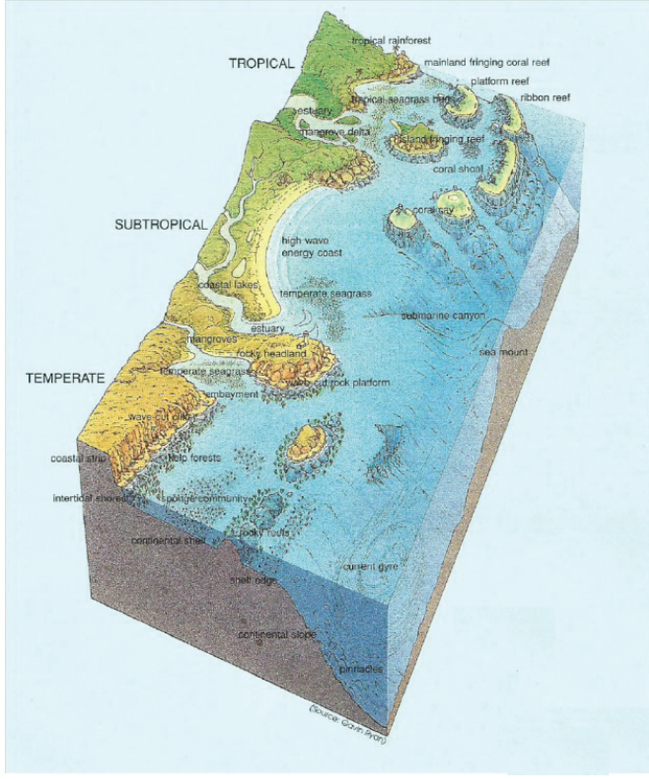

Figure 2.1. A generalized schematic view of Australia's coastal zone and ecosystems, from temperate to tropical regions.

Source: Zann, 1995.

Figure 2.2. Schematic of the terrestrial and marine features of Malampaya Sound, Palawan, Philippines.

Source: Adopted from Pido (1995).

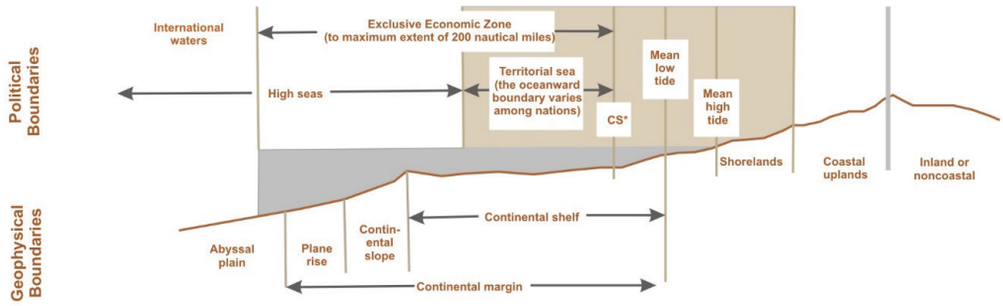

Figure 2.3. Overlapping biophysical, economic, institutional and organizational boundaries in coastal areas.

Source: Scura et al., 1992.

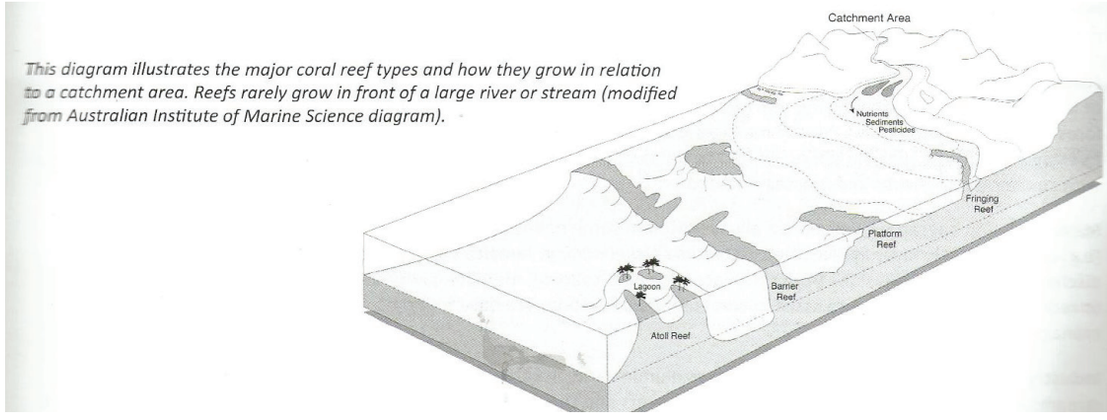

Figure 2.4. Major coral reef types in relation to catchment area in Australia.

Source: Wilkinson and Brodie, 2011.

2.2.3 Values of coasts

2.2.3.1 Generic significance of coasts

Worldwide, the values of the coastal zone - the dynamic interface between the land and sea – are paramount. Broadly, the coastal region provides the natural resource base for various economic/ human activities. These include terrestrial or land-based economic activities such as agriculture (aquaculture, planting of crops and raising of livestock), energy development, forestry, human settlements, industrial development, manufacturing, mining, tourism and wildlife harvesting. There are also marine-based activities such as coastal industries, energy development, fisheries, mariculture, maritime trade, shipping and tourism. Spatially, more than 50% of the world's populations choose to live within 200 km of the coast (Hinrichsen, 1998). Some of these activities are graphically represented in Figure 2.5.

The coastal zone also provides the planet with vital 'free' services, including regulation of earth's climate, the genesis of rainfall, and a place to receive and treat wastes, although this latter function is seldom managed well. In addition, some coastal habitats help to protect residential, agricultural and industrial areas against coastal erosion, flooding and natural calamities. The services and protective functions provided by coasts are estimated to be more valuable than their intrinsic resources, and may be worth "about US $23 trillion a year, only slightly less than the world's GNP" (GESAMP, 2001).

2.2.3.2 Importance of NOWPAP region's coast

The significance of the NOWPAP region as a dynamic regional coast cannot be overemphasized from various perspectives. Among China, Japan, RO Korea and Russia, there is also a long history of diverse peoples sharing together the oceans and the coasts through trade, food consumption and as part of various cultural activities. This coastal region encompasses some large marine ecosystems (LMEs) such as East China Sea and Yellow Sea. Collectively, the lands, coastal fringes and seas provide the natural resource base for economic activities that include agriculture, coastal industries, energy development, fisheries, maritime trade and tourism. The region is likewise home to some of the world's 25 largest container ports for maritime trade. The region is highly urbanized, with rapid population growth. Coastal settlements have developed into major cities, which are among the most populated in the world.

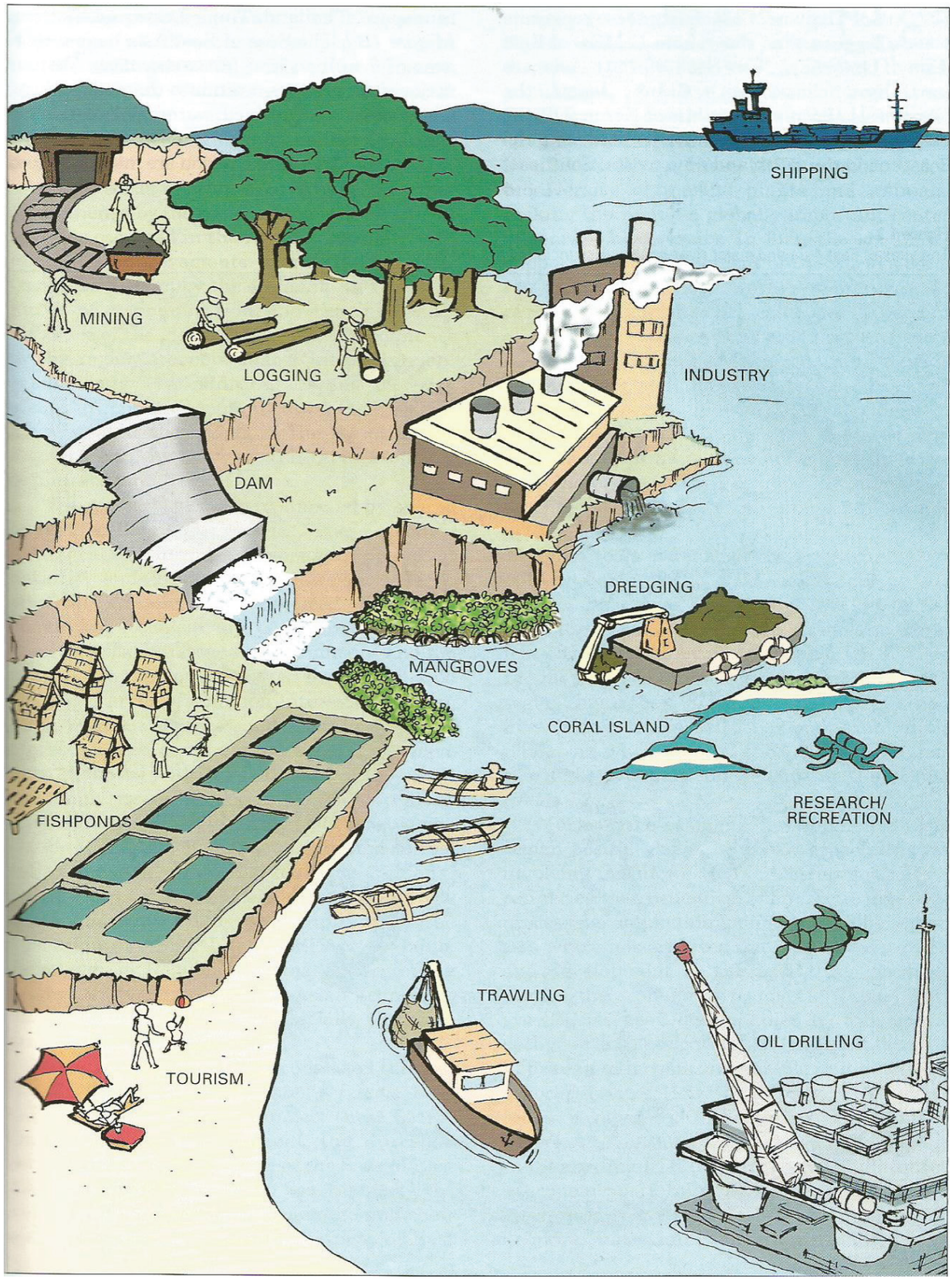

Figure 2.5. Multiple uses of land and sea commonly seen in coastal areas in the East Asian region.

Source: Chua, 2006.

2.2.3.3 NOWPAP's coastal region

The Northwest Pacific Action Plan (NOWPAP) region's geographical coverage includes some coastal, marine and terrestrial areas of the following countries[1]: Japan; People's Republic of China; Republic of Korea; and, Russian Federation. The geographical scope is within these coordinates: from about 121^0E to 143^0E longitude, and from approximately 33^0N to 52^0N latitude (Figures 2.6 and 2.7). This geographical coverage was agreed among the four countries in 1994/97 based on United Nation principles, without prejudice to the sovereign right of any State. Brief description of each country is provided below.

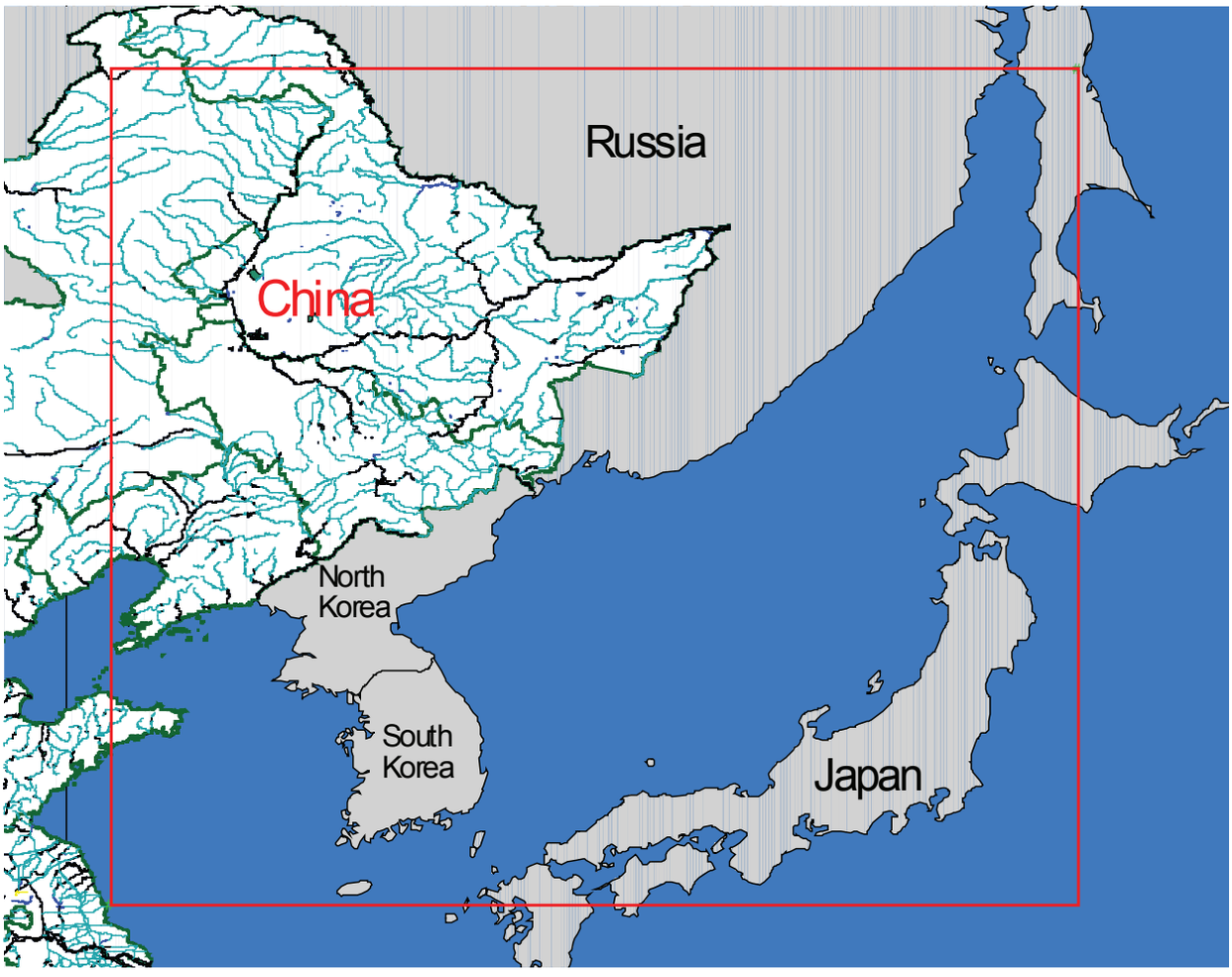

Figure 2.6. Geographical scope of the NOWPAP region.

[1]Democratic People's Republic of Korea is geographically part of the NOWPAP region but has no documents for the ICARM project

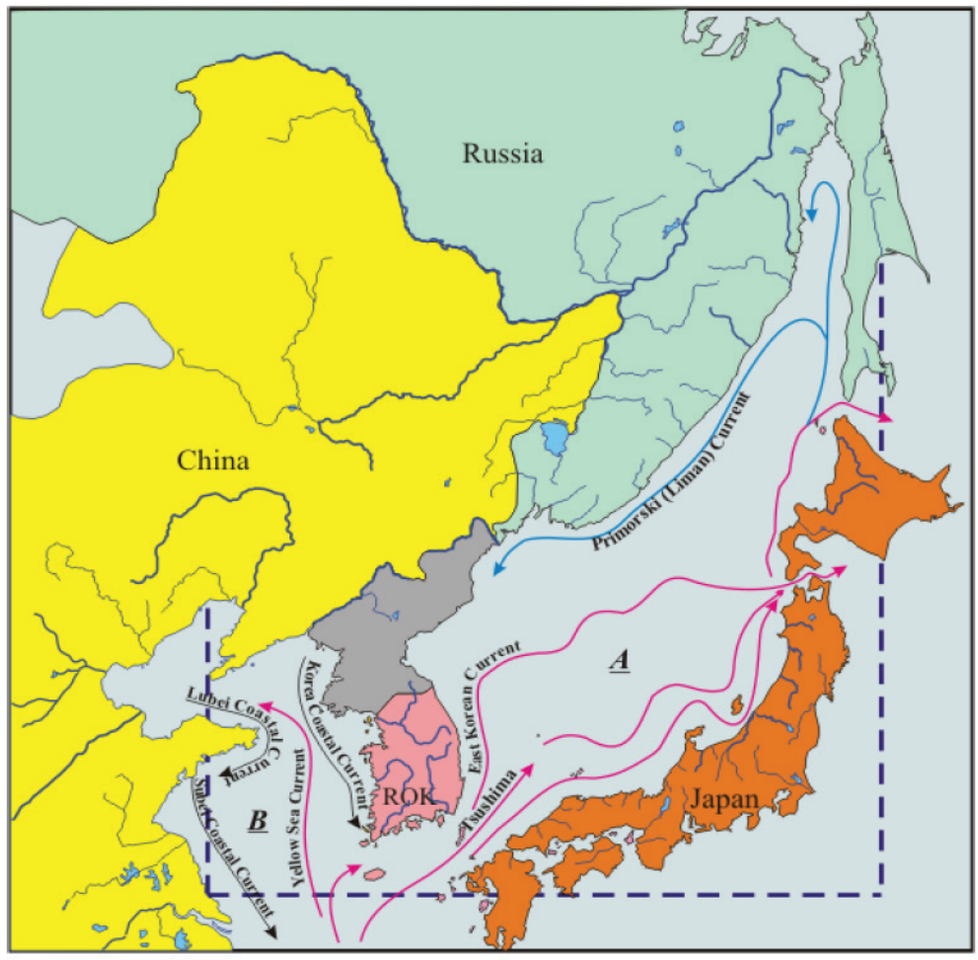

Figure 2.7. NOWPAP region with main marine currents.

Source: SOMER-2, 2014.

China

Some 10.8% of China's national territory is within the NOWPAP region. The marine parts primarily refer to the Yellow Sea, which are bounded by Liaoning, Shandong and Jiangsu Provinces. The terrestrial parts include these five provinces: Heilongjiang, Jilin, Liaoning, Jiangsu and Shandong. Jilin and Heilongjiang are listed as provinces in the NOWPAP region due to the fact that Songhua River, Heilongjiang River, Wusulijang River and Tumen River pass through these provinces. The total land surface area of the basin is about 1,004,000 km^2 while the total length of the coastline is around/roughly 6,054 km.

Japan

In Japan, there are 44 prefectures with riverine systems that flow into the NOWPAP region. The marginal sea surrounded by the country's Islands and the Asian continent constitutes a major region of NOWPAP. This coastal area is a typical semi-closed sea with the southern entrance (Tsushima Straits) and the northern exits (Tsugaru Strait and Soya Strait). The minor region of NOWPAP includes three important enclosed coastal seas: Ise Bay, Setouchi Island Sea (including Osaka Bay area) and Tokyo Bay. Common features of these areas are as follows: large populations, highly industrialized and intensive agriculture.

Korea

The Republic of Korea's geographic boundary of ICARM is similar to what is reflected in its National Program of Action (NPA). The country's coastline stretches to some 11,942 km and some 3,169 islands which are distributed around its marine waters. Sea areas within the NOWPAP region start from the coastline and extend up to the exclusive economic zone (EEZ). Meanwhile, the terrestrial part covers the area from high water mark of coastlines to the landward limit of coastal watersheds. In terms of relative proportion, the coastal area accounts for 31,641 km² (about 32%) of the total territorial land area of 99,514 km². The territorial sea covers some 71,000 km², while the EEZ covers about 447,000 km². Comparatively, the west coast is shallow while the east coast is deep.

Russia

The Russian Federation's part of NOWPAP regional sea is about 6,230 km of shoreline while the total catchment area is about 142,000 km^2. These are located in the North-West Pacific between the Asia coast, the Japanese Islands and the Sakhalin Island. Geographical coordinates are between 34º26' and 51º41' N and between 127º20' and 142º15' E. It is connected with the Okhotsk Sea, by the Nevelskoy and Laperuza straits in the north and northeast, with the Pacific by the Sangar (Tsugaru) strait in the East, and the East Chinese Sea by the Korean (Tsushima) strait in the south. Far eastern regions of Russia adjoining NOWPAP region are Primorsky, Yuzhno-Khabarovsky regions and the Sakhalin Island.

2.3 Elements of integrated development and management

2.3.1 Definitions associated with river basin and coastal management

There are several terminologies that are associated with the integrated management of coastal area and river basins. Some of these terms are listed/defined in Box 2. More detailed definitions are provided for Integrated Coastal Area and River Basin Management (ICARM) and Integrated Coastal Management (ICM). In this guide, ICARM and ICM are used alternatively or synonymously. It is highlighted that the application of these different terminologies ultimately have one common or unifying goal - the sustainable development of marine and coastal areas and resources, using integrated, multi-sectoral and participatory approaches.

Box 2. Some terminologies associated with integrated management of coastal area and river basins

1. Coastal Resource Management (CRM)
2. Coastal Zone Management (CZM)
3. Integrated Coastal Area Management (ICAM)
4. Integrated Coastal Area and River Basin Management (ICARM)
5. Integrated Coastal Management (ICM)
6. Integrated Coastal and Ocean Management (ICOM)
7. Integrated Coastal Zone Management (ICZM)
8. Integrated Marine and Coastal Area Management (IMCAM)

Coastal resource management (CRM) "is a participatory process of planning, implementing and monitoring sustainable uses of coastal resources through collective action and sound decision–making (DENR/DILG/BFAR 2001). Meanwhile, coastal zone management (CZM) – "is a process of governance that consists of the legal and institutional framework necessary to ensure that development and management plans for coastal zones are integrated with environmental and social goals, and are developed with the participation of those affected." (www.cyen.org/innovaeditor /assets/CZM_module.pdf; accessed June 25, 2013). Note that CZM is not restricted to coastal defense works, but includes also a development in economical, ecological, and social terms. Coastline Management is a part of Coastal Zone Management. (http://www.r3coastal.com/Glossary; accessed June 20, 2013).

More terms are associated with the integrated and general development of the coastal zone. Integrated coastal area management (ICAM) "offers a means of balancing the competing demands of different users of the same resources. It also assists in managing these resources to optimize the benefits to be derived on a sustainable basis that are consistent with a country's goals" (www.fao.org.com). As a management approach, ICAM deals with the multiple pressures on coastal areas of land and sea. The objective of ICAM is to ensure that multisectoral development takes all stakeholders' needs into account and has the fewest possible negative impacts and the least possible long-term societal costs (http://www.fao.org/focus/e/fisheries/icam.htm; accessed June 24, 2013).

Integrated coastal area and river basin management (ICARM) provides the key to the integrated development of natural, economic and cultural environments within river basins and coastal areas (UNEP/MAP/PAP 1999). ICARM has recognized that in order to guide and control this wide variety of physical, biological and ecological processes, the classical/traditional management objectives are no longer sufficient. As a new environmental management approach, then, ICARM takes into account the intimate functional linkage between the coast and the river basin. Overall, ICARM is an approach of integrating the physical and socio-economic relationship between the river basins and their corresponding coastal areas (UNEP/MAP/PAP, 1999). The priority issues and/or thematic areas that are often covered include but not limited to: capacity building, coastal land-use planning, enforcement, institutional development, legislation, poverty alleviation, resource use conflicts and river basin development and resource management.

Integrated Coastal Management (ICM) is a "natural resource and environmental management framework which employs an integrative, holistic approach and an interactive planning process in addressing the complex management issues in the coastal area" (Chua, 2006, p. 375). As such, it addresses a variety of problems/issues that threaten the sustainability of the coastal area such as coastal habitat degradation, deprivation and poverty of coastal communities, fishery resources depletion, multiple use conflicts, natural hazards, ocean acidification, pollution and sea-level rise. ICM is regarded as a continuous and dynamic process of planning and managing the coastal area, which employs integrated, holistic and interactive approaches (GEF/UNDP/IMO-PEMSEA, 2006). Cicin-Sain and Knetch (1998) elaborated that ICM may be defined as a "continuous and dynamic process by which decisions are made for the sustainable use, development and of coastal and marine areas and resources".

According to World Bank (worldbank.org.com), ICM "is an interdisciplinary and intersectoral approach to problem definition and solutions in the coastal zone." In conjunction with the Bank's operations, it includes a range of program initiatives that promote environmentally sustainable development of coastal areas such as community- based

management of coastal resources, environment-friendly tourism, navigational risk assessment, oil spill contingency planning, pollution control measures and sustainable aquaculture. In effect, ICM is aimed at maximizing the societal benefits provided by the coastal zone and at the same time minimize the use conflicts and negative environmental impacts. ICM starts with an analytical process to set objectives for the development and management of the coastal zone. ICM should also ensure that the process of setting objectives, planning and implementation involve as broad spectrum of interest groups as possible, that the best possible compromise between the different interests is found, and that a balance is achieved in the overall use of a given country's coastal zones (http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTCMM/0,,contentMDK:20538993~menuPK:1261402~pagePK:148956~piPK:216618~theSitePK:407926,00.html; accessed June 20, 2013).

The FAO Legislative Study 93 has defined ICM as "an approach to managing a defined coastal area that understands the coast as a complex and dynamic system that encompasses many interactions between people and ecosystems, and must be managed as an integrated whole." (http://www.fao.org/legal/publications/legislative-studies/en/?page=2&ipp=10&tx_dynalist_pi1[par]=YToxOntzOjE6IkwiO3M6MToiMCI7fQ%3D%3D; accessed 26 November 2014). In this definition, integrated management refers to the management of sectoral components as part of a functional whole with explicit recognition that the management focus of is the users of resources, and not necessarily the stocks of natural resources.

Integrated coastal and ocean management (ICOM) "is a continuous and dynamic process which takes into account ecological, economic and social considerations and employs a comprehensive method of planning and managing human activities in ocean and coastal areas" (UNESCO, 2006). It has a relatively wide geographical expanse. Hence, ICOM is an approach to manage not only coastal areas but exclusive economic zones and large marine ecosystems, serving the purposes of national ocean policies (http://www.preventionweb.net/english/professional/publications/v.php?id=5464; accessed June 24, 2013). Integrated coastal zone management (ICZM) "is a dynamic, multidisciplinary and iterative process to promote sustainable management of coastal zones. It covers the full cycle of information collection, planning (in its broadest sense), decision making, management and monitoring of implementation." (European Commission, as cited in Wikipedia: accessed June 24, 2013). As a system/process of governance, ICZM consists of adequate/suitable legal and institutional framework necessary to ensure the development and management plans for coastal zones and are integrated with environmental and socio-economic goals which are undertaken with the full participation of all concerned stakeholders. The purpose of ICZM is to maximize the benefits provided by the coastal zone and to minimize the conflicts and harmful effects of activities upon each other, on resources and on the environment (Post and Lundin, 1996).

Integrated marine and coastal area management (IMCAM) "is a participatory process for decision making to prevent, control, or mitigate adverse impacts from human activities in the marine and coastal environment, and to contribute to the restoration of degraded coastal areas. IMCAM approaches have been recognized as the most effective tools for implementing the Convention on Biological Diversity with respect to conservation and sustainable use of marine and coastal biodiversity" (AIDEnvironment National Institute for Coastal and Marine Management 2004). In essence, IMCAM covers both human activities and ecological/environmental facets. It involves all stakeholders, including: decision-makers in the public and private sectors; resource owners, managers and users; non-governmental organizations; and the general public (http://www.cbd.int/marine/imcam.shtml; accessed June 24, 2013).

2.3.2 What is 'integration' in ICM/ICARM

There are essentially five elements/dimensions of integration: (1) conceptual, (2) spatial, (3) organizational, (4) functional, and (5) temporal. These elements/dimensions are interlocking and are mutually re-enforcing. These five intricately-linked dimensions are shown in Figure 2.8.

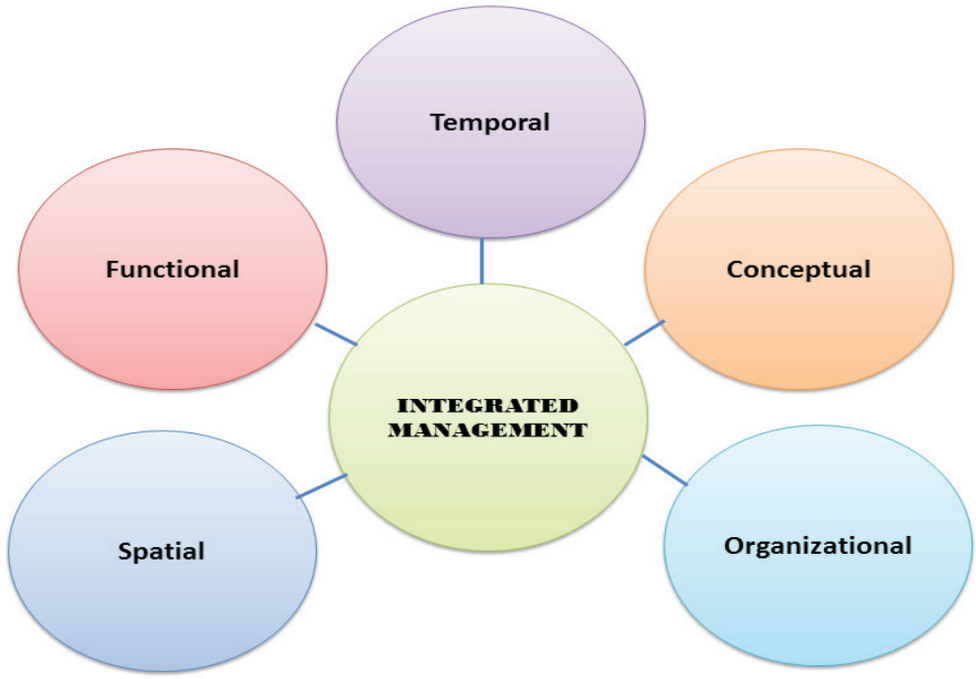

Figure 2.8. Elements or dimensions of integration in an ICM program.

Conceptual integration is recognition that ICM/ICARM is consistent and/or supportive of sustainable coastal development. Munasinghe (1993) and Munro (1995) have argued that sustainable development must meet these three conditions: ecologically sustainable, socially acceptable and economically feasible. Therefore, an ICM program must sufficiently address such sustainable development's three key interlocking dimensions. Conceptually, ICM is duly recognized as a holistic approach to resolve multiple-use conflicts and harmonize the interests of various stakeholders in the coastal areas. Sectoral approaches to coastal and river basin management have failed to effectively address crucial issues and problems within the land-sea inter-phase. Hence, the/an end objective of ICM is to mainstream environmental concerns into a government's economic development agenda so as to achieve a better balance between conservation and human needs for socio-economic development.

Conceptual integration also implies that ICM must be based on solid science, both social and natural sciences. Hence, science coordination is particularly crucial. The promotion of an interdisciplinary approach among scientific disciplines is a good example. It is necessary to work towards providing scientific answers to management questions that need scientific interpretations or solutions to institute the desired changes.

Spatial integration means that an ICM program shall be planned and undertaken in a well-defined geographical space. Obviously, the program area consists of both terrestrial and marine

areas. The terrestrial area may encompass several topographic features: from the highlands that may be vegetated with mossy forests down to the flat lands that are habitated by mangrove forests. Natural resources that may be covered include grasslands, lakes and rivers. Economic activities may include, but not limited, to the following: aquaculture, crop farming, forestry, industries (light and heavy), livestock raising, logging and mining. In the marine areas, natural habitats may include estuaries, coral reefs, seagrass beds, soft-bottom communities and tidal flats. Key economic sectors that operate here include the following: capture fisheries, manufacturing industries, mariculture, oil and gas, shipping and tourism. Regardless of the site's geographical coverage in terms of terrestrial and marine components, the most important consideration is the well-defined geographical delineation. Watersheds and/or catchments are ideal planning/demonstration area. Alternatively, political or administrative boundaries may be used. In practical terms, though, a combination of natural or political boundaries may be used. Spatial integration recognizes the common geographical boundaries, such as the river basins down to the continental slopes.

Organizational integration is aimed at streamlining the functions and operations of an ICM program. Simply told, all involved institutions and/or organizations are fully aware of their respective roles and responsibilities. This organizational dynamic drives interagency and multi-sectoral collaboration towards harmonizing interagency functions and priorities. As a consequence, "turf conflicts" are reduced to the minimum while multiple-use conflicts in the coastal area are managed more effectively. Establishing the appropriate coordinating mechanisms builds effective functional relationships in coastal governance. It improves understanding (the role of each stakeholder), delineates responsibilities and harmonizes interagency and intersectoral conflicts.

Coordination mechanisms have varied among ICM/ICARM regional programs. In the case of the NOWPAP region, the coordination mechanism is largely lodged in the hands of the ICARM Working Group with oversight function from POMRAC. There is also variation among the PEMSEA ICM demonstration sites. In Chonburi, Thailand, the Project Coordinating Committee (PCC) is lodged at the provincial level. The Project Management Office (PMO) originally operated at the municipal level when the pilot project was started covering five municipalities, and while ICM was being scaled up to include other municipalities/cities in Chonburi. ICM implementation has now been scaled up to cover the entire province. The PMO is now situated at the provincial level. The Xiamen Integrated Management Coordinating Mechanism in China takes a different form whereby the Marine Management Coordinating Office was eventually established under the jurisdiction of the municipal government. The Xiamen experience shows that an effective intervention program - such as ICM - requires the presence of an institution bestowed with sufficient authority to engage in planning, execution and regulation of all activities associated with coastal management (Chua et al., 1997, PEMSEA, 2006a). The coordinating mechanism in the form of PCCs and PMOs involves bringing together the various ICM stakeholders.

In functional integration, there is synchronization of various elements for both the 'governance' components and 'sustainable development aspects.' In terms of 'governance,' there must be streamlining of policies and regulations to reduce overlaps. There is also the integration of sectoral plans, programs and projects to increase complementarities. Hence, programs for livelihoods and poverty alleviation must complement with programs that are related to sustainable use of natural resources as well as maintenance of ecosystem services. Under the PEMSEA (2007) model, the 'sustainable development aspects' has five major program components. These are: (1) natural and man-made hazard prevention and management, (2) habitat protection, restoration and management, (3) water use and supply management, (4) pollution and waste reduction management, and (5) food security and livelihood management. These management programs are designed to address the

critical social-economic and environmental trends as well as the emerging transboundary concerns. Natural and man-made hazard prevention and management shall address natural disasters that include these phenomena: cyclones/typhoons, droughts, earthquakes, flooding, land subsidence/ landslide, sea level rise, storm surges, tsunami, volcanic eruption and extreme weather events. Habitat protection, restoration and management shall address issues related to the conservation of coastal ecosystems, habitats and species. Water use and supply management may address concerns such as water supply, proportion of population using an improved drinking water source, percentage of population with access to improved sanitation, lack of sewage treatment plants, and water use competitions and/or conflicts. Pollution and waste reduction management shall deal with pollution-related issues that originate from air, land and water sources. Food security and livelihood management largely pertain to agriculture and fisheries issues that relate to food and nutrition.

Temporal integration implies synchronization of various ICM tasks and activities to achieve greater efficiency and effectiveness. Various programs under the 'sustainable development aspects' are packaged normally into various types of plan. Operational plans normally cover a one year period. Such plans covered the detailed activities to be undertaken by various agencies/entities involved in an ICM program on an annual basis. Management plans are longer in duration, which may cover between 2 to 5 years. Strategic plans have often the longest durations, which may range from 5 to 25 years. Temporal integration also necessitates the synchronization of ICM program planning with the local government planning process/schedule.

2.3.3 ICARM/ICM and sustainable coastal development

Efforts towards integrated management were somehow dictated by the environmental movement and efforts towards sustainable development. This began in the 1960s and was catapulted by the publication of 'Silent Spring', an environmental science book written by Rachel Carson in 1962. The book documented the negative impacts or detrimental effects of indiscriminate use of pesticides on the environment, particularly on the population of birds. A decade later, United Nations Conference on the Human Environment (popularly called as the 1972 Stockholm Conference), was held. Given the participation of some 113 countries, 19 inter-governmental agencies, and more than 400 inter-governmental and non-governmental organizations, it is widely recognized as the beginning of modern political and public awareness of global human and environmental problems.

Traditionally, development was equated solely in economic terms whereby the goals of development were narrowly defined in terms of the Gross National Product (GNP) and its subsequent growth (Streeten, 1980, p. 47). Other equally important objectives like ecologically-balanced environment, social equality, and greater public participation were either sidetracked or less emphasized. Concern for the environment first emerged as an important public issue during the 1960's (Beale, 1980, p. ix). During that time, the concern was almost exclusively confined in the highly developed countries. There was a realization at various points that environmental deterioration resulted into economic decline and ultimately, social disintegration (Hanks, 1984, p. 61). Central to these were environmental malaise were massive pollution generated by the urban industrial society. The agricultural modernization in the U.S., for instance, led to some negative industrial consequences particularly crop infestation and contamination of soil and water (Buttel, 1980, p. 46).

When the concept of conservation was first introduced into the Third World setting, it was generally received with a mixture of indifference and skepticism. Many political leaders then

were reluctant to share the concerns of the developed countries with either pollution or sustainable development (Brookefield, 1980, p. 104). They believed that the maximum utilization of the natural/ environmental resources were of extreme necessity to alleviate the socio-economic conditions of the people, particularly the rural populace. Brookefield (1980, p. 104) noted that their leaders were quite fearful of the fad and vested interest of the industrialized countries to preserve their own affluence at the cost of keeping the rest of the world in poverty. As a result, considerations for environmental conservation have continued to occupy the backseat in both the urban and rural development affairs.

Sustainable development (WCED, 1987; Trzyna, 1995) serves as the conceptual foundation of ICM/ICARM in general, and in crafting the NOWPAP plan in particular. Associated terms include 'ecologically sustainable development' or ESD (Commonwealth of Australia, 1992) and 'sustainability' (Slocombe, 1991; O'Riordan, 1999). In this guide, the terms 'sustainable development', 'sustainability' and 'ESD' are used interchangeably to avoid semantic confusion. Similar to the ICM's requirements, sustainable development involves the simultaneous pursuit of economic prosperity, environmental quality and social equity" (WBCSD, 1997). As an integrative approach, Munasinghe (1993) characterized sustainable development's interlocking dimensions as a development that is ecologically sustainable, socially acceptable and economically feasible. Munro (1995) corroborated/supported these three-pronged dimensions as ecological sustainability, social sustainability and economic sustainability.

Over the last four decades, the concept of sustainable development has evolved through major international events. The UN Stockholm Conference on Human Development in 1972 in Sweden was the pioneering attempt, which was followed by the development of the World Conservation Strategy in 1980. In 1987, report of the World Commission on Environment and Development was published. An outcome of UNCED in 1992 is the formulation of Agenda 21 and similar action agendas for individual countries, which contain national strategies to achieve sustainable development. Ten years later, in 2002, the World Summit on Sustainable Development (WSSD) at Johannesburg, South Africa. Carew-Reid et al. (1994) summed up that sustainable development means improving and maintaining the well-being of people and ecosystems, and likewise entails integrating economic, social and environmental objectives.

2.3.4 Principles associated with ICARM/ICM

ICM/ICARM has several associated principles and/or concepts that are closely-linked with sustainable development. Munasinghe (1993) and Munro (1995) have broadly categorised these in three dimensions: economic, environment and social (see Table 2.1). Chua (2006) provides a more elaborate ICM principles arranged in conceptual tiers (see Figure 2.9). It implies that those engaged in ICARM-related works must strike a wise balance among competing human needs, the use of resources and economic development. Such a balance among economic, environment and social concerns is being pursued in the NOWPAP region.

The economic dimension largely relates to profitability of an enterprise or economic activity. The investment costs must be outweighed by the financial benefits. Simply told, there must be profit to be generated at the end of actual management.

Four principles are briefly described here in terms of environmental or economic dimension. The notion of 'carrying capacity' advocates that development activities be pursued within the carrying capacity of the natural environment – or economic development that is within the limits of

acceptable change. In an island environment, for example, human settlements must be established in such manner that the coastal habitats will not be unnecessarily degraded. Renewable resources should be exploited only at or below their rates of renewal (Hodge, 1995). In forest resources, for example, that timber extraction must not exceed the reproductive capability of the harvested tree species. The second one is the precautionary principle. Decisions should be planned using the best available scientific and technical information. In the event that such data/information are insufficient to fully characterize the risks or negative impacts to the natural environment or ecological system, precautionary measures should be used to prevent serious or irreversible harm.

Table 2.1.
Principles associated with ICARM/ICM and sustainable development

Key dimensions	Associated principles/concepts
Economic	• profitability
Environment	• carrying capacity
	• ecosystem-based management
	• "polluter pays" principle
	• precautionary principle
Social	• accountability
	• inter-generational and intra-generational equity
	• participatory management
	• partnership

Another principle is ecosystem-based management (EBM). EBM is "an integrated, science-based approach to the management of natural resources that aims to sustain the health, resilience and diversity of ecosystems while allowing for sustainable use by humans of the goods and services they provide." (www.eoearth.org/article/Ecosystem-based_management). EBM is an approach that goes beyond examining single issues, species, or ecosystem functions in isolation (UNEP, 2011).The fourth principle is popularly called as the "polluter pays" principle. It argues that the cost of environmental control and management must fall in the first place on the polluters. If a factory pollutes a lake due to its discharges, it must pay the necessary fines or charges. Hence, those who produce negative impacts to the resources and/or environment must either: internalize the costs or undertake the necessary compensatory activities, such as payment of appropriate fees.

Four socially-related principles are briefly mentioned here. One is the principle of 'accountability.' Users of the river basins and coasts must be held accountable for their undertakings in these areas. Forestry users are expected to shun away from the use of destructive techniques in timber harvesting, in the same vein that aquaculturists must promote environment-friendly husbandry techniques. Hence, all stakeholders must be responsible stewards of the resources found therein. The second principle relates to inter-generational equity and intra-generational equity. Within the framework of sustainable development, this pertains to "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). The benefits from the use of river basin and coastal resources should be shared between present and future generations of stakeholders within the NOWPAP region.

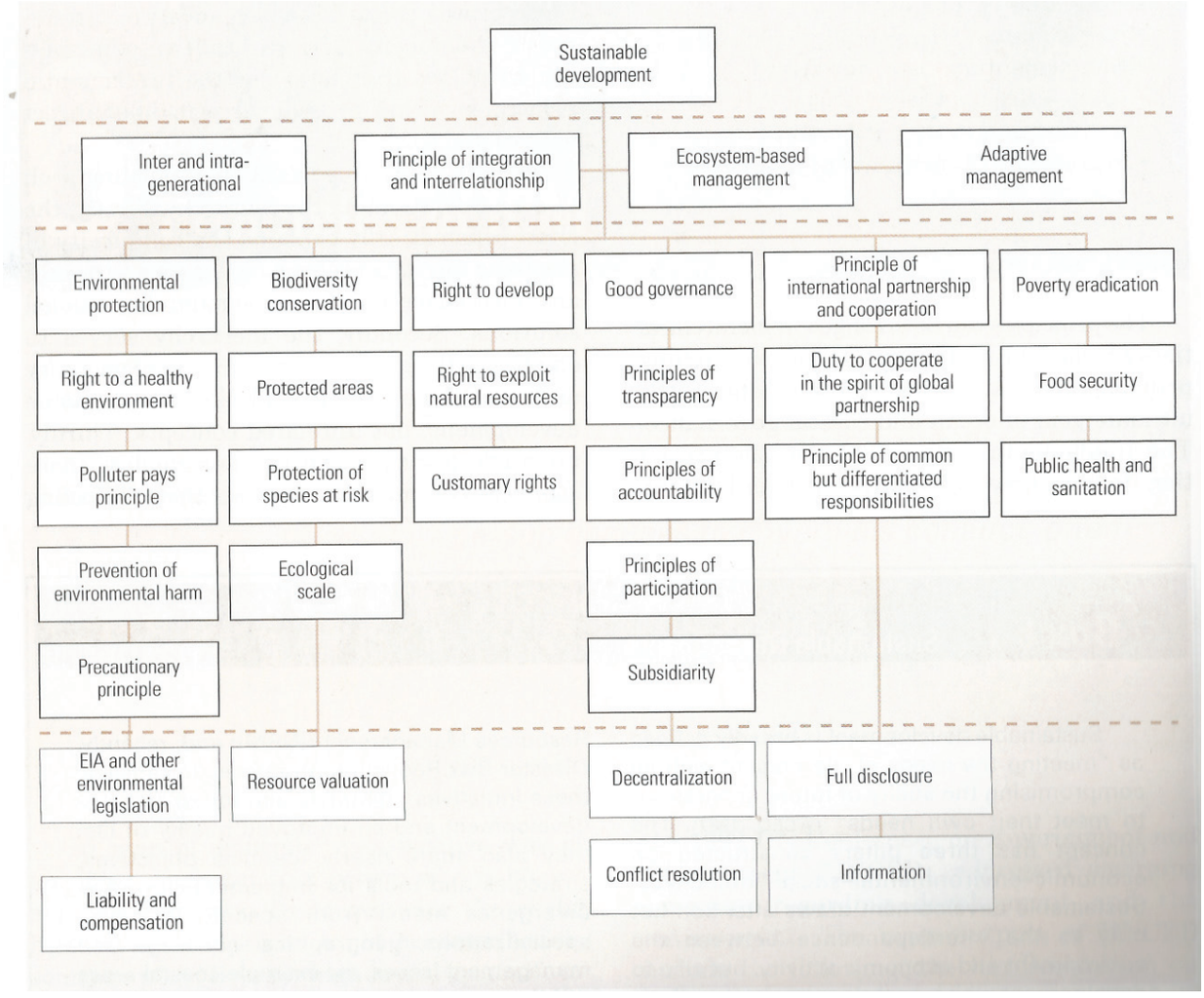

Figure 2.9. ICM principles arranged in conceptual tiers.
Source: Chua, 2006.

The third concept relates to participatory management. The ultimate goal of sustainable river basin and coastal management can only be achieved effectively through multisectoral and multi-institutional collaboration and participation of all relevant stakeholders. Fourthly, the concept of institutional partnership must be duly considered. There is a need to establish appropriate partnership arrangements. These include private-public partnership (government and industry collaboration), as well as innovative partnership schemes between civil society groups and local communities. Collaborative mechanisms must promote policy harmonization and consistency, information sharing and collective action to achieve long-term integrated management.

2.3.5 From sectoral to integrated management

Traditionally, development in the coastal areas has been pursued in sectoral manner. It initially followed the terrestrial model on focussing on certain sectors, such as agriculture, forestry and mining. As such, sectoral concerns have been handled by sectoral agencies, such as fisheries agency for fisheries resources, tourism agency for tourism and maritime agency for matters related to shipping and navigation. Although development efforts have generated substantial achievements,

the uncoordinated and fragmented orientation resulted to marginal results despite substantial inputs. This led to the recognition that the sectoral approach is not necessarily sufficient to strike a balance between economic objectives, social welfare ideals and political ideological doctrines.

The notion of 'integrated' development actually/chronologically started in the terrestrial areas. Among the terms used then were Integrated Rural Development (IRD) and Integrated Area Development (IAD). The rural development efforts in the 1960s, and to some extent during the 1970s, showed their relative biases towards the social and economic aspects. The IRD programs in the Latin American Countries - particularly for Brazil, Columbia, Ecuador and Mexico - were focused on agricultural production, infrastructure building and social services (FAO, 1977). The African approach to IRD aims at decentralization and organizational integration. The specific objectives of IRD for Tanzania were the eradication of rural poverty and people participation (FAO, 1977). The Chinese approach to rural development, which was greatly influenced by the Cultural Revolution, revolved around agriculture and industry (Hauge, 1981).

The same observations prevailed in Asia where rural population accounts for about three quarters of the entire society. In India, the IRD was centered on agricultural development and social justice while rural development in Bangladesh emphasized on agriculture as well as People's Health Center and Self Reliant Movement. The approach to development underlying Sri Lanka's policies consisted of maintaining the efficiency of the commercially organized plantation sector and taxing the modern sector to subsidize traditional sectors. The Rural Reconstruction in Thailand emphasized on livelihood, health services, education and self-government (Hauge, 1981).

In the Philippines, for example, the Integrated Rural Development (IRD)/Integrated Area Development (IAD) approach was adopted by the government in 1973. The IAD approach aims at three major concerns: accelerating growth in depresses areas: increasing local participation; and, distributing equitably the economic gains. Garcia and Cabrido (1982) noted that the IAD differs from the classical approaches with its six innovative features as follows: (1) undertaken within a defined geographical unit; (2) multi- sectoral in operation; (3) initiates grassroots participation; (4) advocates spatial integration; (5) ensures political commitment; and, (6) requires organizational integration. Bertulfo (1983) chronicled that the typical IAD package, sometimes called project mix, are composed of the following basic components: agricultural development like farming systems, livestock dispersal and irrigation; infrastructure development such as roads, ports and flood control; land reform; rural industrialization; and social services like education, nutrition and family planning. As such, IAD projects have been able to catalyze the various development processes in the countryside, more significantly those that relate to agriculture, physical infrastructure and social services.

In effect, integrated developments in the terrestrial areas were attempts to integrate more fully the social and environmental elements in addition to the classical economic gains. Desertification is among the negative repercussions of accelerated development efforts (Morris, 1981, p.129). In using resources to produce high and rising level of income, negative effects soil erosion, loss of genetic resources and deterioration of water quality are often produced which are incidental to the main purpose (Herfindahl and Kneese, 1965, p. 1). As early as 1972, the lending institutions, the world-recognized organization and the government of various countries, have focused their attention on the environmental dimension as an integral factor in rural development. One of the strategic highlights in the formulated World

Conservation Strategy is the integration of conservation and rural developments goals (Hanks, 1984, p. 24).

The World Bank advocated also that rural development must not only extend any particular sector but must also give balance attention to the political, social, economic and environmental circumstances of the particular country or region (World Bank, 1975, p.3). One of the priorities for future operations of Asian Development Bank (ADB) is the optimization of land use and environmental protection (ADB, 1985, p. 238). Many sectoral development activities have resulted in the improvement of human and societal welfare. Negative impacts, however, are generated by unmitigated/unsustainable development endeavors. These include economic activities related, but not limited, to: agriculture, aquaculture, coastal urbanization, fisheries, forestry, industrial development, land reclamation, mining and oil exploitation, ports and harbors, settlements expansion, shipping, tourism and recreation, water and sanitation services and wetland conversion. Hence, the integrated management of these sectors has become a necessity.

Conceptually, ICM/ICARM are closely associated with the so-called 'ecosystem management,' which is aimed at the long-term management (using adaptive and collaborative methods) of the natural environment for human benefit with consideration of ecological processes. As an umbrella term, ecosystem management is in turn linked with five approaches. These are: (1) ecosystem approach; (2) ecosystem-based management; (3) landscape approach; (4) ecosystem-based approaches to adaptation; and (5) integrated water resources management. The ecosystem approach is closely linked with the implementation of the 1992 Convention on Biological Diversity's (CBD) whereby the three objectives (conservation, sustainable use and equitable sharing of benefits) from use of genetic resources are geared towards sustainable development (see www.cbd.int/ecosystem).

Ecosystem-based management or EBM involves managing human interactions with the environment to maintain healthy ecosystems for sustained delivery of ecosystem services (Leech et al., 2009). The landscape approach is an approach for balancing the interests of productive land uses (particularly agriculture and forestry), environmental goals and socio-economic objectives, taking into account the notion of scale, adaptive management and collaborative decision-making (Sayer et al., 2013). Integrating biodiversity and climate change into one concept, the ecosystem-based approaches to adaptation use biodiversity and ecosystem services as part of a strategy to help communities adapt to the negative impacts of climate change at local, national, regional and global levels (see http://www.unep.org/climatechange/adaptation/EcosystemBasedAdaptation/tabid17 /29583/Default.aspx). Integrated water resources management (IWRM) is the management of the terrestrial and water-based resources in a river's catchment area for environmental, economic and social objectives (see Roy et al., 2011 and http://www.un.org/waterforlifedecade/iwrm.shtml)

2.3.6 ICARM/ICM goals and objectives

Realizing the need for a more comprehensive framework and integrated approach for more judicious management of river basins and coastal areas, several models came about. These include the frameworks/models that are earlier described in Chapter 2.3, Section 2.3.1: CRM, CZM, ICAM, ICARM, ICM, ICOM, ICZM and IMCAM. Chronologically, ICM-related efforts started in the US. The establishment of the San Francisco Bay Conservation and Development Commission

as early as 1965 was a pioneering attempt towards. The US likewise enacted the landmark Coastal Zone Management Act of 1972. In Asia, the major ICM initiative started in 1985 with the ASEAN/US Coastal Resources Management Project, which ended in 1992 (see Box 3).

Box 3. ASEAN/US Coastal Resources Management Project as an initiative in integrated coastal management

Name/Title of Program/Project: Association of South East Asian Nations / United States (ASEAN/US) Coastal Resources Management Project
Major Donors/Funding: United States Agency for International Development (USAID)
Duration: 1986 - 1992
Project Sites in six ASEAN countries: Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, and Thailand
Cost: US$ 5.8 million
Executing/Implementing Agency: International Center for Living Aquatic Resources Management (ICLARM), now called as the WorldFish Center
Major objectives:
Analyzing, documenting and disseminating information on trends in coastal resources development
Increasing awareness of the importance of Coastal Area Management policies and identifying, and where possible, strengthening existing management capabilities
Providing technical solutions to coastal resource-use conflicts
Promoting institutional arrangements that bring multisectoral planning to coastal resources development
Key Program/Project components:
ICZM program – by establishing case studies in pilot sites of the above six countries, several interventions were implemented that included: development of ICZM plans, environmental protection, establishment of marine protected areas, habitat rehabilitations, policy development/formulation for integrated management, resource and ecological assessments,
Human resource development – by undertaking short-term and academic training to strengthen existing capabilities including broad-based ICM training
Public awareness – by producing educational materials on the ecological and socioeconomic contributions of the natural resources and the consequences of unsustainable exploitation, promoting civil advocacy and raising environmental awareness
Political will – by organizing policy workshops involving relevant policymakers and lawmakers to increase their understanding of and commitment to the sustainable use of natural resources and appropriate actions to arrest further destruction of the resource base

Sources: Scura et al., 1992, Chua, 1998.

From 1993 to 1999, specifically for East Asia, 11 countries in the region participated in a regional project by GEF/UNDP/IMO that was aimed to prevent and manage pollution on a long-term and self-reliant basis. This project was called as Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS) with Xiamen, China (PEMSEA, 2006a) and Batangas Bay, Philippines (PEMSEA, 2006b) as two ICM demonstrations sites. In late 1999, 11 nations collaborated further when they implemented the follow-on regional initiative called as "Building Partnerships in Environmental Management for the Seas of East Asia (PEMSEA). These 11 countries were involved in developing and implementing various ICM program. In 2006, 18 more local governments in the region had joined PEMSEA and were acting as ICM parallel sites. (Parallel sites are those which implement an ICM program using its financial resources, but with technical assistance from PEMSEA.)

Since the 1970s, ICM/ICARM initiatives have mushroomed throughout the world. Appendix 2 provides a partial/selected list of international and regional initiatives on integrated coastal zone management. NOWPAP came rather late in ICM: ICARM was initiated only in 2005 during the 10th Intergovernmental Meeting; the ICARM Working Group was established in 2007; the 4 National Reports and the Regional Overview on ICARM was published in 2010; and the Regional Overview on Ecosystem Valuation, Marine Spatial Planning and Ecosystem-Based Management is being published.

Whatever model/terminology is adopted, the river basins and coastal areas must ideally satisfy the requirements of economic gains, ecological integrity and social acceptability. The functions of ICOM are wide-ranging, and include the promotion of environmentally compatible economic development, the protection of coastal and marine habitats and biodiversity, as well as area-based planning (UNESCO, 2006, Table 2.2). Hence, these integrated approaches are addressing certain common problems/issues (such as habitat degradation, pollution, resource over-exploitation and use conflicts) in the coastal areas. Moreover, a package of program interventions (such as agricultural expansion/intensification, pollution reduction, sustainable fisheries, tourism development, and watershed management) is likewise developed to address these problems/issues.

ICM is a dynamic process. Hence, there are driving forces that initiate its program development and subsequent implementation. Generally, the highly sectoral approach to coastal management has failed to effectively address crucial issues and problems that confront the watersheds and coastal areas. It is now widely recognized that a "sectoral and disciplinary approach to marine and coastal development does not provide an effective framework for achieving sustainability and resolving conflicts over resource use" (UN, 1993).

The coastal resource system is sustained through a balance between its physical, chemical and biological properties. Its breakdown may imply the systemic functional degradation of these properties resulting in either a loss – or reduction - of resiliency of the ecological system. From a wide range of institutional and legal reforms to economic incentives, ICM is set up to take on parallel initiatives that target changes that result in sustainable coastal resource use and development. More importantly, changes within individuals, institutions and societies are anticipated over the long-term.

Operationalizing an ICM program is hinged on how to balance economic development and various other social concerns with the need to conserve ecological integrity. The fundamental issue/question of trade-offs cannot be avoided in an ICM program. Hence, those involved in ICM are continuously being challenged by systematically coming up with various options and ultimately make hard decisions that are inherent in pursuing sustainable development in river basins and coastal areas. In terms of purpose, "the overall goal of ICM is to improve the quality of human communities who depend on coastal communities while maintaining the biological diversity and productivity of coastal ecosystems" (GESAMP, 1996).

Table 2.2.
Examples of ICOM goals and functions

Goals	Functions
1. Area planning	• Plan for present and future uses of ocean and coastal areas • Provide a long-term vision
2. Promotion of economic development	• Promote appropriate uses of ocean and coastal areas (e.g., marine aquaculture, ecotourism)
3. Stewardship of resources	• Protect the ecological base of ocean and coastal areas • Preserve biological diversity • Ensure sustainability of uses
4. Conflict resolution	• Harmonize and balance existing/potential uses • Address conflicts among ocean and coastal uses
5. Protection of public safety	• Protect public safety in ocean and coastal areas typically prone to significant natural, as well as human induced, hazards
6. Proprietorship of public submerged lands and waters	• As governments are often outright owners of specific ocean and coastal areas, manage government-held areas and resources wisely and with good economic returns to the public

Source: UNESCO, 2006.

Broadly, ICARM requires the adoption of goals, objectives and policies and the establishment of governance mechanisms which recognize the interrelationships between the two systems (coastal area and river basin). The following constitute the four key characteristics of ICARM (UNEP/MAP/PAP, 1999). First, the objective of ICARM is to develop the sustainable production of goods and services required by society and to resolve conflicts in resource allocation for the production of these goods and services. Secondly, ICARM encompasses the catchment area and the adjacent coastal zone thereby taking into account ecological, economic, social and cultural aspects of this area at various levels of governance. Thirdly, ICARM is based upon a coherent set of strategic, tactical and operational activities and uses technical and managerial instruments to realize its objectives. Fourthly, ICARM is action-oriented in nature, continuous and adaptive in time, and participatory *vis-a-vis* public and private stakeholders. Overall, ICARM encompasses a comprehensive and integrated approach to addressing environmental management problems taking into account the relevant human and natural resources dimensions.

2.3.6.1 Sectoral fisheries management in context of ICARM/ICM

There is a growing realisation about the need for a more comprehensive framework and integrated approach, such as the ICZM model, to effectively maintain the ecological integrity of coastal areas in general, and to promote the sustainability of coastal fisheries in particular. In Australia (Kenchington, 1990; Kenchington and Crawford, 1993; Done and Reichelt, 1998) and South East Asia (Chua et al., 1992), the trend now is towards ICZM. Social scientists argue that many solutions to the problems of the fisheries lie

outside the sector itself (Smith, 1979). While it is acknowledged that fisheries should be contextualised within the broader area of the ICZM, marine fisheries can be studied as a distinct but related part of the entire system. Scura (1993a, 1993b) reviewed the experiences of some international research institutions to integrated coastal management, and also developed a typological framework and strategy elements for integrated coastal fisheries management. Hence, ICM becomes an 'over-arching' framework for fisheries management (see Figure 2.10).

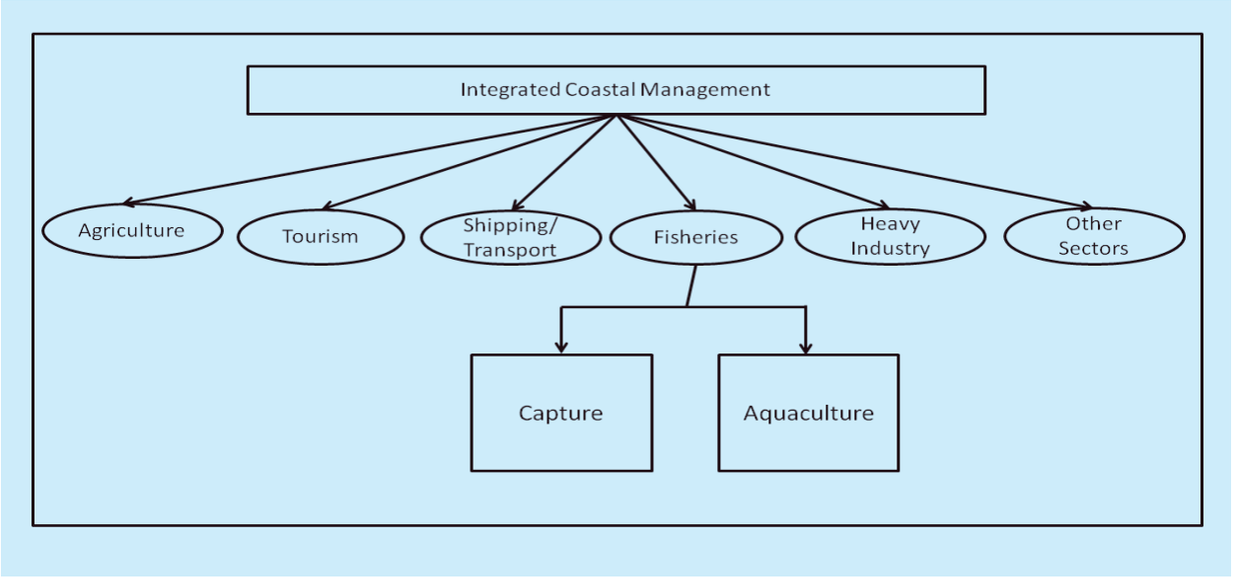

Figure 2.10. ICM as an over-arching framework for coastal fisheries management.

Sources: Chua, 1997, Pido, 2004.

Chua (1997) argued for the application of integrated coastal management system for sustaining coastal fishery development. Cunningham (1995) pointed out that the fisheries sector cannot be managed in isolation, and thus, there is a strong need to consider the inter-relationships between fisheries and other users of coastal resources. In the Philippines, various programs and projects were initiated in using the integrated coastal management approach to promote sustainable fisheries development (Munoz, 1997; Christie and White, 1997; Courtney and White, 2000).

Contextualizing fisheries management within a broader integrated framework relates to the principle to ecosystem-based fisheries management (EBFM) or ecosystem approach to fisheries (EAF). The EBFM has been cited in international fora, such as the Conference on Responsible Fisheries in the Marine Ecosystem (Reykjavic, Iceland, 2001) and the International Council for the Exploration of the Sea/Scientific Committee on Oceanic Research Symposium on Ecosystem Effects of Fishing (Montpellier, France, 1999). The EBFM is defined as "managing fisheries in a manner that addresses multiple needs and desires of society, without jeopardizing options for future generations, to benefit from the full-range of goods and services provided by marine ecosystems" (FAO, 2003). This principle is closely allied with the precautionary principle and limiting fisheries impacts on the ecosystem.

2.4 Major threats/issues in river basin and coastal management

There is a host of major threats/issues in the coastal areas and adjoining watersheds. These are broadly categorized into five interlinked and overlapping areas: (1) environmental degradation and/or habitat destruction; (2) pollution of various kinds; (3) non-optimal/non-sustainable use of natural/environmental resources; (4) natural hazards; and (5) global events/phenomena. Some country-specific examples are provided. This is visually represented in Figure 2.11.

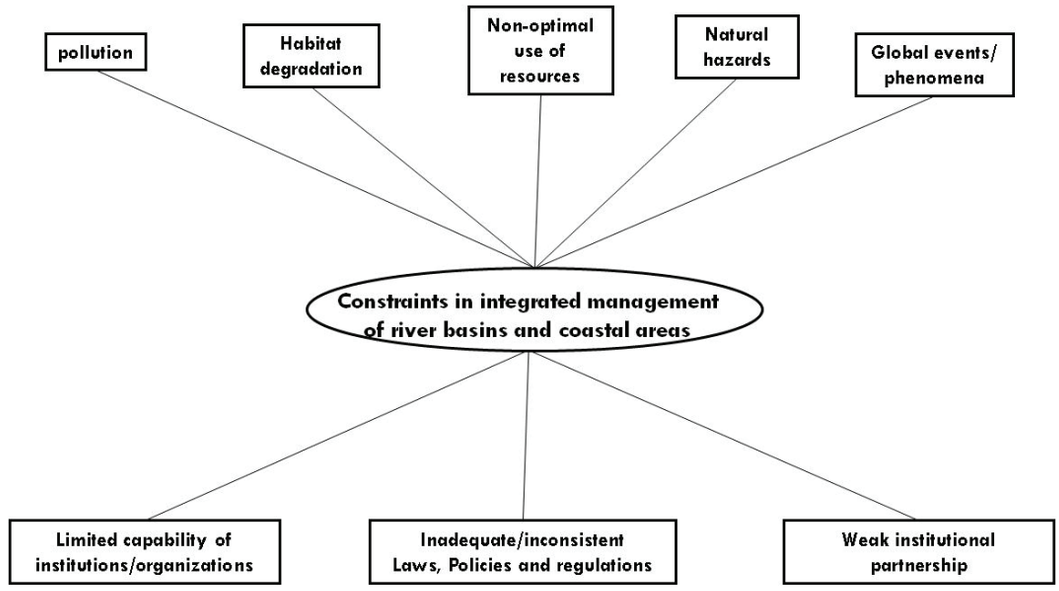

Figure 2.11. Key environmental issues/problems and their institutional/governance linkages.

Source: Modified from DA-BFAR, 2006; Figure 1.6 of this book.

2.4.1 Habitat destruction

The destruction and alteration of habitats is considered to be the greatest of all threats to biodiversity, and the most widespread human impact on the coastal zone (GESAMP, 2001). Habitat destruction relates to three areas. One area is the degradation of coastal habitats such as coral reefs, mangroves and seagrass beds. Another area is the destruction of terrestrial ecosystems such as natural forests and riverine systems. Destruction and degradation of such critical habitats are strongly correlated with the decrease in marine biodiversity and productivity. Threats to biodiversity have been magnified considerably because at least half the world's mangroves and coastal wetlands have been lost (GESAMP, 2001). The third category relates to land use changes whereby natural habitats (like pristine lakes) are transformed into other land uses, such as commercial agriculture and human settlements. Unregulated human activities are impairing the functional integrity of coastal and marine ecosystems, thereby reducing the natural goods and services that they provide.

Specific examples in two countries within the NOWPAP region are provided. In Japan, some 1,689 ha (6.9% reduction) of wetlands were lost in the major NOWPAP region between 1978 to 1994. The area of the ROK's coastal wetlands has decreased considerably by 20%: from 3,203 km² in 1987 to 2,550 km² in 2005. Such decrease in area is mainly attributed to reclamations and other coastal development activities.

2.4.2 Pollution

Pollution may be broadly classified into four: air pollution, marine litter, solid wastes and water pollution. They occur in both air and water, and are present in both the riverine and marine environments.

Water quality

China's main controlled contaminations are chemical oxygen demand (COD) and ammonia nitrogen (NH_3-N) in freshwater while COD, biochemical oxygen demand (BOD), inorganic nitrogen (IN) and active phosphate (P) are the contaminants in the marine waters.

For water pollution in Japan's NOWPAP region, 401 incidences were recorded. Water pollution in the river network has little variability whereby the average BOD ranged from 0.94 to 0.85 mg/L between 2003 to 2006 in the major NOWPAP region. Yellow Sea has been a recipient of pollutants being discharged from the land. Three provinces (Liaoning, Shandong and Jiangsu) directly discharge of pollution loads.

In Korea, the rapid increase of pollutants into the coastal waters is coming from the inputs from land-based sources as well as non-point pollutant sources. The pollution loads in terms of BOD increased to about 40% during the last decade. The overall coastal water quality has remained at seawater quality grade II (1~2 mg/L) in terms of COD since 1991, despite the continuous investment in pollution treatment facilities. Some Special Management Areas (SMAs) and semi-enclosed bays have remained heavily polluted.

In Russia, chemicals form part of discharges from Primorsky Krai rivers that flow into the sea. On the average for 2002, the values for BOD, COD and DO were beyond the maximum permissible concentration (MPC) for the Russian fresh water bodies.

Air pollution

For air pollution in Japan's NOWPAP region, 1,220 incidences were recorded. For Russia's Ussuriisk Taiga and Sikhote-Alin Biosphere Nature Reserve, more than 73% of pollutants are estimated to have emanated from China. More specifically, the most heavily polluted air masses come from the east along the trajectories from Japanese and Korean Peninsula. Principal pollutants are SO_2, NO_2, CO and dust. The distribution of pollutants in the air emitted by the largest cities in the Primorsky Krai clearly stretches for hundreds of kilometers. The main sources of NO_2 are emissions from industrial enterprises (including thermal power plants) and from automobiles.

Nutrients

In China, among the main pollutants are total phosphorous and ammonia. Chemical fertilizers containing nitrates are being discharged into the Yellow Sea. In 1998, fertilizer application in the Chinese sector of the Tumen NET Area was substantial including 13,558 tons of nitrogen and 1,066 tons of phosphate. There has been a continuing effort in Japan to improve the water quality of enclosed ocean bodies. As such, the allowable discharge limits for COD, N and P are specified for plants that discharge more than 50 m^3/day of wastewater.

In Korea, nutrients are discharged into the seas through rivers, as well as through sewage treatment plant outfalls and from the air as well. With the construction of sewage treatment plants, point sources are well under control. Airborne input of nutrients is gaining research interests. Although there are very few data and information on airborne inputs of nutrients into the marine environments, airborne nitrogen inputs were estimated to be 10~20% of the total nitrogen inputs.

For Russia's Primorsky Krai Rivers, the values for ammonium (NH_4), nitrogen dioxide (NO_2), nitrate (NO_3) and phosphate (PO_4) were beyond the MPCs for the Russian fresh water standards. For the entire Russian mainland coast within the NOWPAP region, the anthropogenic flux of phosphate reaches up to 80% of the total river discharge. This is in addition to the direct input of phosphorous to the coastal waters.

Heavy metals, hazardous substances and sediments

In China, heavy metals that cause pollution include lead and mercury. Daliao River, Daling River, Yangze River and Yellow River are among the water bodies that transport these heavy metals. In Japan's coast, the annual average for incidences of harmful liquids was less than 10 cases from 2001 to 2005.

In ROK, pollution by heavy metals and hazardous substances is increasing in semi-enclosed bays and estuaries. This is particularly true in areas next to industrial complexes, harbors and densely-populated urban areas. Surface waters and sediments in trade ports and near industrial complexes are polluted with heavy metals. Except for a very few cases, however, heavy metal concentrations are within the legal standards for human health safety. Most heavy metals in seawater or sediments were recorded either within the seawater quality standards of ROK, or within the guidelines of other countries with sediment quality standards.

For the rivers in Primorsky Krai, Russia, the values for suspended solids and sufract (concentration of anionic detergents) are beyond the MPC concentration for the Russian freshwater bodies. For particulate-bound elements, such as iron and lead, the roles of particulate forms increase up to 98-99%. Metal pollution is also very prevalent whereby the MPC of lead was exceeded in several places to the south of the Russian Far East. An average daily admissible concentration is 0.3 kg/m^3. In Rudnaya Pristan, the annual average level of lead is twice as high. In the northern region - from the Zolotoy Cape to Povorotny Cape - the major sources of pollution to coastal waters are ore-mining and ore-chemical production. The largest operations are located near Rudnaya and Zerkalnaya Bays. Pollutions include large quantities of Pb, Cu, Zn, Cd, As, B, as well as other chemicals in dissolved and suspended forms.

The impact of the tailings discharged into the Tumen River on the biodiversity is considerable. Sands and fine sediments are deposit in the quieter regions and smother many aquatic flora.

Oil spill

In China's part of the NOWPAP region, some 82 oil spill incidents were recorded between 1995 and 2005. As a main pollutant, the values obtained for oils exceed the standard by 2.5 times. In Japan's marine region, the incidences of oil pollution fluctuated from 327 in 2001, 382 in 2003, and 229 in 2005. The January 1997 Nakhodka oil spill that occurred off Fukui Prefecture was the most publicized.

Harmful algal blooms

Popularly known as 'red tide', the phenomenon is technically referred to as harmful algal bloom or HAB. In China, some 713 incidents were recorded between 1995 and 2007. In Japan's marine region, HABs have occurred sporadically during these time periods: 37 in 2001; 43 in 2003; and 18 in 2005.

In the case of ROK, the frequency, intensity, and areal size of red tides in the coastal waters have greatly increased over the last three decades. These incidents of HABs have caused significant economic damage to the aquaculture industry. The accumulated economic damage incurred by red tides was US$ 119 million during the period of 1995 to 2005, with a peak in 1995 at US$76 million.

Marine debris, solid wastes and ocean dumping

In Japan's marine region, the occurrences of waste materials were recorded as follows: 103 in 2001; 124 in 2003; and 94 in 2005. Nonetheless, the observed numbers of occurrences have gradually decreased through the years.

Dumping of wastes in the marine waters of ROK has rapidly increased due to population growth and economic development in the coasts. As a consequence, new regulation is being applied to achieve a 50% reduction of the amount of current dumping. Marine debris is also increasingly becoming a threat as some 30% of the total volumes of disposed marine debris were estimated as plastic materials. In terms of proportion, land-based debris comprised 34.2% of the marine debris collected in coastal beaches.

Wastewater and sewage

Wastewater discharges have been on the rise over the last decade in China. This holds true for both wastewaters from both industry and households. Wastewater discharge from both industry and household was only 0.2 billion tons in 2001; however, this increased to about 1.52 billion tons in 2007. In Japan, public sewerage systems have been developed for the prevention of water environment. In some cases, advanced water treatment is being undertaken in addition to the conventional secondary treatment.

In Korea, most investments on sewage treatment facilities in the coastal area have been concentrated in urban coastal areas. Household sewage discharge accounts for some 53% of organic pollutant input in terms of BOD, and hence, the government has expanded investment in the construction of sewage treatment plants. Peter-the-Great Bay is the most populated part of the coastal area in the Russian Far East discharging annually some $400*10^6$ m^3 of wastewaters. Nonetheless, only 10% of this wastewater undergoes treatment.

2.4.3 Non-optimal use of resources

Non-optimal use of resources largely relates to the poorly-regulated or wanton use of natural resources. Examples are overharvesting of terrestrial resources (such as timber and other forest products) as well as poaching/illegal trade in endangered species. Forms of poaching include: illegal shooting of hoofed animals, such as Sika deer; catching of fur animals, such as raccoon dog and fox; and hunting of mammalian and avian species listed in the Red Book of Russia.

On the marine side, non-optimal use of resources includes overfishing or overexploitation of the fishery resources. Stock depletions have been noted in traditional fishing grounds particularly with the proclamations of neighboring countries of their EEZ boundaries. Key species being poached include crabs, grass shrimps and scallops. This has continued despite regulation due to the high price being commanded by the species and stable market demand.

Non-optimal use of resources largely pertains to coastal and marine resources. This particularly relates to the overexploitation of the fishery resources. Productivity and profitability of fisheries may have been declining due to decreased fishing grounds with the proclamations of neighboring countries of their EEZ boundaries, as well as stock depletion from over-fishing. In Korea, there has been stock depletion due to overfishing of some commercially-targeted species.

In Russia, there has been over-exploitation of some coastal resources. Over-exploitation in this context refers to the capture of fish, shellfish or marine invertebrates at a level that exceeds the maximum sustainable yield of the stock. Further, illegal trade, where the catch is sold directly in the open sea and the 'discards' are thrown back into the sea, does not declare the actual volume of catch. Hence, it is speculated that the rate of harvesting due to illegal fishing in some countries of the Region is at the same level (or even at the higher level) as compared to the legitimate fishing activities.

In the northwest Pacific, total catches are increasing again, after a short decline following their maximum production levels about a decade ago. Most of these changes result from increases in landings of small pelagic species. Overfishing and competition among the neighboring countries of China, Republic of Korea, Japan and Russia are often blamed for the fisheries decline in the northern part of NOWPAP region seas. The catch in North Korea may be very high – and possibly almost as high as that of Japan - which is about 2.5 million tons. Although most conventional (commercially-targeted) species are fully exploited, the total volume of catch might still be increased to about 13 million tons. This may be due in part to the use of different fishing gears.

Today's harvesting of marine biological resources in the Far Eastern Russia is at a lower level when compared with the catch levels in the 1990s. Nonetheless, the catch rates of the most commercially-valuable fish species remain largely the same. Hence, such catch rates result in the decrease of the fish stocks. Some species of crabs, sea hedgehogs and Alaska Pollack have declining natural stocks.

2.4.4 Natural hazards

Natural hazards cover cyclones/ typhoons, droughts, earthquakes, flooding, forest/bush fires, land subsidence/landslide, storm surges, tsunami and volcanic eruption.

Natural disasters may be included as cross-cutting concern. Storm surges associated with typhoons, for examples, are regarded as crucial threats in Masan Bay. In 2003, when a typhoon called "Maemi" attacked the bay, 32 deaths were reported due to storm surges. Most of the victims were residing in the low-lying coastal fringes. Instant height of the surge was reported to be 2.3 m (Nam et al., 2009).

Natural disasters include these phenomena: cyclones/typhoons, droughts, earthquakes, floodings, forest/bush fires, land subsidence/landslides, sea level rise, storm surges, tsunamis, volcanic eruptions and weather events (Appendix 2.3 provides some qualitative descriptions of natural disasters and global events in the Asian region). Those that are increasing in occurrences

include cyclones/typhoons, floodings and storm surges. Cyclones are becoming more frequent in countries like China, Philippines and Thailand; floodings are impacting negatively on low-lying areas of Cambodia and Vietnam; and storm surges have increased, up to more than 49-fold in some areas. There is either no distinct trend and/or discernible pattern for natural events such as earthquakes and tsunamis. Nonetheless, some of these disasters have devastating costs in terms of lives and properties. The December 2004 Indian Ocean Tsunami was a case in point, as well as the Kobe earthquake in 1995 with damages worth US$131 billion. Millions of people living in the low-lying areas of Bangladesh, India and Vietnam will be affected by sea level rise, and sea levels are projected to rise to 40 cm in Southeast Asia by 2100, which will increase the loss of small islands. Understandably, some of these natural events are exacerbated by anthropogenic activities, such as droughts and landslides.

2.4.5 Global events/phenomena

Global events/phenomena relate to the following: ballast water and invasive/exotic species, climate change (including global warming), extreme weather events, ocean acidification, and sea level rise. The issue of ballast water and invasive/exotic species ballast water and invasive/exotic species is quite significant in the Asian region due to the ever-increasing levels of shipping and maritime trade. Hence, there is an increasing threat to marine biodiversity, damage to fisheries and human health.

Climate change is a global phenomenon that will affect the NOWPAP region. Climate change's negative impacts may include increasing sea water intrusion and/or freshwater flooding in heavily populated coastal mega/sub regions. Extreme weather events are likewise increasing in many parts of the NOWPAP region. There is projected increase in ocean acidification that will make shell forming organisms particularly vulnerable. Included here are hard corals and their dependent species.

Due to sea level rise, there will be an increasing sea water intrusion and/or freshwater flooding in heavily populated coastal mega/sub regions of south, east, and Southeast Asia. Sea level rise is of particular concern in China. On the average, the sea level of the Yellow Sea arises at 2.5 mm per year. From 2004 to 2006, the sea level of the Yellow Sea was higher than the last years. The Korea Hydrographic and Oceanographic Administration (KHOA) analyzed the sea level data of Korea's coastal areas. The analysis was based on the observation data that were recorded from the 1970s up to 2008. According to KHOA (2009), the sea level rises of the western coasts (Yellow Sea) and southern coasts of the Korean peninsula during the last four decades were estimated at 2.4 mm/yr and 2.9 mm/yr, respectively. Coastal facilities - such as industrial complexes and wharves of the port in Masan Bay - could effectively adapt to the natural and gradual sea level rise. The issue of sea level rise is often associated with climate change.

2.5 Contextual Elements of ICARM/ICM

2.5.1 ICM management framework / SDCA framework

PEMSEA (2007) has developed the new sustainable development for coastal area (SDCA) framework is an articulation of a "complete" framework framed by the goals of sustainable development in coastal areas (Figure 2.12). Within this context, ICM provides the necessary procedures, techniques and tools for program planning, development and implementation. Such framework allows then both a systematic and holistic planning and management approach

in addressing the critical societal issues that threaten the ecological integrity and economic development as well environmental sustainability.

The SDCA Framework provides more focus and accountability in coastal governance. Six thematic areas constitute the governance dimension: (1) policies, strategies and plans; (2) institutional arrangements, (3) legislation; (4) information and public awareness; (5) financing mechanisms; and (6) capacity development. Moreover, the Framework provides a scheme for streamlining the on-the-ground actions.

Coastal governance must network and bind people together to create what Jentoft (2007) calls a "[social] and political coalition." Hence, the roles of local government are particularly crucial. The concurrence of the local leaders – also called as local chief executives – is crucial in conferring legitimacy and sustainability of the ICM program. Effective coastal governance also relies on the active involvement of local communities and other stakeholder groups, such as people's organizations and civil society groups. Coastal governance in this context may be described then as the "integration of people, science, politics and values" (Dovers, 2002). This governance component further emphasizes the need to develop/strengthen existing governance elements in order to promote integration, collaboration and use of science to enhance policy/ decision-making and management of marine and coastal areas and resources.

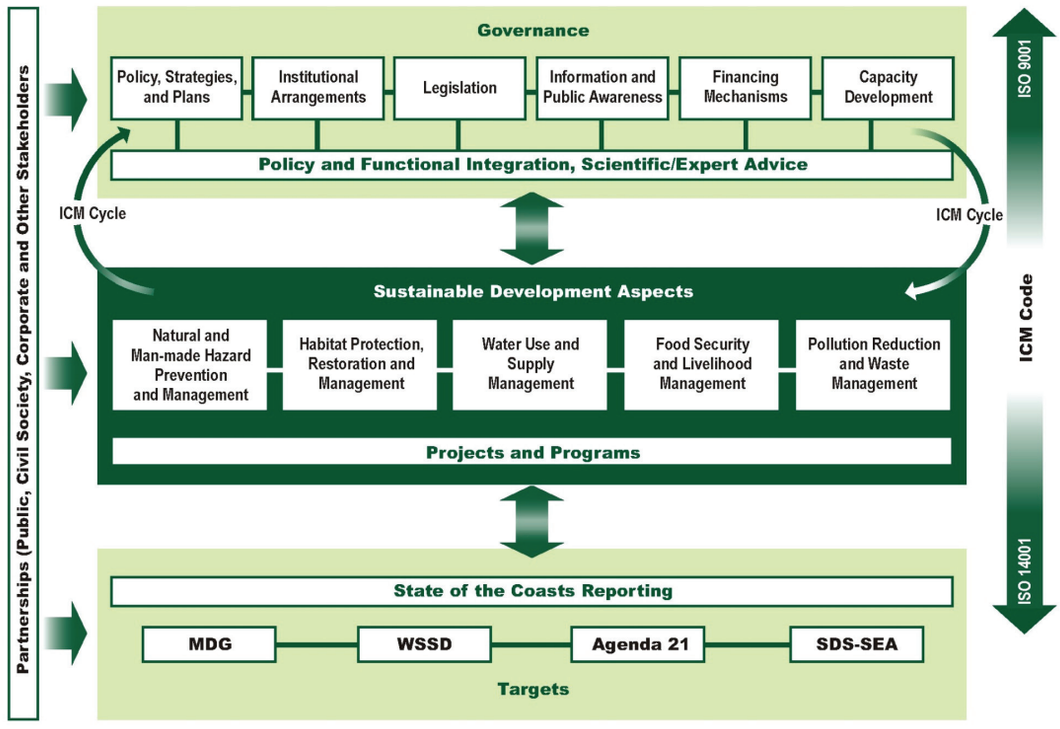

Figure 2.12. Process oriented, common framework for sustainable development of coastal areas thru ICM implementation.

Source: PEMSEA, 2007.

The sustainable development aspects consist of five key areas. These are: (1) natural and man-made hazard prevention and management, (2) habitat protection, restoration and management, (3) water use and supply management, (4) food security and livelihood management, and (5) pollution

reduction and waste management. Natural disasters include these phenomena: cyclones/typhoons, droughts, earthquakes, floodings, forest/bush fires, land subsidence/landslides, sea level rise, storm surges, tsunamis, volcanic eruptions and weather events. Those hazards that are increasing in occurrences include cyclones/typhoons, floodings and storm surges. Cyclones are becoming more frequent in countries like China, Philippines and Thailand; floodings are impacting negatively on low-lying areas of Cambodia and Vietnam; and storm surges have increased in some coastal areas. There seems to be no discernible pattern for natural events such as earthquakes and tsunamis. Understandably, some of these natural events are exacerbated by anthropogenic activities, such as droughts and landslides. Whether man-made or natural, however, these disasters have devastating costs in terms of human lives and properties. Sustainable development aspects emphasize the need for an integrated approach in addressing these various elements.

Emerging major environmental hazards largely relate to these three issues: climate change and/or global warming, ocean acidification, ballast water and invasive/exotic species. Climate change has negative impacts that include reducing the availability of freshwater in central, south, east, and Southeast Asia as well as increasing sea water intrusion and/or freshwater flooding in heavily populated coastal mega/sub regions of south, east, and Southeast Asia. There is projected increase in ocean acidification that will make shell forming organisms – such as corals and their dependent species – particularly vulnerable. The problem of invasive species is especially relevant to the EAS region due to the ever-increasing levels of shipping throughout the region, thereby increasing threats to marine biodiversity, damage to fisheries and human health.

Habitat restoration and management include issues related to ecosystems, habitats and species. Coastal habitats in the NOWPAP region – that include soft-bottom communities, mangroves, coral reefs and seagrasses – are either decreasing in area or the severity of threats is increasing. There is continuing decrease in area of terrestrial forest, although the positive development in the region is the decreasing net loss in forest cover. Exception is China that has an increasing forest cover due to its reforestation activities. Agricultural intensification and diversification will continue, as more arable lands and permanent croplands are being devoted to this economic activity. Despite inadequate proportion of terrestrial and marine protected areas (MPAs), their numbers and geographical extents are increasing. Notwithstanding, there is an increasing number of threatened species, both terrestrial and marine.

Food security and livelihood management largely pertain to agriculture and fisheries issues that relate to food and nutrition. In terrestrial agriculture, more lands are being devoted for crop production. Similarly, lands being utilized for livestock raising/production have been expanding. In short, both agricultural expansion and intensification are happening. Aquaculture production is increasing for inland, brackishwater and marine systems. Likewise, there is an increasing production for capture fisheries (both small-scale and industrial), but the catches are declining for some species. Since 1999, aquaculture production surpassed that of capture fisheries. Overfishing has led to dramatic declines in coastal fish stocks in the region that include South Asia, South East Asia and Gulf of Thailand. Destructive fishing practices are degrading habitats that support fisheries such as bottom trawling, blast fishing and fishing with poisons. There is improving nutritional status given reduction in the prevalence of underweight children under five. Demand for fish and fishery products is increasing both regionally and worldwide.

Several issues are associated with water supply and use management. There has been a positive trend concerning the proportion of population using an improved drinking water source over the last three decades. Nonetheless, some standards are not met whereby some 22% of urban drinking water supplies do not meet national health standards. Water supply is currently sufficient

with trend towards scarcity given increasing population and commercial uses. The lack of sewage treatment throughout parts of the region has resulted in rampant cases of water borne diseases like amoebiasis, cholera and gastroenteritis. Water use competitions and/or conflicts are likely to escalate given increasing demand from both domestic and industrial sectors. On the positive side, the percentage of population with access to improved sanitation has increased from 1990-2006.

Pollution reduction and waste management issues originate from air, land and water. There is increasing marine/coastal pollution coming from various domestic and industrial sources. Within the marine sector, oil pollution is paramount as there are about 300 oil spill incidents (involving over 200 million gallons of oil) that occurred in the East Asian region since the mid-1960s. Marine pollution is manifested by the increase in areas being affected by eutrophication, harmful algal blooms (HABs), shellfish poisoning and marine litter. There is an increasing load of pollutants coming from land-based sources. Increasing use of inorganic fertilizers (nitrates and phosphates) from agricultural plantations implies increasing loads of nutrients to the marine environment. In the case of marine litter, there is an increasing volume of plastics, rubber, polystyrene, paper, cloth, glass, ceramic and metals.

Overall, the trend of emissions of organic water pollutants in the region is increasing from 1990 to the middle of 2000. Persistent organic pollutants are present in coastal marine sediments of the EAS region, which are at levels equal or higher than in other parts of the world. Levels of heavy metals - such as arsenic, cadmium, chromium, copper, lead, mercury and zinc - have generally increased in the coastal waters of the region over the past two decades. Erosion, siltation and sedimentation have increasing trends, and these factors are largely associated with forest destruction, land clearing for agriculture, aquaculture expansion and urban coastal settlements. Increasing levels of marine litters and/or solid wastes are being washed up on coastlines and seas of the EAS region, with levels equal to or exceeding global averages. In terms of air pollution, increasing emissions of carbon dioxide are growing issues for the East Asian region. There are increasing levels of emissions for nitrous oxide and ozone-depleting substances as well. Moreover, fossil fuel combustions have been contributing to air pollution.

The SDCA Framework also articulates both the how of solving coastal problems, as well as the how/procedures of creating investment/development opportunities. It repackages the ICM framework and process as a delivery mechanism for services and products that can increase the demand for and investment in an ICM program. Moreover, it enhances the sustainability of ICM within the local governance structures. Lastly, the SDCA Framework in effect re-structures ICM as a "hybrid" coastal and marine governance mechanism that is driven by day-to-day (rules-based) standards and by normative and ethical (principles-based) approaches. This is in conjunction with world-class ISO standards and regulations.

This framework's State of the Coasts Reporting facilitates program monitoring and evaluation. It is also governed by international pronouncements such as the Millennium Development Goals, World Summit on Sustainable Development and Agenda 21. Regionally, this framework is linked with the SDS-SEA.

2.5.2 ICM/ICARM program development and implementation cycle

There are many models/types for ICM/ICARM program development and implementation cycle (see Figure 2.13, 2.14, 2.15 and 2.16). There are two commonalities among these ICM models. First, the process is cyclical. Secondly, the starting point is usually a certain initiation and assessment and the end point is a sort of monitoring and evaluation (M&E). Then, the cycle starts all over again. The PEMSEA model is given emphasis and/or used as an illustrative model.

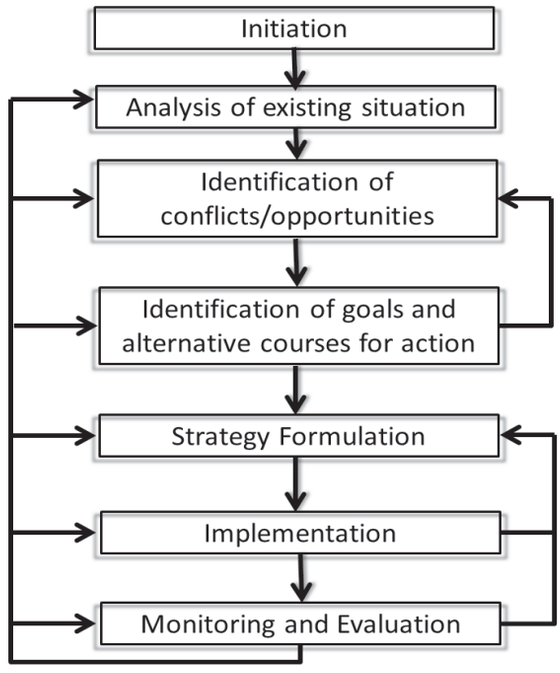

Figure 8: Planning Process of ICARM

Figure 2.13. Planning process of ICARM.

Source: UNEP/MAP/PAP, 1999.

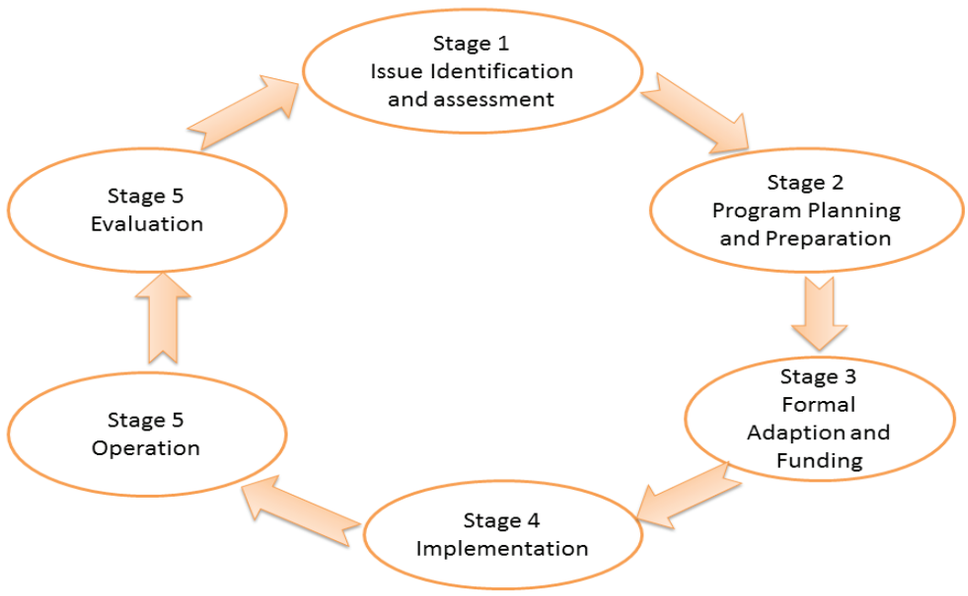

Figure 11. The six stages of an ICM process (Olsen 1993; Cicin-Sain and Knetch 1998

Figure 2.14. The six stages of an ICM process.

Source: Olsen, 1993; Cicin-Sain and Knetch, 1998.

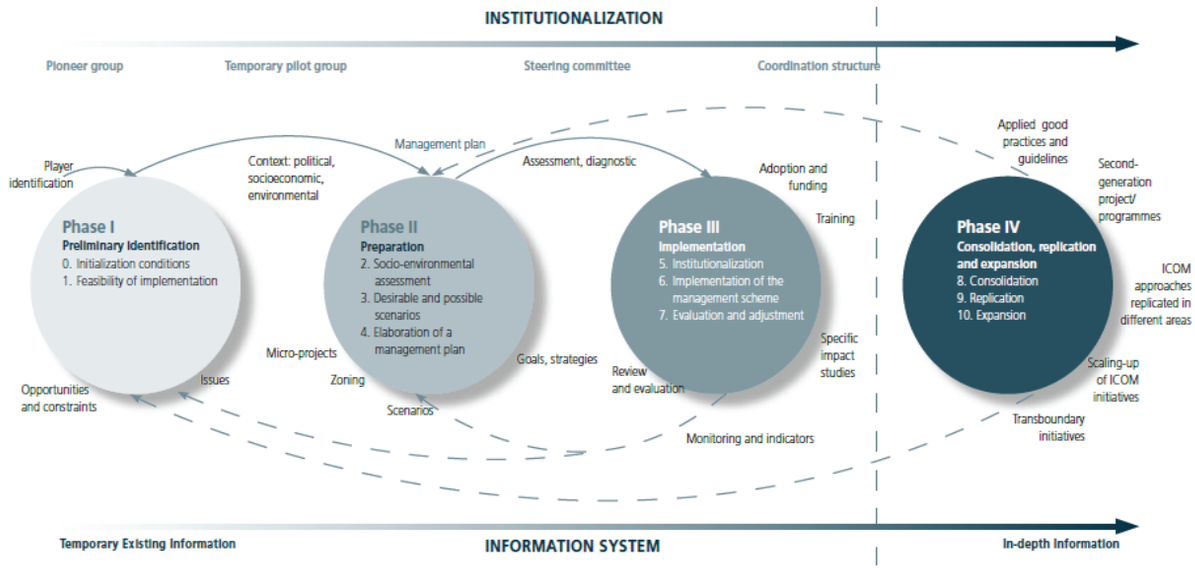

Figure 2.15. Elements of the Integrated Coastal and Ocean Management process.

Sources: Henocque and Denis, 2001, UNESCO, 2006.

Figure 2.16. The integrated coastal management development and implementation cycle.

Source: Chua, 2006, PEMSEA, 2007.

The PEMSEA's ICM program development and implementation cycle was developed based on experiences and lessons learned worldwide (Chua, 1998, 2006). The model provides a systematic, procedural, and iterative approach in identifying and prioritizing environmental concerns and in planning, approving, implementing and monitoring cost-effective policy and

management interventions. Reflected in this model are six interlinked and highly iterative stages whereby specific procedures are undertaken to achieve specific objectives/outputs/ outcomes. The strategic targets of the ICM cycle is built upon a series of processes including those that help to define and prioritize management issues, identify program agenda, monitor what works and what does not, forge not only responsibility and accountability but also contribute to knowledge management (Chua, 1998). Although there are other ICM approaches, this model has been widely used in the Asian region. It operates in a systematic manner, whereby several steps and/or outputs are pre-conditions before moving from one stage to another.

Stage 1 (Preparing Stage) establishes a project management mechanism in order to organize staff, set up a project coordinating committee and identify working relationships with local government (http://www.pemsea.org/icm-cycle). This stage highlights the importance of both a high level project coordination committee to provide policy guidance and facilitate inter-agency and multi-sectoral coordination and a project management office to coordinate day-to-day tasks for the development and implementation of the ICM program. They can take various forms of project structures or management mechanisms, such as a Project Management Office (Batangas Bay, Philippines) and Marine Management Coordinating Committee (Xiamen, China). This stage also includes initial consultation with stakeholders, preparation of work and financial plans, and training of site personnel on ICM concepts and methodologies.

It is also essential to establish a monitoring and evaluation (M&E) system to monitor and measure the progress and achievements of an ICM program/project. Such M&E system will consist of relevant monitoring indicators and/or information. The logistical, manpower and other requirements for SOC reporting and potential application of the ICM Code are likewise assessed at this juncture.

In the preparing stage (Stage 2) of the ICM cycle, there is detailed identification and prioritization of environmental issues that require intervention. These issues/problems include, but not limited to: natural and man-made hazards, habitat protection/ restoration, water use and supply, pollution, waste management, food security and sustainable livelihoods.

The key documents to be produced during Stage 2 include the following: State of the Coast (SOC) report, a coastal strategy (CS), a public awareness program and an initial risk assessment. As a snap shot of the local situation, the SOC presents some baseline information as well the physico-ecological and socioeconomic characteristics of the ICM site. The coastal strategy identifies the major coastal issues and provides the stakeholders with a common vision and framework for action in managing the coastal region over a long-term period (25 to 50 years). Its other elements include mission statements, strategies and principles, and suggested courses of actions. The Coastal Strategy provides a framework within which more issue-specific action plans can be developed. A public awareness program is a pre-requisite to effective public involvement. Initial risk assessment (IRA) serves as a screening mechanism for determining priority environmental concerns, which have been earlier identified. An Integrated Information Management System (IIMS) will be established for systematic data collection and analysis. Aside from storing information, the IIMS is also shared among the various line agencies. Results from these assessments and consultations are then developed into strategies and action programs.

In Stage 3, Developing Stage, several documentary outputs are produced. The Coastal Strategy Implementation Plan (CSIP) is produced that addresses risks and focuses on prioritizing action programs within the Coastal Strategy framework. Action plans may be

developed along these thematic issues or areas: coastal and ocean governance, natural and man-made hazard prevention and management, habitat protection, restoration and management, water use and supply management, pollution and waste reduction management, food security and livelihood management.

Institutional arrangements shall also be developed to ensure the viability of the ICM program. Appropriate permanent management structures will be designed to improve on inter-agency coordination. There will be a refined risk assessment (an offshoot from an earlier IRA) for an in-depth analysis of the coastal issues and the formulation of more concrete risk management options. An integrated environmental monitoring program is developed to assess changes in the environmental risk levels. Development and implementation of a coastal use zoning plan and/or marine spatial plan is also an important activity during this stage. Another key consideration is the establishment of a sustainable financing mechanism for operation of the program.

The main outcome in Stage 4 is the formal adoption of the strategic environmental management plan (SEMP) and other related action plans by the concerned local and/or national governments. Note that the SEMP was the term used for the integrated planning document during the first project phase of PEMSEA (such as the SEMP for Batangas in the Philippines), while the CS/CSIP is the term used from the second through the succeeding project phases. The implementation arrangements, including financing mechanisms and investment opportunities, will be also legitimized at this stage. This stage is very crucial because many ICM programs and projects never reach this stage. In addition to the SEMP adoption, action plans (e.g. integrated waste management) were also adopted for both Xiamen and Batangas. The approved Sihanoukville Coastal Use Zoning Scheme illustrates an example on how to develop and implement a zoning scheme covering both land and sea as a planning unit. The adopted Danang Coastal Use Zoning scheme was developed to provide the local government unit with an effective regulatory tool for managing and allocating the use of its coast.

Adoption is facilitated by disseminating information to the general public of the environmental issues and risks associated with public health, ecosystem health and the society's well-being. When the local governments adopt the relevant plans, these are eventually integrated into the local development planning framework. Active involvement of the general public in the adoption process through extensive consultations during the passing of local ordinances is likewise necessary.

Stage 5 (Implementing Stage) involves the execution of program activities that are contained in the SEMP and/or action plans. This stage eventually sets up an interagency and/or multi-sector coordinating mechanism. The project management arrangements – such as project management offices or project coordination committees - can be transformed to be essential parts of local government institutional structures, and financial resources are utilized to operate the ICM program. Action plans that provide quick and/or visible results are selected to build confidence of the stakeholders.

Stage 6 (Refining and Consolidating Stage 6) involves an evaluation and refinement of the ICM program. The monitoring and evaluation (M&E) system set up in earlier stages will be used to track changes in environmental quality and guide the implementation of project activities by noting variances, slippages, and corrective measures that need to be undertaken. The results will be used as guidelines for the next ICM cycle in view of changes in priority environmental and management concerns. At this stage, some of the lessons learned are also disseminated. The experiences with regard to wise ICM practices are likewise synthesized.

2.5.3 Other elements/dimensions of ICM

2.5.3.1 ICM project proposal development

2.5.3.1.1 Background/Context

The identified ICM problems/issues need to be addressed with appropriate interventions that are commonly called as projects, which are often considered as the fundamental building blocks of development. Gittinger (1972) defined projects as the cutting edge of development. In ICM then, these projects are needed to either address the problems or promote the sustainable development of the coastal areas. In the PEMSEA's (2007) ICM framework, these projects may be covered under five major management areas: natural and man-made hazard prevention; habitat protection/ restoration; water use and supply; food security and livelihood; and pollution/waste reduction.

This part/section provides an overview of the processes and techniques of developing project proposals as component in developing an ICM program. These include basic principles and concepts for effective project development and management more specifically to river basins and coastal areas. ICM projects must be contextualized and/or made consistent within the broader policy framework and/or planning environment. The success (or failure) of an ICM project depends on a number of physical, technological, financial, sociological, institutional and economic factors.

2.5.3.1.2 Some Fundamentals of Project Development and Management

Pragmatically, a project may be considered as any sequence of tasks and/or activities which must be completed in a given time span to meet specific objective or identified targets. Such elements are reflected in varying forms in the definitions below:

"development intervention to attain specific designated objectives in a determined time and span and following an established plan of action" (UNDP Evaluation Office, 2002).

"collection of linked activities, carried out in an organized manner with a clearly defined start and finish point, to achieve some specific results that satisfy the needs of an organization" (Young, 1996)

"discrete package of investments, policies and institutional and other actions designed to achieve a specific development objectives (or set of objectives) within a designated period" (Baum and Tolbert, 1985)

Based on the above cited definitions, projects may vary/ differ in functional components, historical context, temporal dimension, development orientation and geographical scope. Moreover, any project shares some common characteristics/ traits. These include but not limited to the following: consists of a collection of activities; specificity of purpose often expressed in either a broad goal or a set of well-defined objectives; a specific starting point and a specific end point; output-oriented in terms of specific deliverables at the end period; it has cost constraints; and involves capital investment. There are also so-called as critical success factors (CSFs) in project implementation. Pinto (1998) indicates that projects that are most likely to succeed are those with: clear goals and/or achievable objectives; well-established project plans and schedules; persistent top management support; and a good monitoring and evaluation (M&E) system, including feedback mechanisms.

Most often, the terms 'project' 'program' or 'plan' are at times used interchangeably. When viewed hierarchically, plan is at the topmost, followed by program, and then by project at the lowest rung. Bruce (1982) describes a program as a collection of projects. In an ICM context, for instance, habitat protection/restoration may be considered as a program, as it is a continuing service which is not time bound. Hence, it may consist of several habitat-related projects, such as mangrove reforestation, seagrass transplantation and coral reef restoration. Cusworth and Frank (1993) have argued that the activities of a program may be diverse in scope, and widely diffused, both in space ad time compared to the activities of a project. Several programs may then be subsumed within a plan. Villacorta and Gaon (1986, p. 11) define a plan as "an embodiment of an organization's concepts, philosophies, goals, programs, projects and activities of making contribution to public welfare."

2.5.3.1.3 Project cycle

All projects go through a cyclical process that is alternatively referred to as 'project development cycle,' 'project life cycle' or 'project cycle.' For various purposes, the project cycle is a process with relatively standardized phases that typically include: identification, formulation, appraisal and approval, implementation and evaluation (GEF, 2007, p. 27). It is argued that the project cycle's number of stages, phases or steps vary among proponents or practitioners. Regardless of the number of stages, the project cycle should be viewed as iterative steps, and not as a linear set of sequential steps. Moreover, there has to be flexibility at any stage of the project work.

The five-phase project cycle of the UNEP is adopted here as an illustrative example (Figure 2.17) (UNEP, 2007). These five phases are: (1) identification, (2) preparation and formulation, (3) review and approval, (4) implementation, (5) evaluation. Phase 1 (identification) involves situational analysis about the issues, problems and opportunities. A few pages of 'project brief' may be developed at this juncture. Phase 2 (preparation and formulation) is often the most time-consuming phase that may involve developing baseline and undertaking a feasibility study. Phase 3 (review and approval) is largely a funding agency's internal activity involving inter-divisional review, as well as the project approval process. Phase 4 (implementation) is the actual execution of the project to achieve the desired objectives and/or results. This phase involves monitoring and reporting of the project's progress. Phase 5 (evaluation) is the fifth and final phase. Normally, there is a mid-course (also called mid-term) evaluation for amendments and improvements, as well as the end of project (also called as final) project evaluation.

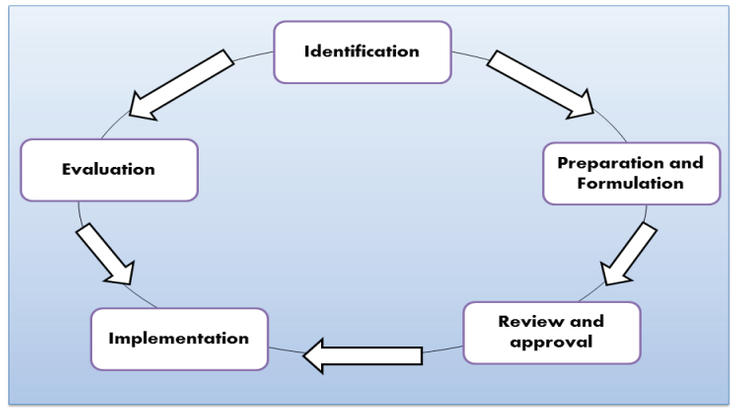

Figure 2.17. The five-phase project cycle of UNEP.

Source: UNEP, 2007.

2.5.3.1.4 Preparation of project proposals

Basics of project proposal

A written proposal may be regarded as an instrument through which a proponent conveys an intention to a prospective or particular client. Hence, a project proposal is a written document that is prepared and submitted by a proponent to a possible funding and/or donor agency. Locke et al. (1987) argue that any proposal has three-fold purposes: (1) communication, (2) plan, and (3) contract. As a communication tool, the proposal communicates the proponent's statements of intention in relation to a particular issue or problem identified. Secondly, it also serves as a planning tool, which is a basis for action or investigation. Worthwhile proposals are well-written in terms of activities, scheduling and costing; it also incorporates possible constraints and contingency actions. Thirdly, it can be part of a legal or contract document. Approved project proposal is often appended to a contract, which serves as a formal bond of agreement between the proponent and granting entity.

A project proposal could either be 'solicited' or 'unsolicited.' A solicited proposal is often written in response to a formal request for proposal (RFP). Such RFP is a bid document prepared to identify companies, individuals, institutions or organizations that are qualified to successfully conduct a project in a cost-effective manner. The Asian Development Bank, Global Environment Facility (GEF) and World Bank are among the key institutions that request submission for ICM-related project proposals. An unsolicited proposal is prepared without formal invitation from a funding source or agency.

Concept proposal/note

In most cases, for solicited project proposals, the proponents do not usually submit a full proposal or a detailed proposal. Instead, they submit first a project brief (also called as a concept note, a concept paper or a concept proposal). This document normally ranges in length from 2-4 pages.

This preliminary document enables the soliciting/funding agency to determine the relevance and significance of the project, whether or not it addresses its interest. The concept proposal provides the project background or context, objectives, methodology, work plan and budget. It likewise provides an indication of the capability of the proponent institution.

The format of a concept proposal varies among the funding or granting entity. Normally, however, it may consist of nine parts or sections (see Box 4). The Project Concept Note/Paper Format of the Global Environment Facility - Small Grants Programme in Maldives, as an illustrative example, is given in Appendix 2.4.

Box 4. Brief description of typical concept proposal elements

1. Project title – a concise phrase or succinct statement that reflects the targeted deliverables, outcomes or results of the project
2. Justification – Also called as a rationale, this provides a brief background and for initiating the project.
3. Objectives – A project usually consists of one goal and a number of objectives. Goals are universal and lasting while objectives change under varying circumstances (Young 1963). A goal is attained with the achievement of two or more corresponding/associated objectives. Objectives are normally expressed in precise or measurable terms.
4. Expected outputs – targeted deliverables upon successful completion of the project. As expected products or outcomes of the objectives, these must be stated in OVI or objectively verifiable terms.
5. Duration – indicates the duration or life span of the project covering both the starting and ending dates.
6. Work plan – Lists/describes the project activities including their corresponding timelines. Most funding agencies require a logical framework analysis (LFA) matrix.
7. Project Implementation – Essentially, this is the project's organization and management (O&M). Such implementation arrangement describes the agencies or institutions that will be involved in the project, including their roles and responsibilities.
8. Budget – reflects the funding requirements. This may be divided into personnel, operating expenses and capital outlay.
9. References – list only the key or major references quoted in the text.

Project Proposal

Preparation of a project proposal – also called as full-blown proposal or full proposal – may follow two routes. The first route is to write it in full outright or at the outset. The second route is by writing first a project brief. Once the project brief has been approved, the proponent may then proceed with the preparation of a full-blown proposal.

The format of a project proposal varies among agencies or granting entities. In most cases, it may follow the format of a project brief. Relevant sections, however, are written in more detail. The United Nations' template for preparing project proposals is provided as an example (Appendix 2.5).

2.5.3.1.5 Logical framework analysis

Logical framework analysis (LFA) assists in developing an ICM project. The LFA was originally developed by the firm Practical Concepts Incorporated for USAID during the late 1960s in order to assist in the planning, management and evaluation of development activities (Coleman, 1987). The basic architecture of the LFA is relatively simple. It consists of just a 4x4 matrix in which the rows represent the levels of project objectives, including the means required to achieve them (the vertical logic). The columns, on the other hand, indicate how the achievement of these objectives can be verified (the horizontal logic). Its developers described such structure elaboration of a well-designed, objectively described and evaluable project (PCI, 1979). Table 2.3 describes the items or elements to be inputted in each cell of the LFA matrix. Such may guide an ICM manager in preparing his/her particular LFA matrix.

Table 2.3.
Structure of project design matrix (logical framework)

<table>
<tr><th>Narrative Summary</th><th>Objectively Verifiable Indicators</th><th>Means of Verification</th><th>Important Assumptions</th></tr>
<tr><td>Overall Goal

Indirect and long-term effect and impact</td><td>The target value of the indicator which measures the degree of achievement of overall goal</td><td>Sources of information to check the OVI mentioned on the left</td><td>Conditions to maintain the effect of the project</td></tr>
<tr><td>Project Purpose</td><td>The target value of the indicator which measures the degree of achievement of project purpose</td><td>Sources of information to check the OVI mentioned on the left</td><td>External conditions for Project Purpose to link with Overall Goal</td></tr>
<tr><td>Output

The products and services which directly result from</td><td>The target value of the indicator which measures the degree of achievement of output</td><td>Sources of information to Check the OVI mentioned on the left</td><td>External conditions for Output to link with Project Purpose</td></tr>
<tr><td rowspan="2">Activity

Daily activities by the project team to realize the output mentioned above</td><td colspan="2" rowspan="2">Inputs

Necessary resources to the project by both the donor and the recipient country such as budget, personnel and equipment</td><td>External conditions for Activities to link with Output</td></tr>
<tr><td>Pre-condition

Conditions necessary to start the activities</td></tr>
</table>

Sources: Coleman, 1987.

A goal (or aim) is the very reason/rationale for undertaking the project. The goal is the aim and end toward which the purposes or immediate objectives are directed. It is an ideal and should be expressed in abstract terms (Young, 1963). As an end to be achieved, a goal can be a higher level objective, relevant to the socio-economic status of a sector, a geographic area or target group of beneficiaries. Attaining a goal is associated with the achievement of two or more corresponding objectives.

The purpose (or objective) is what the project is expected to achieve in development terms once it is completed within its time period. Any objective must meet the classical criteria called as SMART: specific, measurable, attainable, realistic and time bound. Moreover, Keeney (1988, p. 396) adds that an objective specifies both a value criterion (i.e. an object) and an orientation of preference with respect to that criterion.

Outputs are specific results or outcomes that are produced through the management of inputs. An output can be expressed in quantitative terms, such as the number of mangrove trees planted or the number of ICM personnel trained. It can also be qualitative, such as the development of more environment-friendly fishing practices. It may be also attitudinal, such as greater participation in ICM-related activities. Inputs refer to the tasks or activities to be undertaken, as well as the resources available to produce the outputs. Resources may include equipment, facilities, personnel, technical assistance, and training.

Development agencies, such as the USAID (1980) and DANIDA (undated), have used LFA in the design and evaluation of its projects. The LFA has likewise been transformed into many

variations. The GTZ (undated), for example, integrated the LFA within its planning method called as the ZOPP. The ADB (1993), on the other hand, enhances the original LFA to become its Project Framework. The LFA for the GEF Bohol Marine Triangle (BMT) project in Central Visayas, Philippines is given in Appendix 6.

2.5.3.2 Institutional arrangements

2.5.3.2.1 Definition and context

Institutional arrangements are a governance component in sustaining an ICM program at the local government level. Following the PEMSEA model, institutional arrangement is one of the six key elements within such governance mechanism (Figure 12). Sorensen and McCreary (1990, p. 1) have defined institutional arrangements as the "composite of laws, customs and organizations and management strategies established by society to allocate scarce resources and competing values." What is being managed in an integrated manner, in this parlance, is the coastal area. Lacerna et al. (2003) elaborate that institutional arrangements involve the functional dynamics of the social, political and social institutions. If key coastal issues/problems continue to exist – such as resource overexploitation, land-based sources of pollution, environmentally-destructive fishing and aquaculture practices, resource use conflicts and chemical pollution – such conditions are simply manifestations that there are limitations or inadequacies with the way the institutional arrangements are established for managing coastal resources and environments.

Institutional arrangements must be closely linked with the other coastal governance elements, such as financing mechanisms, legislation, information and awareness, policies, strategies and plans. Cicin-Sain and Knetch (1998, p. 149) have argued that a key challenge is "to fashion ways to ensure that the actions of the coastal and ocean institutions at each level of government are harmonized with one another and are consistent with agreed coastal goals and policies." An ICM program emphasizes the importance of operationalizing inter-agency and multi-sectoral coordinating mechanisms that involve all concerned stakeholders from planning to implementation. Hence, institutional integration cuts across various economic sectors, government bodies and even international agencies.

2.5.3.2.2 Government involvement in an ICM program

The support of the governments at all levels is required for an effective ICM program. Formal endorsements of both the national and sub-national/local governments are therefore crucial. Effective institutional partnership between national and local governments would contribute significantly to the success (or otherwise) of an ICM program.

In many Asian countries, the governmental system is often divided into the national (central or federal) level and the sub-national (or local) level. The local government is usually divided into smaller political and/or administrative units. Japan consists of some 47 prefectures, each being governed by an elected governor, legislature and administrative bureaucracy. In turn, each prefecture is further divided into cities, towns and villages.

The national and sub-national governments have varying and/or distinct roles in coastal and ocean governance. Geography could be a factor in delimiting the government's jurisdictional roles and responsibilities. Nearshore coastal areas are often managed by the local government (examples

are within the 15 km from the shoreline in the Philippines and within 3 nm from the shoreline in Indonesia).

In general, the national government has often jurisdiction over the foreshore areas, up to the Exclusive Economic Zone (EEZ). Its responsibilities include national security, foreign relations, transboundary issues and economic prosperity. Moreover, national governments are often focused on policy, legislation, capacity development and financing in support of ICM implementation by local government. Given greater access to funding and technical expertise, national governments extend technical and financial support to the ICM programs of the local governments. The national government's enacted national coastal policies may then be adjusted and implemented by local governments to suit their specific local conditions.

Local governments are at the forefront of local problems; hence, activities are often operational or on-the-ground. Local chief executives are more aware of the issues/problems as well as the wants and preferences of the stakeholders at the ground level. There are several challenges when initiating an ICM program at the local level. Local leaders may resist an ICM program if they perceive it to be any of the following: reduces or constrains their authority over the use of the coast; requires an additional budget item that does not bring commensurate local or on-the-ground benefits; and lack of expertise to implement the program.

2.5.3.2.3 Stakeholder participation in an ICM program

Stakeholders refer to "persons or entities who, directly or indirectly, positively or negatively affect or are affected by the policies relating to, or activities or phenomena in, the coastal and marine area" (Chua, 2006, p. 239). These include but not limited to the civil society groups, local and national governments, private sector, local communities, international organizations, donors and scientific communities (see Box 5). Typically considered as stakeholders are those who use coastal resources for profits (dive operators) and livelihoods (artisanal fishers who rely on the coastal area for their food and livelihoods). Other interest groups – from donors and national governments, as well as surrounding coastal communities – may have different concerns. Thus, ICM programs face the great challenge of maintaining harmony among the various coastal stakeholders concerning their competing motives, wants and preferences.

Establishing the appropriate institutional arrangements does not happen in a vacuum. There is a series of analysis and consultations to be undertaken to ensure the cooperation, involvement and participation of various stakeholders can be achieved by formalizing the linkages between and among the various coastal. Since stakeholders are composed of various sectors, agencies, institutions, and even personalities, they must agree on a set of ICM objectives. Before effective coordination may occur in an ICM program, it is essential to define properly the stakeholders through a technique called as 'Stakeholder Analysis'.

A stakeholder analysis is a technique you can use to identify and assess the importance of key people, groups of people, or institutions that may significantly influence the success of your activity or project (http://erc.msh.org/quality/ittools/itstkan.cfm). Stakeholder analysis may also be defined as "an approach and procedure for gaining understanding of a system by means of identifying key actors or stakeholders in the system, and assessing their respective interests in the system (MacArthur, 1997). Among others, this technique is used to: (1) identify people, groups, and institutions that will influence your initiative (either positively or negatively); (2) anticipate the kind of influence, positive or negative, these groups will have on your initiative; and (3) develop strategies to get the most effective support possible for your initiative and reduce any obstacles to successful implementation of your program. In this context, the initiative is an ICM program.

Box 5. Key stakeholder groups in a typical ICM program

1. governments
    - national governments
    - local governments
2. private sector
    - aquaculturists
    - divers
    - energy developers
    - shippers
    - tourist operators
3. communities
    - artisanal fishers
    - reef gleaners
4. civil society
    - non-governmental organizations (NGOs)
    - media
    - people's organizations
5. international organizations
6. donors
7. scientific communities / academe

Stakeholder Analysis has three basic steps (http://www.mindtools.com/pages/article/newPPM_07.htm). The first step is to identify who your stakeholders are. Stakeholders refer to "persons or entities who, directly or indirectly, positively or negatively affect or are affected by the policies relating to, or activities or phenomena in, the coastal and marine area" (Chua, 2006, p. 239). Box 5 earlier provides some of the key stakeholders. Process-wise, think of all the institutions and/or peoples who are affected by your ICM program, who have influence or power over it, or have an interest in its successful or unsuccessful planning and implementation. Remember that although stakeholders may be both organizations and people, ultimately you must communicate with people. Ensure that you identify the correct individual stakeholders within a stakeholder organization.

The next step is to work out their power, influence and interest, so you know who you should focus on. Some of these stakeholders may have the power either to block or advance. Some may be interested in what you are doing, others may not care. Map out your stakeholders on a Power/Interest Grid on the template as shown in Figure 2.18. Then, classify them by their power and by their interest in your ICM program.

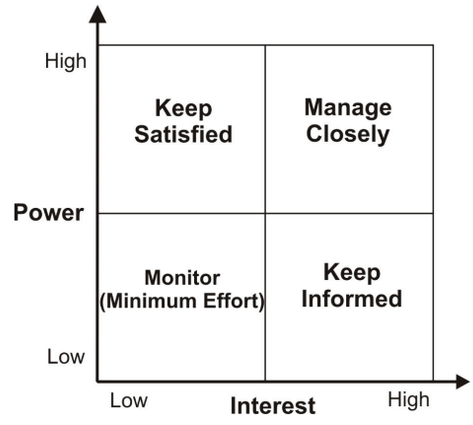

Figure 2.18. Power/interest grid for stakeholder prioritization.
Source: http://erc.msh.org/quality/ittools/itstkan.cfm, 24 January 2008.

For example, the local government is likely to have both high power and high interest over your ICM program. The unorganized artisanal fishers may have high interest, but are unlikely to have power over it. Some established NGOs may have low interest, but may have high power to influence its results. It is possible that the scientific communities / academe may have both low power and interest. The position of a person or institution on the grid shows you the actions you have to take with them. High power, interested people, such as local chief executives, are the people you must fully engage and make the greatest efforts to satisfy.

The final step is to develop a good understanding of the most important stakeholders so that you know how they are likely to respond, and so that you can work out how to win their support - you can record this analysis on a stakeholder map. After you have used this tool and created a stakeholder map, you can use the stakeholder planning tool to plan how you will communicate with each stakeholder.

2.5.3.2.4 Establishment of a coordinating mechanism in an ICM program

A functional coordinating mechanism needs to be established so that existing institutional arrangements among all stakeholder organizations and line agencies can be better integrated. The implementation of an ICM program does not necessarily require the establishment of a new agency to take over all ICM-related responsibilities that are previously performed by various government line agencies and/or other organizational entities. Chua (2006) describes that coordinating mechanisms underpin the dynamic features of ICM for these four reasons: (1) provide a platform for addressing the concerns of the various stakeholders; (2) provide a transparent mechanism for decision making; (3) promote interagency collaboration when developing or implementing management interventions; and (4) strengthen partnerships among stakeholders and create a favorable environment for the implementation of a coastal strategy to achieve a shared vision. He stresses that the purpose of the coordinating mechanism is to harmonize any overlapping responsibilities of line agencies and stakeholder interest, as well as to integrate policy and management interventions. The ICM coordinating mechanism's purpose is to guarantee the functional, organizational and policy integration of an ICM initiative.

Given the above set-up, government line agencies would still be expected to implement projects and programs that fall under their jurisdictional mandates. However, such projects and programs would better complement each other through an ICM program since each one of them would now contribute to a common vision.

At the ground/local level, the actual institutional arrangements may depend on the peculiar socio-economic, bio-physical and governance conditions of the site. In the PEMSEA model, there are generally two organizational units that operate at the ICM site level. The overall coordination, policy setting and high-level management decisions are lodged within the Project Coordinating Committee (PCC). This is alternatively referred to as the coastal management council. In an ICM program intervention, the PCC likewise coordinates interagency involvement. Various stakeholders that include local governments, people's organizations, industries, non-government organizations and academes participate in the PCC in various roles and/or capacities. The Project Management Office (PMO) is also set-up to act as the PCC's operating arm and/or technical secretariat. The PMO runs the project day-to-day operations and executes the PCC's decisions. The detailed functions of the PCC and the PMO are given in Appendix 7 (PEMSEA, 1999). Institutionalization of the PCC and the PMO is often done through formal agreement with all concerned stakeholders.

Figure 2.19 provides an illustrative example of the institutional arrangement in an ICM site in the Batangas Bay Environmental Protection Council for the Batangas Bay Region (BBR), Philippines. The legal and institutional mechanisms for ICM implementation in the BBR sought to establish the most appropriate multi-sectoral organization and operation modalities which will harmonize sectoral policies, plans and programs in the BBR (PEMSEA, 2006b). Recognizing the importance of legal mandate, the institutional mechanism adopted in the BBR in 1996 was the Batangas Bay Region Environmental Protection Council (BBREPC). The Provincial Government's Environment and Natural Resources Office serves as the secretariat.

The PMO is usually hosted by the lead agency in an ICM initiative. Criteria that are used to select a PMO may include the following: (1) organizational mandates that go beyond sectoral interests, such as fisheries or tourism; (2) experience and capability in integrated program planning and implementation; (3) possesses a multidisciplinary staff; (4) with previous works or direct linkage to coastal communities; and (5) consent of other institutional stakeholders for that particular agency to take the lead for the ICM program. Overall, the PMO has role for overseeing the implementation as well as monitoring and evaluation of an ICM program/project.

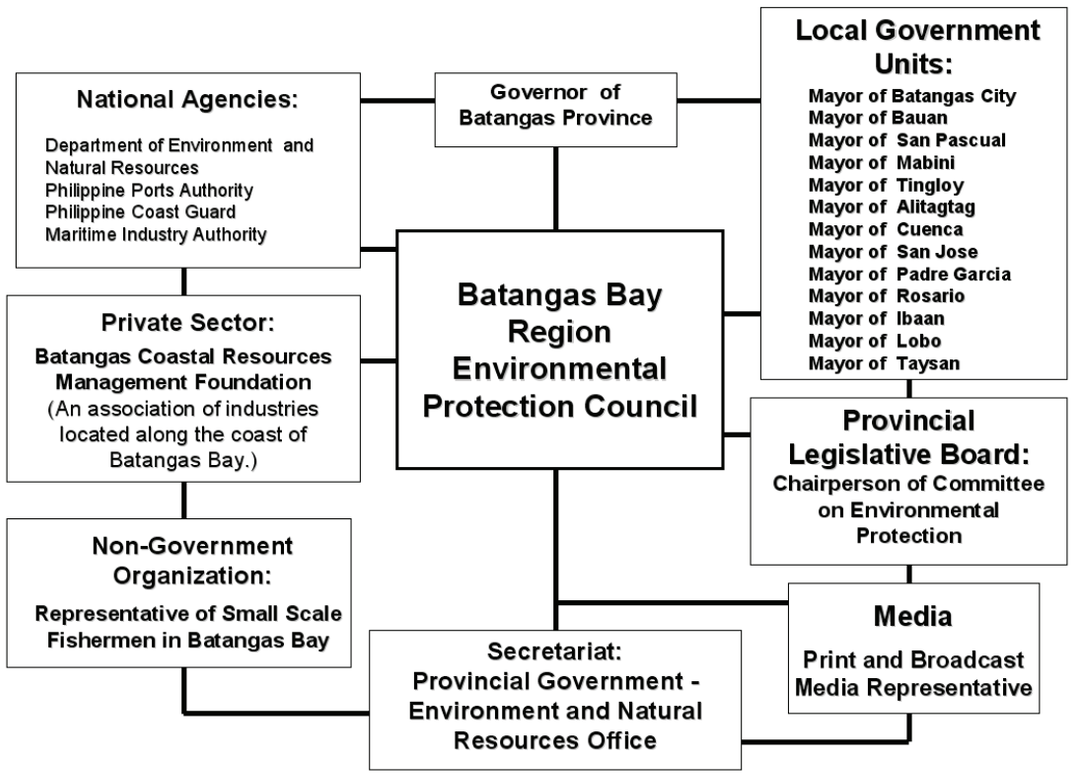

Figure 2.19. Composition of the Batangas Bay Environmental Protection Council in the Batangas Bay Region, Philippines.

Source: PEMSEA, 2006b.

The coordinating mechanism in the form of PCCs and PMOs involves bringing together the various ICM stakeholders. The resulting coordination among the various stakeholders may be contextualized at three levels: vertical, horizontal, and temporal. Vertical coordination refers to the coordination along the different levels of governance. The case of Chonburi, Thailand, illustrates the vertical coordination from the Office of the Vice Governor (who serves as the PCC chair) down to the ICM PMO office (Figure

2.20). It was a simplified representation of the ICM coordination mechanism in Chonburi at that time. Following the scaling up of ICM implementation to the entire province in 2010, they have improved the coordination mechanism, with the Governor chairing the PCC and the Secretariat located at the office of the Chonburi Provincial Administrative Organization (no longer in Sriracha Municipality). This kind of set-up ensures complementation and consistency among policies and management actions implemented at the ground level. Given that the higher levels have greater resources, vertical coordination facilitates the provision of technical and budgetary assistance to the organizational entities at the lower levels.

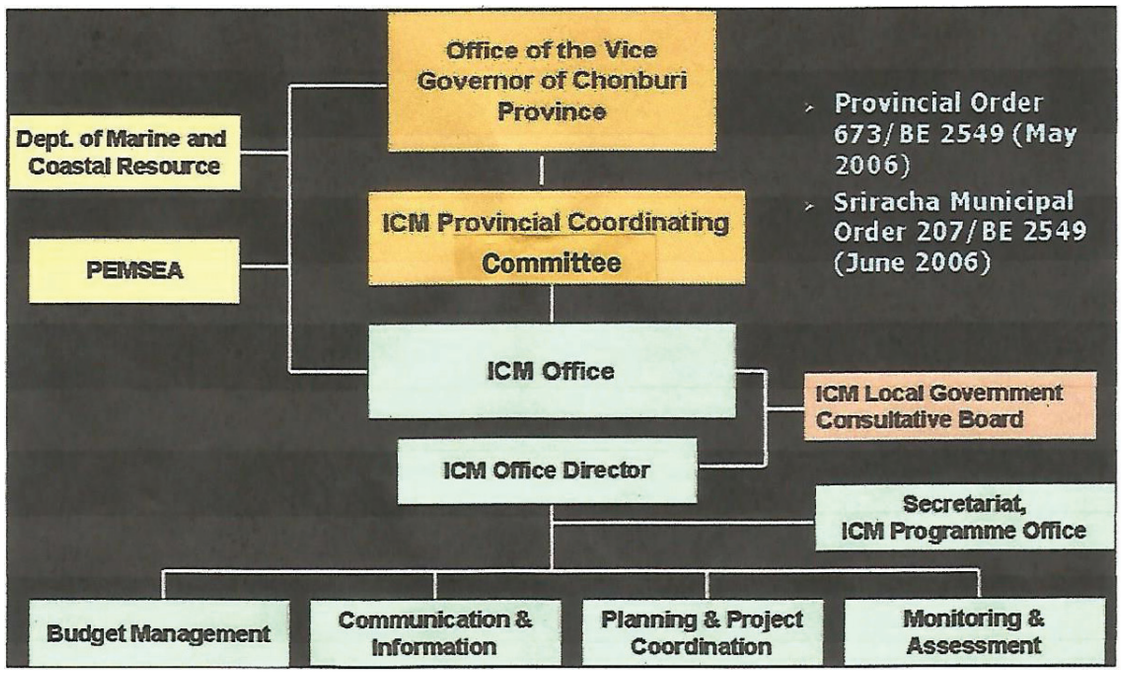

Figure 2.20. Institutional arrangements in 2006 for sustaining the implementation of an integrated coastal management program in Chonburi, Thailand.

Source: A paper entitled "Mobilizing stakeholders and building long-term stewardship for the Chonburi ICM Program in Thailand" presented at the Workshop on Consolidating ICM Experiences and Scaling Up during the EAS Congress 2006 in Haikou City, Hainan, P.R. China.

Horizontal coordination, on the other hand, pertains to the coordination at the horizontal levels of all implementing agencies executing the management actions of the ICM program. The Xiamen Marine Management Coordination Committee in Xiamen, China provides an illustrative example (Figure 2.21). Such Committee coordinates the efforts of the 22 institutional entities involved in the ICM program. Strong political will and commitment are needed from the very beginning of the ICM program to minimize interagency conflicts that may impede the program's progress. Thirdly, temporal coordination refers to the sensible phasing of all ICM activities over a common time frame. Some operational activities may be undertaken within a year, while other catalytic activities may be implemented over a five-year period. Hence, the implementation of relevant activities and tasks are synchronized over an agreed time period.

Based on PEMSEA experience, coordinating mechanisms have been shown to be particularly effective at the local than at the national level. This is dictated by the fact that interagency conflicts are usually more intense at the national level (Chua, 2006). Nonetheless, national coordination of ICM efforts remains essential as more and more local ICM practices are expanded or scaled up.

The organizational modalities may vary in coordinating ICM efforts at the national level. In the case of ROK, the Coastal Planning and Management Division of the Ministry of Marine Affairs and Fisheries coordinates national activities relating to coastal and marine governance. In other Asian countries, such as Vietnam, a new office for integrated coastal zone and river basin management has been established under the Vietnam Environmental Protection Agency to orchestrate various ICM initiatives.

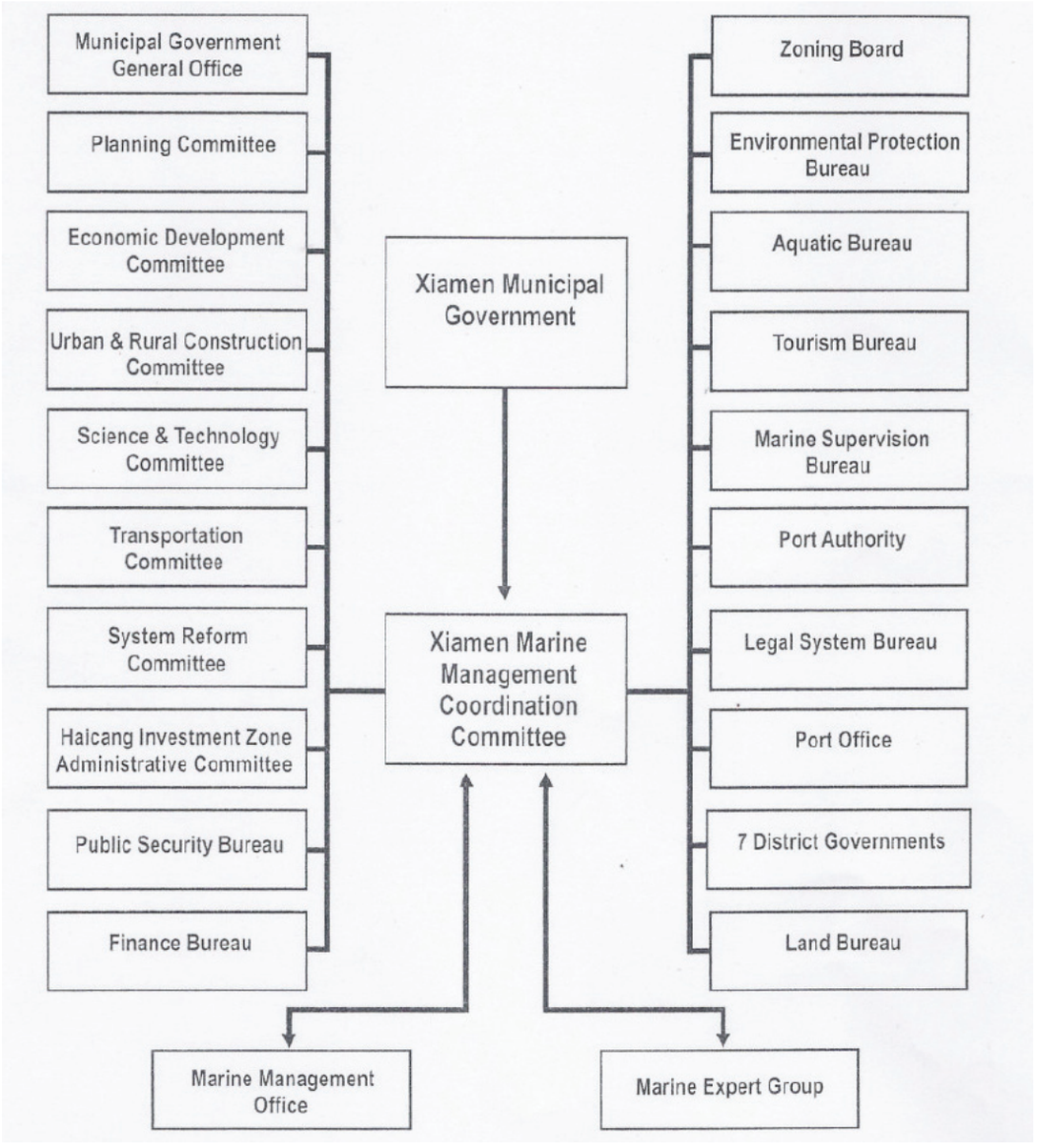

Figure 2.21. Xiamen Integrated Management Coordinating Mechanism.

Source: PEMSEA, 2006a.

This national coordinating mechanism's roles or mandates may include: guarantee effective information and knowledge exchange among the various local ICM programs; ensure optimal use of resources that are provided by national governments and donor agencies; streamline ICM efforts at the national level; and develop these ICM programs' local capacity.

2.5.3.3 Monitoring and evaluation of an ICM program

2.5.3.3.1 Background/context

This provides an overview of the monitoring and evaluation (M&E) processes/dimension in ICM program implementation. It starts with an introduction of the basic M&E concepts and/or elements. Such elements are contextualized in terms of relevant ICM performance indicators. It also provides a description of the processes for conducting M&E of the ICM program, including internal assessment and internal assessors. The State of the Coast (SOC) reporting as an M&E tool is likewise introduced here (Provincial Government of Batangas, Philippines and PEMSEA, 2008). It wraps up with a synthesis on the relevance of the M&E system to provide the management with the necessary corrective measures and/or management actions in pertinent stages of the ICM program cycle.

2.5.3.3.2 Fundamentals of monitoring and evaluation

M&E as a management tool are intertwined activities within the program/project cycle. Mathur and Inayatullah (1980) noted that the notions of M&E are usually bundled together to indicate a set of related activities concerned with the gathering of information about the performance and effectiveness of a program. Hence, it provides early signs of failure success of a program/project so that the management could undertake the necessary corrective actions or measures. Despite being interactive and mutually supportive activities, they have distinct features.

Technically/methodologically, monitoring is a continuous process of collecting and analyzing information to measure the progress of the program or project towards achieving its specific aims, objectives or targets. Process-wise, Casley and Kumar (1987) describe that this involves a continuous assessment of the functions of the project activities in the context of an implementation schedule. Monitoring involves then the provision and use of information to enable the management to assess the progress of implementation. Monitoring provides the management with regular feedback about the status of project or program implementation. Good managers judiciously undertake monitoring to assess whether or not inputs are delivered, used as intended, and are having the intended initial effects (or short-term outcomes).

Evaluation's focus, however, is more with the overall impacts (or long-term outcomes). Weiss (1972, p. 1) argues that evaluation has the built-in notion of judging merit whereby "someone is examining and weighing a phenomenon against some explicit or implicit yardstick." To avoid erroneous conclusions due to natural variability or external influences, evaluation often requires a relatively long period of time. It involves comparison of the project information with other literature from the perspectives of time, area or population. Hence, "evaluations are intended to find out whether a project has been successful or not, and why" (UNCRD, 1980, p. 254). Current data/information are inevitably compared with the baselines. When conducting an evaluation, it is necessary to "be able to detect whether things are better or worse than some benchmark or some earlier point in time" (Smithson, 1996, p. 76). Hence, there is a before and after comparison due to an intervention. Rossi (1992, p. 4) reiterates the clarity of goals in evaluation as "evaluators cannot estimate the impact of programs that do not have clear, consistent goals."

An effective M&E system for an ICM program consists of various components. Among others, these would include performance indicators, baseline data, and implementation mechanisms,

documentation and reporting. Further, the M&E system may be contingent on the different stages of the ICM program. Under the PEMSEA (2007) model, during the Preparing Stage (Stage 1), what is prepared is 'Project Monitoring Program'. During the Initiating Stage (Stage 2), monitoring indicators may be contained in the State of the Coast. In Developing Stage (Stage 3), wherein an Integrated Environmental Monitoring has to be established, the M&E system largely relates to the parameters to be monitored as well as the methodology for data collection and analysis. In Refining and Consolidating Stage (Stage 6), there is program monitoring and evaluation. This M&E may be regarded as more of result-based M&E – the assessment is geared more towards outcomes and impacts rather than simply the delivery of outputs. Whatever scheme is adopted or developed, it has to be understandable to the local governments who will be at the front line of ICM program implementation. Such M&E system must be pragmatically operational to: (1) demonstrate that the system is performing effectively; (2) determine that objectives and targets are being achieved and the needs and expectations of stakeholders are being consistently met; and (3) assess the impacts of implementation.

2.5.3.3.3 Indicators in an ICM program

Adequate, reliable and valid sets of indicators are used to measure performance and outcomes of an ICM program. In natural resource management, indicators are also alternatively referred to as 'reference points' for fisheries management (Caddy and Mahon, 1995) and 'barometer' of sustainability (IUCN, 1997). Several jargons have been associated with the term 'indicator'. In the fisheries sector, fisheries 'sustainability' indicators (Garcia, 1996; Hancock et al., 1996) are used, while Kirkegaard and Gartside (1998) prefer the term 'performance' indicators in the context of recreational fisheries. Hammer (1995, p. 147) argued that "the choice of indicator or focus will be critical to the social construction of the problem, maintaining diversity and resilience of ecosystems for sustainable fisheries." Scientific credibility, sensitivity to environmental change and cost effectiveness are among the established criteria for indicators (USAID, 1980; OECD, 1994).

ICM indicators may be regarded as quantitative/qualitative statements or measured/observed parameters that can be used to describe existing situations and measure changes or trends over time (Duda, 2002). Hence, M&E indicators may be contextualized in a variety of ways. For instance, the European Environment Agency classifies the indicators into four types, each responding to a different set of question: Type A, Type B, Type C, and Type D (EEA, 1999). The Organisation for Economic Co-Operation and Development developed the Pressure State Response (PSR) model (OECD, 1994). In the ICM parlance, this was later modified/expanded into the Driving Force-Pressure-State-Impact-Response (DPSIR) framework (AIDEnvironment et al., 2004, IOC, 2005). The Australian model is a modification of the PSR model (Commonwealth of Australia, 1994, 1996). Sen and Nielsen (1996) proposed four clusters indicators: biological, physical and technical indicators, market indicators, socio-economic indicators, and decision making arrangement indicators. Indicators for coastal ecosystems may also be contextualized at three levels (SEARCA, 1995): household level, community level and national level.

Chua (2006) highlighted some challenges relevant to the identification, selection and use of the ICM indicators to assess the effectiveness of an ICM program. One challenge is the attribution: direct causation must be explicitly established on how the ICM program contributed to the desired ecological outcomes or socio-economic impacts. For example, the increase in the fisheries biomass must be directly attributable to the ICM program's conservation of mangroves and reef areas

and not to other coastal habitat rehabilitation efforts. Ganapin et al. (2003) expounded that "the argument that situations would have been worse had ICM not been there does not hold unless proper documentation and credible evaluation of the complex processes involved and their impacts are made." Another challenge is in closing the gap between the ecological and governance cycles. The establishment of fisheries refugia – which is a policy action/adoption – is not immediately translated into increase in fish stocks. The increase in biomass particularly for top level carnivores is only noticeable after several years. Another concern is delimiting the number of indicators. The indicators must be usable to local governments given their limited technical expertise and financial resources. It is desirable then to arrive at a manageable set of indicators; these may be also aggregated into useful indices that are directly usable to busy decision and policy makers.

Chua (2006) developed the three-tiered ICM indicator framework in the context of an ICM program (Figure 2.22). Structurally, the framework's logic is from general concerns (top) to the more specific matters (below). Using this framework may facilitate the attainment of the following: evaluating the types and nature of pressures on natural coastal ecosystems; creating a culture in which baselines are established and monitored; tracking socioeconomic and ecological changes arising from ICM interventions; and measuring the effectiveness of management responses.

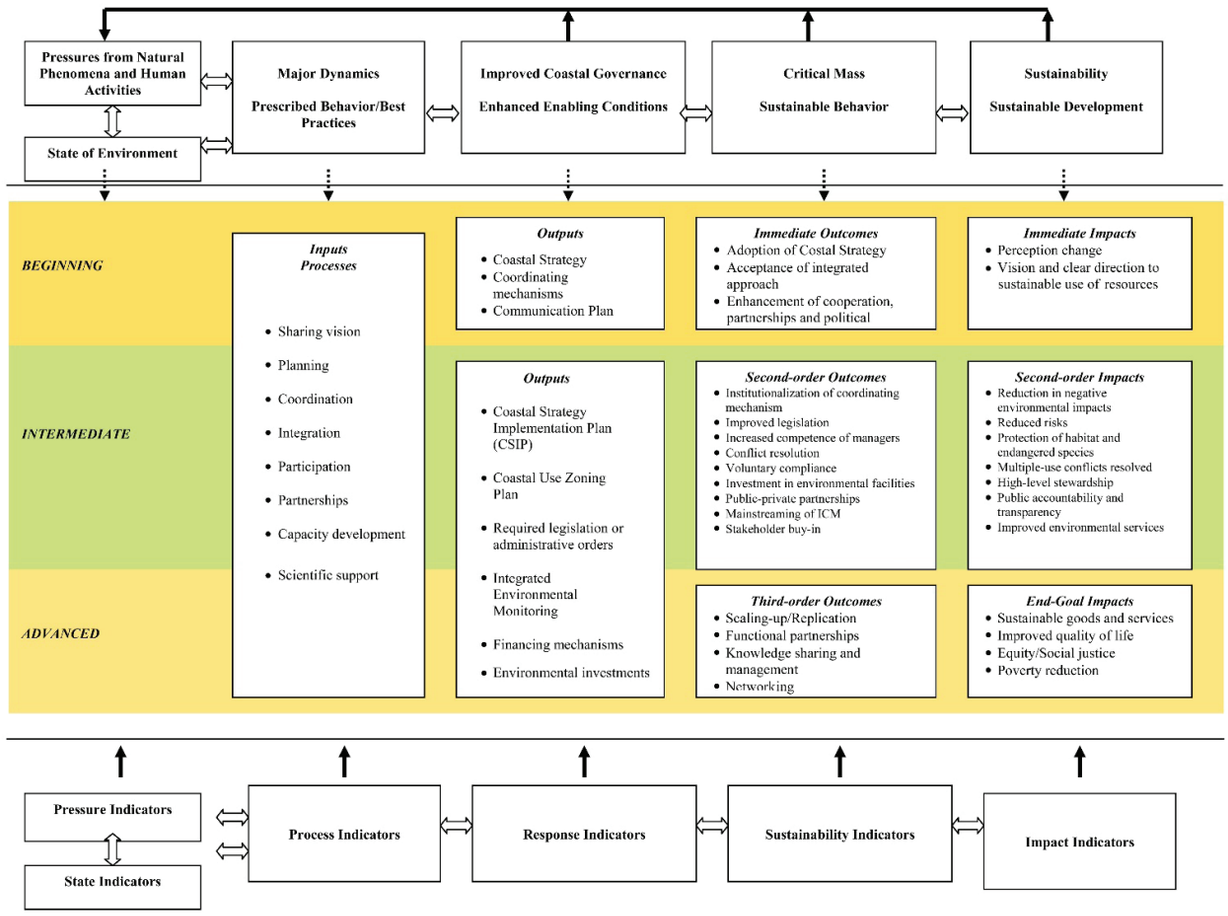

Figure 2.22. The three-tiered ICM indicator framework.

Source: Chua, 2006.

Chua (2006) elucidates the tiers as follows: the overarching (first) tier uses the ICM dynamics framework that represents a spring board for the creation of a detailed and comprehensive indicator framework; the second tier adds substance to the indicator framework, which is based from the LFA and other outcome mapping frameworks. The third tier consists of detailed and verifiable performance indicators that are grouped into six specific categories: pressure, state, process, response, sustainability and impact indicators (Appendix 2.8).

He further elaborates that these ICM indicators measure the following six areas: (1) 'process' indicators that measure the processes of integrated coastal planning and management; (2) 'state' indicators that asses the ecological and socioeconomic status of the coastal area; (3) 'pressure' indicators relate to forces that are influencing the state of environment and natural resource use such as risk quotients that measure the pressures on both the coastal ecosystems and the living conditions of coastal inhabitants; (4) 'response' indicators that relate to the various forms of policy and management interventions undertaken such as strategic environmental plans and specific zoning schemes; (5) 'sustainability' indicators that include behavioral transformations institutional and financial mechanisms that will ensure the continuity of an ICM program initiatives; and (6) 'impact' indicators that result/emanate from ICM interventions such as expansion in areas of coastal habitats that measures ecological changes and increase in income level that measure/reflect socio-economic changes.

A functional M&E will improve the performance of an ICM program to achieve its goals, objectives and targets. Reporting is an integral part of M&E and should be undertaken regularly in relation to the above indicators. The results of the M&E can be used to provide corrective or mitigative measures at relevant stage(s) of the ICM cycle.

2.5.3.4 Legislation

2.5.3.4.1 Context/Background

Broadly, legislation refers to laws passed by the national legislature or by sub-national or local law-making bodies. Aside from the term "laws", legislation may also be referred to as statutes, ordinances, measures, and enactments. The law-making body may be a group of people who come together for the sole purpose of making laws (such as Parliament at the national level); it may also take the form of a single person, usually the highest ranking executive of a country, such as President or Prime Minister.

The procedure for passing legislation, and its format, depends on the country's legal system. The timeframe also varies according to country and locality. Thus, it is usually best for ICM program managers to plan for ICM legislation at the appropriate stages of planning and implementation.

2.5.3.4.2 Legislation in the ICM Context

Legislation is an important element of governance to support the planning and implementation of an ICM program. Under the PEMSEA's model, legislation is one of the six key elements within the governance component. Broadly, legislation may refer to laws being passed by law-making bodies at appropriate levels of governance. Legislation involves developing and implementing national legislation and/or local administrative orders, which support new and existing policies that facilitate the effective implementation of an ICM program. Cicin-Sain and Knetch (1998) have argued that creating an adequate legal framework for an ICM program is a challenge because of the complex jurisdictional setting it operates.

Such national policy provides the guidance and/or basis in developing legislation at the local level. The legislative modality is also contingent on the existing political system, and may be

viewed in terms of a spectrum. In the ASEAN region, at one end are countries whose national governments have strong roles in enacting coastal legislations. Vietnam and Malaysia are examples of this legislative type of set-up. In-between are countries where the roles of the central and local governments are more or less balanced. Thailand exemplifies this situation. At the other end of the spectrum are countries where there is a relatively high degree of local governments' involvement. Such highly decentralized schemes are typified by countries like Indonesia and the Philippines.

Legislation involves developing and implementing relevant laws, rules and regulations at all levels of governance to facilitate the effective implementation of an ICM program. These may cover land-use and sea-use zoning schemes, inter-agency and multi-sectoral arrangements, registration, licensing and market-based instruments, as well as enforcement and mechanisms. Legislation is in effect one of the tools for regulating the use of the coastal area. ICM legislation is geared towards sustainable coastal development, which in turn must meet these sustainable three key interlocking dimensions/conditions: ecologically sustainable, socially acceptable and economically feasible (Munasinghe, 1993, Munro, 1995).

In the context of an ICM program, legislation provides legitimacy to implement the desired ICM activities and it likewise becomes a basis for enforcing compliance. Legislative processes, however, could be a lengthy and tedious. Depending on the circumstances, a new legislation may be introduced to support ICM or 'addendum'/supplement to the existing ones may suffice. There has been a general trend towards decentralization in many Asian countries whereby there is devolution and/or deconcentration of powers to local governments from national governments, including the authority over some aspects of management of the coastal areas. This may be advantageous when legislating a local ICM program.

2.5.3.4.3 International Conventions

International conventions provide globally-accepted standards for protecting and managing the marine environments (Chua, 2006). Figure 2.23 provides the major international conventions as they relate to various facets of coastal and marine governance. International legal instruments may serve as the standards or basis for the development of national or local policies.

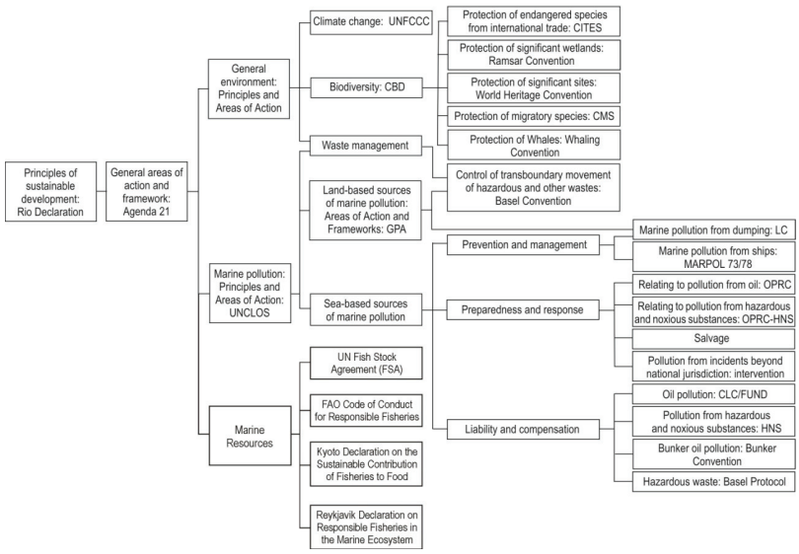

Figure 2.23. International conventions in an integrated implementation network.

Source: PEMSEA, 2003.

A treaty is an expressed agreement under international law entered into by actors in international law, namely sovereign states and international organizations (http://en.wikipedia.org/wiki/Treaty). Among other terms interchangeably used with treaty is international agreement, protocol, covenant, convention or exchange of letters. International conventions provide globally-accepted standards for protecting and managing the marine environments (Chua, 2006). Treaties can be loosely compared to contracts: both are means of willing parties assuming obligations among themselves, and a party to either that fails to live up to their obligations can be held liable under international law (http://en.wikipedia.org/wiki/Treaty).

International conventions' national and local implications must be properly contextualized. International legal instruments may serve as the standards or basis for the development of national policies, as well as ICRAM plans and/or programs. Appendix 9 provides the major international conventions as they relate to various facets of coastal and marine governance.

Note that the implementation of international conventions and "soft laws" on coastal governance involves certain legislative instruments. For example, the legislation of a national coastal and/or marine policy is ideal as it establishes a cross-sectoral framework. This is essential to the appropriate on-the-ground implementation of an ICRAM program. Furthermore, such a policy would provide the guidance - as well as courses of actions - for the sub-national or local governments in the management of their respective coastal and ocean environments (see Part 1, Section 1.5.2).

2.5.3.4.4 Legislations that Support ICM

The development of national coastal and marine policies – most of which have been based in international conventions - has varied between and among countries in the region. Such national policies, in turn, provide the guidance and/or basis in developing legislation at the local level. PEMSEA (2005) has provided some of the guiding principles in policy development: establish stakeholder ownership; policymaking should be transparent; build upon existing policies and efforts; and localize good practices and lessons learned.

Since legal systems are diverse, the legislation process varies. Hence, each ICM program manager must keep in mind the context of his country's legal system. In most cases, the proponent is a government administrative agency or a member of the legislative body itself. There are situations, though, whereby the process is initiated by the private sector or a non-government organization.

Legislation can be classified into three main types: (1) institutional, (2) regulatory, and (3) remedial or procedural legislation (DENR/DA-BFAR/DILG, 2001). Any one or a combination of these legislations may support an ICM program. Institutional legislation assigns and allocates functions and powers to the appropriate agency or agencies. Hence, this legislation may include the reorganization of agencies or the establishment of new agencies to support the implementation of an ICM program.

Regulatory legislation seeks to control or modify the general public's behavior. A government often employs a mixed set of policy instruments or regulatory measures. Environmental protection measures belong to this category such as those in areas of habitat protection, solid waste management and wastewater management. Eskeland and Jimenez (1991) provided a three-tier taxonomy of the government's regulatory mechanisms to induce behavioral change: (1) market-based incentives (MBIs), (2) command and control (CACs), and (3) government production or expenditure. MBIs

affect the incentives of private agents (such as taxes and subsidies) see Appendix 2.10; CACs regulate activity by source specific constraints, such as regulatory measures for coastal fisheries; and government expenditure deals with the enforcement and expenditure of regulatory agencies.

Remedial or procedural legislation is the third type of legislation. It provides the method or manner of proceeding or accomplishing what is prescribed in substantive law. Examples of the subject matter of procedural law are: monitoring and assessment protocols; permit issuance procedures; and surveillance and enforcement mechanism. Institutional, regulatory and procedural laws need not be mutually exclusive as one piece of legislation may have a combination of these three types. Other policy instruments may also be available: property rights system, liability laws and moral suasion.

2.5.3.4.5 Enabling legislations that support ICARM/ICM in NOWPAP Region

Enactment of laws and policies are usually brought about by a stimulating factor or a 'trigger' event. Given different political systems, there is a considerable variation on how a national coastal and marine policy is developed among the countries in the NOWPAP region.

Republic of China

The country's constitution provides the primary basis for the legal system of environment and natural resources management. China's legal instruments are expressed in terms of laws, legislations and standards. The Law of Environmental Protection (1989), however, serves as the main legal framework for environment-related concerns. The Law of Marine Environmental Protection (1999) provides specific guidelines in protecting the marine environment, conserving the ocean's resources, preventing pollution, maintaining ecological balance, safeguarding human health, and promoting sustainable development. In 2001, the Sea Area Use Management Law of the People's Republic of China was enacted.

The Chinese government has developed an associated system of supervision and monitoring in implementing the relevant laws pertaining to coastal and ocean management. Some 13 major laws – related to the contaminants inputs on the environment – were approved by the People's Representative Committee of China. These cover both terrestrial and marine environments as well as specific resources, such as wildlife and fisheries. Sixteen key legislations were approved by the State Council of China since the 1990s. Main Laws and Regulations Related to the Contaminants Inputs on Environment in China are provided in Appendix 2.11.

Japan

Japan has enacted a comprehensive array of environmental policies and legislations over the last 50 years. These initially relate to pollution problems, water management and rapid industrialization. Among others, the 'Basic Law for Environmental Pollution Control' was enacted in 1967 while the 'Water Pollution Control Law' was enacted in 1970.

Legislations pertaining to river basin management and coastal management consist of three categories. The first category is the 'basic law,' which is directed primarily to policy considerations, institutions, environmental standards and disciplines. Included in this category are the 'Basic Environment Law', 'Basic Act on Ocean Policy' and 'Fisheries Basic Act.' Enacted in 2007, the Basic Act for Ocean Policy is the first legislation that defined the integrated coastal and river basin management.

The second category of legislation relates to the 'management of national land and

environment.' Examples are the 'Water Pollution Control Law,' 'Sewerage Law,' 'Law to Ensure Sustainable aquaculture Production' and 'River Law.' In 2011, the 7th Basic Policy for Area-wide Total Pollutant Load Control (TPLC) was enacted given the planning period from 2011-2015. This policy contains several management measures to reduce the pollutant loads from both point-sources and non-point sources. The key measures that are aimed to reduce pollution include: (1) dissemination and improvement of the sewerage system, the johkaso (private sewage system) and the rural community sewerage; (2) appropriate application of the TPLC standard in accordance with the circumstances of each workplace; (3) promotion of sustainable agriculture; (4) conservation and restoration of tidal flats and sea grass bed; and (5) improvement of sediment bottom by dredging and sand covering.

The trend now in Japan is towards environment-friendly agriculture as exemplified by various initiatives. The "Good Agricultural Practice" for farmers was established in 2005 to dramatically reduce the use of chemical fertilizers while the "Act on the Promotion of Organic Agriculture" was instituted in 2006 to support agriculture without chemical fertilizers. The 2007 "Basic Plan for Fisheries" promotes the sector's sustainable development. Appropriate policies are also being developed to improve environmental quality standards (EQS) in enclosed sea areas.

The third legislative category pertains to the 'protection and conservation of environment.' During 1970s, the 'Waste Disposal and Public Cleansing Law' and the 'Law Relating to the Prevention of Marine Pollution and Maritime Disaster' were enacted as domestic legislations for protection of the marine environment in the wake of international adoptions of the 'London Dumping Convention' in 1972 and the 'MARPOL73/78.' With regard to EIA, the national law was enacted in 1997 as the 'Environmental Impact Assessment Law' and revised in 2011 aiming at strategic environmental assessment (SEA) found in some leading countries that have EIA systems. Through effective complementation of the EIA Law and the Law for the Conservation of Endangered Species of Wild Fauna and Flora, ICARM-oriented marine spatial planning and ecosystem-based management are anticipated to be more successful.

Russian Federation

The Maritime Doctrine of the Russian Federation (2001) for the present period up to the year 2020 provides the overarching legal framework. This legal instrument contains the provisions for the marine activities that are related to the concept for national security, foreign policy, military doctrine and functional directions of the national sea policy. Other relevant national policies include the following: The Federal Law on Russian Continental Shelf; The Federal Act on the Internal Maritime Waters, Territorial Sea and Adjoining Zone of the Russian Federation; The Federal Law on the State Border of the Russian Federation; and The Federal Law about Exclusive Economical Zone of the Russian Federation. Further, there are numerous departmental regulatory documents concerning specific maritime activities.

A key limitation is the apparent lack of direct legal regulations in the Law of the Russian Federation concerning enforceability of ICARM and sustained nature management in the marine coastal areas. Even the Maritime Doctrine of the Russian Federation (2001) does not define the boundaries of the coastal zone (Aibulatov, 2005). The prevailing legislations do not specifically characterize the coastal zone (a strip of land and sea, closely bounded by environmental, economical, social and geographical factors) as a whole entity. Moreover,

these legislations have not yet fully-defined the geographical boundaries or institutional responsibilities of federal, regional and municipal level agencies. Hence, Russia needs more laws pertaining to river basin and coastal area management.

Republic of Korea

In terms of legal and institutional mechanisms, integrated coastal management in Korea has been strengthened by the evolution of marine environment protection (Nam and Kang, 2006). Its main trigger was the loss of coastal habitats and degradation of marine environment by land-based development and pollutants, which were critical issues in the late 1990s. Introduction of watershed-based management through the amendment of Marine Pollution Act and enactment of Coastal Management Act in 1999 provided more solid legal basis for integrated coastal and river basin management. Wetlands Conservation Act of 1999 has also functioned as a strong pillar to implement ICM.

New policy directions were set in the late 2000s. Specifically, for Masan Bay, several technical guidelines were prepared and implemented in terms of controlling land-based activities and pollutant based on its environmental carrying capacity. The Marine Environment Management Act was enacted by wholly amending the previous Marine Pollution Prevention Act that provided the legal base for ICARM of Masan bay. To effectively address the crucial issue of ecosystem degradation of uninhabited islands in the mid 2000s, the Law on Conservation and Management of Uninhabited Islands was enacted in 2007. Wetlands Conservation Act covers geographically both wetlands - coastal and inland – including tidal wetlands. In the same year, the Law on Conservation and Management of Marine Ecosystem, was enacted in 2007. In addition, the enhanced public awareness and interest on marine ecosystem have led to more scrutiny of coastal development projects, especially land reclamation.

The Coastal Management Act was also revised to introduce new management tools in 2009. Such tools include coastal zoning mechanism and natural coastline protection. The natural coastline protection policy is intended to protect the natural environment from wanton development of the coastal area. Each local government has to set a protection target of natural coastline in quantitative manner. In order to achieve the target for every five years, they have to cancel, postpone, relocate or resize development projects. During the ‘development stage,’ three national plans regarding ICARM were developed; the Framework Plan on Conservation and Management of Marine Ecosystems (2009), the National Comprehensive Plan on Marine Environmental Management (2011), and the National ICM Plan (2011).

On the other hand, the acts and statutes relevant to the protection of the marine environment and ecosystem inclusive of living resources could be identified based on its geographic jurisdiction. Geographic coverage of laws related to marine ecosystem protection and ICM is showed at Figure 1.15.

2.6 Tools and techniques in ICARM/ICM

Several tools and techniques are useful are planning and managing an effective ICM program (Box 6). Some of these are briefly described below.

Box 6. Some tools and techniques in planning and implementation of an ICARM/ICM program

1. Economic valuation
2. Environmental impact assessment
3. Information and management system
4. Institutional analysis/organizational development
5. Profiling
6. Participatory/rapid appraisal
7. Problem analysis/diagnosis
8. Public awareness and education
9. Public-private partnership
10. Risk assessment
11. State of the coasts (SOC) reporting
12. Marine spatial planning

2.6.1 Economic valuation

Recognizing that natural resources have value, economists devised ways by which goods and services derived from it can be translated into monetary terms. This cognizance gave rise to economic valuation as a tool that can help generate better, more insightful decisions that take into consideration impacts of human economic activities to the environment. Environmental goods and services that flow into the economy are converted into money as a measure of their value. Therefore, benefit-cost analysis of programs, projects, or activities that affect the environment becomes more encompassing. Seeing the big picture serves to decrease the probability of making decisions that can cause irreversible damage to natural resources.

The economic valuation of natural resources is the process of assigning measurable value (monetary) to any particular natural resource. It converts the value of the Ecosystem "goods" and "services" to a common unit understood by all stakeholders- "money". The purpose of economic valuation is to make the different services provided by ecosystems comparable to each other, using a common metric. Ecosystems have value because they maintain life on Earth and the services needed to satisfy human material and nonmaterial needs.

The total economic value (TEV) of a natural resource can be summed up into the following equation. Figure 2.24 below presents the general framework in gauging the total value of a natural resource.

$$TEV = UV + NUV$$

Where: UV = Use Value consisting of direct value, indirect use value and option value;

NUV = Non-Use Value consisting of bequest value and existence value.

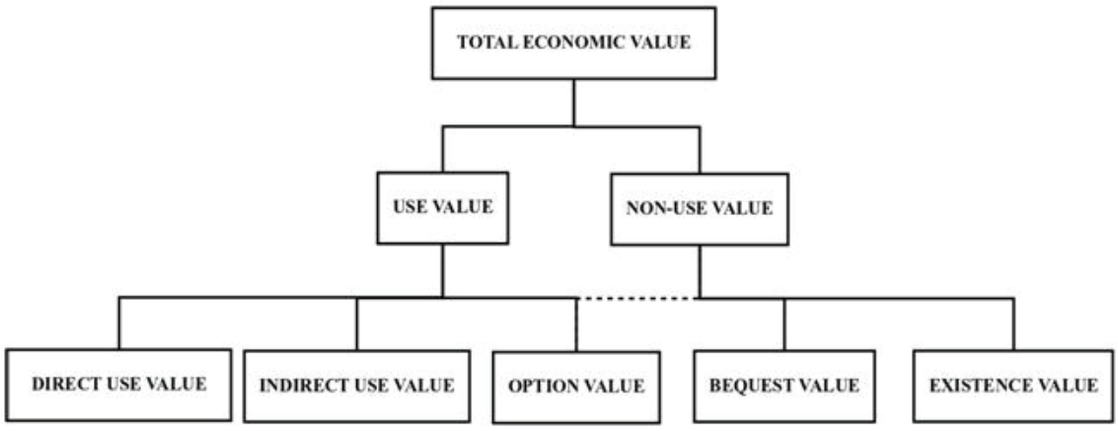

Figure 2.24. General framework of total economic value.

Source: Costanza et al., 1997.

Use Value is the value of ecosystem's "goods and services" that are used by humans for consumption or production purposes. These are tangible and intangible goods and services of ecosystems that are either currently used directly or indirectly or that have a potential to provide future use values.

Direct use values are the ecosystem's "goods" that are tangible. It could be consumptive or non-consumptive and based on actual use of the environment. The value of these goods can be derived using the market based approach which means that the goods are valued on the present market value of the resource. For example, the value of the watershed can be attributed to the farm production and cost of the domestic water consumption.

Examples of consumptive uses are: harvesting of food products (e.g. fish, wild fruits, honey hunting of animals for consumption from natural or managed ecosystems); timber for fuel or construction; medicinal products; water for drinking and other household use. Examples of non-consumptive use are enjoying recreational and cultural amenities such as wildlife and bird-watching, water sports, and spiritual and social utilities that do not require a harvesting of products. Amur River provides direct use values to the people who visit the area.

Indirect use values are the "services" of the ecosystem that maintain the processes to support other services such as the following: nursery of marine species (mangroves), pollination and biological control services for food production, water purification, waste assimilation, nutrient cycling and other regulation services leading to clean air and water supply and thus could reduce health risks.

Indirect use values are intangible services and are sometimes referred to as "regulating and supporting" services. This is a non-market based value which means that valuing these services could be attributed to the present condition or the quality of the resource. For example, the value of the mangrove forest as nursery of some marine species could be attributed to the volume of juvenile species.

Option value refers to the value that people place on having the option to enjoy something in the future, although they may not currently use it. For instance, a person may hope to visit the Daheishan National Forest in Liaoning, China sometime in the future, and thus would be willing to pay something to preserve the area in order to maintain that option.

Non-Use Values are the values that are not associated with actual use, or even an option to use, ecosystem goods or its services. This is the kind of value that is the hardest, and the most controversial to estimate because this is also a non-market based value. In most cases 'Willingness to Pay' is the most common method being used to value the resource. Willingness to pay is the capacity of an individual to pay voluntarily a certain amount for the preservation of the resource for the future generation.

Bequest value is the value of leaving the use and non-use values of the resources to offspring or simply means the "legacy" of the present generation to the future generation. For example, a person may be willing to pay to protect the spectacular scenery of Amur Bay in Russia so that future generations will have the opportunity to enjoy it. Existence value is the value from knowledge of continued existence reflecting the benefit people receive from knowing that a particular environmental resource, such as the rare species of lancelets and white dolphins in China.

2.6.2 Environmental impact assessment

In a practical sense, an environmental impact assessment (EIA) is a process of evaluating the possible impacts or effects that a proposed activity or project may have on the socio-economic and bio-physical environments. Such impacts (or effects) may describe them in a number of ways that include direction, duration, frequency, intensity, probability, reversibility and spatial extent. The International Association for Impact Assessment (IAIA) defines an EIA as "the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made" (IAIA, 1999). The IAIA also argued in its 1999 Newsletter the five Operating Principles for the EIA process that could be applied worldwide (Box 7). Additional principles include accountability, cost-effectiveness, interdisciplinary and transparency. Basics/fundamentals of EIA are provided in some references such as Glasson and Chadwick (1997) and Carpenter and Maragos (1989).

Box 7. Operating principles that EIA process should be applied

1. As early as possible in decision making and throughout the life cycle of the proposed activity;
2. To all development proposals that may cause potentially significant effects;
3. To biophysical impacts and relevant socio-economic factors, including health, culture, gender, lifestyle, age, and cumulative effects consistent with the concept and principles of sustainable development;
4. To provide for the involvement and input of communities and industries affected by a proposal, as well as the interested public;
5. In accordance with internationally agreed measures and activities.

Source: IAIA, 1999.

Trinidad & Tobago's Environmental Management Authority listed five objectives of an EIA: (1) to ensure that environmental considerations are explicitly addressed and incorporated into the development decision-making process; (2) to anticipate and avoid, minimize or offset the adverse significant biophysical, social and other relevant effects of development proposals; (3) to help the project proponent, the public and government regulators understand core issues of concern as well as to provide the opportunity for input from interested parties and to increase likelihood of public

acceptance; (4) to protect the productivity and capacity of natural systems and their ecological processes; and (5) to promote development that is environmentally sustainable and optimizes resource use and management opportunities. An EIA is quite a useful technical evaluation tool for ICM as it ensures that political leaders and decision makers take into account the environmental impacts when deciding whether or not to proceed with a project undertaking in a river basin or coastal area. EIAs are unique in that they do not require adherence to a predetermined environmental outcome, but rather they require decision-makers to account for environmental values in their decisions and to justify those decisions based on the environmental studies conducted and public comments on the potential environmental impacts (Holder, 2004). A generalized EIA process flow-chart is provided in Figure 2.25.

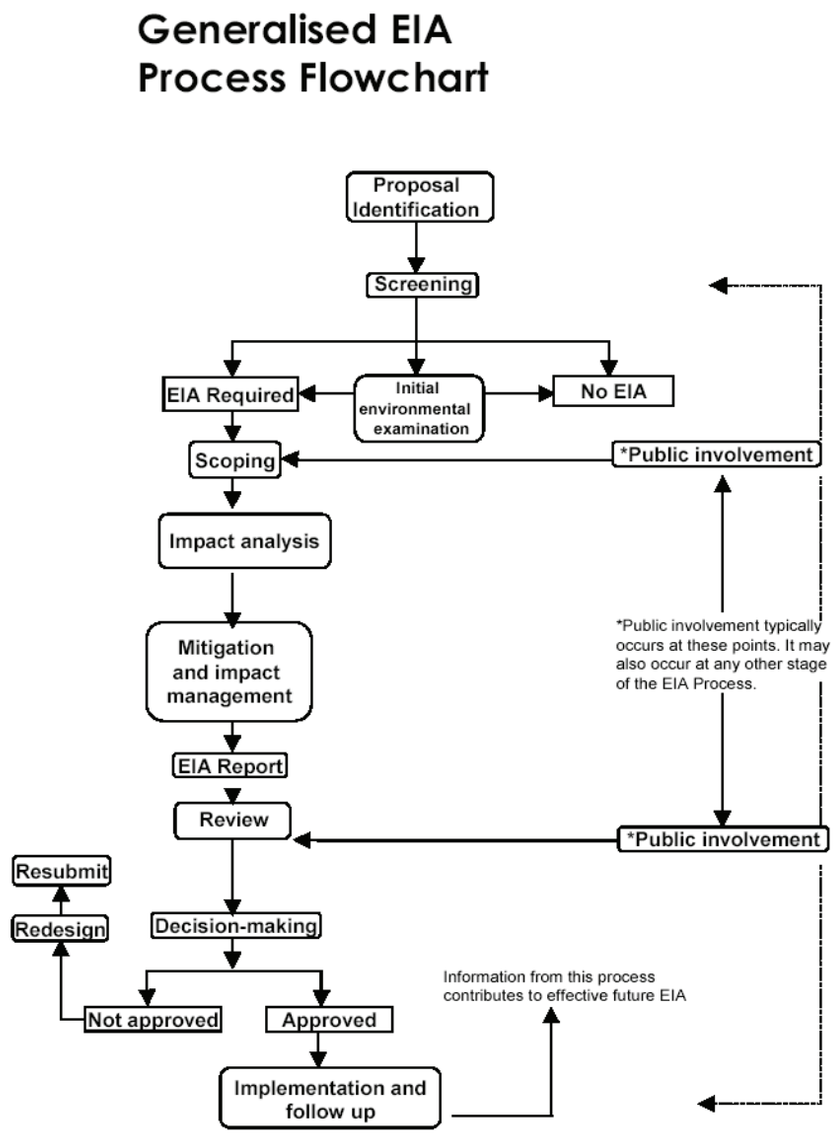

Figure 2.25. A generalized EIA process flow-chart

Source: Ogola, 2007.

Historically, EIA started/commenced in the 1960s as part of the growing environmental movement. This was developed as a methodological tool in recognition that unbridled economic development has resulted in negative environmental impacts, such as pollution and destruction of natural resources. The USA led the EIA's legal, methodological and procedural foundations/uses with the enactment of the National Environmental Policy Act (NEPA) in 1970. Among developed countries that followed included: Australia that passed the Environment Protection (Impact of Proposals) Act in 1974; Canada with its Canadian Environmental Assessment Act (1995); the Dutch EIA legislation started its implementation on 1 September 1987. To systematically assess environmental impacts, the European Union introduced in 1985 the European Union Directive (85/337/EEC) on Environmental Impact Assessments (known as the EIA Directive).

Within the NOWPAP's region, China's EIA Law requires that an environmental impact assessment be completed prior to project construction. In Russia, the two key environmental legislations are the 1995 Federal Law on Ecological Expertise, and the 2000 Regulations on Assessment of Impact from Intended Business and Other Activity on Environment in the Russian Federation. Most Asian countries have also formalized their respective EIA legislations.

Pursuant to NEPA, an environmental assessment (EA) is an environmental analysis prepared to determine whether a federal action/project would significantly affect the environment and thus require a more detailed Environmental Impact Statement (EIS). EA is alternatively referred to as Initial Environmental Examination (such as the Philippines). The certified release of an Environmental Assessment results in either a Finding of No Significant Impact (FONSI) or an EIS.

Threats to coastal regions – such as acid rain, marine litter, radioactive contamination and toxic oil spills – do not recognize national political borders. The cross-border or transboundary nature/character of many environmental problems/issues has led to the creation of transnational regulation via multilateral and bilateral treaties. Key Multilateral Environmental Agreements (MEAs) that are linked/related with EIA's legal, policy and institutional arrangements include the following: Convention on Environmental Impact Assessment in a Trans-boundary Context (Espoo, 1991); Rio Declaration (1992) whereby Principle 17 calls for use of EIA as a national decision making instrument to be used in assessing whether proposed activities are likely to have significant adverse impact on the environment; UN Convention on climate change and Biological Diversity (1992) cited EIA as an implementing mechanism of these conventions (article 4 and 14 respectively); and Doha Ministerial Declaration encourages countries to share expertise and experience with members wishing to perform environmental reviews at the national level (November, 2001). The United Nations Economic Commission for Europe's Convention on Environmental Impact Assessment in a Transboundary Context was negotiated to provide an international legal framework for transboundary EIA (see http://en.wikipedia.org/wiki/Environmental_impact_assessment). Also at the international level, lending banks (such as African Development Bank, Asian Development Bank (ADB, 1988), European Bank for Reconstruction and Development and World Bank) and bilateral aid agencies have EIA procedures that apply to borrowing and recipient countries.

2.6.3 Profiling

In a practical term, profiling is simply preparing a 'snapshot' of a particular area or event. In the context of ICM/ICARM, the coastal environmental profile is a snapshot of the current environmental situation at an ICM project site/area. It describes its bio-physical features and socio-economic characteristics, as well as its management issues and development opportunities. The

project area must be defined in terms of geographic coverage that include land/ watershed area (ha or km2), coastline (km or miles distance) and marine area (ha or km^2). The Coastal Environmental Profile for Balabac Strait Corridor, Philippines is an illustrative example (see Figure 2.26).

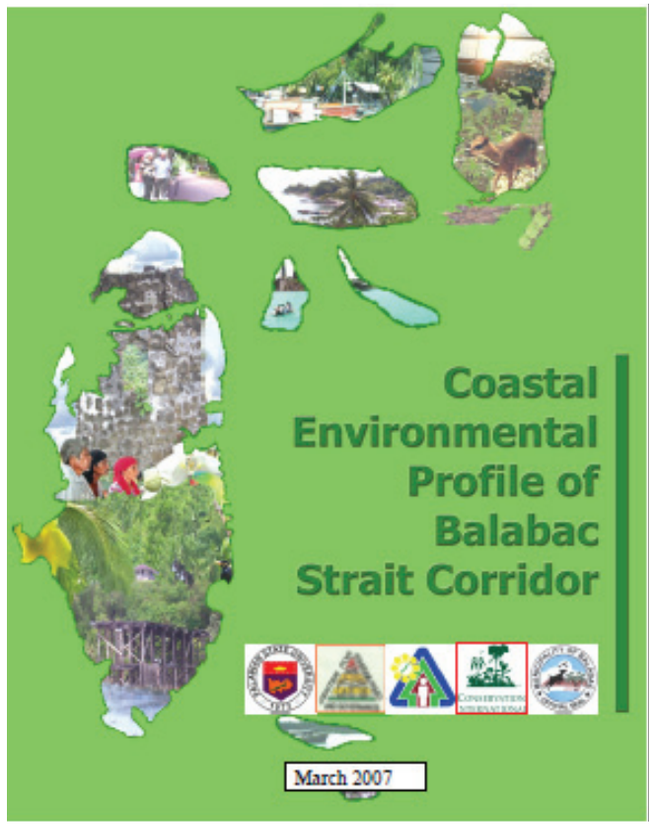

Figure 2.26. Coastal environmental profile for Balabac Strait Corridor, Palawan Province, Philippines.

Source: PSU et al., 2007.

The aims of a coastal environmental profile include the following: (1) to establish relevant qualitative and quantitative baseline information about the project area; (2) to identify data gaps that require further research or monitoring; (3) to determine the critical problems/issues and environmental investment opportunities; and (4) to contribute to the development of plans related to ICM. The existing literature provides the primary sources of data/information. Nonetheless, these may be supplemented with primary data gathered, as may be needed. To the extent possible, the relevant facts and figures must be focused within the confines of the ICM site. Use only aggregated data/information – such as tide or rainfall – in cases where these are not specific to the site.

The environmental profiling process may be undertaken in four interactive (not necessarily sequential) stages: (1) formation of a multi-disciplinary study team, (2) the collection, collation and organization of existing literature/secondary data, (3) analysis and evaluation of compiled data/information, and (4) conduct of stakeholders' workshop/writeshops. These documents may be sourced out from government agencies, private institutions, universities and NGOs. Limited primary data may likewise be incorporated, such as those generated through 'rapid appraisals' and/ or selected interviews with key informants or respondents.

Structurally, a profile may be divided into seven chapters, although this is not a definitive rule. Chapter I is essentially the general introduction. Among others, it describes the purposes of the profile as well as summary content of the document. Chapter II may provide some historical information as well as environmental conditions and characteristics. It may include but not limited to: biodiversity, coastal habitats/ecosystems, geographic features (like flat, moderately sloping and rolling topographies), geological conditions, meteorological processes (like monsoons), marine hydrographic pattern, marine living resources, terrestrial flora and threatened species.

Chapter III may focus on the human dimension. Among others, this includes the customs and traditions, culture, gender issues, demography, socio-political structure and religions. Chapter IV may emphasize on the economic sectors and/or activities. Covered here are aquaculture, agriculture, commerce, energy, forestry, industry, manufacturing, marine fisheries, off-shore explorations, shipping and tourism. Given coastal urbanization, related to fisheries, shipping and tourism are also accelerating. Chapter V may zero in on threats and opportunities. Threats refer to problems and/or negative issues while opportunities refer to positive conditions or potentials in the area. Typical coastal threats include illegal fishing activities, coral reef destruction, erosion, habitat loss and alteration, mangrove over-exploitation, pollution, saltwater intrusion, sewage, siltation and solid wastes. Governance-related problems include multiple use conflicts, lack of coordination among institutions, inadequate policy and legislation and low level of public awareness.

Chapter VI describes the current interventions being done/undertaken to address the identified problems/issues. Such management measures may take the form of a discrete activity, project or program. Chapter VII provides some prescriptions to address the threats/issues described in Chapter VI to attain the sustainable development of the concerned coastal area. The management recommendations may be broadly classed into three: (1) socio-economic; (2) institutional/ governance; and (3) bio-physical/environmental. This chapter also provides some strategic directions to be undertaken relative to coastal land and water zoning scheme, property rights/ regimes, and traditional coastal management practices. Given population and development pressure in many coastal areas, the development of appropriate institutional arrangement is paramount.

2.6.4 Participatory and rapid appraisals

Development practitioners are continuously developing applied research methodologies that: (1) are cost-effective; (2) can generate information within the shortest possible time; and (3) maximize the participation of concerned stakeholders. Moreover, the results that they produce – although neither quantitatively precise nor statistically robust – are relevant enough to provide the managers and politicians with the basic information that they need and the general courses of actions to undertake concerning direct management interventions, applied research, development planning or policy making. These applied techniques in field data collection have become popularly known as rapid rural appraisals (RRAs) and/or participatory rural appraisals (PRAs).

Examples of research methodologies allied with RRAs and PRAs include exploratory survey (Collinson, 1981), Sondeo (Hildebrand, 1981), informal agricultural survey (Rhoades, 1982), informal methods and reconnaissance survey (Shanner et al., 1982), agro-ecosystems analysis (Conway, 1985, 1987), rapid rural systems appraisal (Sajise et al., 1990), PRA (Mascarenhas et al., 1991) and participatory learning approaches (Schonhuth and Kievelitz, 1994). Chambers (1980, 1992) argued that such methodologies came about to fill in rural development needs for information that is timely, accurate and usable. Among the key features of PRAs/RRAs are triangulation (using

a variety of techniques to cross-check or validate information), gaining firsthand knowledge from the rural people/stakeholder themselves, and learning rapidly and progressively. Traditionally, RRAs/PRAs were applied in terrestrial environments such as agriculture, forestry and freshwater lake systems.

Over the last two decades, however, there have been initiatives in applying RRAs/PRAs in non-terrestrial resource systems, as well as fisheries and marine environments. Related methodologies include: rapid appraisal techniques for Philippine coastal fisheries (Fox, 1986); rapid assessment techniques for coastal wetland evaluation (Howes, 1987); RRA for fisheries development (McCracken, 1990); rapid appraisal of coastal environments or RACE (Pido and Chua, 1992); rapid appraisal methods for coastal communities (Townsley, 1993); participatory rural appraisal of coastal communities (Lamug, 1994); and rapid appraisal of fisheries management systems or RAFMS (Pido et al., 1996).

The RACE (Pido and Chua, 1992) method is particularly relevant to ICARM/ICM. There is a need for practical methods to rapidly assess the conditions or status of coastal areas that produce practical results at a rather reasonable cost. RACE-related methods employ, among others, visualization techniques, in-depth interviews, focus groups and observation studies. These are usually carried out by a multidisciplinary research team, with members coming from social sciences, natural sciences and even integrative fields, such as regional planning and natural resources management.

2.6.5 State of the coasts reporting

Under the PEMSEA's (2007) framework, the State of the Coasts (SOC) was designed as an operational tool of local government for planning and implementation of an ICM program. It is a reporting system developed primarily to assess the progress and impacts of ICM implementation by local governments (Provincial Government of Batangas, Philippines and PEMSEA 2008. The SOC is an integrated and comprehensive approach that documents the status of the socioeconomic, governance and biophysical features/facets of an ICM program. It traces its roots in the State of the Environment (SOE) reporting (Zann, 1995).

The SOC relates to the M&E component of an ICM program in relation to the: (1) establishment of relevant baseline data/information, (2) selection of ICM indicators, and tracking of progress of implementation through time. As the SOC is designed in tracking progress toward sustainable development targets, it uses simple, meaningful and measurable indicators, such as the 'smileys.'

In any ICM program, appropriate baseline data and/or information to serve as reference point about the attainment of its desired goals, objectives or targets. The SOC baselining is normally undertaken during the initiating stage of ICM implementation to provide comprehensive qualitative and quantitative baseline information on the various bio-physical and human dimensions. Moreover, the SOC baselining provides the following functions: (1) consolidates/synthesizes information coming from both published sources and gray literature; (2) identifies the critical data gaps that need further research and monitoring; and (3) provides the basis in determining and prioritizing pertinent issues that can be included in the ICM program.

The baseline data/information established will become cumulative and shall become the basis/reference point at the different or succeeding stages of ICM program implementation. Henceforth, the SOC not only facilitates the M&E activities but also monitors the progress of ICM program's targets through time. While some information are presented as snapshots, other

information are presented as trends. The preparation of an SOC report is ideally a collaborative activity among institutional partners that include academe, government agencies, non government organizations, people's organizations and private sector – even donor agencies. Moreover, the SOC may also provide the mechanism for local governments to document their environmental and social performances which can be linked with recognition and certification such as ISO 9001 and ISO 14001 (Chua, 2006).

Core indicators for SOC are considered to be a basic set of indicators for evaluating changes that have occurred in the area over time. From a total of 160 SOC indicators, 35 core indicators were determined as the basic set of indicators to evaluate the progress in ICM implementation based on the PEMSEA's 2007 SDCA Framework. Given the SOC, the goals, objectives and targets of an ICM program is translated in operational and/or measurable terms. There are seven generic steps in preparing an SOC report (Figure 2.27). The three major stages in preparing the SOC report are: (1) SOC inception or the initiation of SOC implementation; (2) data gathering, analysis and validation; and (3) report preparation and dissemination. The whole process takes about six months to accomplish. The SOC Report of Batangas Province is used here as an illustrative example.

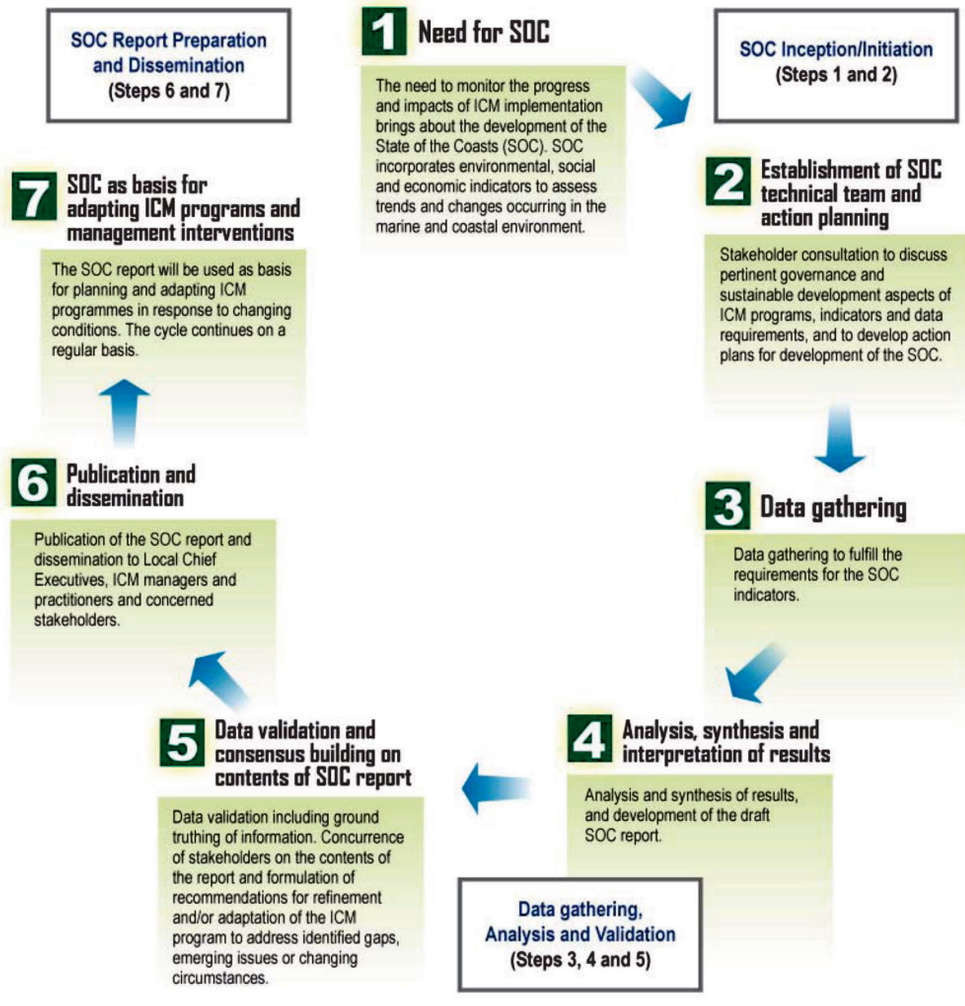

Figure 2.27. *Generalized steps for the development of SOC reports.*

Source: Provincial Government of Batangas, Philippines and PEMSEA, 2008.

2.6.6 Marine spatial planning

Marine spatial planning – more popularly called by its acronym MSP – is described by Ehler and Douvere (2009) as a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process. Zonation and zoning scheme are at times used synonymously with MSP; if not, these are the closely associated terms. They contend that development and implementation of MSP involves these 10 steps: (1) identifying need and establishing authority; (2) obtaining financial support; (3) organizing the process through pre-planning; (4) organizing stakeholder participation; (5) defining and analyzing existing conditions; (6) defining and analyzing future conditions; (7) preparing and approving the spatial management plan; (8) implementing and enforcing the spatial management plan; (9) monitoring and evaluating performance; and (10) adapting the marine spatial management process.

Note that these 10 steps are more iterative rather than linear, with several feedback loops along the chain/process. Adaptive management is a built-in component of the process. The original sets of goals and objectives may change through time, the assumptions could be modified for the projected costs and benefits, and even the wants/preferences of stakeholders may evolve as result of technological development. Given its geographical context, MSP may provide a comprehensive and/or integrated framework for sectoral management, such as protected area management, tourism development and fisheries management. The so-called internationalization of MPAs has somehow influenced the evolution of the art and science of MSP.

A key rationale for MSP is to address conflict resolution. Ehler and Douvere (2009) have identified two major types of conflict: conflicts among human uses (user-user conflicts) and conflicts between human uses and the marine environment (user-environment conflicts). Throughout this guidebook, conflicts may arise if there is not integrated management of several economic sectors such as agriculture, aquaculture, maritime transportation, oil and gas development, tourism, shipping and waste disposal. A proper/comprehensive MSP - being future-oriented - adequately address the user-environment conflicts to sustain the provision of ecosystem services.

UNESCO is among the UN organizations that has a special interest in MSP. Worldwide, various nations have started to use marine spatial management to achieve sustainable use and biodiversity conservation in ocean and coastal areas (http://www.unesco-ioc-marinesp.be/msp_around_the_world). Among the users are Australia, Western Europe and North America.

The four member-states of NOWPAP have practiced MSP in varying degrees and modalities. China's 'Law on the Management of Sea Use' introduced an innovative and significant legal system for strengthening integrated coastal management in the country. On 27 October, 2001 the 24th session of the Standing Committee of the Ninth National People's Congress adopted the Law that subsequently took effect on 1 January 2002. This law contains these three principles: (1) the right to the sea-use authorization system; (b) the marine functional zoning system; and (c) the use-fee system. The second principle effectively pertains to MSP. As such, it is stipulated that any use of the sea areas must comply with the marine functional zoning scheme established by the government. Under this scheme, marine planning, management and development, the sea is divided into different types of functional zones to regulate and to guide rational utilization of the coastal and marine areas. Such zonation is based on a set of criteria related to ecological functions and prioritized use. Li (2006) documented that prior to its enactment, China's coastal management was characterized by the following problems: (1) ineffectiveness in solving sea-use conflicts among various sectors; (2) difficulties in putting into practice the sea-sue rights management and user-fee systems; and (3) failure to maintain peace and order amongst sea users.

2.6.7 Problem analysis/diagnosis

Problem analysis assist in contextualizing an ICM project to be implemented in a given river basis or coastal area. The process is facilitated by constructing and/or developing what is popularly known as a problem tree. Problems are presented in a hierarchical order from the roots (causes) to the branches (effects). This is graphically presented in Figure 2.28.

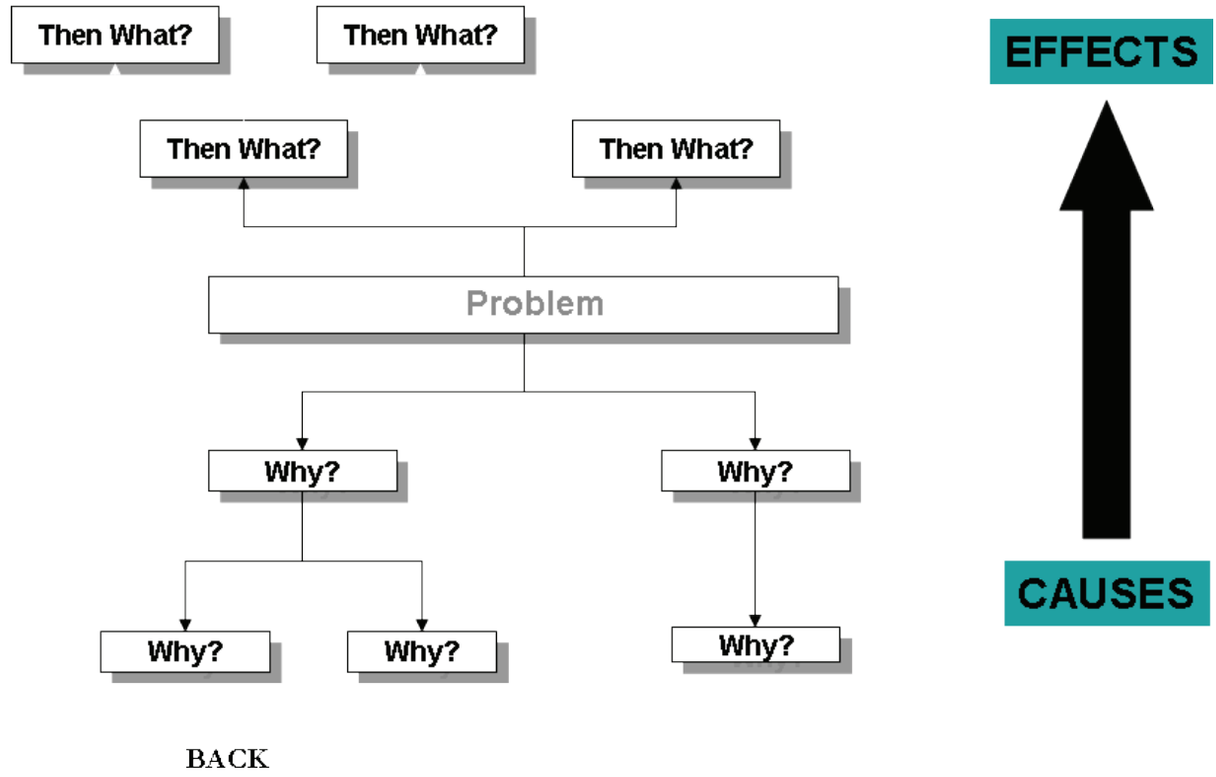

Figure 2.28. Problem analysis of causes and effects.

The steps for constructing a tree vary according to authors and/or practitioners. What are provided here are the 11 steps by DANIDA (undated). Problem tree analysis is associated with logical framework analysis (LFA). There are two main approaches that can be used to help give focus to the problem analysis. The first approach is the 'focal problem' method. Under this approach, development problems (or constraints) are brainstormed by the group, a core or focal problem is identified, and the cause and effect analysis then pivots around the focal problem. The other approach is the 'objectives oriented' method. Through this method, a broad/high level development objective is specified at the start of the analysis, and constraints to achieving this objective are then brainstormed, analyzed and sorted in to a cause and effect logic. Although both approaches are equally valid, the first approach is given emphasis here.

Two key points are highlighted when using the problem tree as a diagnostic tool. First, it may be appropriate to undertake a number of separate problem analysis exercises with different stakeholder groups. This process may help determine different perspectives and how priorities vary. Remember that as single, such as marine litter, could be viewed differently by various coastal stakeholders. Secondly, the process is as important as the product. The exercise should be presented as a learning experience for all those involved, and as an opportunity for different

views and interests to be presented and discussed. However, one should not necessarily expect full consensus among stakeholders on what the priority problems are.

Problem analysis should be undertaken as a group learning activity involving stakeholders, including beneficiaries, who can contribute relevant technical and local knowledge. A workshop environment (involving groups of up to 10-25 carefully selected participants) is an appropriate forum for developing problem trees, analyzing the results, and then proposing solutions.

In this context, the marine fisheries sector is being analyzed, which is one of the key issues in an ICM program. Steps through 11 are given in Appendix 2.12. Steps 2 and 3 are related with the typical stakeholder analysis. Several considerations are noted for step 4. First, problems as perceived by stakeholders are enumerated and written on cards. As a rule of thumb, there should be only one problem (or idea) per card. A problem should be expressed as a negative state, and not necessarily an absence of solution. Problems should be existing problems, not possible, imagined or future ones. It is better to first complete the inventory of problems before proceeding to structure these items into a tree. Related problems may be clustered together.

Through this 11-stage process, some key problems confronting the fisheries sector are defined (see Figure 2.29). As such, specific ICM projects may be developed to address these problems. For example, a project on enforcement may be developed to address the issues of destructive fishing practices, such as cyanide and dynamite fishing. Similarly, an ICM project on reforestation may be developed to address the issue of harvesting/conversion of mangroves. It is important to recognize that the product (the problem tree diagram) should provide a simplified but nevertheless robust version of reality. If it is too complicated, it is likely to be less useful in providing direction to subsequent steps in the analysis. In general, the cause-effect analysis and objective tree techniques can be applied to define goals, outputs and options for designing, planning and developing a project (Saldana and Whittle, 1998).

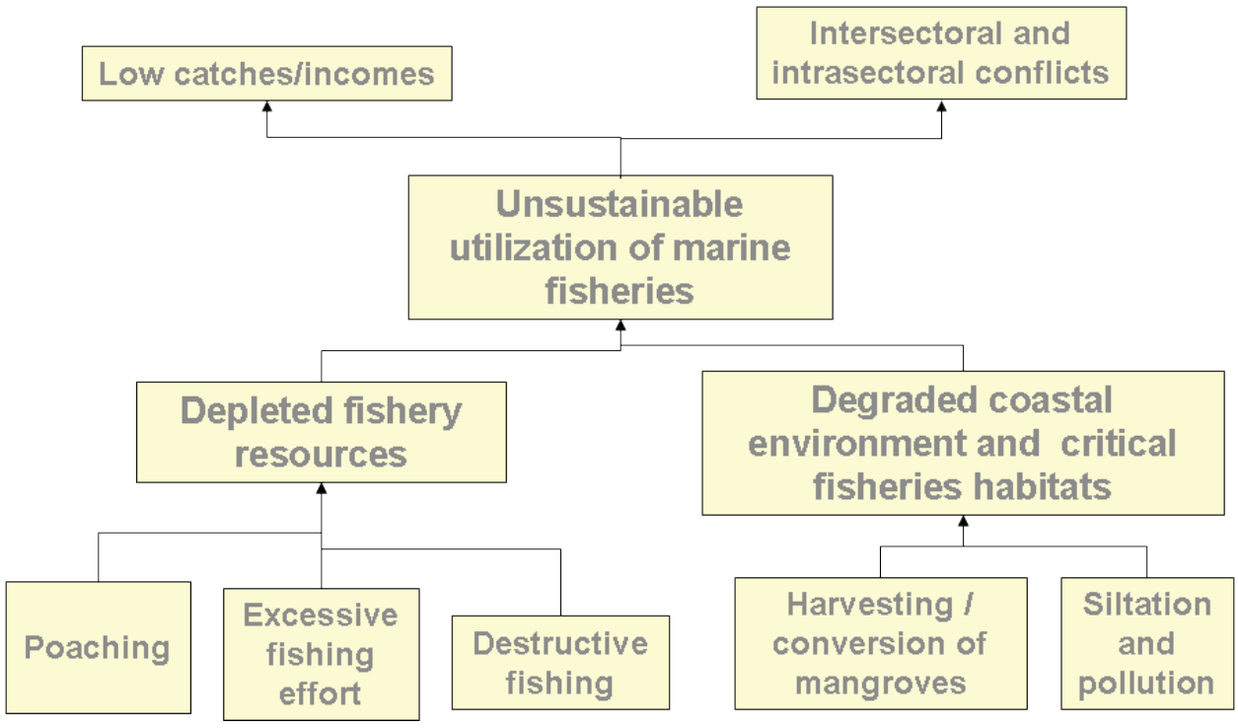

Figure 2.29. Sample problem tree for unsustainable utilization of marine fisheries.

2.7 Web Based ICM/ICARM Resource Materials

Given the internet technology, many Resource Materials about ICM/ICARM can now be freely accessed in the web. These websites are by no means exhaustive but more of illustrative examples.

2.7.1 Selected organizations, institutions and programs dealing with ICM/ICARM

There is an array of organizations, institutions and programs dealing with ICM/ICARM. A selected list of the useful websites is provided in Appendix 13. Coastal zone management programs abound such as in South East Asia (http://icm.noaa.gov/globalinfo/seasia/ICM_SEA.htm); International Coral Reef Initiative (http://www.environment.gouv.fr/icri/Site_ICRI/); and Latin America and the Caribbean (http://www.iadb.org/sds/ENV/links_206_e.htm). Meanwhile, some links are described below.

2.7.1.1 Arafura and Timor Seas Ecosystem Action (ATSEA) program

Web Link: http://www.atsea-program.org/about-atsea

Summary:

On May 14th 2010, ATSEA program was officially started. ATSEA program is a manifestation of further effort at understanding and addressing existing problems at Arafura and Timor Seas by ATSEF, undertaking a Transboundary Diagnostic Analysis (TDA), development of a Strategic Action Programme (SAP), and implementation of innovative demonstration project. ATSEA program is a vital forum for bringing the littoral nations of the Arafura and Timor Seas to work on the transboundary marine issues, with the objective of ensure the integrated, cooperative, sustainable, ecosystem based management and usage of the living coastal and marine resources, including fisheries and biodiversity of the Arafura and Timor seas, through the formulation, inter-governmental adoption, and initial implementation of a regional SAP.

The Arafura and Timor Seas Experts Forum (ATSEF) coordinates the GEF/UNDP Arafura and Timor Sea Ecosystem Action (ATSEA) program. Countries participating in the project include Australia, Indonesia Papua New Guinea and Timor Leste. As an organization, ATSEF aims to ensure the integrated, cooperative, sustainable, ecosystem-based management and use of the living coastal and marine resources, including fisheries and biodiversity of the Arafura and Timor Seas.

2.7.1.2 Bay of Bengal Large Marine Ecosystem (BOBLME) Project

Web Link: http://www.boblme.org/

Summary:

Over 400 million people in the Bay of Bengal area – transcending Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka, and Thailand – are dependent on coastal and marine resources for their food, livelihood and security. Rapid population growth, high

dependence on resources and increased land use has resulted in over exploitation of fish stocks and habitat degradation, and has led to considerable uncertainty whether the ecosystem will be able to support the livelihoods of the coastal populations in the future. Hence, the (BOBLME) Project has been collaboratively initiated to better/improve the lives of their coastal populations by improving regional management of the Bay of Bengal environment and its fisheries. As such, this regional project has many elements of an ICM/ICARM program.

The Project has five components: Component 1. Strategic Action Programme; Component 2. Coastal/Marine Natural Resources Management and Sustainable Use; Component 3. Improved Understanding and Predictability of the BOBLME Environment; Component 4. Maintenance of Ecosystem Health and Management of Pollution; and Component 5. Project Management, Monitoring and Evaluation, and Knowledge Management. The executing agency is the FAO Regional Office for Asia and the Pacific in Bangkok. The BOBLME Project is funded principally by the Global Environmental Facility (GEF), Norway, the Swedish Internal Development Agency, FAO, participating Governments and the National Oceanic and Atmosphere Administration (NOAA) with a total estimated budget of $USD 31 million over five years. Currently, the project is under one-year extension.

2.7.1.3 Chilika Development Authority

Web Link: http://www.chilika.com/iczm-projects.php

Summary:

The World Bank has funded the on-going Integrated Coastal Zone Management (ICZM) Project (Project ID: P097985) of the Government of India (GoI) (http://web.worldbank.org/external/projects/main?pagePK=64312881&piPK=64302848&theSitePK=40941&Projectid=P097985) through the Ministry of Forest and Environment. Its objective is to assist in building national capacity for implementation of comprehensive coastal management approach in the country, and piloting the integrated coastal zone management approach in these states: of Gujarat, Orissa (also called Odisha) and West Bengal. The project is aimed at an integrated approach coordinating activities of various stakeholders for the sustainable usages of the coastal natural resources maintaining the natural environment.

There are four project components. The first component is national ICZM capacity building that includes mapping, delineation and demarcation of the hazard lines, and delineation of coastal sediment cells all along the mainland coast of India. The second component is the piloting ICZM approaches in Gujarat that support capacity building of the state level agencies and institutions, including preparation of an ICZM plan and pilot investments. The third component is the piloting of ICZM approaches in Orissa that encompass the capacity building of the state level agencies and institutions, including the preparation of an ICZM plan for the coastal sediment cells that include the stretches of Paradip-Dhamra and Gopalpur-Chilika and pilot investments. The fourth and final component is the piloting ICZM approaches in West Bengal.

In Orissa, the major government agencies involved are follows: (1) State Pollution Control Board; (2) Department of Water Resources; (3) Department of Environment and Forest (Wildlife Wing); (4) Department of Fisheries; (5) Department of Culture; (6) Department of Tourism; (7) Orissa State Disaster Mitigation Authority under the Revenue Department; (8) Department of Industries; (9) Department of Housing and Urban Development; and (10) Chilika Development Authority (CDA). In 2007, the CDA was declared as the project's nodal agency. The specific

project components include: coastal erosion and associated oceanographic processes; vulnerability to disaster; biodiversity conservation; livelihood security; pollution/environmental quality management; and improvement and conservation of cultural/archaeological assets.

2.7.1.4 Coastal Management Institute, Coastal Resources Center (CRC), University of Rhode Island, USA

Web Link: http://www.crc.uri.edu/projects_page/coastal-management-institute-at-crc/) and http://www.crc.uri.edu/initiatives/

Summary:

The new Coastal Management Institute at the Coastal Resources Center (CRC) is dedicated to building coastal leaders and applies a full suite of capacity-building methods to support coastal leaders. The Institute is built upon a strong foundation of over 40 years of practical field experience and capacity building both in the United States and internationally. The Summer Institute in Coastal Management – its flagship training course that started in 1991 - has been offered every two years at the University of Rhode Island (URI) Narragansett Bay Campus. Professionals from more than 65 countries and 150 organizations have attended and joined the CRC alumni family. This course's alumni hold key positions in public and private-sector organizations and form a worldwide network of coastal professionals.

Recognizing that an integrated approach to coastal issues is essential, the CRC provides professional services for a variety of projects. Such initiatives include fisheries and aquaculture, climate change, community planning, marine conservation, capacity building and marine spatial planning. Many useful ICM/CRM publications may be also downloaded in the web. By aligning people more holistically with their environment, the CRC is helping to define workable solutions in the coastal regions.

2.7.1.5 Coordinating Body on the Seas of East Asia (COBSEA)

Web Link: http://cobsea.org/

Summary:

COBSEA consists of 10 member countries: Australia, Cambodia, China, Indonesia, Republic of Korea (ROK), Malaysia, Philippines, Singapore, Thailand and Vietnam. It was formed in 1981 by the original five member states of the ASEAN (Indonesia, Malaysia, Philippines, Singapore and Thailand) as a UNEP Regional Seas Programme to oversee the implementation of the "Action Plan for the Protection and Sustainable Development of the Marine and Coastal Areas of the East Asian Seas Region", which is commonly referred to as the East Asian Seas Action Plan. The East Asian Seas Regional Coordinating Unit (EAS/RCU) acts as the secretariat of COBSEA. China and ROK participate in the North West Pacific Regional Seas Programme while Australia is involved in the Pacific Regional Seas Programme.

Many current activities are based on the New Strategic Direction for COBSEA (2008-2012). These include thematic areas of marine- and land based pollution, coastal and marine habitat conservation and management and response to coastal disasters. COBSEA addresses these areas through four inter-linked strategies: information management; national capacity building; strategic and emerging issues; and regional cooperation. Three COBSEA-related strategies and plans are presented here.

2.7.1.6 Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF)

Web Link: http://www.coraltriangleinitiative.org/

Summary:

The CTI-CFF is a multilateral partnership of six countries working together to sustain extraordinary marine and coastal resources by addressing crucial issues such as food security, climate change and marine biodiversity. These are the governments of Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands and Timor-Leste (the 'CT6'). There is broad scientific consensus that the Coral Triangle represents a global epicenter of marine life abundance and diversity. Spanning only 1.6% of the planet's oceans, the Coral Triangle region is home to the highest coral diversity in the world. These unparalleled marine and coastal living resources provide significant benefits to the approximately 363 million people who reside in the Coral Triangle, as well as billions more outside the region. As a source of food, income and protection from severe weather events, the ongoing health of these ecosystems is critical.

At the Leader's Summit in 2009, these six governments' leaders agreed to adopt a 10-year CTI Regional Plan of Action (CTI RPOA) to safeguard the region's marine and coastal biological resources. The RPOA has five goals: strengthening the management of seascapes, promoting an ecosystem approach to fisheries management, establishing and improving effective management of marine protected areas, improving coastal community resilience to climate change, and protecting threatened species. The CTI-CFF seeks to address both poverty reduction through economic development, food security, sustainable livelihoods for coastal communities and biodiversity conservation through the protection of species, habitats and ecosystems. Some CTI-related strategies and plans include the following: CTI Regional Plan of Action; GEF/UNDP/CTI West Pacific-East Asia Oceanic Fisheries Management Project; GEF/UNDP/ADB CTI IW: LEARN: Portfolio Learning in International Waters with a Focus on Oceans, Coasts, and Islands and Regional Asia/Pacific and Coral Triangle Learning Processes; and GEF/UNDP/CTI Sulu-Celebes Sea Sustainable Fisheries Management Project (SCS) Hence, this regional initiative have various concerns that are related to ICM/ICARM.

2.7.1.7 Partnerships in the Environmental Management for the Seas of East Asia (PEMSEA)

Web Link: http://www.pemsea.org

Summary:

The Partnerships in the Environmental Management for the Seas of East Asia (PEMSEA) is a partnership arrangement involving various stakeholders of the Seas of East Asia, including national and local governments, civil society, the private sector, research and education institutions, communities, international agencies, regional programmes, financial institutions and donors. It is also the regional coordinating mechanism for the implementation of the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA). Its 'Core Operations' consist of activities that directly assist countries on national policy reforms, scaling up of ICM programmes at the national and local government levels, technical cooperation in integrated and ecosystem-based management of watersheds, estuaries and adjacent coastal seas.

There is a link that is specifically dedicated to ICM (http://www.pemsea.org/integrated-coastal-management). It covers/includes ICM definition, ICM Code, ICM Cycle and ICM Scaling

Up. Related Publications, such as those pertaining to contingent valuation as well as environmental and socio-economic benefits of ICM. Some information from some 23 ICM sites that are linked with PEMSEA are likewise provided. Many of the materials and references in this guide were sourced out from PEMSEA.

PEMSEA espouse that ICM is a mechanism that involves a systematic process for managing competing issues in marine and coastal areas, including diverse and multiple uses of natural resources. It puts into practice effective governance, active partnerships, practical coordinating strategies, sustainable financial resources and strengthened technical institutional capacities. Various ICM programs are being implemented in Bali in Indonesia, Batangas in the Philippines, Chonburi in Thailand, Danang in Viet Nam, Nampo in DPR Korea, Port Klang in Malaysia, Shihwa in RO Korea, and Sihanoukville in Cambodia. PEMSEA targets the implementation of ICM programmes in at least 20 percent of the East Asian region's coasts by year 2015.

2.7.1.8 USAID Coastal Resource Management Project (CRMP) in the Philippines

Web Link: www.oneocean.org

Summary:

This useful link was launched in January 1998 during the International Year of the Ocean, to showcase the USAID-assisted Coastal Resource Management Project (CRMP) in the Philippines. It has since evolved into a rich and comprehensive resource on the country's experience in CRM and related program/project initiatives. Under CRMP, OneOcean.org documented and made available to the Internet public a wide collection of information tools and resources on CRM and other environmental concerns, serving as a "virtual library" where Internet users can readily access and download valuable guidance documents.

When the CRMP was completed in 2004, oneocean.org served as the web site of the Fisheries Improved for Sustainable Harvest Project (FISH), documenting experiences and lessons of the FISH Project until its completion in 2010, while still maintaining the rich information resource developed during CRMP's time (1996-2004). This website contains FISH's several documents (http://oneocean.org/download/) that include: project reports, technical papers and references on coastal resource management, policy papers, newsletters, coastal environmental profiles, coastal resource management plans, coastal laws and other legislation related to CRM in the Philippines, and information and education (IEC) resources. It has likewise published and/or contained an entire training course on CRM/ICM.

2.7.2 Journal references and publications related to ICM/ICARM

There is an array of journal references and publications related to ICM/ICARM that are freely available in the internet. ICM planners and practitioners may access most of these without financial constraints. A few of these journals are described in the succeeding sub-section that are liberally lifted or summarized from their respective websites. Additional useful web sites related to ICM/ICARM are provided in Appendix 2.14.

2.7.2.1 Journal Title: Journal of Integrated Coastal Zone Management

Web Link: http://www.aprh.pt/rgci/index_eng.html

Summary:

Given its acronym JICZM, the Journal of Integrated Coastal Zone Management (RGCI – Revista de Gestão Costeira Integrada) is a peer-reviewed international journal that publishes articles dealing with all the subjects related to coastal management. Among coastal topics covered are those related to chemistry, ecology, engineering, oceanography, pollution and sedimentology. Paleoenvironments, ancient shorelines, historical occupation, diachronically analysis and legislation evolution are some subjects considered to fall within the purview of the JICZM/RGCI.

Published papers here present results from fundamental as well as applied, and directed research. Emphasis is given to results on interdisciplinary contributions, on management tools and techniques, on innovative methodological or technical developments, on items with wide general applicability, and on local or regional experiments that can be a source of inspirations to other regions. Geographically, it encompasses a wide spatial area that extends from an indefinite distance inland to an indefinite limit seaward.

2.7.2.2 Journal Title: Marine Policy

Web Link: http://www.journals.elsevier.com/marine-policy/

Summary:

Marine Policy is the leading journal of ocean policy studies. It offers researchers, analysts and policy makers a unique combination of analyses in the principal social science disciplines relevant to the formulation of marine policy. Major articles are contributed by specialists in marine affairs and marine science that include anthropologists, geographers, economists, political scientists, resource managers and international lawyers. Drawing on their expertise and research, the journal covers: international, regional and national marine policies; institutional arrangements for the management and regulation of marine activities, including fisheries and shipping; conflict resolution; marine pollution and environment; conservation and use of marine resources. Marine Policy's regular features include research reports, conference reports and reports on current developments to keep readers up-to-date with the latest developments and research in ocean affairs.

2.7.2.3 Journal Title: Ocean and Coastal Management

Web Link: http://www.journals.elsevier.com/ocean-and-coastal-management/

Summary:

Ocean & Coastal Management (popularly called as OCM) is an international journal that is dedicated to the study of all aspects of ocean and coastal management at international, national, regional, and local levels. It is published several times per year. OCM recognizes that sustainable development and conservation of ocean and coastal resources requires the insights of a number of monodisciplinary, multidisciplinary as well as integral studies and approaches. The different disciplines may range from the natural and physical sciences to the social sciences, such as economics, and law.

Although articles from all relevant disciplines are invited, such contributions must make clear the explicit link between fundamental concepts and the central improvement of management practice. Comparative studies – examples are perspectives among countries and between regions are encouraged, as well as studies assessing current management approaches. Articles involving analytical approaches, policy analysis, development of theory, and improvement of management practice are especially welcome.

2.8 Reflections on way forward for ICM/ICARM

Over nearly half a century - taking the mid-1960s in the US as chronological reference point - multitudes of ICM/ICARM programs have been planned and undertaken worldwide. These included various countries in Africa, Asia, Australia, Europe, Middle East, North America and Pacific. ICM/ICARM have likewise been applied in a variety of human endeavors that include agricultural development, aquaculture, biodiversity, conflict analysis/mediation, climate change, disaster risk reduction and management, fisheries, food security, marine protected areas, pollution control, poverty alleviation and water resources management.

Some re-thinking is needed, however, in terms of the actions that have already been done/ implemented – as well as those that are currently undertaken. Some actions will be contingent on the level of knowledge and/or awareness of the political leadership and policy makers. Governance and institutional reforms are desirable to upgrade the local capacity to enhance integrated planning and management of the coastal zone. New institutional arrangements can be established so that property rights can be allocated to resolve the coastal problems as well as reduce the multiple use conflicts. Effective policies also need to be developed for certain sectors, such as reducing fishing capacity particularly in the artisanal sector. For example, there is a pervasive policy need for agriculture and forestry sectors to reduce their negative downstream sedimentation and coastal pollution impacts/ effects.

There are areas, though, whereby the challenges are more of generating additional knowledge through applied research or scientific investigations. More experiments/research endeavors are needed for restoring and/or rehabilitating coastal habitats, such as coral reefs, mangroves and seagrass beds. Impact assessments are likewise needed for some management interventions, such as establishing marine protected areas (MPAs) to restore and manage coastal fisheries. The integration of new knowledge into suitable governance mechanisms will lead to an improved management of the coastal zone.

On the development side, more sustainable livelihood opportunities are needed. Conservation cannot be fully appreciated when the coastal inhabitants are mired in abject poverty and deprivation. Appropriate technologies that are environment-friendly need to be developed. These include appropriate forms of aquaculture and farming that optimize productivity – yet at the same time ecologically-benign.

Cross-border or transnational issues must be further evaluated. Given the increasing maritime trade in the region, the risks posed by ballast water and associated invasive species are also magnified. Bio-economic assessments of shared fish stock in East Asian region in support of the FAO Code of Conduct for Responsible Fisheries. Pragmatic multivariate decision-making tools need to be further developed. These include management-oriented databases decision-making tools for optimization of conservation and use strategies.

More time may be needed to realize the full on-the-ground impacts of an ICM program. Such program must accrue to the beneficiaries that include the local communities of the coastal zone, managers of farmlands, forestry and water bodies. A reduction in poverty of the majority of coastal dwellers is a paramount indicator for the success of an ICM program. In fact net gains for all stakeholder groups are desired. This is because "the overall goal of ICM is to improve the quality of human communities who depend on coastal communities while maintaining the biological diversity and productivity of coastal ecosystems" (GESAMP, 1996).

This guide winds with regard to the NOWPAP key activities and key outcomes on ICM/ICARM to provide a perspective of what will be undertaken in the coming years. The Twelfth NOWPAP POMRAC Focal Points Meeting was held in Busan, Republic of Korea, on 4-5 September 2014. Among others, the Workplan and Budget for POMRAC for 2014 -2015 Biennium in relation to the NOWPAP Medium-term Strategy or MTS (2012-2017) that was adopted during the 16th NOWPAP IGM in 2011. One of the main MTS Objectives for Theme 1, which is integrated coastal and river basin management or ICARM, is to develop and adopt a harmonious approach towards coastal and marine environmental planning on an integrated basis and in a pre-emptive, predictive and precautionary manner.

For 2014, a key activity of ICARM WG was the finalization of this regional guideline for integrated coastal planning/management. For 2015, the main planned activity is the regional workshop and training course in cooperation with PEMSEA for implementation of regional guidelines for integrated coastal planning/management combined with the 13th POMRAC FPM. It is hoped that this document will be a useful guide not only to NOWPAP users but also to other academicians, civil society organizations, policy makers and practitioners outside of the region who are engaged in ICARM-related activities.

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APPENDICES

Appendix 2.1. Working Group (WG) for Integrated Coastal Area and River Basin Management (ICARM) from the NOWPAP region.

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Appendix 2.2. Partial/selected list of international and regional initiatives on integrated coastal zone management.

Program	Country/Region	Responsible Agency	Funding Agency
Land-Ocean Interactions in the Coastal Zone (LOICZ)	Global	Netherlands Institute of Sea Research (NOIZ)	International Geosphere-Biosphere Programme (IGBP)
Global Programme of Action for Protection of Marine Environment from Land-based Activities	Global (UNEP Regional Seas)	UNEP	UNEP-GEF
IUCN Programme on Marine Protected Areas	IUCN Regional/ country offices	IUCN	IUCN
IOC Coastal Area Management Programme	IOC member counties	IOC-UNESCO	UNESCO
Integrated Coastal Zone Management Demonstration Projects	35 ICZM projects (Baltic, North Sea, North-west Europe, central and eastern Mediterranean)	EU	EU
International Coral Reef Initiative (ICRI)	80 developing countries with coral reefs	ICRI-CPC	ICRAN, Sweden, Philippines
International Coral Reef Action Network (ICRAN)	Southeast Asia Western Pacific East Africa Caribbean	CORAL, GCRMN, ICRI-CPC, WCMC, WRI, UNEP, ICLARM, UNEP Regional Seas	UNF
IMO/GEF/UNDP Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas	East Asia (Brunei Darussalam, Cambodia, China, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand, Vietnam)	UNDP/IMO	UNDP-GEF
Partnerships in Environmental Management for the Seas of East Asia (PEMSEA)	East Asia (Brunei Darussalam, Cambodia, Korea, China, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand)	UNDP/IMO	UNDP-GEF and participating governments

Program	Country/Region	Responsible Agency	Funding Agency
Capacity Assessment for ICM in Latin America	Latin America (Belize, Dominican Republic, Cuba, Patagonia, Argentina)	CRC (URI)	UNDP-GEF
Meso-American Reef Initiative	Latin America (Mexico, Guatemala, Honduras, Belize)	CRC (URI)	USAID
CRC/USAID CRM Capacity Building Program	East and South Africa	CRC (URI)	USAID
CRC Western Pacific Capacity-Building Program	Central Philippines, Fiji, North Sulawesi - Indonesia	CRC (URI)	Packard Foundation
PROARCA-Coastas	Latin America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama)	CRC (URI), The Nature Conservancy, WWF	USAID, CCAD (Español)
Coastal and Marine Resources Management in Latin America and the Caribbean	Latin America, Caribbean	Inter-American Development Bank	Inter-American Development Bank
Strengthening of Capabilities for Managing Coastal and marine Environmental Resources in Wider Caribbean Region	Caribbean	UNEP/RCU	Inter-American Development Bank, UNEP

Sources:
Coastal Zone Management in South East Asia (http://icm.noaa.gov/globalinfo/seasia/ICM_SEA.htm)
International Coral Reef Initiative (http://www.environment.gouv.fr/icri/Site_ICRI/)
Latin America and the Caribbean (http://www.iadb.org/sds/ENV/links_206_e.htm)

Appendix 2.3. Some qualitative descriptions
of natural disasters and global events in the Asian region.

Natural disaster / global event	Status / trend
Typhoons and/or cyclones/	frequency increasing
Droughts	Remain specific to some countries
Earthquakes	No distinct trend/pattern
Extreme weather events	significant increases
Flooding	Floodings have worsened in low lying areas/ floodplains
Forest/bush fires	significant increases
Land subsidence / Landslide	Remain specific to some countries
Sea level rise	May affect most the low-lying areas of the region
Storm surges (waves/surges and windstorms)	Increasing trend
Tsunami	No distinct trend/pattern
Volcanic eruption	No distinct trend/pattern and remain specific to some countries

Appendix 2.4. Project concept note/paper format of the Global Environment Facility - Small Grants Programme in Maldives

Preparation and submission of a Concept Paper is the first step in the application process for GEF Small Grants Programme (GEF-SGP) support. A project concept paper is a brief description of the proposed project idea. After being reviewed and pre-screened according to the GEF SGP criteria and Country Programme Strategy, shortlisted proponents will be provided with further advice and guidelines to prepare a full proposal within 3 weeks of the submission deadline. Full proposals will then be reviewed and grants awarded to successful applicants within 5 weeks. Please follow the format below to submit your concept paper. The concept paper should not be more than 3 pages in total.

Project Concept Note

General Information:

Project title: Name of Project

Project site: The location of project site (as specific as possible)

Proponent/s: Name of organization, address, email, phone, fax, and contact person/s

Project Partners: List those who will provide other funding (cash or in-kind) for the project

Total Project Cost: Full amount that you will need to implement the Project (US $ and MVR)

Amount Requested for funding: Amount that you are requesting from the GEF SGP (US $ and MVR)

Local Counterpart: How much funding will your organization be providing for this project? In cash and/or in kind?

Other Co-financing Do you have any prospects for co-funding for the full project from other organizations?

Project Duration How long will the project last?

GEF SGP Focal Area (Delete the one(s) not applicable)

1. Biodiversity 2. Climate Change 3. Land Degradation 4. International Waters 5. Persistent Organic Pollutants

Project Description (1 - 2 Pages)

Rationale of the Project

What is the objective of the project? (Keep in mind that the concept must be aligned with the GEF Focal areas and country programme strategy.)

Describe the community in one paragraph (ie: numbers, livelihoods, location, ecosystems, other important considerations)

What are the likely outcomes of the project, and what are the likely outputs? What measurable changes will be effected?

State the GEF focal area under which local and global environmental benefits will be achieved. How will these be secured? What are the indicators that will be used to measure these benefits/ results? See the country programme strategy and guidance documents for a list.

Describe potential barriers to the implementation of this project, and how they will be overcome.

NGO/CBO Background (~1/2 Page)

- Describe your organization's mission, history, membership, general activities, and successful experiences
- Describe other activities that will complement the proposed project activities
- Describe your experience in developing proposals and implementing projects funded by outside donors, if any
- Describe the organization's total budget and main sources of funding

Community Participation

You should describe how stakeholders in the affected communities will be (and have been) practically involved with the project:

- As part of its planning and design;
- In its implementation;
- In monitoring and evaluating its effectiveness and impact.

Note that community participation means much more than how the community will benefit from the project. It refers to active involvement and ownership by an appropriate spectrum of people, including, in particular, women and grassroots communities.

Project Cost

- What is your best estimate of what the project will cost?
- Who will support the project besides the GEF SGP? Support can be money, services, or labor. (Note that GEF SGP projects require co-financing from the community, co-financing from other sources is highly recommended). Also note that only prospective sources of co-financing need to be indicated at the concept phase. The full proposal will require evidence of co- financing in cash and in kind.
- Describe activities that will be funded by GEF SGP funds and co-financing.

Important information: Please note that UN exchange rate of US $ 1 = MVR 15 should be used for budgeting. SGP grant funds cannot be used to pay any salaries to grantees/NGO members. However, the grant can be used to provide a minimum level of compensation for community members for the time they spend on the project, under the project's administrative costs. GEF SGP regulations allow a maximum of 10 % for administrative costs. In addition, only up to maximum 50 % of SGP funds may be used in the purchase of equipment or hardware. The rest should be sourced from co-financing either from the CSO or external sources.

Source:http://www.mv.undp.org/content/maldives/en/home/presscenter/articles/2013/09/16/gef-small-grants-programme-call-for-project-concept-notes-from-ngos-cbos-/

Appendix 2.5. United Nations template for preparing project proposals

I. Project Cover sheet – include contact information, project director, project period, indigenous population that your organization represents or works with, and project summary

II. Organizational history, mission, vision and structure – include a few brief paragraphs explaining how your organization was established, its mission, vision and structure, as well as its record of working on indigenous issues

III. Background and analysis of the problem to be addressed – provide an an analysis of the field, what are the existing gaps and challenges, and what exactly is the problem to be addressed? Which indigenous peoples are affected by this problem and how can the proposed project/program help address the issue?

IV. Proposed goal, objectives, target population and implementation plan – What is the overall goal of the program/project, and what are the objectives? How will the project be implemented?

V. Annual project budget - provide a line item budget in US$ with short narrative explanations for each line item, which can be footnoted to the budget. A sample budget is attached on the following page.

VI. Attachments:

Overall organizational budget (operating budget)

List of other potential sources of support (if any)

By-laws of association/organization, where appropriate

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* Note: This template is intended to serve as a sample to assist in writing a project proposal. The organization should feel free to use other formats, as long as all the above-mentioned elements are included in the proposal. Project proposals should be no longer than 10 pages, although shorter proposals would be preferred.

SAMPLE Project Budget Outline		**US$**	
		UN Fund	**Other Sources (if any)**
10 Project Personnel *			
11.50 Consultant(s)			
11.51Consultant 1	150$/month*10months	1500	
11.52 Consultant 2	150$/month*10months	1500	
13.00 Administrative Support			
13.01Financial officer	450$*10months		
13.02Administrator	400$/month*10months	1500	
15.00 Official Travel			
15.01 Travel in 7 districts	120$/month*10months	1200	
Project Personnel			
19.00 Component Total		**5700**	
30 Training**			
33.00 In-service Training			
33.01Rent of the workshop facilities	100$*9workshops	900	
33.02Handout preparation	50$*9workshops	450	
33.03Refreshments	100$*9workshops	900	
33.04Coordination fee for the districts	50$*9districts	450	
33.05Stationaries	50$*9workshops	450	
33.06Transportation for the workshop	50$*9workshops	450	
33.07Per diem/Accommodation	80$*8workshops*5people	3200	
33.08Info sheets	200$*3types(500copies each)	600	
39.00Component Total		**7400**	
40 Equipment***			
41.00Expendable Equipment			
41.01Toner/Printer cartridge	100$/month*10months	1000	
41.02Stationaries	50$/month*10month	500	
42.00Non-Expendable Equipment			

42.01PC Computer & Printer	1500$	1500	
49.00Component Total		**3000**	
50 Miscellaneous			
51.00 Operation, Maintenance, Repair of equipment	30$/month*10months	300	
52.00Publications of the tool kit	2$/copy*1000copies	2000	
53.00Sundry and communications	100$/month*10months	1000	
59.00Component Total		**3300**	
99.00 Grand Total		**19400**	

Narrative to budget line items:
* Project Personnel - the project will require two consultants to implement the workshops and financial officers to manage the logistics

** Training - the project objectives will be met by undertaking 9 workshops on capacity building and will include the above costs

***Equipment - the organization would require the following equipment in order to prepare for the workshops, etc.

Source: www.un.org/.../unvf/unvf_application_form_instructions.doc

Appendix 2.6. The logical framework analysis (LFA) for the Global Environment Facility (GEF) Bohol Marine Triangle (BMT) project in Central Visayas, Philippines.

Interview Logic	Indicators of Performance	Sources of Verification	Risks and Assumptions
Project Goal Options and existence values embodied in the globally significant Bohol Marine Triangle (BMT) conserved.	Biological and physical parameters that represents the health of the BMT Ecosystem (i.e. living coral reefs, fish abundance, mangrove forest cover) is stabilized or increasing.	Longitudinal biological studies generated by the project	
PROJECT PURPOSE To enable the biodiversity resources in the BMT through a more effective, equitable and sustainable planning, implementation, monitoring and enforcement of biodiversity conservation efforts.	Increase in the number and total area of marine reserves in the BMT with community-based and multisectoral conservation planning, implementation, monitoring and enforcement mechanisms compared to 1999 baseline data. Incidence of mangrove conversion, sand quarrying, blast fishing, coral reef destruction, garbage and sewage pollution and illegal constructions is significantly reduced by Year 5.	Quarterly and Annual Project Reports Police records Barangay records Project reports	Natural phenomena precipitated by global climate change do not neutralize positive impacts of project Baseline programs to address issues in sustainable development that are relevant to coastal and marine biodiversity continue and are effective
Project Outputs **Output 1** Strengthened government and community institutions will facilitate the application of a coastal management framework, with the establishment and maintenance of marine reserves as a major component.	Number and total land area of new marine reserves legalized Year 1 2 3 4 5 6 Cum no. 2 3 5 8 10 12 Total area (ha.)=50-100 Number of trained core groups undertaking regular conservation planning, monitoring and enforcement activities Year 1 2 3 4 5 onwards No. 3 6 6 6 6	Publication of maps of marine reserves Project progress report	Interagency cooperation to ensure the identification, delineation, mapping out and recognition of marine reserves as scheduled continues to the level and extent necessary The marginal benefits of local leaders from participating in the Project is greater than their opportunity costs
	No. of barangay level CBRM plans formulated in a participatory process and integrated in the Master Plan Year 1 2 3 4 No. 3 6 12	No. of resolutions adopted No. of agency plans Supportive of the Master Plan	

Intervention Logic	Indicators of Performance	Sources of Verification	Risks and Assumptions
Output 2 The development and application of policies and guidelines will facilitate elimination of destructive activities	Comprehensive friendly ordinances, statutes, policies and guidelines and other legal instruments promulgated by concerned authorities and key stakeholders is increasing over time, beyond 1999 baseline	Local government gazette	General public is receptive of and sustains interest in biodiversity conservation issues. Local conservation constituency increase Influence in local policy making
Output 3 Relevant and reliable information used for monitoring and inventory and as basis to establish sustainable harvesting	Number of targeted socio-economic and biological research conducted by 2nd Q Y1 Frequency of resource inventory monitoring conducted Year 1 2 3 4 5 onwards Freq. 1 0 1 0 1 biennial Frequency of random surveillance Patrols in marine reserves Year 1 2 3 4 5 onwards Freq. 6 12 12 12 12 monthly Monitoring and enforcement agreement between resource users and authorities Made operational by 1st Q of Y3	Project progress report Project progress report Project progress report Publication of agreement	Interagency cooperation to ensure effective Monitoring & enforcement of regulations Continue to the level and extent necessary Same as above Cooperation of trained core groups continue To extent and level necessary
Output 4 Compliance with environmental guidelines improved through a programme of education and awareness building	Increase in the percentage of the coastal Population in the municipalities Baclayon, Duis and Panglao who actively participate in BMT conservation policy dialogues and advocacy beyond 1999 baseline	Commissioned studies	Coastal population appreciate the global Significance of BMT, comprehend its threats and motivated to take action.
Output 5 Alternative conservation enabling livelihood activities are sustained through established benefit-sharing scheme and trust fund/revolving fund schemes	Regulations on the collection of fees and other benefit sharing schemes are gazetted and disseminated to all key stakeholders by 1st Q of Y2 A trust fund to be managed by the BMT Management Board is set up by 1st Q of Y2.	Local government gazette Local government budget Quarterly Project report	Dive industry and other representatives of the eco-tourism industry are amenable to the "beneficiaries pay" principle. Relevant local government units committed to passing legislation to operationalize collection of user and license fees.

Interview Logic	Indicators of Performance	Sources of Verification	Risks and Assumptions
	Cumulative number of communities in the three pilot areas with alternative livelihoods being pilot tested by core groups and financed by the trust fund and counterpart funds Month 15 30 Cum No. 1 3	Project progress report	Alternative livelihoods are economically viable relative to the activity being replaced.
Output 6 Targeted ecosystem rehabilitation improves overall ecosystem health and contributes to improved well-being of local communities	Areas of degraded habitat delineated and mapped Land tenure situation established Targeted rehabilitation undertaken	Project progress reports Project progress reports Maps and reports	Expertise is available Land tenure is recorded and unambiguous Areas suitable for rehabilitation exist and the materials and expertise required for rehabilitation are available; All destructive forces have been removed.
Output 7 Integrated Master Plan for BMT is established and operationalized	A 10 – Year Integrated Master Plan for BMT for 3 municipalities with components on zoning, enforcement, communication, and community participation developed and adopted by key stakeholders by 4th Q of Y3 BMT Project office set up by 1st Q of Y1 Project plan of separations completed by 1st Q of Y1 A functional BMT Management Board composed of key stakeholders is set up with legal mandate and is officially and popularly organized by 1st Q of Y2 A Memorandum of Agreement is forged among all key stakeholders spelling gout their respective roles and functions in the implementation of the BMT Master Plan as well as other institutional arrangements by 1st Q of Y2	Publication of the BMT Master Plan Project inception report Project inception report Project progress report Publication of the MOA	Interagency cooperation to ensure effective implementation of the Master Plan continue to the level and extent necessary Funds from UNDP and counterparts are released on time The marginal benefits of local leaders from participating in the Project is greater than their opportunity costs Interagency cooperation to ensure effective monitoring & enforcement of regulations continue to the level and extent necessary

Source: Project document for Global Environment Facility (GEF) Bohol Marine Triangle (BMT) project in Central Visayas, Philippines.

Appendix 2.7. Roles and Responsibilities of Project Coordinating Committee (PCC) and Project Management Office (PMO)

F*or the National Project Coordination Committee(s) (NPCC):*

To provide policy and management advice with respect to the implementation of project activities at the respective ICM demonstration site or subregional pollution 'hot spot' locations;

To ensure smooth implementation of project activities by ensuring timely financial inputs and delivery of outputs from participating agencies;

To review and approve annual project workplans and annual project progress reports;

To ensure integration of project activities as part of governments' program of work;

To coordinate with concerned local and national authorities, where necessary, to resolve conflicts which are beyond the scope and responsibility of the Project Management Office;

To monitor and guide the day to day operation of the Project Management Office (PMO);

To maintain linkages with the Programme Development Management Office (PDMO);

To provide any other assistance that could lead to smooth and effective implementation of the project.

For the Project Management Office (s) (PMO):

To manage the project in accordance with the objectives set out in the project document;

To prepare a project coordination and management framework and guidelines, and to develop a detailed workplan for implementation of project activities, including milestones, counterpart budgets, timeframe, monitoring strategies and evaluation criteria;

To ensure timely GEF/UNDP inputs and delivery of outputs from each ICM site or subregional pollution 'hot spot' activity;

To maintain a close working relationship and communications with the GEF/ UNDP/ IMO Regional Programme, the UNDP, and any other related national and regional projects;

To prepare annual progress reports for approval by the NPCC;

To assist in organizing and monitoring progress monitoring progress of project activities at each ICM site or subregional 'hot spot' location;

To serve as a Secretariat for the NPCC;

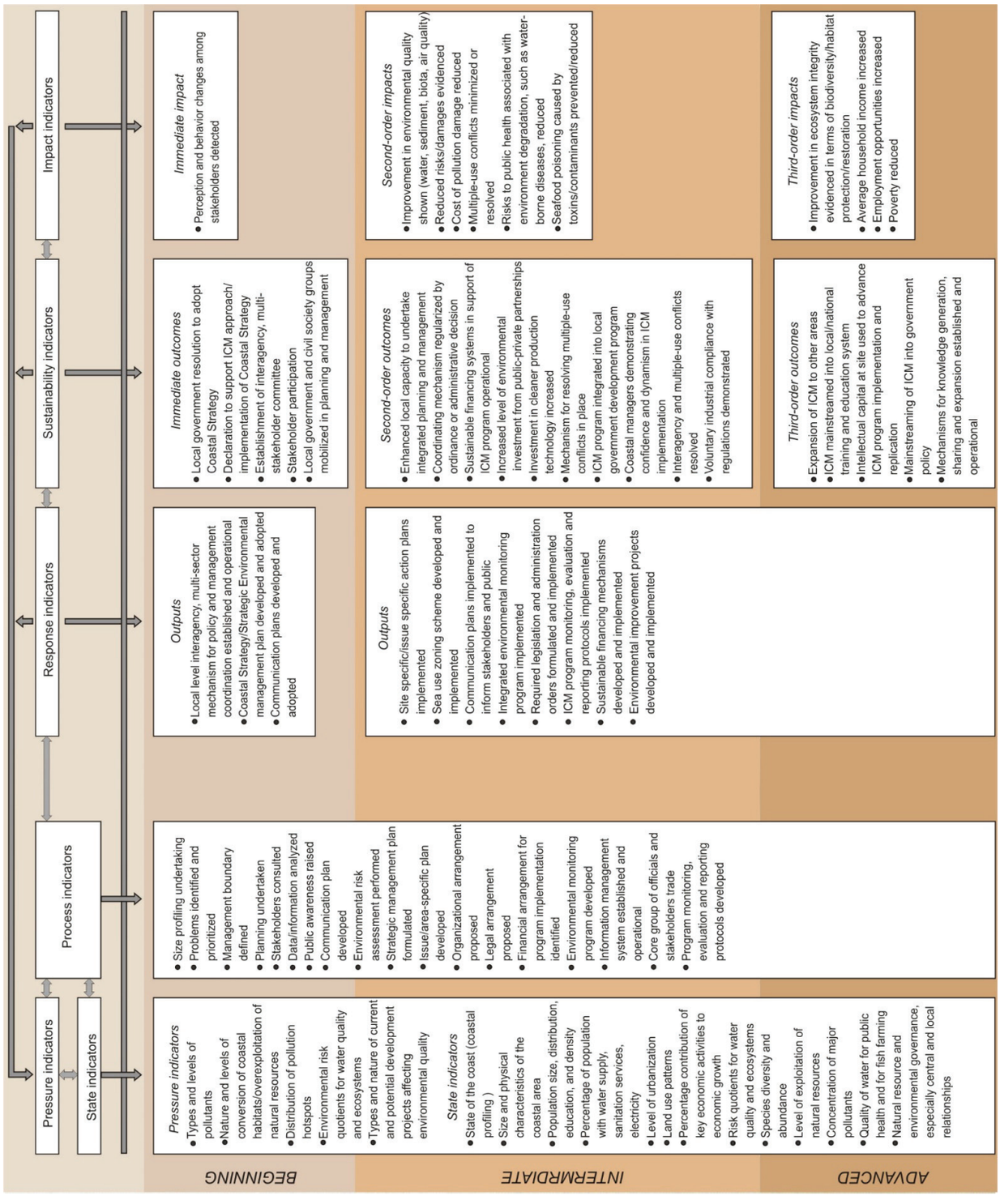
To prepare a database of local experts and specialists for participation in project and programme-related activities;

To coordinate the activities of international consultants and national professionals, review reports and submissions and assist in the implementation of recommendations when accepted; and

To review project outputs, prepare technical reports and organize workshops to distill lessons learned from the ICM demonstration sites and subregional pollution 'hot spot' locations, and package the information into working models for dissemination.

Source: PEMSEA, 1999.

Appendix 2.8. The third tier of detailed, verifiable performance indicators grouped by pressure, state, process, response, sustainability and impact indicators.



Source: Chua, 2006

Appendix 2.9. Major international instruments relating to the coastal and marine environment.

1. Rio Declaration
2. United Nations Convention on the Law of the Sea, 1982 (UNCLOS)
3. United Nations Framework Convention on Climate Change, 1992 (UNFCCC)
4. Convention on Biological Diversity, 1992 (CBD)
5. Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973 (CITES)
6. International Convention for the Regulation of Whaling, 1946
7. Ramsar Convention on Wetlands, 1971 (Ramsar Convention)
8. Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972 (World Heritage Convention)
9. Convention on the Conservation of Migratory Species of Wild Animals, 1979 (Convention on Migratory Species)
10. Code of Conduct for Responsible Fisheries
11. International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 Relating Thereto (MARPOL 73/78)
12. Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 and Its 1996 Protocol (London Convention)
13. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1989 (Basel Convention)
14. International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC)
15. International Convention on Civil Liability for Oil Pollution Damage, 1969 and Its 1992 Protocol (CLC)
16. International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 and Its 1992 Protocol (FUND)
17. International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996 (HNS)
18. Basel Convention Protocol on Liability and Compensation, 2000
19. International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 (Bunker Oil Convention)
20. International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969 and Protocol Relating to Intervention on the High Seas in Cases of Pollution by Substances Other Than Oil, 1973 (Intervention)
21. International Convention on Salvage, 1989 (Salvage)

Source: PEMSEA, 2003.

Appendix 2.10. Different types of market-based incentives or instruments (MBIs) and some examples

1. **Fiscal instruments** are basically taxes paid by resource users for services rendered by the government or in exchange for doing something "undesirable" yet necessary so that such acts can be regulated or minimized. Examples:

- Garbage tax, where taxes are imposed for services provided in the collection and disposal of garbage;
- Effluent tax, where a levy is imposed on the type and volume of effluents released into the water;
- Water pricing, where prices reflect the true cost of supplying water; and
- Differential taxation, where firms are taxed according to types of materials used and wastes produced.

2. **Charge systems** are systems of fees or fines imposed on resource users so as to minimize or regulate certain behaviors which are deemed "undesirable" to the maintenance of good environmental quality, and yet are necessary to ensure socioeconomic development. Examples:

- Charges on dumping or disposing of wastes into specified disposal sites;
- Charges on the disposal of wastewater into any water body based on the pollutants present;
- Charges paid by land-owners for environmentally harmful land use according to the land use plan of the area;
- Fees for the maintenance of waste treatment facilities; and
- Fees from developers who "visually pollute" the landscape.

3. **Financial instruments** include incentives given to resource users to encourage them to comply with practices which are more environmentally friendly. Examples:

- Financial incentives given to firms who relocate polluting industries from urban centers to industrial zones or less populated areas;
- Low interest loans extended to projects that improve the environments;
- Financial incentives given to people who recycle wastes; and
- Financial incentives given to farms who use organic fertilizers.

4. **Market creation** uses tradable permits, rights and quotas to make sure that resource use and exploitation of an ecological system is within its carrying capacity. Examples:

- Effluent discharge permits may be based on the carrying capacity of a bay where the total level of effluents is set and allocated among the polluters. A firm that discharges more than its allocation may team up with another that discharges less than its quota.
- Fishing quotas are issued based on historical volume and/or size of fish catch. These quotas are allocated among fishermen and can be traded among them in the form of Individual Transferable Quota (ITQ).

5. The posting of **bonds** are required of firms for possible damage to the environment through their activities. Examples:

- Ship-owners post bonds for possible oil spill.
- Firms using toxic or hazardous materials for production are made to post bonds for possible damage from improper disposal of wastes.

6. **Deposit-refund systems** require resource users to pay deposits for recyclable materials or toxic and hazardous materials to encourage them to return such materials to the manufacturer for treatment or re-use.

Sources: ADB, 1997, MPP-EAS, 1999.

Appendix 2.11. Main Laws and regulations related to the contaminants inputs on environment in China.

Type	Name and Published Year of Document	Approved by
Law	Law of Fishery (1986)	People's representative Committee of China
	Law of Reservation for Wild Animals (1988)	
	Law of Environmental Protection (1989)	
	Law of Water and Soil Conservation (1991)	
	Law of Mines Resources (1996)	
	Law of Marine Environmental Protection (1999)	
	Law of Water (2002)	
	Law of Promotion on Clean Production (2002)	
	Law of Environmental Influences Assessment (2003)	
	Law of Prevention on Environmental Pollution by Solid Wastes (2004)	
	Law of Prevention and Control of Water Pollution (2008)	
	Circular Economy Promotion Law of the People's Republic of China (2008)	
	Energy conservation law of the People's Republic of China (2009)	
Legislation	Managing Guidelines to Protecting on Propagation of Aquaculture Resources (1979)	State Council of China
	Managing Guidelines to Prevention Marine from Shipping (1983)	
	Managing Guidelines to Keep Contamination and Damage from Coastal Construction and Engineering (1990)	
	Managing Guidelines to Keep Contamination and Damage from Pollutants in Terrestrial Sources (1990)	
	Rules on Implementation of the Law of Prevention of Terrestrial Wild Animals (1992)	
	Technical Guidelines on Environmental Impacts Assessment (1993)	
	Rules on Implementation of the Law of Prevention of Water and Soil (1993)	
	Rules on Implementation of the Law of Prevention of Aquicolous Wild Animals (1993)	
	Guidelines on Natural Preservation Zones (1994)	
	Guidelines on Preservation of wild Plants (1996)	
	Management Ordinance of Environmental Protection on Projects (1998)	
	Detailed Rules on Implementation of the Law of Prevention of Water Pollution (2000)	
	Implementation Guidelines on Law of Forests (2000)	
	Regulation of the management of levy and usage of pollutant discharge fee (2003)	
	Regulation of the management of prevention and control of the coastal project pollution on marine environment (2007)	
	Regulation of the management of prevention and control of the maritime project pollution on marine environment (2006)	

Type	Name and Published Year of Document	Approved by
Standard	Sanitary Standard for Drinking Water (1985)	National or Ministries
	Water Quality Standard for Fisheries (1989)	
	Quality Standard for Agricultural Irrigation (1992)	
	Wastewater and Sludge Disposal Standard for Municipal WTP (1993)	
	Integrated Wastewater Discharge Standard (1996)	
	Sea Water Quality Standard (1997)	
	Discharge Standard for Municipal Wastewater (1999)	
	Environment Quality Standard for Surface Water (2002)	
	Standard for Pollution Control of Sewage Marine Disposal Engineering (2000)	
	Technical Specifications Requirements for Monitoring of Surface Water and Waste Water(2002)	
	Specification for offshore environmental monitoring(2008)	

Source: Xie, X. 2009. National report of China on integrated coastal and river basin management in the NOWPAP Region.

Appendix 2.12. Problem analysis with coastal fisheries sector as example in 11 steps.

1 - Define the entity to be analyzed.

2 - Identify the major groups involved.

3 - Examine the groups identified.

4 - Write down on cards as many problems as possible.

1. Unsustainable utilization of marine fisheries
2. Depleted fishery resources
3. Degraded coastal environment and critical fisheries habitats
4. Low catches/incomes and dissipated resource rents
5. Losses/reduced value of catches
6. Inequitable distribution of benefits from resource use
7. Intersectoral and intrasectoral conflicts
8. Poverty among artisanal fishers

5 - For each of the problems above, ask "What are the major causes of this problem?". Write any new problems down.

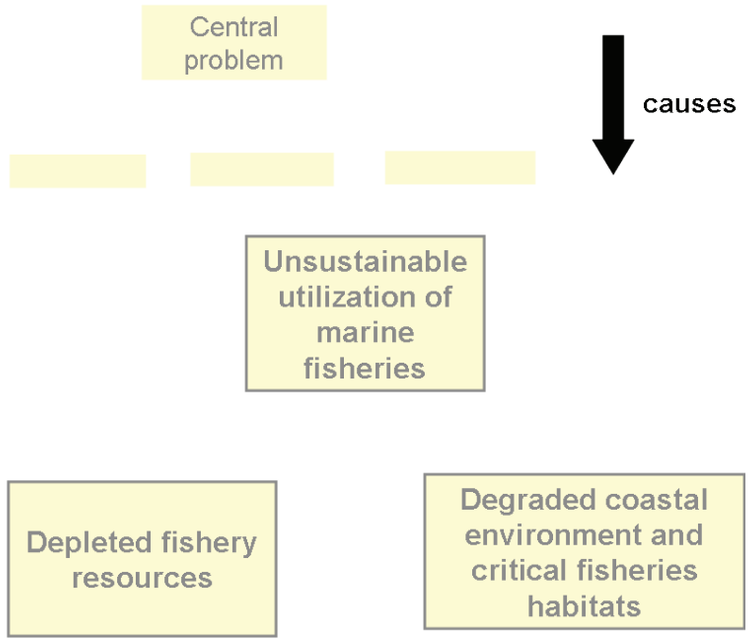
- Depleted fishery resources
  ~Poaching and other transboundary issues
  ~Excessive fishing effort
  ~Destructive fishing
  ~By-catch

- Degraded coastal environment and critical fisheries habitats
  ~Harvesting / conversion of mangroves fishing effort
  ~Siltation and pollution
  ~Typhoons/other natural stresses
  ~El Niño

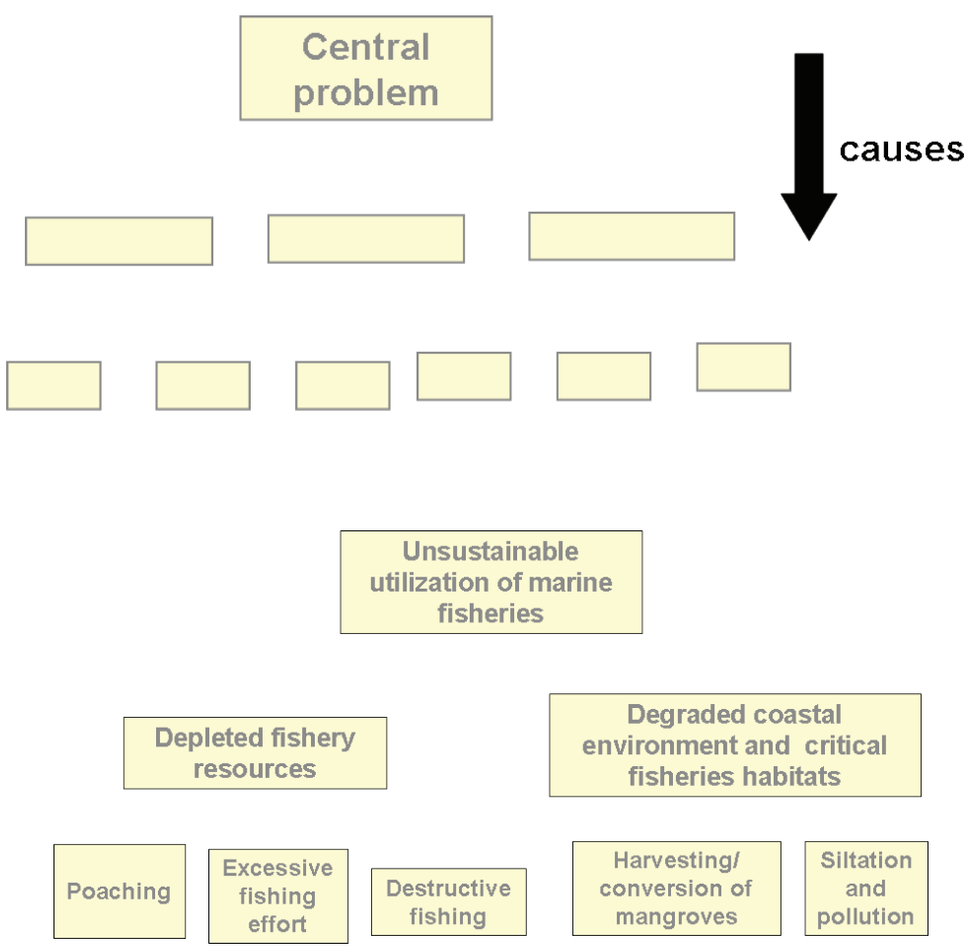
6 - For each of the problems above, ask "What are the most important problems it in turn causes?" (effects).

- Depleted fishery resources
  ~Low catches/incomes and dissipated resource rents
  ~Intersectoral and intrasectoral conflicts

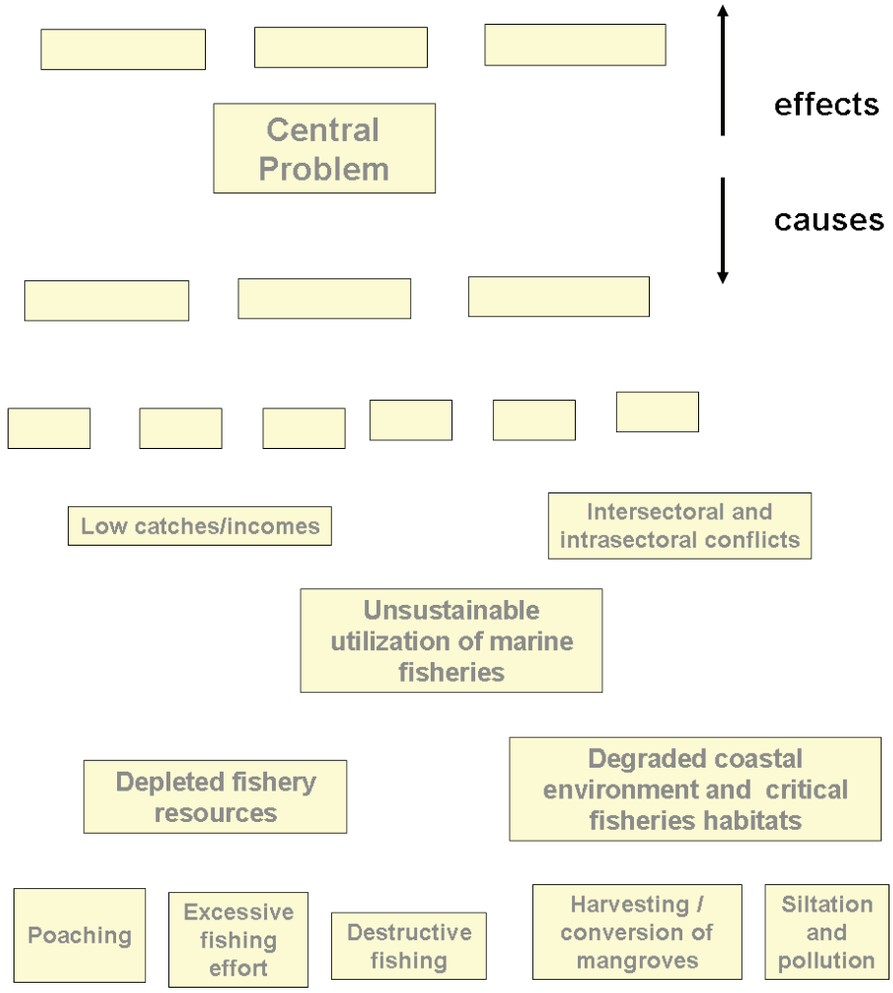
7 - Start building the problem tree by selecting what is seen as the central problem (which has causes and effects). Then place the direct causes of this problem parallel to each other underneath.



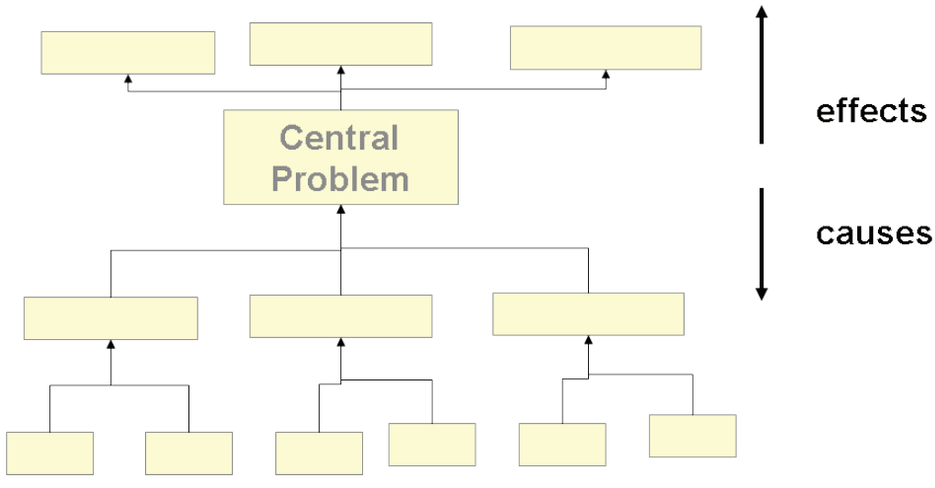
8 - Place the causes of the direct causes as identified in Step 7 underneath.



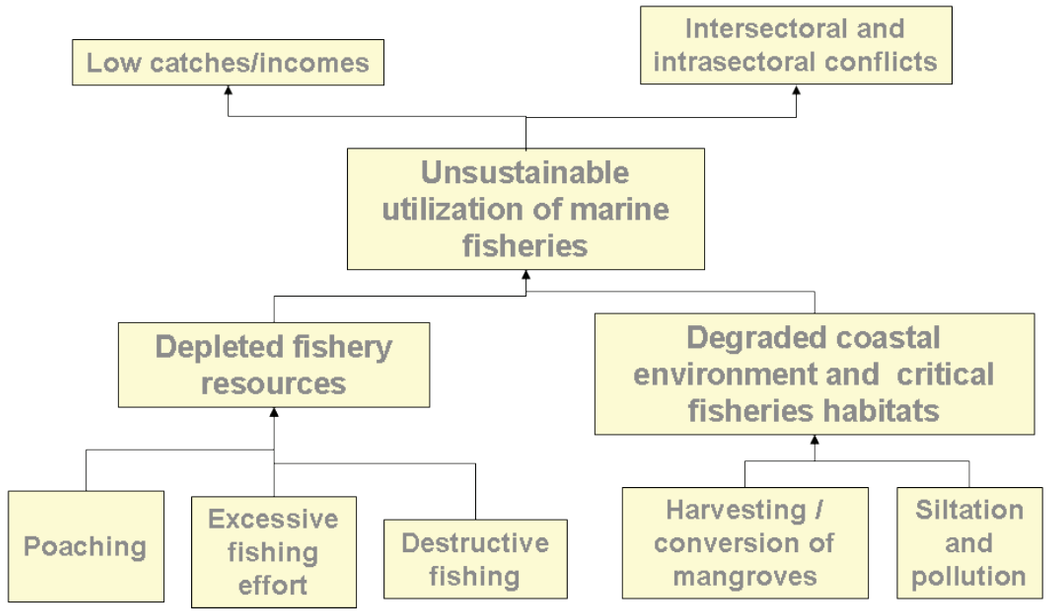
9 - Determine the effects of the causes identified in step 7 and 8 above the central problem.



10 - Causes and effects are further developed along the same principle so that a problem tree with cause and effect relations is created.



11 - Review the logic till you are convinced that the essential information on the major cause-effect relationships in the problem tree have been identified.



Appendix 2.13. Web links of selected/sample organizations, institutions and programs dealing with ICM/ICARM.

Association of South East Asian Nations (ASEAN)

Website: http://www.asean.org/

Summary:

Established on 8 August 1967, the ASEAN is a geo-political and economic organization of 10 countries located in Southeast Asia. Originally established by Indonesia, Malaysia, Philippines, Singapore and Thailand, its membership has expanded to include Brunei, Burma (Myanmar), Cambodia, Laos, and Vietnam. Its aims include the acceleration of economic growth, social progress, and cultural development among its members, the protection of the peace and stability of the region, and to provide opportunities for member countries to discuss differences peacefully. ASEAN spans over an area of 4.46 million km2 with a population of approximately 580 million people, 8.7% of the world population (http://en.wikipedia.org/wiki/ASEAN). Five ASEAN plans are described here (Table 3). There are other ASEAN regional agreements, such as the Cebu Declaration on East Asian Energy Security, the ASEAN-Wildlife Enforcement Network in 2005, and the Asia-Pacific Partnership on Clean Development and Climate.

ASEAN produced several plans related to protection of both terrestrial and coastal environments. These include the: ASEAN Strategic Plan of Action on the Environment (1994-1998); ASEAN Cooperation on Transboundary Pollution; Regional Haze Action Plan; ASEAN Vision 2020 Agenda and Vientiane Action Programme (VAP) (2004-2010); and Hanoi Plan of Action (1999-2004). With regard to ICM, it was involved with the ASEAN-US Coastal Resources Management Project.

Global Environment Facility (GEF)

Website: http://www.thegef.org/gef/whatisgef

Summary:

The Global Environment Facility (GEF) was established in October 1991 as a $1 billion pilot program in the World Bank to assist in the protection of the global environment and to promote environmental sustainable development. The United Nations Development Programme, the United Nations Environment Program, and the World Bank were the three initial partners implementing GEF projects. In 1994, at the Rio Earth Summit, the GEF was restructured and moved out of the World Bank system to become a permanent, separate institution. The GEF unites 183 countries in partnership with international institutions, civil society organizations (CSOs), and the private sector to address global environmental issues while supporting national sustainable development initiatives.

An independently operating financial organization, the GEF provides grants for projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants. Since 1991, GEF has achieved a strong track record with developing countries and countries with economies in transition, providing $12.5 billion in grants and leveraging $58 billion in co-financing for over 3,690 projects in over 165 countries. Through its Small Grants Programme (SGP), the GEF has also made more than 16,030 small grants directly to civil society and community based organizations, totaling $653.2 million. The GEF also serves

as financial mechanism for the following conventions that include the following: Convention on Biological Diversity (CBD), United Nations Framework Convention on Climate Change (UNFCCC), Stockholm Convention on Persistent Organic Pollutants (POPs), UN Convention to Combat Desertification (UNCCD) and Minamata Convention on Mercury.

UNDP/GEF Yellow Sea Large Marine Ecosystem (YSLME) Project

Website: http://www.yslme.org/

Summary:

The objective of UNDP/GEF Yellow Sea Large Marine Ecosystem (YSLME) Project is ecosystem-based, environmentally-sustainable management and the use of the Yellow Sea and its watershed. The Yellow Sea Large Marine Ecosystem is situated between northeastern China and the Korean Peninsula and has been significantly affected by human development. The focus of the YSLME project on sustainable fisheries management and reducing stress to the ecosystem provides an opportunity for exploring how this GEF project can further national and regional commitments to certain international conventions and agreements, such as the United Nations Convention on the Law of the Sea (UNCLOS), the FAO Code of Conduct for Responsible Fisheries, and the Global Programme of Action for the Protection of the Marine Environment from Land – based Activities (GPA). Its 2007 Transboundary Diagnostic Analysis (TDA) has identified these nine major transboundary environmental concerns: (1) pollution and contaminants; (2) eutrophication; (3) Harmful Algal Blooms (HABs); (4) fishing effort exceeding ecosystem carrying capacity; (5) mariculture facing unsustainable problems; (6) habitat loss and degradation; (7) change in ecosystem structure; (8) jellyfish blooms; and (9) climate change-related issues.

The Strategic Action Program (SAP) for the Yellow Sea to address these environmental issues. The YSLME SAP sets regional management targets for environmental quality of the Yellow Sea and the required management actions to achieve these targets by 2020, based on the concept of the "ecosystem carrying capacity" (ECC). As such, the project addresses three key sustainable development aspects. Habitat protection, restoration and management targets include maintenance of habitats according to standards and regulations of 2007 and reduction of the risk of introduced species. For food security and livelihood management, the targets relate to 25-30% reduction in fishing effort, rebuilding of over-exploited marine living resources and improvement of mariculture techniques. Pollution reduction and waste management targets include complying with international requirements on contaminants, reduction of total nutrient loadings to 2006 levels and reduction of standing stock of marine litter.

Appendix 2.14. Sample journal references and publications related to ICM/ICARM that are available in the internet.

Journal Title:

Journal of Coastal Conservation

Web Link: http://www.springer.com/earth+sciences+and+geography/geography/

journal/11852

Summary:

The Journal of Coastal Conservation is a scientific journal for the dissemination of both theoretical and applied research on integrated and sustainable management of the terrestrial, coastal and marine environmental interface. Covered here are multidisciplinary and integrated knowledge and understanding of: physical geography, coastal geomorphology, sediment dynamics, hydrodynamics, soil science, hydrology, plant and animal ecology, vegetation science, biogeography, landscape ecology, recreation and tourism studies, urban and human ecology, coastal engineering and spatial planning, coastal zone management, and marine resource management. This journal encourages submissions of studies about environmental applications that make use of spatial information technology (IT) such as remote sensing, Geographical Information Systems (GIS), environmental databases, Global Positioning Systems (GPS) and mobile technologies, cartography and digital mapping, geovisualisation, modelling and simulation, and the Internet. Applications that focus on the use of physical coastal modelling involving the detailing of the design, construction, instrumentation and results of model tests are also encouraged, including the theory, measurement, analysis and modelling of waves as well as natural hazards assessment.

Journal Title:

Journal of Coastal Engineering

Web Link: http://www.worldscientific.com/worldscinet/cej

Summary:

Coastal Engineering Journal is a peer-reviewed medium for the publication of research achievements and engineering practices in the fields of coastal, harbor and offshore engineering. The preferred submission are original papers and comprehensive reviews on waves and currents, sediment motion and morph dynamics, including coastal structures and facilities. Reports on conceptual developments and predictive methods of environmental processes are also published. Other desired topics are soft technologies related to coastal zone development, shore protection, and prevention or mitigation of coastal disasters. The journal covers not only fundamental studies on analytical models, numerical computation and laboratory experiments, but also includes the results of field measurements and case studies of real projects.

Journal Title:

Marine and Coastal Fisheries

Web Link: http://www.bioone.org/page/fidm/aims

Summary:

This open-access, online journal publishes original and innovative research that synthesizes information on biological organization across spatial and temporal scales to promote ecologically sound fisheries science and management. The American Fisheries Society, as publisher, provides an international venue for studies of marine, coastal, and estuarine fisheries. Focus is given on species' performance and responses to perturbations in their environment, and promotes the development of ecosystem-based fisheries science and management. The journal encourages contributors to identify and address challenges in population dynamics, assessment techniques and management approaches, human dimensions and socioeconomics, and ecosystem metrics to improve fisheries science in general and make informed predictions and decisions. The detailed list of themes of the journal is provided in http://www.fisheries.org/mcf/mission.html.

Journal Title:

International Journal of Coastal & Offshore Engineering

Web Link: http://ijcoe.inio.ac.ir/page.php?slc_lang=en&sid=1&slct_pg_id=12

Summary:

This peer-reviewed medium is intended to cover not only fundamental studies, but also results of field measurements and case studies of real projects. As an engineering journal, it encourages the publication of original research and significant developments in the related fields. State-of-the-art review papers, which review particular areas of coastal engineering and offshore structures, are also welcomed and accepted. Among others, the journal's scope includes, but is not limited to, the following topic areas: coastal engineering, port and waterfront engineering, coastal zone development and management, offshore engineering, sub-sea technology hydrodynamics and coastal hazards

Journal Title:

Journal of Coastal Research

Web Link: http://www.scimagojr.com/journalsearch.php?q=27374&tip=sid

Summary:

This journal provides an international forum for the littoral sciences. The Coastal Education and Research Foundation publishes this journal on a bimonthly basis. As a professional forum, this is dedicated to all aspects of integrated coastal research. The journal disseminates knowledge and understanding of coastal areas by promoting communication between specialists in geology, biology, geography, climate, littoral oceanography, hydrography, engineering, and remote sensing. The journal contains scholarly papers, review articles, book reviews, news, and provides additional special issues.

Journal Title:

Coastal Management

Web Link: http://www.scimagojr.com/journalsearch.php?q=26814&tip=sid&clean=0

Summary:

Coastal Management is a peer-reviewed, applied research journal. Its thematic areas relate to the technical, legal, political, social, and policy issues relating to the use of coastal resources and environments on a global scale. This e-journal presents timely information on management tools and techniques as well as recent findings from research and analysis that bear directly on management and policy.

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INTEGRATED COASTAL PLANNING AND ECOSYSTEM-BASED MANAGEMENT IN THE NORTHWEST PACIFIC REGION

КОМПЛЕКСНОЕ ПЛАНИРОВАНИЕ И УПРАВЛЕНИЕ ПРИБРЕЖНЫМИ ЗОНАМИ НА ОСНОВЕ ЭКОСИСТЕМНОГО ПОДХОДА В СЕВЕРО-ЗАПАДНОЙ ПАЦИФИКЕ

На английском языке

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