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Catalysing Ocean Finance

Volume II
Methodologies and Case Studies

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Caption: Indonesia: Hardy head silversides (Atherinomorus lacunosus) are abundant shoals of fish living in shallow water reef flat seagrass meadows throughout the Indo-Pacific. These fish species that feed primarily on zooplankton and small benthic invertebrates are an important part of the seagrass food web. They make an excellent food source for larger fish species.

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FOREWORD

The world's oceans and coastal areas are an integral part of life on earth. They are the source of a variety of essential goods and services – including food, transport, oil, gas, and minerals, to name but a few, and also deliver vital ecosystem services such as climate regulation and oxygen production.

It is therefore of tremendous concern that our oceans are under significant threat, whether that be from pollution, overexploitation, habitat loss, invasive species, or climate change.

While a number of important commitments have been made to the protection and restoration of oceans, their health is still in decline. This underscores the need to take decisive action without delay.

This publication - *Catalysing Ocean Finance* - demonstrates that, far from being an intractable problem, sustainable ocean management could become a successful legacy of today's generation of decision-makers. It shows how the challenges facing the ocean stem from widely understood market and policy failures - failures which can be addressed through the application of appropriate mixes of market and policy instruments.

As early as the mid-1990s, the Global Environment Facility (GEF) and its partners recognised and began to address threats to marine ecosystems and associated livelihoods and economies. In so doing, the GEF acknowledged that the sheer size and multi-country nature of most of these marine systems, and their linked river basins, as well as the global nature of some of the threats they are faced with, called for coordinated, multi-country approaches. With its focus on transboundary waters, this positioned the GEF as a potential catalyst to demonstrate and scale up effective strategies to address ocean challenges.

Over the past twenty years, the United Nations Development Programme (UNDP) and the GEF have successfully developed a range of strategic planning tools aimed at assisting governments to put in place enabling policy environments to catalyse investment for restoring and protecting the marine environment. In several cases, catalysed public and private financial flows have exceeded the initial GEF investment several hundred-fold. In some cases, these instruments have helped to shift sizeable ocean industries, such as shipping and tuna fisheries, to a more environmentally sustainable path.

Catalysing Ocean Finance takes stock of how effective these instruments have been in helping countries to address challenges facing the oceans and explores how they could be successfully scaled up. It estimates that an initial public investment – on the order of $5 billion over the next ten to twenty years – could be sufficient to catalyse several hundred billion dollars of public and private investment, and thereby foster global transformation of ocean markets towards sustainability.

The Global Environment Facility and the United Nations Development Programme, working in partnership with partner countries and initiatives, such as the recently launched World Bank Global Partnership for Oceans and the UN Secretary General's Oceans Compact, look forward to building on the successful approaches demonstrated in *Catalysing Ocean Finance* to sustainably utilise our oceans, for the benefit of present and future generations.

Sincerely,

Helen Clark
Administrator
United Nations Development Programme

Naoko Ishii
Chief Executive Officer
Global Environment Facility

ACRONYMS

$	US dollar
ABNJ	Areas Beyond National Jurisdiction
ACUMAR	Autoridad de Cuenca Matansa Riachuelo
BOD/COD	Biochemical Oxygen Demand/Chemical Oxygen Demand
BSERP	Black Sea Ecosystem Recovery Project
BWM	Ballast Water Management
CARP	Comisión Administradora del Río de la Plata
CBD	Convention on Biological Diversity
Chl a	Chlorophyll a
CO_2	Carbon Dioxide
CP	Cleaner Production
CTMFM	Comisión Técnica Mixta del Frente Marítimo
DDT	Dichlorodiphenyltrichloroethane
DIN	Dissolved Inorganic Nitrogen
DRP	Danube Regional Project
EBRD	European Bank for Reconstruction and Development
EcoQOs	Ecosystem Quality Objectives
EcoQWROs	Ecosystem Quality or Water Resource Objectives
EEDI	Energy Efficiency Design Index (for ships)
EEZs	Exclusive Economic Zones
EIB	European Investment Bank
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FFA	Forum Fisheries Agency
FSA	United Nations Fish Stocks Agreement
GBP	GloBallast Partnerships
GEF	Global Environment Facility
GHG	Greenhouse gas
GIA	Global Industry Alliance for Marine Biosecurity
GloBallast	Global Ballast Water Programme
GPA-LBA	Global Programme Action to Protect the Marine Environment from Land-based Activities
HCFC	Hydrochlorofluorocarbons
ICM	Integrated Coastal Management
ICPDR	International Commission for the Protection of the Danube River
IOC/UNESCO	Intergovernmental Oceanographic Commission of UNESCO
IFNR	Investment Fund for Nutrient Reduction
IMC	Inter-Ministerial Committees
IMO	International Maritime Organization
IMTA	Integrated Multi-Trophic Aquaculture
IPCC	Intergovernmental Panel on Climate Change
ITQs	Individual Transferable Quotas
IUCN	World Conservation Union
IW	International Waters
IWRMP	Integrated Water Resource Management Plan
JAP	Joint Action Programme
JPOA	Johannesburg Plan of Action
LME	Large Marine Ecosystem
LPC/PC	Lead Partner Country/Partner Country
M&E	Monitoring and Evaluation
MARPOL	International Convention for the Prevention of Pollution From Ships
MDG	Millennium Development Goal
MEPC	Marine Environment Protection Committee (of the IMO)
MHLC	Multilateral High Level Conference
MPA	Marine Protected Area
MRV	Measurement, Reporting and Verification
MSC	Marine Safety Committee
MSY	Maximum Sustainable Yield
Mt	Metric Tons
N	Nitrogen
NAP	National Action Plan or Programme
NGO	Non-governmental organisation
NIMRD	National Institute for Marine Research and Development (Romania)
NOAA	National Oceanic and Atmospheric Administration
ODI	Overseas Development Institute
ODS	Ozone Depleting Substances
OECD	Organisation for Economic Co-operation and Development

OFMP	Oceanic Fisheries Management Project
OPRC	International Convention on Oil Pollution Preparedness, Response and Cooperation
P	Phosphorus
PA	Precautionary approach
PCB	Polychlorinated Biphenyls
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PIC	Pacific Island Countries
POPs	Persistent Organic Pollutants
PPPs	Public Private Partnerships
QA/QC	Quality Assurance/Quality Control
R&D	Research and Development
REDD	Reducing Emissions from Deforestation and Forest Degradation
RFMO	Regional Fisheries Management Organisation
RPMF	Rio de la Plata & its Maritime Front
SAP	Strategic Action Programme
SDCA	Sustainable Development of Coastal Areas
SDS-SEA	Sustainable Development Strategy for the seas of East Asia
SEEMP	Ship Energy Efficiency Management Plan
SIDS	Small Island Developing States
SOC	State of the Coasts
SPC	Secretariat of the Pacific Community
SSTs	Sea Surface Temperatures
STAP	Scientific and Technical Advisory Panel
TDA	Transboundary Diagnostic Analysis
TSC	Train-Sea-Coast
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WCMC	World Conservation Monitoring Centre
W/C	Western and Central
WCPFC	West & Central Pacific Fisheries Commission
WCPO	West & Central Pacific Ocean
WHO	World Health Organization
WSSD	World Summit for Sustainable Development
WTO	World Trade Organization
WWTP	Wastewater Treatment Plant
YSFRI	Yellow Sea Fisheries Research Institute
YSLME	Yellow Sea Large Marine Ecosystem

INTRODUCTION

Coasts and oceans are being degraded at a rate that will have significant social and economic implications worldwide if allowed to continue unabated. Over the last twenty years, UNDP-GEF has successfully developed and applied a series of ocean and coastal market transformation methodologies that have proven very effective at removing barriers and putting in place an enabling policy environment that can catalyse sizeable quantities of public and private sector financial flows for ocean restoration and protection.

Volume I of this publication, titled "Transforming Markets to Restore and Protect the Global Ocean", summarises, through a series of six case studies, the effectiveness of each of these instruments in catalysing financial flows and presents options for scaling them up to address present and future threats to coastal and ocean resources. Volume II of this publication, titled "Methodologies and Case Studies", comprehensively reviews each of the three methodologies and six case studies used to justify several of the main conclusions reached in Volume I.

Volume I of *Catalysing Ocean Finance* is divided into four chapters. Chapter 1 explores the main causes of coastal and ocean degradation and presents a new paradigm to sustainably utilise open access resources such as the global ocean: using scarce grant funds to promote integrated, science-based ocean and coastal planning and policy reform, remove investment barriers, and catalyse large public and private flows for sustainable ocean resource management.

Based on the six case studies, Chapter 2 briefly describes the application of three major planning instruments used to foster sustainable productive use patterns of coastal and ocean resources over the past 20 years. Chapter 3 considers the lessons learnt from these case studies and methodologies over the past 20 years that can inform their transfer and replication in other ocean and coastal contexts. Lastly, Chapter 4 sets forth a roadmap to restore and protect our ocean over the next 20 years via the combination and scaling up of these planning instruments to address four principal ocean sustainability challenges.

Volume II of *Catalysing Ocean Finance* is divided into three chapters. Chapter 1 provides a detailed description of the TDA/SAP methodology as a strategic planning tool for management of Large Marine Ecosystems and their linked drainage basins. This is followed by three case studies – Danube/Black Sea Basin, Yellow Sea Large Marine Ecosystem, and Rio de la Plata/Maritime Front – documenting how TDA/SAP created the necessary enabling environment to deliver sizeable levels of investment for ocean restoration and protection in each of these waterbodies. Chapter 2 describes Integrated Coastal Management as a very effective tool for promoting sustainable use of coastal resources at local, municipal and provincial scales, and highlights the East Asian Seas PEMSEA programme as a case study documenting how effective ICM can be at creating an enabling environment that can leverage large sums of environmental investment, both public and private. Lastly, Chapter 3 describes how an approach involving building on emerging or anticipated global or regional legal frameworks can deliver significant new and additional financial flows for ocean sustainability, and literally transform entire markets such as shipping and fisheries.

Catalysing Ocean Finance builds on the findings of two companion UNDP-GEF publications (Sherman and McGovern, 2012; UNDP-GEF, 2012): The first publication *Frontline Observations on Climate Change and Sustainability of Large*

Marine Ecosystems reviews climate change and other threats to ocean ecosystems, and the steps UNDP and other GEF agencies are taking to address these threats in 10 LMEs. The second, *International Waters – Delivering Results*, highlights the substantial progress made in addressing these threats through twenty years of UNDP-GEF support to advancing the sustainable management of 31 of the world's most important transboundary marine and freshwater ecosystems. *International Waters – Delivering Results* documents the much broader ongoing application of *Catalysing Ocean Finance's* three planning instruments across a wide range of waterbodies, both marine and freshwater.

Catalysing Ocean Finance and its two companion volumes are intended for government policy makers tasked with creating incentives for the protection, restoration and sustainable development of coastal and ocean resources vital to the economic future of the world's coastal nations. Volume I endeavors to capture in as concise a manner as possible some key lessons of the last 20 years in the field of sustainable coast and ocean management. Volume II should enable decision-makers to further explore the potential of one or several ocean planning instruments to meet their specific geographic/thematic needs at local, provincial, national, regional or global scales. The two companion publications provide a wealth of technical information for further research and action.

METHODOLOGIES AND CASE STUDIES

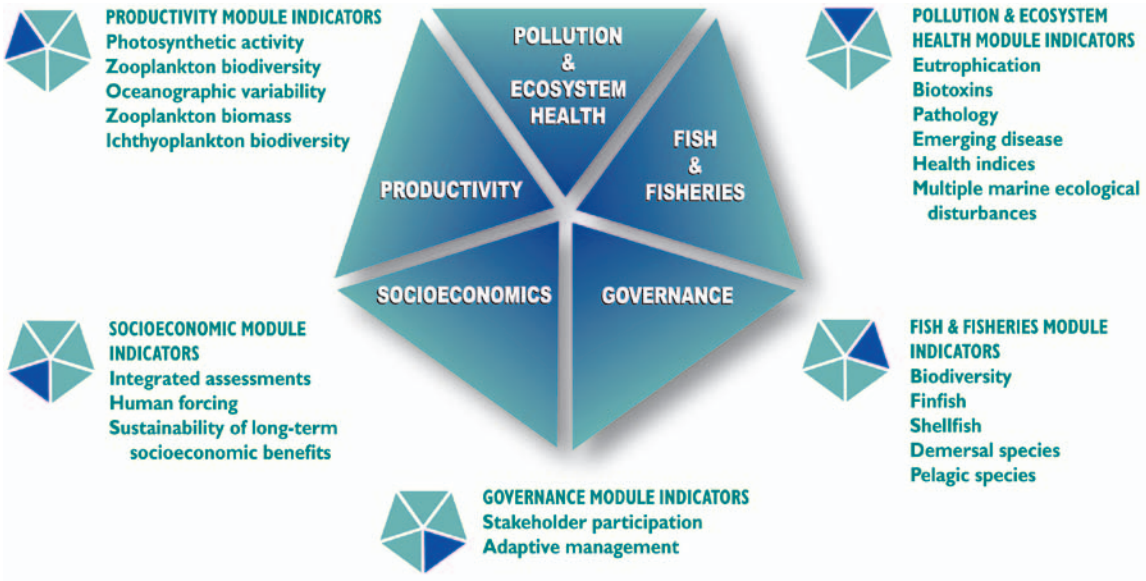
1. Applying the TDA/SAP methodology to restore and protect the world's Large Marine Ecosystems (LME)

1.1 Introduction

Large Marine Ecosystems (LMEs) are relatively large areas of ocean space of approximately 200,000 km^2 or greater, adjacent to the continents in coastal waters where primary productivity is generally higher than in open ocean areas. The physical extent of an LME and its boundaries are based on four linked ecological, rather than political or economic, criteria: (i) bathymetry (depth), (ii) hydrography, (iii) productivity, and (iv) trophic relationships. Based on these four ecological criteria, 64 distinct LMEs have been delineated around the coastal margins of the Atlantic, Pacific and Indian Oceans. The world's LMEs produce about 80% of the world's annual marine fisheries catch and contribute an estimated $12.6 trillion in (non-market) goods and services annually to the world's economy. A majority of the world's 64 LMEs are shared ecosystems in that they are bordered by two or more countries, reaching as high as 28 countries in the Caribbean Sea LME. This underscores the need to take cooperative, multi-country approaches to achieve truly sustainable, ecosystem-based management of critical LME goods and services.

Five modules (Figure 1) are typically used to characterise the LME approach for LME assessment and management. The modules include 1) pollution and ecosystem health, 2) fish and fisheries, 3) productivity, 4) governance and 5) socioeconomics. The modules in turn define a series of indicators to establish baselines for monitoring the changing states of LMEs, and for taking preventive and remedial actions toward the recovery and sustainability of degraded or threatened LME goods and services.

Figure 1: The 5 LME Modules for Ecosystem-Based Monitoring, Assessment and Management



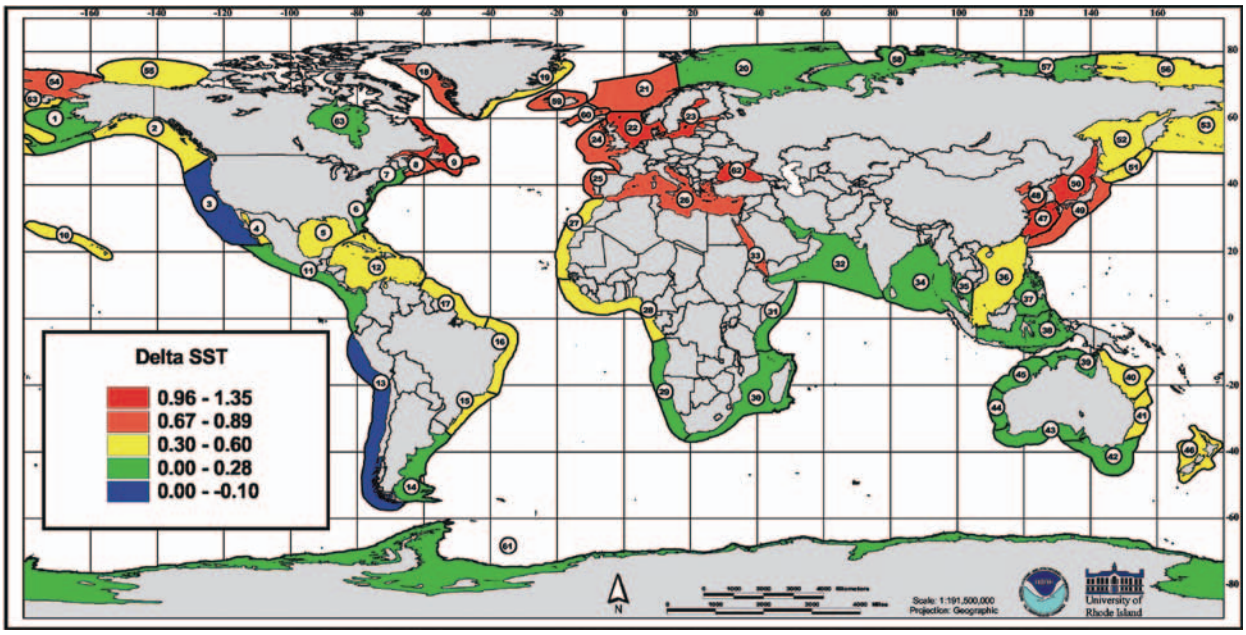
(Source: US-NOAA LME programme)

Threats to LMEs and the International Response

Continued over-fishing in the face of scientific warnings, fishing down food webs, destruction of coastal habitat, and accelerated pollution loading—especially nitrogen export—have resulted in significant degradation of LMEs adjacent to both developed and developing nations. Fragmentation among institutions, international agencies, and disciplines, lack of cooperation among nations sharing marine ecosystems, and weak national policies, legislation, and enforcement all contribute to the need for a new imperative for adopting ecosystem-based approaches to changing human behavior in these systems in order to avoid serious social and economic disruption.

To the loss of economic, environmental, and community security that accompanies the degradation and depletion of coastal and marine waters, climate change now adds even more complexity. Together with NOAA, UNEP and partners, GEF has supported an assessment of the changing states of coastal areas and LMEs. This assessment documents warming of sea-surface temperatures (SSTs) over the last 25 years as recorded from satellites. One of the key findings is that warming rates are much faster than scientists have suspected as shown in the GEF-funded publication and Figure 2 (Sherman and Hempel, 2008). The dark red areas of Figure 2 are warming on average at the most rapid rates; such rates of more than one degree Centigrade over 25 years are unprecedented. Together with the lighter red shaded LMEs, more than one-quarter of the planet's LMEs are warming at a very rapid rate. Already, the warming of LMEs is forcing fish stocks to move, often to cooler waters in nearby countries (Sherman and McGovern, 2012), presenting a direct threat to food and national security for some coastal communities, including the loss of investments and jobs related to fish processing.

Figure 2: Warming Clusters of LMEs in relation to SSTs: 1982-2006



Nothing less than the security of coastal communities and ocean states is at stake as degradation and depletion, amplified by climate change, impact coastal economies, communities, and food supplies. This trend has been evident for decades with little coordinated response before the Rio Summit in 1992. With the creation of the Global Environment Facility (GEF) in 1991 and the adoption of its Operational Strategy by governments in 1995, the GEF has responded with specific collaborative methodologies and significant grant financing to the myriad of stresses affecting coasts and oceans, to help countries commit to actions and finance aimed at ocean and coastal sustainability.

Role of the Global Environment Facility

Since the mid-1990s, developing countries have approached the GEF in increasing numbers for assistance in improving the management of Large Marine Ecosystems (LMEs) shared with neighboring nations. Large Marine Ecosystems (LMEs) serve as place-based, ecologically defined areas for which stakeholder

support for integrating essential national and multi-country reforms and international agency programmes can be mobilises into a cost-effective, collective response to an array of conventions and programmes. Site-specific ocean concerns, those of adjacent coastal areas, and linked freshwater basins are being addressed in LMEs through GEF assistance.

GEF's mandate is to provide incremental cost finance to address global environment issues like climate change, biodiversity and international waters—which covers both transboundary freshwater and marine systems. GEF projects were originally implemented by three Implementing Agencies (the World Bank, UNEP, and UNDP), later expanded to ten agencies. The only new funding source to emerge from the 1992 Earth Summit, the GEF has allocated in its first two decades $10.4 billion, supplemented by more than $44 billion in co-financing, for more than 2,700 projects in more than 165 developing countries and countries with economies in transition. For the International Waters focal area, 220 transboundary water projects have been funded with 149 different cooperating countries totaling over $8.5 billion in total cost and $1.3 billion in GEF grants. The GEF has clearly emerged as a significant catalytic funding source for transboundary systems—especially marine ecosystems.

Twenty Years of GEF Support for Coasts and Oceans

The GEF Council-approved Operational Strategy in 1995 recognised the sensitive international political dimensions of assisting states in collective management of transboundary water systems. The Council noted that global environmental benefits would accrue if countries worked together on priority concerns of these transboundary systems, which as noted earlier are the dominant waters on Earth. The GEF Council included the concept of LMEs as an appropriate biogeographic framework for programming in its Operational Strategy as a vehicle to foster ecosystem-based management of coastal and marine resources in the International Waters focal area. This geographic approach, which includes the coasts and adjacent river basins, represented a pragmatic way to operationalise the "ecosystem approach" with an area sufficiently large to include GEF transboundary considerations, especially mobile living resources.

Since 1995, the GEF has provided substantial funding to support country-driven projects for introducing multi-sector, ecosystem-based assessment and management practices for LMEs located around the margins of the ocean. At present, 110 GEF recipient countries and 21 non-recipient countries are collaborating on 20 GEF Council approved LMEs and one LME-equivalent (the Warm-water Pool of the Pacific) in order to catalyse joint commitments to action and finance (Figure 3). UNDP is involved as an implementing agency in 13 LME projects or 65% of the GEF LME Portfolio (Table 1). UNDP's cumulative GEF programming in LMEs totals $148.2 million (Dec 2011; UNDP-GEF PIMS Database).

Figure 3: LMEs that have received GEF financing

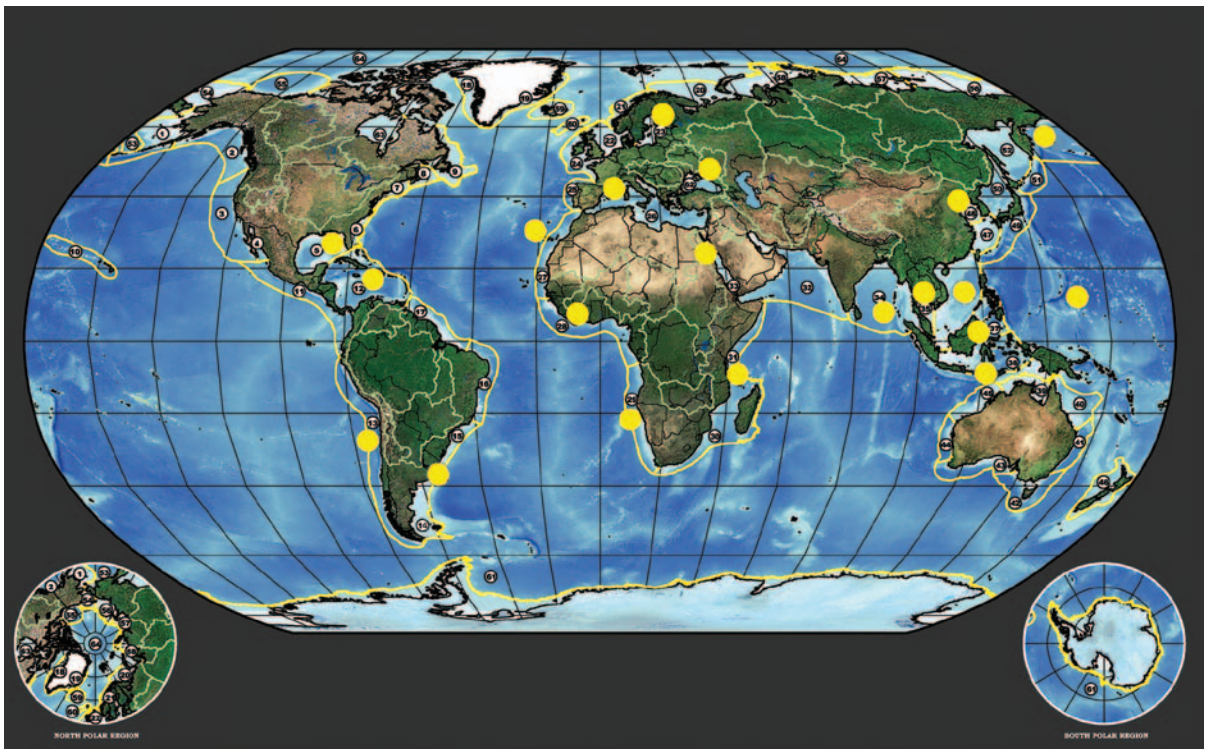


Table 1: UNDP-GEF LME Projects, GEF Financing and Co-Implementing Agencies

UNDP-GEF LME Projects	Cumulative GEF Grant Financing ($)	Co-Implementing & Partner GEF Agency/ies
Benguela Current LME	20,906,910	
Agulhas/Somali LME	13,923,000	UNDP, UNEP, World Bank
Guinea Current LME	18,145,985	UNEP, UNIDO
Red Sea LME	10,018,000	UNEP, World Bank
Humboldt Current LME	7,000,000	
Sulu-Celebes Sea LME	2,975,000	
W/C Pacific Warm Pool LME	16,441,085	
W. Bering Sea LME	3,261,000	
Black Sea LME	21,090,000	UNEP, World Bank
Yellow Sea LME	14,743,833	
Caribbean Sea LME	7,726,952	UNEP, FAO
Patagonia Shelf LME (via Rio de la Plata/Maritime Front)	9,310,000	
N. Australia Shelf LME (via Timor-Arafura Sea)	2,650,000	
TOTAL GEF GRANTS (UNDP)	**$148,191,765**	

By using a multi-scaled approach and sequenced funding tied to progressive commitments to joint action through GEF methodologies, the achievement of a succession of milestones is rewarded by additional GEF projects. The goal is to catalyse joint commitments to reforms and investments in each collaborating state and to achieve development assistance coherence with coordinated programmes all working together to address priorities outlined by states.

Recommended GEF Methodology—the TDA/SAP Approach

There are many barriers to states working together on their shared coastal and marine ecosystems. Disputes over borders, oil/gas, exclusive economic zones, fisheries, continental shelves, and maritime transport often cloud discussions. In order to overcome disputes, potential jealousies, uncertainties, and assumptions about the intentions of neighboring states, the GEF identified a methodology to help countries learn to work together. Known as the Transboundary Diagnostic Analysis and the Strategic Action Programme (TDA/SAP), this methodology is coupled with the use of national inter-ministry committees in GEF projects and a series of learning processes for sharing experiences known as GEF IW:LEARN. These processes have proven to be the key to leveraging state commitments to joint action and catalysing sizeable coastal and ocean finance as this publication illustrates.

Formulation of a Transboundary Diagnostic Analysis (TDA) and a Strategic Action Programme (SAP) are all part of one process undertaken by states desiring to begin to address opportunities and concerns in their shared marine ecosystems. The TDA is a scientific analysis while a SAP is a political document. National inter-ministry committees should represent each cooperating state in the process of formulating them. The TDA begins the process as countries and partners compile data and factual information on the transboundary ecosystem and its concerns and opportunities. This analysis is done spatially because only certain parts of larger LMEs may be experiencing a particular transboundary issue.

This process of joint fact-finding is aimed at each state being able to understand the situation its neighbors experience to fill gaps in understanding and develop trust that one state is not hiding information from others. National inter-ministry committees provide national information to the analysis that is assembled on a multi-country basis, in some cases using GIS systems. This sharing of information

builds trust and confidence in working together and fills information gaps in joint understanding of how the larger system functions. These processes are also critical for integrating science into management in a practical way and for establishing appropriate governance regimes to change human behavior in different sectors. When they are in draft form, the TDA and the SAP provide a great tool for discussion and participation by stakeholders to garner political support for joint action.

The shared commitment and vision for action embodied in the SAP has proven essential in GEF projects for developing partnerships to sustain commitment to action. States cooperate in establishing adaptive management structures as part of GEF monitoring and evaluation requirements by measuring indicators and harmonising QA/QC for trust in the data. This has led states to adopting their own LME-specific ecosystem targets and measurement systems in response to the Johannesburg Summit and to establishing partnerships with different bilateral, multilateral, and UN agencies for better coherence by development assistance agencies. The first step is development of the TDA. The main technical role of a TDA is to identify, quantify, and set priorities for water-related concerns and opportunities for development that are transboundary in nature. In particular, the TDA aims to:

- Identify and set priorities for transboundary concerns and opportunities;
- Gather and interpret information on the water-related impacts and socio-economic consequences of each concern or opportunity;
- Analyse the immediate, underlying, and root causes (barriers) for each concern or opportunity geographically, and in particular identify specific practices, sources, locations, and human activity sectors from which water and environmental conflicts arise;
- Complete an analysis of institutions, laws, policies and required investments.

As an objective analysis, the TDA provides the factual basis for the formulation of the SAP. The TDA should be part of a process of engaging stakeholders through the initial TDA steps and the subsequent development of alternative solutions during the formulation of the SAP. Stakeholder identification and consultation and studies of institutional capacity, governance, and investment are all essential components of the TDA process. In order to make the analysis more relevant to institutional reforms, it should include a detailed 'governance analysis' which considers the national and transboundary institutional, legal and policy situation and identifies key barriers to progress in each.

An important feature of the TDA methodology is analysis of the root causes/barriers causing the conflicts, degradation, social issues or opportunity; these are nearly always gaps and failures in the institutions, regulations, policies, information and other components of water and ocean governance systems. GEF projects address root causes of issues rather than only the symptoms of more deep-seated concerns. The TDA process allows complex transboundary issues to be broken up into smaller, more manageable components for action as specific sub-areas of degradation or priority "hotspots" are geographically identified (with their specific problem and root cause) within the larger, complex system. Some of these may be deemed high priority; others may not. In the case of LMEs, it is essential to examine linkages among coastal zones, LMEs, and their contributing freshwater basins as part of the TDA process so that necessary linkages to root causes in upstream basins can be addressed in the subsequent SAP.

The SAP is a negotiated policy document that should be endorsed at the ministerial level of all relevant sectors in each country to show commitments to action. As a visioning process with participation by key stakeholders, it establishes clear priorities for action (for example, policy, legal, institutional reforms, and investments) to (a) resolve the priority concerns identified in the TDA or (b) to pursue joint development opportunities where the basket of benefits are larger for countries working together than individually on unilateral actions. A key element of the SAP is to identify national reforms and investments for addressing priority transboundary concerns (which generates global benefits for GEF purposes) rather than just local benefits. Another key element involves the development of institutional mechanisms at the regional and national levels for implementing the SAP and monitoring and evaluation procedures to measure effectiveness of the outcomes of the process. New legal cooperative frameworks are often supported by GEF to facilitate state commitments to meeting targets and actions included in the SAP.

The SAP outlines the reforms and investments countries agree to jointly undertake to balance competing water,

coastal, and living resources utilisation, resolve the priority transboundary concerns or pursue the shared opportunities. After agreement by ministers, technical assistance, capacity building, and/or investment GEF projects can be developed to implement sector measures that contribute to removing barriers and resolving the transboundary concern(s) or opportunity. The SAP sets out specific actions for each country that can be adopted nationally (through National Action Programmes, or NAPS) and are to be harmonised with the other participating countries. Additionally, the TDA provides a mechanism to foster participation of policy makers, scientists, management experts, stakeholders, and civil society at local, regional, national and international levels of interest as a step toward development of the SAP. This allows sound science to assist policy making within a specific geographic location for an ecosystem-based approach to management that can be used to engage stakeholders. This methodology that fosters science and civil society groups into participative activities with their governments is a key feature of the GEF processes that can help ensure inclusion, disrupt corruption, and promote good governance.

Lastly, there are two feedback loops in the TDA/SAP process that can help foster adaptive management. The first step consists of the selection of Ecosystem Quality or Water Resource Objectives (EcoQWROs) based upon the results of the TDA. The second step consists of the negotiation of short-term, measureable and costed targets, set within the timescale of a project implementation cycle, in order to achieve the EcoQWROs. Both the ultimate objectives (EcoQWROs) and the short-term targets require quantitative indicators and these are incorporated within a regular monitoring programme. The results of the monitoring programme are used for (a) implementing regulations and checking compliance with the operational objectives, and (b) measuring the status and trends of key ecosystem or water resource status indicators in order to assess progress towards targets and objectives.

1.2 Methodology – Transboundary Diagnostic Analysis/Strategic Action Programme (TDA/SAP)

1.2.1 Introduction

Following the restructuring of the GEF after its pilot phase, the GEF prepared its first Operational Strategy in 1995. Recognising the gap in effective methodological approaches to prioritising and addressing the environmental and water resource problems of large, multi-country water systems such as river basins, aquifers, and Large Marine Ecosystems, the International Waters component of the GEF Operational Strategy made specific reference to a two-stage process of joint 'fact finding' and regional policy development, termed Transboundary Diagnostic Analysis and Strategic Action Programme, respectively. Conduct of a TDA and preparation and high level multi-country adoption of a SAP were set as a pre-condition before groups of countries could receive additional GEF International Waters financing to support implementation of agreed governance reforms and required investments as enumerated in the SAP.

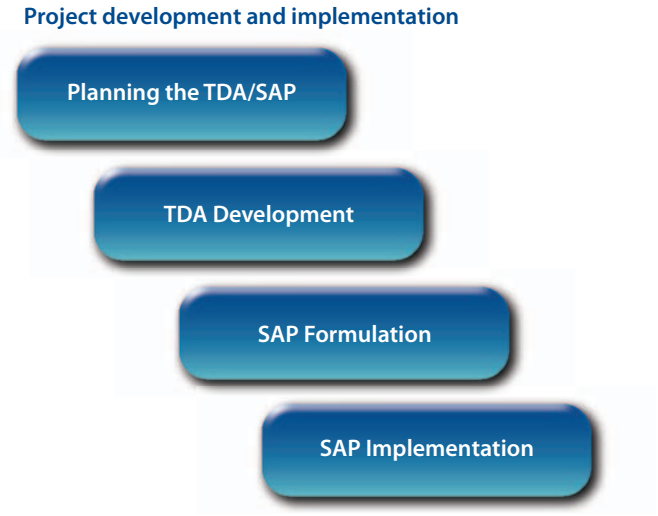
UNDP-GEF, working through the GEF co-financed Train-Sea-Coast programme of the UN Division for Ocean Affairs and Law of the Sea (UN-DOALOS), worked cooperatively with the GEF Secretariat, GEF Implementing Agencies, several regional waterbody organisations and international experts in the preparation of a detailed TDA/SAP methodology and training material for roll-out to the GEF International Waters portfolio in need of TDA/SAP capacity support (TDA/SAP Course, 2005). The TDA/SAP curricula development followed the proven 'Train-X' methodology of UNDP, which utilises a sequence of course validation and delivery to optimise content and pedagogical integrity. The TDA/SAP guidance material was completed in 2004 and has since been delivered to multiple target stakeholders in over a dozen GEF waterbody settings. Chapters 1.2 and 1.3 describe the TDA/SAP methodology in detail and highlight three case studies from three regions – Central Europe, Asia/Pacific and Latin America. These case studies document the effectiveness of TDA/SAP as a tool that, by promoting regional and national ocean governance reform, can create the necessary enabling environment to catalyse substantial sums of public and private finance for ocean-related investments.

1.2.2 Methodology – Transboundary Diagnostic Analysis/Strategic Action Programme (TDA/SAP)

The TDA/SAP process is divided into four phases, each of which falls within the development and implementation of a GEF International Waters (IW) project. Each phase will normally take a minimum of several months, and the whole development and implementation process can range from

a year in a very small project to several years in a major one. The main activities covered in the overall project and the first three phases are shown in Figure 4, below. Detailed sets of tasks for each phase are described later.

Figure 4: GEF IW Project TDA and SAP development and implementation



1.2.3 TDA Procedure

The TDA is a scientific and technical fact-finding analysis used to scale the relative importance of sources, causes and impacts of transboundary waters problems in both freshwater and marine ecosystems. It is intended to be an objective assessment and not a negotiated document.

The analysis is carried out in a cross sectoral manner, focusing on transboundary problems without ignoring national concerns and priorities. In order to make the analysis more effective and sustainable, it should include a detailed 'governance analysis' that considers the local institutional, legal and policy environment.

Further, conduct of the TDA should be preceded by a full consultation with all stakeholders, and the stakeholders should be involved throughout the subsequent process. Four key elements that underpin the TDA are:

- Joint fact-finding
- Prioritisation
- Participation
- Consensus

The TDA approach is not only a proven way of achieving progress but, by helping to establish an environmental and socioeconomic baseline for the waterbody in question, it also acts as a diagnostic tool for measuring the effectiveness of SAP implementation. The TDA is meant to be a 'living' document that is subject to review and revision periodically as new issues emerge and scientific and technical knowledge becomes available.

Major Tasks of the TDA

Development of the TDA is a scientific and technical process of fact-finding (or diagnosing) the state of, and threats to, international waters. The major outputs of the TDA include the following elements:

- TDA preparation: Information and data 'stock taking' exercise
- Identification and initial prioritisation of transboundary problems
- Analysis of environmental and (if possible) socioeconomic impacts/consequences of each transboundary problem
- Final prioritisation of transboundary problems
- Governance and barrier analysis

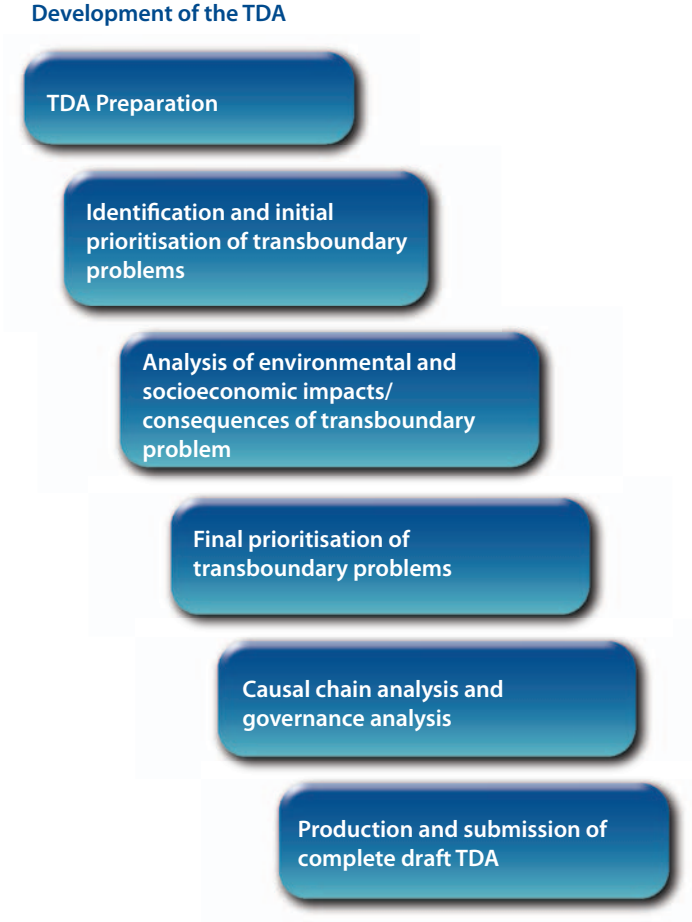
As much as possible, experts from the countries involved should do the work, but at times international experts may also be needed, the emphasis being on using the best available independent expertise.

The TDA thus provides the factual basis for the formulation of a SAP based on a reasoned and multi-sectoral consideration of the problems. But it also acts as a trust and confidence builder by showing countries how to exchange information and work together. This is valuable for the eventual formulation of the SAP.

(i) TDA preparation: Information and data 'stock taking' exercise

There is often a wealth of information and data available concerning a given transboundary waterbody. However, it generally comes from multiple sources, its generation and use is often uncoordinated, and it is frequently neither accessible nor entirely appropriate.

Figure 5: Steps carried out during the TDA development process



Therefore, prior to developing the TDA, a simple information and data 'stock taking' exercise should be initiated (often termed a meta data study). This will ascertain the sources of information/data, its availability and gaps in knowledge.

(ii) Identification and initial prioritisation of transboundary problems

The main analytical and diagnostic work has often been called Scaling – Scoping – Screening. This means that the scale (or timescale and geographical area) of each problem, and its scope (magnitude) must be determined, and then the problems must be screened to sort out those of high priority from low.

The first step in the TDA process is to agree on the transboundary problems. The initial stakeholder consultation will have already highlighted the main problems, but it is important to revisit them, agree on whether or not the list is complete, examine their transboundary relevance, determine preliminary priorities and examine the scope of each. The experts should brainstorm the list of problems with emphasis on their transboundary nature, and then conduct a simple exercise to assign priorities (high-medium-low) from an environmental and socioeconomic standpoint. The geographical extent of the problems associated with each problem can also be stated.

(iii) Analysis of impacts/consequences of each transboundary problem

The environmental impacts and socioeconomic consequences of the relevant transboundary problems should also be identified. Some of this information may have been gathered from the stakeholder consultation process since stakeholders may identify impacts or consequences and it is on this basis that problems are identified. However, the project must ensure that the entire range of impacts and consequences are identified and quantified, and this may require additional research.

The final reports for each problem will be quite brief (typically some 5 pages per transboundary problem) but should contain objective and quantitative information. The work will normally be conducted by selected individual specialists.

(iv) Final prioritisation of transboundary problems

After the completion of the analysis of impacts/consequences, a final prioritisation should be carried out. Final prioritisation is vital since it ensures that the causal chain analysis concentrates on those problems that are the most significant to stakeholders and represent the best investment of their resources.

(v) Causal chain analysis and governance analysis

Future corrective actions can only be proposed with confidence if the whole chain of symptoms, causes and effects is understood. Such a causal chain analysis has to be carried out for each priority problem. The completed causal chain analysis should help to locate potential areas of intervention for the GEF, and is an important basis for the design of the practical barrier removal actions that will be included in the SAP.

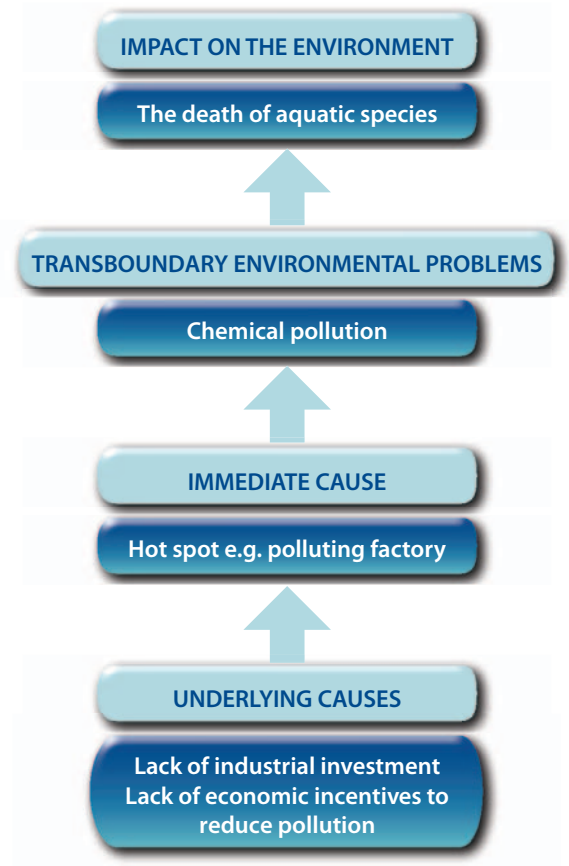
The causal chain relates the problems to their immediate physical causes and their social and economic underlying causes. However, there is a danger here of confusing problems and immediate causes. For example, take the question of 'Pollution hot spots'. Should the existence of hot spots be described as the problem to be dealt with?

The outline causal chain diagram of Figure 6 shows that this would be wrong. The hot spot is the immediate cause of the problem.

During the TDA the interaction between causes and effects of key transboundary problems has to take into account the geographical scale of the environmental and social impacts of a problem. The problem itself and the causes of the problem may be different.

Completion of a causal chain analysis for each of the priority problems requires a mixture of expertise: scientific for the immediate causes, and social and economic for the underlying and root causes.

Figure 6: Outline of sample causal chain diagram



Immediate causes are usually technical in nature and should be quantified, prioritised and geographically located. Underlying causes are those that contribute to the immediate causes. They can broadly be defined as sectoral resource uses, practices and policies, and their related social and economic causes.

Beyond the sectoral causes however, are deeper root causes of the problems, often macroeconomy, demography, consumption patterns, environmental values and access to information and democratic processes. Most of these are beyond the scope of a GEF intervention but it is necessary to document them. The reason for this is that some proposed solutions may be unworkable if the root causes of the problem in question are overwhelming. Furthermore, actions taken nearer to the root causes are more likely to have a lasting impact on the problem.

(vi) Governance analysis

The term 'Governance' is shorthand for the whole political environment: institutions, laws, policies and projected investments that affect the environmental problems. The analysis of these is known as governance analysis.

The existence of a problem implies that some parts of the current governance mechanisms or their implementation are insufficient otherwise the problem would not exist. Therefore these mechanisms and the reasons for any failure must be documented in order that appropriate interventions can be suggested.

An important characteristic of governance analysis is to find out where decision-making power really sits, and how the mechanisms actually work, as opposed to how they are supposed to work.

Governance analysis should describe the dynamic relations within political and social structures that underpin such aspects as legislative and regulatory frameworks, decision-making processes and budgetary allocations. In carrying out the causal chain analysis, many cross-cutting underlying causes will be found to be governance issues.

It is also vital to know what relevant projects, programmes and investments have been approved, or are in the pipeline, for the forthcoming decade. Investment project cycles are generally very long, so the current development portfolios become an integral part of the TDA.

The governance analysis should be conducted by regional experts, and there should be regular feedback between both groups in order to understand the dynamics and synergies between the causes of transboundary problems and possible failures in governance.

(vii) Production of the complete draft TDA and submission for final approval

Up to this point, all the fact-finding, analysis and diagnosis has been carried out separately for each key problem or related set of problems. These now have to be combined into a single document.

This complex task is conducted under the supervision of the Project Manager, who may appoint specialists to help. The draft TDA should have a jargon-free executive summary and the main text should be lucid and concise. There should be easy to understand maps (either sketch, GIS or photographic) illustrating the geographic scale and scope of the priority transboundary problems, impacted areas and the location of immediate causes (such as pollution hot spots, river diversions, urban developments, etc.).

To have official standing, the TDA should be formally adopted by the project steering committee following any technical and stakeholder reviews that may be advisable. This adoption gives a seal of authority and 'buy-in' on the document as input into the more political process of the SAP.

1.2.4 Formulating the SAP

The third phase takes the process into the political arena where objectivity may be affected by political pragmatism. A good TDA will have made it easier to develop logical, sustainable and politically acceptable solutions on the basis of sound scientific and socioeconomic analysis. This is why so much emphasis has been given to the groundwork in the first two phases.

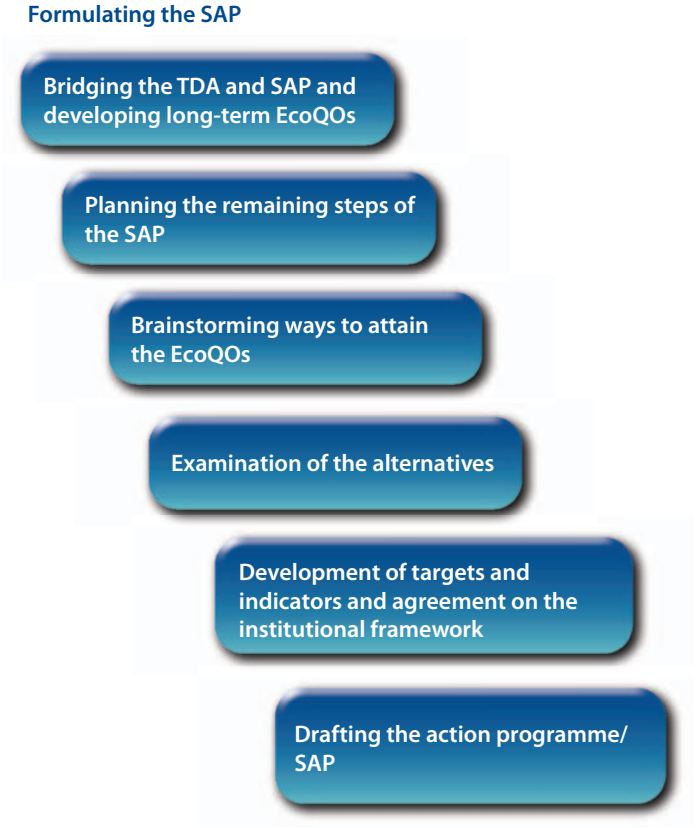
Figure 7 shows the theoretical sequence of tasks, although of course some of these will go on in parallel.

(i) Bridging the TDA and SAP and developing long-term EcoQOs

This is a crucial step, coming between the TDA and the SAP phases of the process, and provides the bridge between the two stages. It links how the shared waterbody is now with what it is hoped it will be in the future. The Ecosystem Quality Objectives (EcoQOs) are statements of the 'vision' of how the stakeholders would like to see the state of the system in the future.

Therefore the project should examine the 'vision' and each priority transboundary problem detailed in the TDA and ask the question, "What would be an acceptable environmental status that would be a sign of a solution for this problem"? This statement of status will represent a long-term EcoQO.

Figure 7: Steps carried out during the SAP formulation process



It is important that at this stage there is full consultation with all the stakeholder groups to encourage 'buy-in' and ownership. EcoQOs should be statements of the 'vision' of how the **stakeholders** would like to see the state of the system in the future. A practical way of achieving this is to involve stakeholder representatives in the bridging meeting and subsequent SAP meetings, who will report back to their respective groups on the outcomes.

(ii) Planning the remaining steps of the SAP

Many of the solutions proposed in the initial brainstorming meeting, including investments, will require action at a national level. It is important to engage the national inter-ministry committees (IMCs) in the process as early as possible. One way to do this is to organise national meetings that mirror the initial brainstorming. These should be organised by the national IMCs and include a suitable range of stakeholders and technical specialists.

Each country's National IMC should appoint a National Action Programme (NAP) Formulation Team who will eventually generate draft NAPs. These teams ensure that all actions are firmly anchored on realistic national policy and investment capacity, and promote a sense of national ownership.

In addition, a SAP formulation team should be created. This will include representatives of the TDA experts and NAP Teams in order to ensure adequate synergy to address regional priorities; this is of course a technical team that will not make political decisions.

(iii) Brainstorming ways to attain the EcoQOs

The objective of the brainstorming activity is to work with stakeholder representatives and specialists to propose a number of practical options that would make significant progress towards achieving the EcoQOs.

A brainstorming meeting should be organised with participation of stakeholders and experts. Everyone is encouraged to be creative in his or her ideas. No attempt is made to limit the discussion to what seems reasonable or feasible. Because of this informality, it is not necessary to seek formal approval from the steering committee for who should be invited.

The meeting examines each EcoQO and identifies possible options, particularly governance reforms and investments, for achieving them. The process involves working in small groups, each of which develops part of a matrix (or table) of options, which should include:

- Which part of the causal chain they address
- Timeframes for implementing them
- Responsible parties
- Relative costs (where possible)
- Indicative priorities to the solutions proposed

This matrix will be the basis for further technical evaluation and should be as 'inclusive' as possible, since it does not represent a commitment.

(iv) Examination of alternatives

The high priority proposals emerging from the brainstorming now have to be evaluated for:

- Their technical and financial feasibility
- Their environmental and socioeconomic costs and benefits
- Their political and social acceptability

Each of these analyses should be carried out nationally by the NAP formulation teams and national members of the SAP formulation team. However, the whole process should be steered regionally.

At this stage, firm decisions need to be taken by the project steering committee and, most importantly, by the national inter-ministry committees. The outcome is ultimately reflected in the draft NAPs.

Parties committing themselves to implementing the SAP must be fully accountable for their actions. Therefore, the stakeholder group/sector/government agency responsible for implementing the actions proposed within the TDA must be clearly and unambiguously identified.

(v) Development of targets and indicators

To integrate the national actions detailed above into a coherent region-wide programme of action (the SAP), three basic technical recommendations are required. These are:

- Development of short-term targets and priority actions including investments
- Agreement on the national/regional institutional framework
- Development of measurable M&E indicators for each target

Development of short-term targets and priority actions

The technical and political consultation process described above should enable the SAP formulation team to determine how far the political process can be taken, in the short/medium term, towards the long-term EcoQOs.

Through careful accounting of the environmental and social benefits, a set of one to ten year targets and priority actions can be set. In addition, the targets should be reflected in measurable process, stress reduction and environmental and socioeconomic status indicators. These should ask the question 'What measurable progress should be observable at the end of a decade'?

Short-term targets are stepping stones on the way to an EcoQO; they define the pragmatic steps towards achieving agreed EcoQOs. The timescale of an EcoQO may be decades while a shorter-term target would be monitored and reported on perhaps annually.

Short-term targets are goals towards which measurable progress should be observed over a period of, say, one, five or ten years. Targets may be environmental, such as some sort of water quality indicator or species abundance, or they may be more closely linked to societal factors such as the proportion of human sewage that is now being treated to secondary level. They should be unambiguous and easy to communicate to the public.

Agreement on the Institutional Framework

The TDA will have already examined institutional strengths and weaknesses, both national and regional. Proposals should be formulated on how the weaknesses should be corrected (barriers removed), through increasing the capacity of existing institutions or creating new ones.

For example, there may be a need to create a revised or new regional coordinating framework such as a commission for a river basin or Large Marine Ecosystem. In parallel, there must be discussions on:

- The formulation of national policy
- The need for legal and institutional reforms
- Investment priorities

These proposals will normally be formulated by the NAP teams, agreed by the national inter-ministry committees, and final agreement reached following the decision on the operational objectives.

The TDA/SAP is itself a policy process leading to concrete benefits, as governments make commitments to institutional and policy changes, and investments, and may identify actions needed and carry them out during the progress of the TDA/SAP.

Development of measurable M&E indicators for each target

Monitoring and evaluation (M&E) indicators are long-term monitoring tools used to verify the implementation of the SAP and to enable adaptive management as conditions change. In order to achieve this, the SAP team should prepare a set of process, stress reduction and environmental and socioeconomic status indicators based on the results of the TDA but adapted according to the needs of the long-term EcoQOs and shorter-term targets and priority actions.

Project monitoring and evaluation indicators for any subsequent GEF interventions should also be developed. There should be clear linkages between the indicators and the institutional capacity for monitoring them.

(vi) Drafting the Strategic Action Programme (SAP)

Drafting the SAP has many similarities with the NAP drafting process. It should be prepared on the basis of identified regional priorities and agreed Ecosystem Quality Objectives. The various SAP and NAP meetings conducted during the SAP formulation process will have produced a great deal of material that will need to be integrated into one document.

The work of integration of the various materials of the SAP into a single document should be conducted under the supervision of the Project Manager and key members of the PMU and the SAP expert(s).

The SAP should be a concise jargon-free document with clear targets, quantifiable time-limited milestones and unambiguous assignment of responsibilities. It should embody:

- A statement of the priority problems
- Principles adopted for solving them
- Institutional arrangements
- Policy and legal reforms
- Investments
- Joint planning and dispute settlement mechanisms
- Public participation
- Long-term EcoQOs and short-term targets and priority actions
- Common measures to be taken
- Monitoring and review arrangements and reporting

It should include a series of annexes giving details such as monitoring and evaluation indicators, lists of stakeholders and contact points.

Drafting the National Action Programmes (NAPs)

Based on the regional SAP, each country involved in the TDA/SAP will need to develop a National Action Programme (NAP) (or Integrated Water Resource Management Plan (IWRMP) / Poverty Reduction Strategy Paper (PRSP), as appropriate). The reason for this is that the underlying causes as well as the complex linkages between the sources of environmental degradation and threats mean that national actions must respond to the uniquely specific circumstances and priorities of each country.

Each country must select the approach that best suits its geographic characteristics, political, financial, institutional and regulatory frameworks, best available science and technology, current assessments, inventories and data. Further, some countries will place the NAP higher in the political process than others (i.e. at a parliamentary level rather than ministerial). Therefore no two NAPs will have quite the same appearance, scope or focus.

(vii) Ministerial adoption

As a long-term strategic programme designed to change government, corporate and public behaviour, the SAP (and the associated NAPs) must be formally endorsed by relevant government authorities. This is to ensure that they are adequately incorporated into planning and budgetary processes at all levels: national, state, province, district, municipal.

Solid support from government authorities is a key to successful implementation of SAP activities and strategies, including pilot projects. Particularly because it addresses a cross-sectoral range of issues, the SAP must be brought into the mainstream of policy, legal and budget provisions, enforcement mechanisms, and technical and scientific frameworks.

Official adoption of the SAP is also necessary to give the process the legitimacy and support that will be needed to bring on board a wide range of stakeholders, both from the public and private spheres.

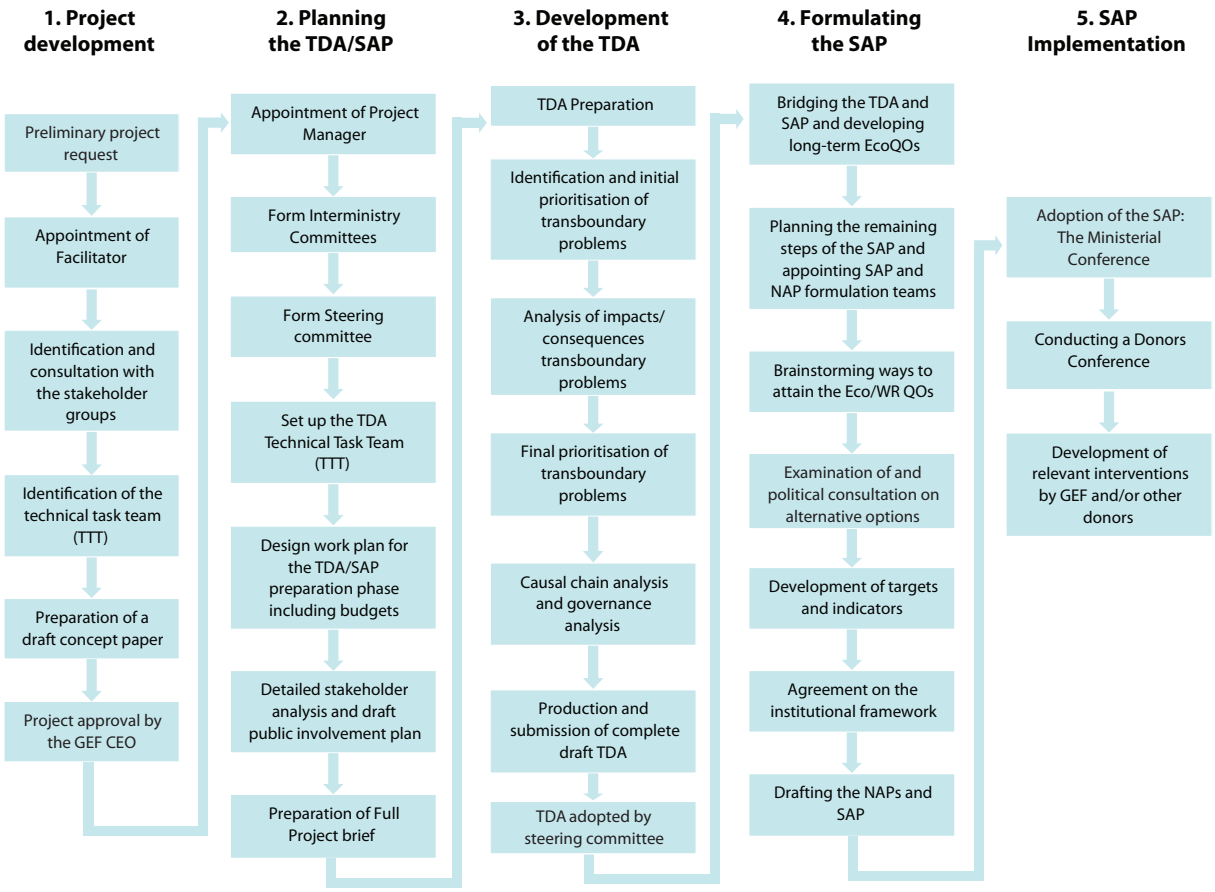
(viii) Conducting a Donors Conference

The SAP planning process itself should be encouraging to the various parties engaged in the endorsement process. One of the most efficient mechanisms is to call a donors (or partnership) conference, to allow bilateral and multilateral organisations to review the proposals and to engage in joint planning for future projects including SAP and NAP investment needs.

Suggested preparation for a donor meeting:

1. Inform relevant donors of planned meeting at least six months in advance.
2. Distribute preliminary NAPs at least two months prior to the meeting.
3. Distribute endorsed SAP as soon as it is available

Figure 8: Summary of TDA/SAP Methodology



1.3 Catalysing Ocean Finance Case Studies

Catalysing Ocean Finance Case Study #1: Danube/Black Sea Basin

Context:

As a result of the 'green revolution' during the nineteen sixties, many countries dramatically increased their application of fertilisers to agricultural land, including in the 17 countries of the Danube River basin and downstream Black Sea, in western and central/eastern Europe. While this fertiliser helped to dramatically increase agricultural productivity, it also had a cost as farm run-off contributed nutrient (nitrogen, phosphorus) pollution to these transboundary waterbodies. Concurrently, population growth and industrialisation led to significant increases in 'point sources' of pollution to the Danube and the Black Sea from poorly or untreated wastewater and large scale livestock farms (manure). The net result was a three to four fold increase in the burden of nutrients reaching the Danube and the Black Sea. While nutrients are essential to both freshwater and marine ecosystems, in excess they can lead to a serious (and growing) problem known as 'eutrophication', whereby excess nutrients stimulate high levels of plankton growth; when these plankton die, their decomposition by aerobic bacteria consumes so much oxygen in the water that major areas can experience very low oxygen conditions, or 'hypoxia'. By the nineteen eighties, much of the northwest shelf of the Black Sea was hypoxic, a number of species and benthic ecosystems had disappeared, and economic losses – from fisheries, tourism and other sectors – were estimated at $500 million per year. Through the joint preparation of their respective Transboundary Diagnostic Analyses (TDA), the Danube and Black Sea countries confirmed nutrient pollution as the highest priority transboundary issue facing the Danube/Black Sea basin system. Drawing from the Danube and Black Sea TDAs, the suite of barriers the countries of the Danube/Black Sea basin faced are summarised in Table 2:

Table 2: Identified barriers to restoring and protecting the Danube River and Black Sea ecosystems

Type of Barrier	Barriers	Stakeholders			
		Consumers / Users	Policy Makers	Local & Multi-lateral Financiers	Supply Chains
Regulatory	Lack of a number of Black Sea international agreements/regulations		✓	✓	
	Lack of coordinated policy and legislation development between the Danube countries and Black Sea countries		✓	✓	
	Lack of coordinated policy and legislation development processes in EU (Bg, Ro) and other countries of the Black Sea basin		✓	✓	
	Non-existent or insufficient policies and legislation at national level (e.g. fisheries, agriculture, tourism, etc.)	✓	✓		
	Poor enforcement of existing environmental protection legislation and regulations in agriculture, industry, shipping and harbors, fisheries, etc.	✓	✓	✓	

Type of Barrier	Barriers	Stakeholders			
		Consumers / Users	Policy Makers	Local & Multi-lateral Financiers	Supply Chains
Institutional	Non-existent or weak local, national, regional and/or global ocean governance institutions		✓	✓	
	Diminished government control over privatised farms and other businesses	✓	✓		✓
	Low public sector capacity (individual, institutional, national)	✓	✓	✓	
Financial	Lack of suitable financial instruments and/or skills to access and apply them	✓		✓	✓
	Poor management and/or poor capital investments and operational funding for waste water collecting/treatment systems	✓	✓	✓	
	Low level of user fees (tariffs) and incentives for rational water use and adequate treatment	✓	✓		✓
	Lack/mismanagement of public funds dedicated to improvements of the quality of environment	✓	✓	✓	
Economic	Unsustainable development/practices in agriculture, coastal zone development, tourism, fisheries, etc.	✓	✓		
	Lack of or inadequate economic incentives (e.g. subsidies, etc.)	✓	✓		✓
	Poor implementation of sectoral management planning at national level and international level	✓	✓		✓
	Low standard of living (poverty, unemployment, low income)	✓	✓		✓
Political	Significant political changes in the Black Sea region, e.g. EU accession of Romania and Bulgaria	✓	✓	✓	
	Political tensions between countries limit opportunities for transboundary cooperation on the joint management of natural resources and environment of the Black sea region	✓	✓	✓	
	Emergence of breakaway regions not internationally recognised and which don't sufficiently engage in regional environmental cooperation	✓	✓	✓	✓
Informational	Insufficient (and/or poor access to) data and information for sustainable management of the Black Sea ecosystem	✓			✓
	Insufficient knowledge of available financial and economic instruments for sustainable ocean management		✓	✓	
	Low awareness of negative environmental impacts	✓	✓	✓	
	Low standard of environmental education and awareness	✓	✓	✓	✓
Technological	Limited track record and experience of supply chain actors and investors	✓	✓		✓
Environmental	Decline in natural resources and biodiversity of the ecosystem both marine and coastal.	✓	✓	✓	✓

Figure 9: The Black Sea Drainage Basin

Source: World Bank

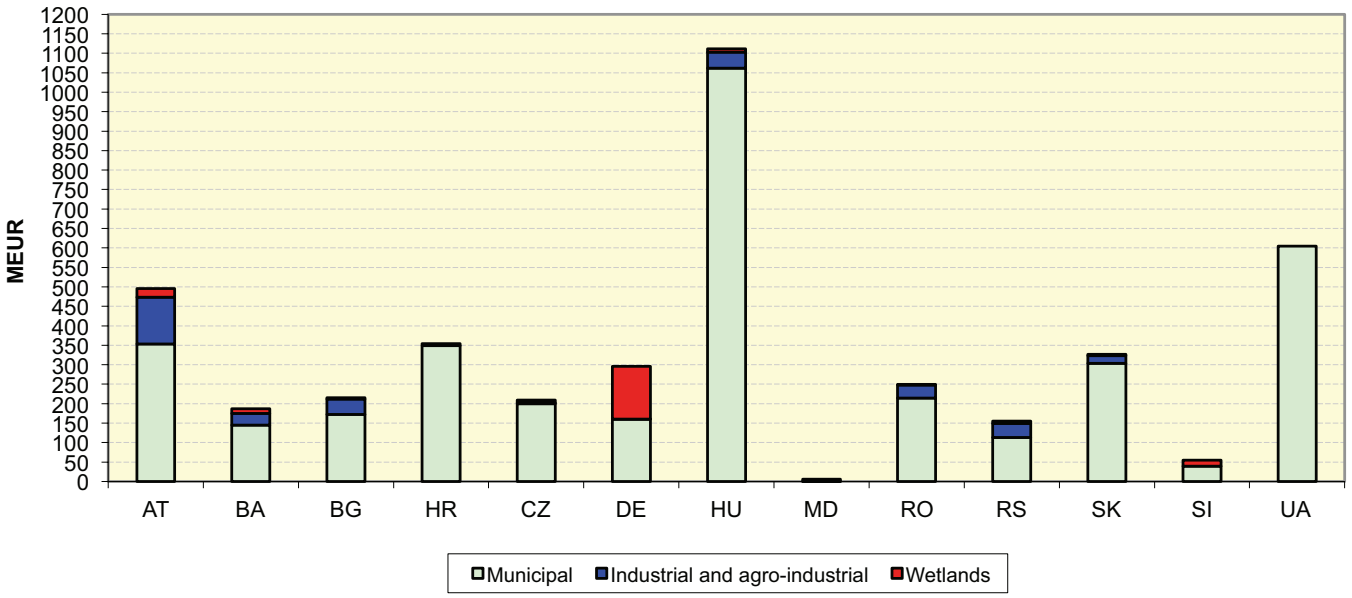
UNDP-GEF Strategy:

Beginning in the early 1990's, UNDP initiated a series of GEF International Waters projects, totaling just over $50 million in GEF grants, with the long-term objective of restoring the highly degraded Danube and Black Sea transboundary ecosystems. Through multi-country negotiation and adoption of the Danube and Black Sea Strategic Action Programmes, UNDP-GEF supported the 17 governments of the Danube and Black Sea basins in reforming their policies, legislation and institutions related to reducing nutrient pollution in the basin (Box 1). This included adopting Best Agricultural Practices for manure management and fertiliser application, phase out of phosphorus-containing detergents, promoting industrial cleaner production, etc. Through a range of capacity development efforts, UNDP-GEF also helped to establish, strengthen and ultimately sustain the emerging commissions and secretariats for both the Danube and the Black Sea, charged with coordinating implementation of their respective conventions and action programmes. Through two of these International Waters projects, UNDP-GEF also helped the countries to prepare an investment portfolio of nearly 500 projects representing needed pollution reduction investments totaling over US $5 billion. As shown in Figures 10 & 11, a sizeable fraction of these investments had been completed as of 2006, with substantial associated reductions in nitrogen and phosphorus pollution loads (Table 3) to the Danube and Black Sea.

Box 1: Danube/Black Sea Basin – Policy, Planning and Regulatory Drivers for Investments in Nutrient Pollution Reduction

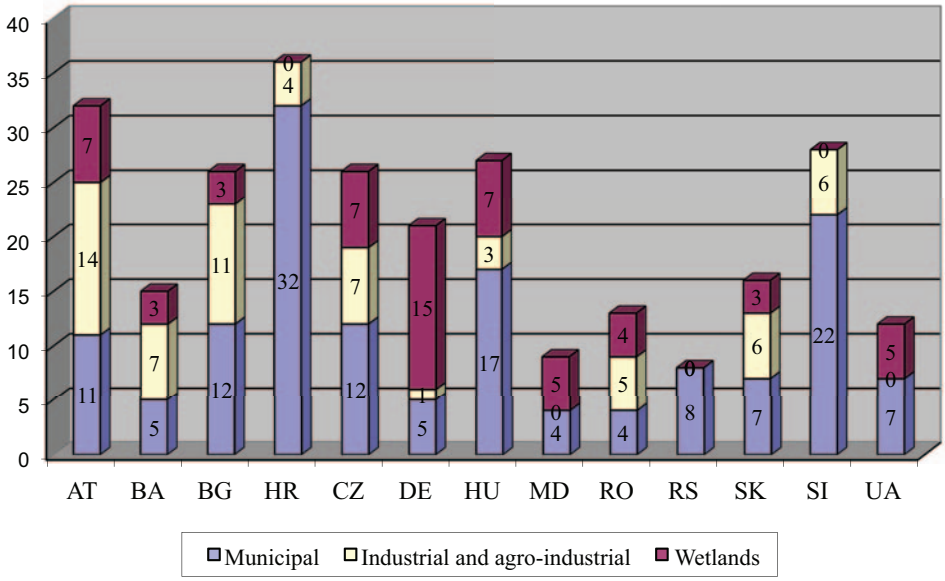
Black Sea	Danube River	Black Sea & Danube River
Convention on the Protection of the Black Sea against Pollution	**Danube River Protection Convention**	**European Union Water Framework Directive**
■ To prevent pollution by hazardous substances or matter; Annex to the Convention ■ To prevent, reduce and control pollution from land-based sources; Protocol to the Convention (Articles 7, 8, 10) ■ To prevent, reduce and control pollution from or through the atmosphere; ■ To protect biodiversity and the marine living resources; Draft Protocol on the biodiversity ■ Black Sea Strategic Action Plan (2009) ■ Ecosystem Quality Objective 3: Reduce eutrophication ■ Ecosystem Quality Objective 2b: Conserve coastal and marine habitats and landscapes ■ Upgrade all WWTPs serving populations > 200,000 p.e. within the BS countries sub-basins to include N & P removal. ■ Ensure all industrial plants have adequate wastewater treatment to reduce N & P emissions from direct discharge to surface waters. ■ Reduce or phase out the use of high P-containing laundry detergents. ■ Introduce harmonised P and N standards for all WWTPs serving >100,000 p.e. Ensure compliance with and harmonise standards at regional level. ■ Harmonise the monitoring and assessment of N & P (concentrations and loads) in major rivers and straits. ■ Develop a nutrient modelling tool to enable source apportionment estimates to be made. ■ Improve the use of regulatory instruments for reducing point and diffuse source pollution from agriculture.	*Danube River Basin Management Plan* (adopted by ICPDR 2009): Basin-wide vision for nutrient pollution is the balanced management of nutrient emissions via point and diffuse sources in the entire Danube River Basin District that neither the waters of the DRBD nor the Black Sea are threatened or impacted by eutrophication. 2015 Management Objectives: ■ Reduction of the total amount of nutrients entering the Danube and its tributaries to levels consistent with the achievement of the good ecological/chemical status in the Danube River Basin District by 2015. ■ Reduction of discharged nutrient loads in the Black Sea Basin to such levels, which permit the Black Sea ecosystems to recover to conditions similar to those observed in the 1960s. ■ Reduction of phosphates in detergents preferably by eliminating phosphates in detergent products ■ Implementation of the management objectives described for organic pollution with additional focus on the reduction of nutrient point source emissions. ■ Implementations of best environmental practices regarding agricultural practices (for EU Member States linked to EU Common Agricultural Policy (CAP)). ■ Create baseline scenarios of nutrient input by 2015. ■ Definition of basin-wide, sub-basin and/or national quantitative reduction targets (i.e. for point and diffuse sources).	*Water Framework Directive* ■ River Basin Management (consistent with IWRM) ■ Identification of main problems: nutrient, organic and hazardous substance pollution and hydromorphological alterations ■ Stakeholder consultation/ participation *Urban Wastewater Directive* ■ Specifying need for wwt for given pe ■ Requirement for tertiary treatment (more stringent treatment) due to Romania declaring BS coastal waters as sensitive ■ Nitrates Directive ■ Identification polluted or threatened (N) waters ■ Designation vulnerable zones ■ Establishment codes good agricultural practice and action programmes ■ National monitoring and reporting *Integrated Pollution Prevention and Control (IPPC) Directive* ■ Impacts on both industrial plants and large 'industrial' agricultural production

Figure 10: Total Danube Pollution Reduction Investment Costs (millions of Euros) as of 2006, projects per country and sector



Source: International Commission for the Protection of the Danube River, ICPDR

Figure 11: Number of completed Danube pollution reduction investments per sector by country, as of 2006



Source: ICPDR

A key element of the UNDP-GEF effort to restore the highly degraded Danube and Black Sea ecosystems was the GEF Danube/Black Sea Basin Strategic Partnership for Nutrient Reduction, prepared and implemented in cooperation with the World Bank and UNEP and closely coordinated with related efforts by the EU, EBRD and EIB. The long-term objective of the Strategic Partnership was for all Danube/Black Sea basin countries to take measures to reduce nutrient pollution levels and other hazardous substances to such levels necessary to permit Black Sea ecosystems to recover to similar conditions as those observed in the 1960s. The intermediate objective of the Partnership was to reduce discharges of nitrogen and phosphorus to the Black Sea to levels at or below those observed in 1997. The Partnership consisted of three components:

1. The Danube Regional Project (DRP) implemented by UNDP provided technical assistance and capacity

building for countries implementing the SAP (now termed Joint Action Programme, JAP) for the Danube Basin with a focus on nutrient reduction ($17 million). It focused on policy/legal/institutional reforms and included associated finance for national projects for $1 billion in water quality investments to accompany the reforms and involved the International Commission for the Protection of the Danube River (ICPDR).

2. The Black Sea Ecosystem Recovery Project (BSERP), implemented by UNDP ($10 million), provided technical assistance and capacity building in implementing the Black Sea SAP, also with a focus on legal, policy and institutional reforms to enable nutrient pollution reduction through both investments and improved nutrient management practices.
3. The Investment Fund for Nutrient Reduction (IFNR) implemented by the World Bank. This test of innovative financing supported single country, single sector investment sub-projects for nutrient reduction in the municipal, industrial, and agriculture sectors as well as wetland/floodplain restoration. The GEF Council approved funding in 3 tranches totaling up to $70 million for the 6+ year implementation period. The World Bank GEF IFNR supported identification and preparation of 10 demonstration investments in 7 eligible countries totalling $67 million in GEF financing and $194 million in co-financing (ratio 3:1) which were projected to deliver estimated nitrogen reduction of over 5,000 mt/yr and phosphorus reductions of over 400 mt/yr.

Results – Stress Reduction through Governance Reform and Investment

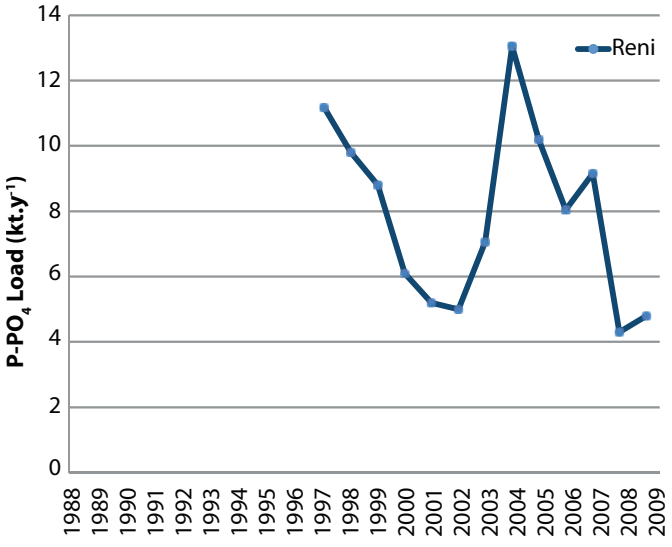
By helping the governments put in place a strong enabling environment for governance reform and investment, substantial reductions in nutrient pollution to the Danube/Black Sea basin have occurred over the time period of the series of UNDP-GEF interventions. To date, at least $3.0 billion has been invested in addressing over 200 Danube and Black Sea nutrient pollution hot spots including municipal, industrial, agro-industrial and wetlands (Table 3); this includes over $260 million leveraged through the World Bank/GEF Investment Fund for Nutrient Reduction. Cumulative projected reductions in nitrogen and phosphorus pollution from these investments amount to 25,100 and 4,070 mt/year, respectively (Table 3). This compares favorably with estimates of the net reduction in nitrogen loads to the Black Sea, 36,000 mt/year, between the 1988-1996 average (364 kt/year) before the UNDP-GEF catalysed investments began, and the average over the 1999-2008 GEF period of 328 kt/year (Figure 13). Similarly, inorganic phosphorus loads from the Danube to the Black Sea have dropped 5-6 kt/year against their mid-nineties highs (Figure 12), also in relatively close correspondence with the reductions achieved via investments in the basin. Notably, the 36 kt/year reduction in nitrogen loads represents about 3.6% of global anthropogenic nitrogen loads from insufficiently treated sewage (1 million mt/year; Seitzinger et al., 2010); this isn't surprising given the population of the Danube/Black Sea basin of about 160 million, and the fact that it has historically been an area with some of the highest applications of chemically intensive industrial agriculture in the world. These data also underscore significant progress towards achieving and even exceeding (for P) the intermediate Strategic Partnership objective of stabilising Black Sea nutrient loads at 1997 levels. Driven by commitments under the Danube River Protection Convention, the EU Water Framework Directive and Danube Joint Action Programme, and with policy advisory support from the UNDP-GEF Danube Regional and Black Sea Ecosystem Recovery Projects, the World Bank and others, most Danube and Black Sea countries have taken important steps to reform and implement their nutrient management policies and legislation (fertiliser use, manure management, etc.) which will continue to improve the enabling environment for public and private nutrient reduction finance going forward. Over time, implementation of these commitments should be reflected in further measurable reductions in total nitrogen and phosphorus loads to the Black Sea from the Danube. However, these impacts will take some time to appear in Danube nitrogen loads to the Black Sea due to the very high level of accumulated fertiliser and manure nitrate in Danube basin groundwater which will gradually diminish as improved fertiliser and manure management practices continue.

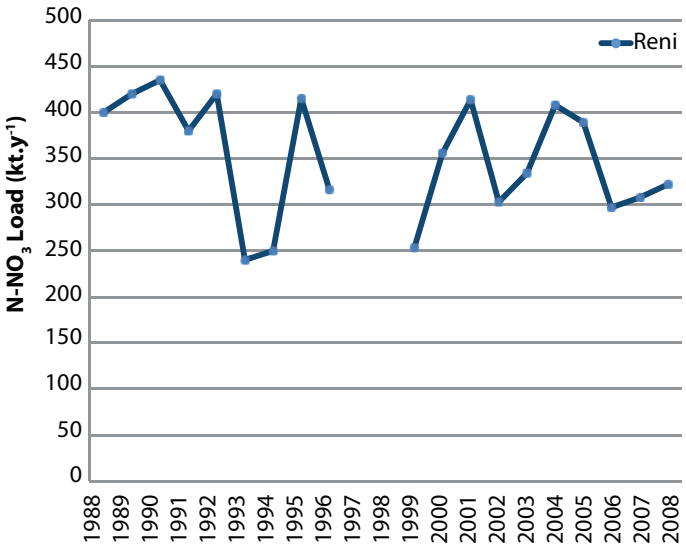
Table 3: Danube/Black Sea Basin Nutrient Reduction Investments and associated nutrient pollution reduction, through 2005

COUNTRY	Number of projects by sector					Total Financing ($million)	Nitrogen Pollution reduction (mt/yr)	Phosphorus pollution reduction (mt/yr)
	Municipal	Industrial	Agro-Ind.	Wetlands	Land Use			
Austria	18	1		10		469.45	2,272	227
Germany	7			13		331.38	870	79
Czech Republic	17					220.17	2,610	253
Slovakia	19	10		5		263.00	3,605	890
Hungary	14	2		2		438.51	9,631	1,045
Slovenia	12		2	1		239.83	2,088	750
Croatia	1		1			256.00	n/a	n/a
Bosnia-Herzegovina	1	1				20.37	31	5
Bulgaria	1			4		40.04	785	128
Romania	7		1			490.60	2,302	529
Moldova	1		1			73.95	280	70
Ukraine	37	6	1	2		14.30	n/a	n/a
Russian Federation	9			1		49.60	n/a	n/a
Serbia		1				22.14	430	70
Georgia			1			8.25	n/a	n/a
Turkey					1	45.00	200	25
TOTALS	**144**	**21**	**7**	**38**	**1**	**$2,982.59**	**25,104**	**4,071**

Source: UNDP-GEF Danube Regional Project, 2005; DABLAS 2004 Assessment; ICPDR 2004 JAP report, World Bank

Figures 12 and 13: Danube River annual inorganic nitrogen ($N\text{-}NO_3$) and inorganic phosphorus ($P\text{-}PO_4$) loads to the Black Sea (1988-2008) measured at Reni station located near discharge point of the Danube to the Black Sea



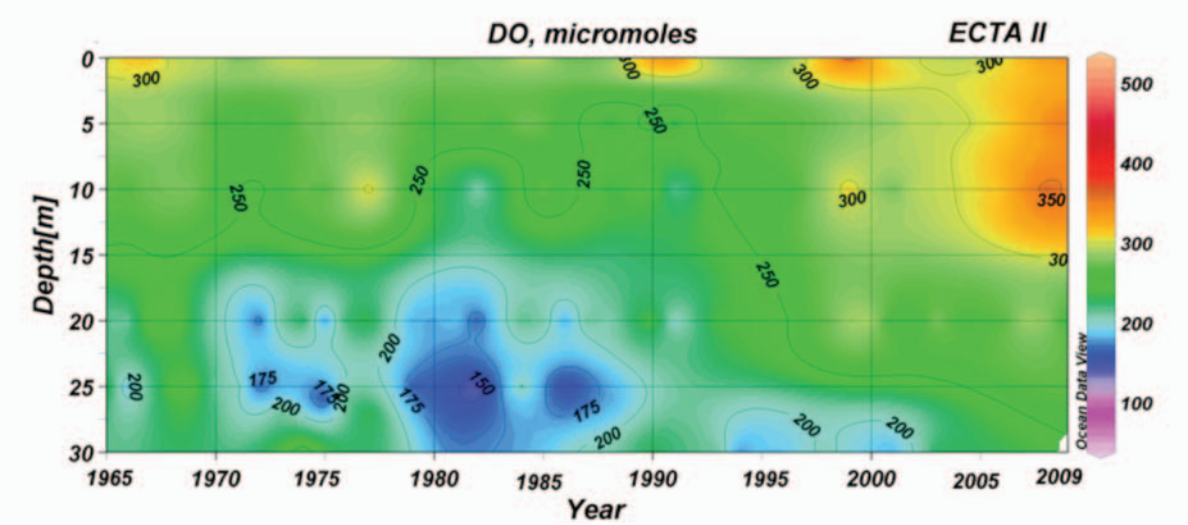


Source: ICPDR Transnational Monitoring Network

Results – Environmental Benefits

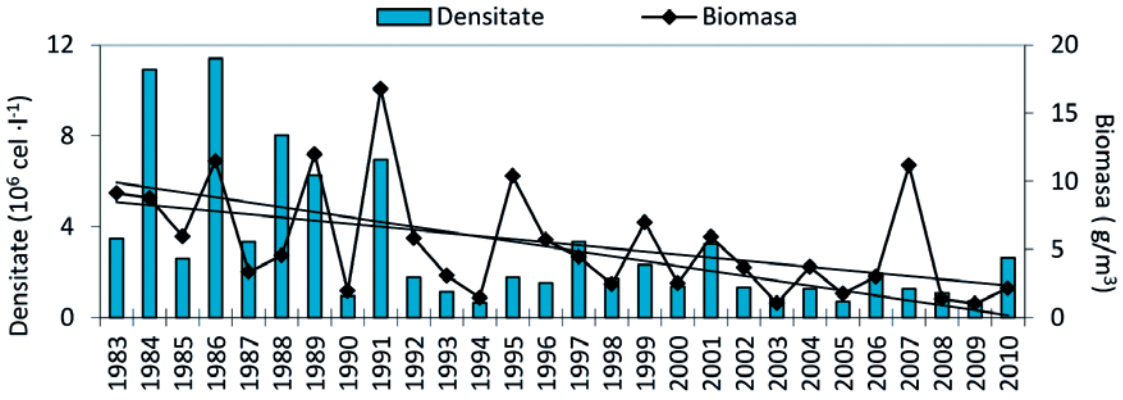
For nitrogen, phosphorus and chlorophyll-a (an indicator of productivity), 68, 88 and 100% of Danube waters, respectively, were recently rated as Class I or II in the Danube water quality index that is considered to be compliant with good water quality. In the Black Sea, the NW Shelf hypoxic zone has been virtually eliminated (Figure 14), the average biomass of phytoplankton has decreased significantly from peaks of late eighties (Figure 15), the key benthic 'phyllophora' habitat is returning, and many species that were considered locally extinct are also returning (Figure 16). Through this strategic, long-term intervention combining governance reform and catalytic environmental finance, the Danube/Black Sea ecosystem is on the road to recovery in terms of its functioning and effective delivery of both environmental and socioeconomic benefits to the nearly 160 million residents of the basin.

Figure 14: Reversal of eutrophication and hypoxia in the NW shelf of the Black Sea as reflected in oxygen concentrations (umol/l) off Constanta, Romania (blue and green correspond to low oxygen areas during periods of greatest hypoxia; yellow and orange illustrate return of more oxygenated waters)



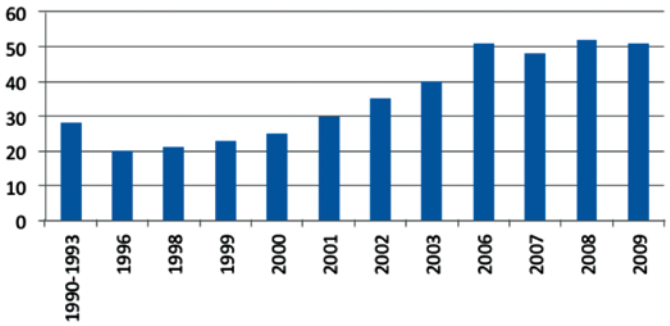
Source: Dan Vasiliu, NIMRD-Constanta, Romania, FP6 Sesame Project Reports

Figure 15: Long-term trends in average phytoplankton biomass and cell density, NW Shelf Black Sea, reflecting reduction in eutrophication from late 1980's peaks to present day



Source: NIMRD Constanta data

Figure 16: Number of macrozoobenthos taxa near Constanta, Romania, 1990 – 2009



Source: NIMRD-Constanta, Black Sea Commission archive

Catalytic Ocean Finance Summary	Amount (US $)
Total GEF Grant Financing	$51.89 million
Total Programme Co-financing	$91.988 million
Catalysed Public and Private Sector Financing	$2.983 billion
Catalytic Finance Ratio (Total Catalysed Finance : UNDP-GEF Finance)	57:1

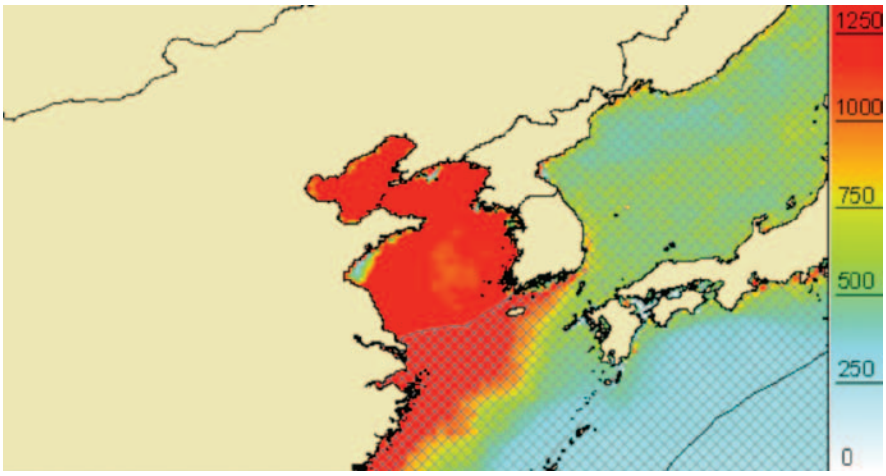
Catalysing Ocean Finance Case Study #2: Yellow Sea Large Marine Ecosystem

Context:

The Yellow Sea Large Marine Ecosystem (YSLME) shared by the People's Republic of China, Republic of Korea, and Democratic People's Republic of Korea, is an important global resource. This international waterbody supports substantial populations of fish, invertebrates, marine mammals and a number of threatened seabird species. A number of large cities inhabited by many tens of millions lie within the Yellow Sea's drainage basin including Qingdao, Tianjin, Dalian, Shanghai, Seoul, Inchon, and Pyongyang-Nampo. The people of these large urban areas are dependent on the Yellow Sea as a source of marine resources for human nutrition, economic development, recreation, tourism and livelihoods.

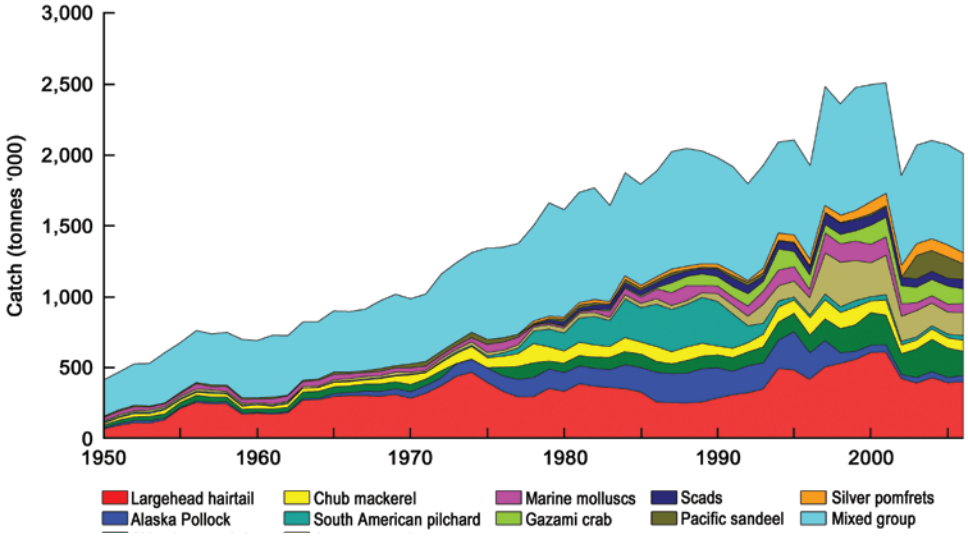
Among the 64 LMEs in the world, YSLME has been one of the most significantly affected by human development. Today the Yellow Sea faces serious environmental problems, many of a trans-boundary nature, that arise primarily from anthropogenic causes. Many of its coastal and marine resources are threatened by both land and sea-based sources of pollution and extensive economic development in the coastal zone. Major portions of the Yellow Sea experience eutrophic conditions with mean annual primary production usually exceeding 1,000-2,000 mg C/m^2/day throughout the year (Figure 17). YSLME fishery resources have historically been one of the most intensively exploited in the world; fisheries yields peaked in 2002 (Figure 18) and about half the stocks are considered overexploited or collapsed (Figure 19). Significant changes to the structure of the fisheries and substantial reduction in catch-per-unit-effort have resulted from unsustainable fishing practices over an extended period. All of these threats have resulted in the depletion of fish biomass, loss of biodiversity and degradation of coastal habitats.

Figure 17: Mean annual Yellow Sea Primary Production (mg C/m²/day)



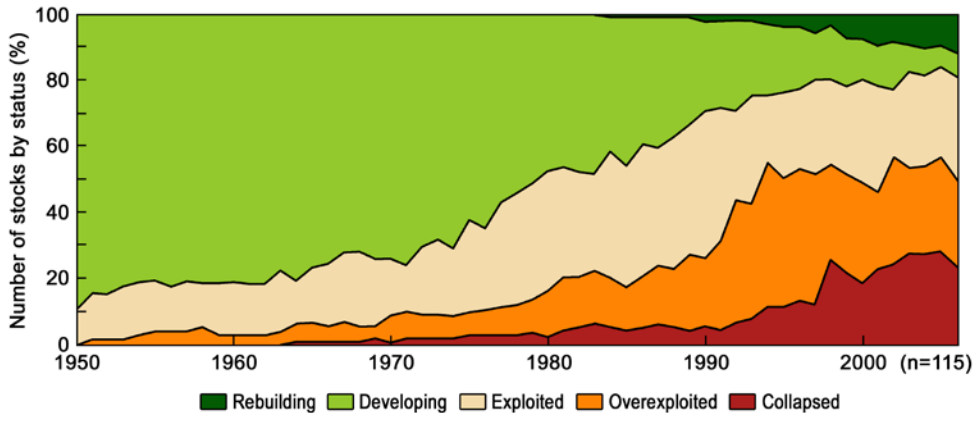
Source: University of British Columbia and Pew Charitable Trusts. Sea Around Us Project – Fisheries, Ecosystems and Biodiversity. www.seaaroundus.org

Figure 18: Fish landings in Yellow Sea LME by species



Source: University of British Columbia and Pew Charitable Trusts. Sea Around Us Project – Fisheries, Ecosystems and Biodiversity. www.seaaroundus.org

Figure 19: Status of Yellow Sea fish stocks



Source: University of British Columbia and Pew Charitable Trusts. Sea Around Us Project – Fisheries, Ecosystems and Biodiversity. www.seaaroundus.org

The three littoral countries – China, Republic of Korea (ROK) and the Democratic People's Republic of Korea (DPRK) – with their massive human populations living in the Yellow Sea drainage basin, have recognised that they share common problems with pollution abatement and control from municipal and industrial sites as well as contributions from non-point source contaminants (such as nutrients and pesticides) from agricultural practices. The countries are urgently seeking to address problems of reduced fish catch and shifts in species biomass and biodiversity (caused in part by overfishing), red tide outbreaks, degradation of coastal habitats (caused by explosive coastal development), and effects of climate variability on the YSLME.

UNDP-GEF Strategy:

The UNDP-GEF Yellow Sea LME project, "Preparation of a Preliminary Transboundary Diagnostic Analysis and Strategic Action Programme for the Yellow Sea Large Marine Ecosystem" was implemented from 2004 through 2011. The objective of the project was ecosystem-based, environmentally-sustainable management and use of the YSLME and its watershed by reducing development stress and promoting sustainable exploitation of the ecosystem from a densely populated, heavily urbanised, and industrialised semi-enclosed shelf sea. An essential activity in achieving the objective was the preparation of a Transboundary Diagnostic Analysis (TDA) and related biophysical assessments, and the formulation of a Strategic Action Programme (SAP) of agreed policy, legal and institutional reforms, and investments, to address the priority transboundary issues agreed upon through the TDA. In recognition of the need for taking integrated, ecosystem-based approaches to managing the transboundary resources of the YSLME, UNDP-GEF emphasised the importance of strengthening regional governance in the implementation of the project activities and of the SAP. The significant achievements of the project along these lines are discussed in the following sections.

The TDA process agreed upon the priority transboundary issues facing the YSLME (overfishing, pollution, habitat loss, harmful algal blooms and climate change) and identified the root causes of the environment degradation of YSLME. Principal barriers preventing integrated, ecosystem-based management of the YSLME are summarised in Table 4 (Yellow Sea TDA, 2004).

Table 4: Identified barriers to sustainable management of the Yellow Sea Large Marine Ecosystem

Type of Barrier	Barriers	Stakeholders			
		Consumers/ Users	Policy Makers	Local & Multi-lateral Financiers	Supply Chains
Regulatory	Existing policies and legislation need to be updated and harmonised to meet challenges from new development		✓		
	Issuing new policies and/or modification of existing legislation and regulations should follow the legal procedures as defined, not based on political considerations		✓		
	Need for consistent, transparent and equitable enforcement of existing legislation and regulations		✓		✓
Institutional	Overlapping of responsibilities in national and local institutional arrangements in ocean governance institutions		✓	✓	
	Lack of effective co-ordination of institutions responsible for ocean related matters, including ministries, local governments, and research institutes		✓		
	Inappropriate arrangements for public sector, and NGOs for decision-making processes.	✓	✓		✓
	Insufficient capacities for NGO and civil society participation	✓	✓		✓
Financial	Lack of suitable financial instruments and/or skills to access and apply them	✓	✓	✓	✓
	Inadequate transparency in the allocations of financial resources, and imbalanced distribution of resources to the institutions		✓		✓
	Lack of financial strategies for marine environmental protection and sustainable uses of marine and coastal resources	✓	✓		

Type of Barrier	Barriers	Stakeholders			
		Consumers/ Users	Policy Makers	Local & Multi-lateral Financiers	Supply Chains
Economic	Market failures that result in non-sustainable ocean practices (over-fishing, pollution, invasive species, etc.)	✓		✓	✓
	Lack of long-term studies of economic benefits and of marine and coastal resources result in short-term unsustainable use of the resources	✓	✓	✓	
	Monitoring & evaluation of governance performance is limited in short-term economic development		✓		✓
Informational	Insufficient (and/or poor access to) data and information for sustainable ocean management	✓			✓
	Insufficient knowledge of available financial and economic instruments for sustainable ocean management		✓	✓	
	Insufficient awareness of ocean issues by public, policy makers and the private sector	✓	✓	✓	✓
	Imbalance in information availability for all relevant institutions, e.g. NGOs, local communities, in decision making process	✓	✓	✓	✓
Technological	Limited availability of suitable technologies		✓	✓	✓
	Insufficient guidance in developing environmentally sound technologies		✓	✓	
	Limited track record and experience of supply chain actors and investors	✓			✓
Political	Historical problems and territorial disputes between countries limit opportunities for transboundary cooperation on ocean issues		✓		
	Insufficient mutual trust between the countries in transboundary cooperation on ocean		✓		
	Different political systems and foreign policies in the countries limit opportunities for transboundary cooperation on ocean issues		✓		

Source: Yellow Sea TDA

The TDA findings provided the basis for the management targets and actions that have been carefully reviewed, negotiated and agreed through the YSLME Strategic Action Programme (SAP) which has been endorsed by the three countries (Yellow Sea SAP, 2009). A landmark provision of the SAP is the establishment of the YSLME Commission with defined terms of reference and structure. Considering the complex geopolitical situation in the Yellow Sea, the Commission is envisioned to be a soft, non-legally binding and cooperation-based institution. In the agreed governance structure of the YSLME Commission, not only are the regional governance arrangements clearly defined, but also the national coordinating mechanisms to enable closer cooperation among the relevant national ministries to work more closely in protecting the marine and coastal environment. DPRK's full participation in the Commission is provided for in the SAP to ensure geographical completeness. The Commission will be the institutional vehicle to continue and expand current efforts of the YSLME programme in the implementation of the SAP and will contribute to better coordination of national efforts and enhance the effectiveness of regional initiatives.

The agreement to establish the YSLME Commission has significantly increased the confidence of the participating countries in enabling them to work regionally in implementing necessary management actions as defined in the YSLME SAP. To date, the SAP has provided the framework for the allocation of sizeable levels of financial resources to address the major transboundary problems of pollution and overfishing as discussed further below.

Results – Stress Reduction through Governance Reform and Investment

The YSLME countries have jointly committed over $10.86 billion towards achieving the priority commitments made

in the SAP (Table 5 and Box 2). For ecosystem-based fishery management, the SAP commitment is to reduce Yellow Sea fishing effort by 25-30% through vessel buy-back and retraining, stock assessments, etc., valued at $3.638 billion. For pollution reduction, the SAP commitment is to reduce nutrient discharges by 10% every 5 years through enhanced wastewater treatment, reducing fertiliser use and industrial discharges, etc., valued at $5.625 billion. For biodiversity conservation, the main commitments of the SAP are to protect coastal habitats, establish a regional MPA network, and promote civil society participation, valued at $1.586 billion. Notably, the commitment to restore Yellow Sea fish stocks, with recent catches of about 2 million mt/year, represents about 10% of the estimated 21 million mt/year of the global fish catches that fall within the overexploited or depleted category, further underscoring the catalytic impact.

Box 2: Yellow Sea Large Marine Ecosystem – Policy, Planning and Regulatory Drivers for Environmental Investments in Pollution Reduction, Sustainable Fisheries and Habitat Restoration

Yellow Sea LME Strategic Action Programme	China – National Policies, Legislation, Strategies, Plans	Republic of Korea – National Policies, Legislation, Strategies, Plans
■ Establishment of Regional Cooperation Mechanism - Establishment of YSLME Commission as a regional cooperation mechanism to ensure effective cooperation on the management actions identified and agreed in the YSLME SAP ■ Reduction of Nutrient Discharges by 10% every 5 years ■ Control total pollution loading from non-point sources and sea-based sources ■ Reduction of Fishing Effort by 30% via boat buy-back, providing training on alternative livelihood and providing opportunities and means for alternative livelihoods ■ Protection of Marine & Coastal Wetlands ■ Improvement of mariculture techniques to reduce environmental stress; develop environment-friendly mariculture methods and technology ■ Establishment of regional environmental monitoring network	12th Five-Year National Plan *Reducing pollution discharge to the sea, e.g. reducing nutrient discharge by 10% every 5 years; and reducing fishing efforts by 1/3.* Environmental Protection Law *Article 21: "The discharge of pollutants and the dumping of wastes into the seas, the construction of coastal projects and the exploration and exploitation of offshore oil must be conducted in compliance with legal provisions so as to guard against the pollution and damage of the marine environment."* Marine Environment Protection Law *Provides for implementing mechanisms*: ■ Environmental Impact Assessment (EIA); ■ System for "total quantity control" of contaminant discharges in major zones; ■ Marine environmental quality standard and pollutant discharge standard; ■ Levy of discharge fees and dumping fees; ■ Contingency plan for oil-spill from offshore platforms, vessels, and coastal units likely to cause marine pollution.	Comprehensive Plan for Marine Environment Preservation *Includes prevention of land-based sources of pollutants, improvement of coastal water quality and preservation of marine ecosystem, strengthening of international cooperation and preservation of global environment* Marine Pollution Prevention Act *Controls land-based sources of pollutants flow into the coastal waters and degrade the marine environment.* Water Quality Conservation Law *Controls end-pipe discharge for all waters in Korea, such as lakes, rivers, ports, and coastal waters.* Fishery Resources Protection Law *Defines jurisdictional waters and permission to fish.* Ordinance for the Implementation of the Fishery Resources Protection Law *Describes fishing boundaries, restrictions of fishing permission, and application procedures for fishing licenses*

Yellow Sea LME Strategic Action Programme	China – National Policies, Legislation, Strategies, Plans	Republic of Korea – National Policies, Legislation, Strategies, Plans
	Fisheries Law *The Amended Fisheries Law introduces the concept of total allowable catch to China's fisheries management, based on the principle that the fishing effort should be lower than the recruit of fish stocks. Collection of a resources fee was first applied to a single species (Chinese prawn), and later covered all fish stocks.* *Promotion of Responsible Fishing Practices* ■ Allowable catch of species; ■ Restricted fishing zones/seasons; ■ Banned or restricted fishing gear and methods; and ■ Minimum mesh sizes.	Article 27 of Fishery Resources Protection Decree *Introduced a TAC system. Nine species and five fisheries are in the TAC system as of 2004 and the Korea Government will expand TAC system to 21 species in 2010.* Comprehensive Plan for Coastal and Near Sea Fishery Industry Restructure *Introduced fishing boat buy-back actions*

Table 5. Breakdown of YSLME SAP Implementation Commitments by Country and Activity ($)

Areas	Activities	China	ROKorea	Sub-Total
Regional Fishery Management	Identification of boats; buy back; and decommissioning	5,025,000	56,875,000	61,900,000
	Increase Tourism opportunities	16,720	58,756,660	58,773,380
	Technical retraining programmes	150,000	7,820,833	7,970,833
	Joint regional stock assessments	556,000	3,487,500	4,043,500
	Artificial reefs deployment	100,000	4,791,667	4,891,667
	Others (to be classified)	3,472,633,850	28,091,173	3,500,725,023
Sub-total		**3,478,481,570**	**159,822,833**	**3,638,304,403**
Pollution Control and Regional Monitoring & Assessment Network	Establish regional pollution monitoring guideline and network based on any existing ones	350,000	33,065,000	33,415,000
	Evaluation of facilities and equipment to control/reduce discharge from industrial and municipal sources	90,000	164,115,000	164,205,000
	Improve control mechanism of pollution from point sources	1,000	183,845,000	183,846,000
	Improve regional strategy for oil spill	6,720	5,622,500	5,629,220
	Implement improvement of wastewater & sewage treatment facilities	50,000	1,231,880,833	1,231,930,833
	Support for monitoring & reducing atmosphere-based sources	120,000	41,402,500	41,522,500
	Support for monitoring, reducing, & improving fertiliser use	225,000	544,080,000	544,305,000
	Support for monitoring & reducing sea-based sources	32,800	10,442,500	10,475,300
	Implementation of reducing nutrient discharge activities	30,000	5,865,000	5,895,000
	Improve capacity in disease diagnoses	2,940	5,782,500	5,785,440
	Others (to be classified)	3,384,289,528	14,078,747	3,398,368,275
Sub-Total		**3,385,197,988**	**2,240,179,580**	**5,625,377,568**

Areas	Activities	China	ROKorea	Sub-Total
Biodiversity Conservation	Regional evaluation of implementation of CBD and RAMSAR convention and country reports within the YSLME	21,400	2,491,667	2,513,067
	Develop explicit goals in the form of regional habitats and species targets and a biodiversity conservation plan in implementation of CBD, Ramsar and other conventions	11,400	2,514,166	2,525,566
	Analysis of country coastal management guidelines, identification of conservation areas according to planning zones.	13,400	2,152,500	2,165,900
	Identification of habitats of selected migratory species at the regional level	26,200	4,791,667	4,817,867
	Sponsoring of network of NGOs to work together to promote Public Awareness	16,720	3,600,000	3,616,720
	Make assessment on the trend of introduced species in the region	47,280	1,000,187	1,047,467
	Monitoring impacts	1,000,000	2,130,000	3,130,000
	Others (to be classified)	1,560,675,280	6,433,445	1,567,108,725
Sub-Total		**1,561,811,680**	**25,113,632**	**1,586,925,312**
Other components		1,036,760	1,195,748	2,232,508
Project Management		8,125,055	2,480,722	10,605,777
Grand Total		**8,434,653,053**	**2,428,792,515**	**10,863,445,568**

Source: Yellow Sea SAP

Results – Environmental Benefits:

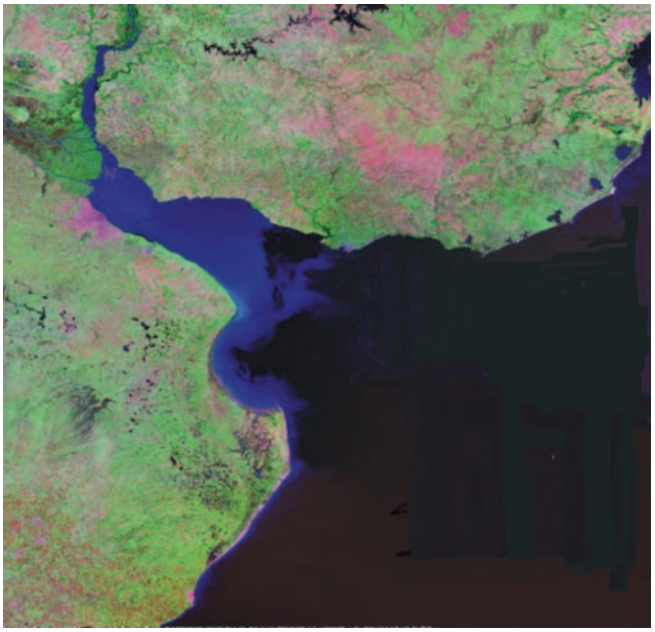
As the SAP implementation proceeds in the coming years, it is expected that significant global environmental benefits would be realised, including: restoration of globally important fisheries by reducing within four years up to around 10% of the current fishing effort; increased uptake of innovative (IMTA) sustainable mariculture techniques in a region responsible for one-third of global mariculture production; improved management of globally significant habitats for migratory birds and mammals; decreased eutrophication through reduction in nutrient discharges of about 10% every five years; and overall, significant progress towards restoration of ecosystem carrying capacity and associated livelihoods. These impacts will be monitored and reported through the YSLME Commission as part of its mandate.

Catalytic Ocean Finance Summary	Amount (US $)
Total GEF Grant Financing	$14.744 million
Total Programme Co-financing	$10.302 million
Catalysed Public and Private Sector Financing	$10.863 billion
Catalytic Finance Ratio (Total Catalysed Finance : UNDP-GEF Finance)	737:1

Catalysing Ocean Finance Case Study #3: Rio de la Plata and Maritime Front

Context

Figure 20: Rio de la Plata and Maritime Front satellite image.



The Rio de la Plata, located on the south-eastern South American Shelf, links the "La Plata Basin"(the second largest river in the continent and the fourth largest in the world) with the Atlantic Ocean. Rio de la Plata and its Maritime Front (RPMF) constitute a transitional water system hosting significant biodiversity and other ecosystem services shared between the Republic of Argentina and the Republic of Uruguay.

The RPMF features a wide range of aquatic species from warm, temperate and cold waters. The result is an ecosystem with a high level of biodiversity and a low degree of endemic species. This includes 146 fish, 757 mollusk, and 98 copepod species. Endemic species include the mejillín, (Brachidontes rodriguezzi), clams (Macoma uruguayensis and Mesodesma mactroides), the navaja (Taggelus gibbus) and the Plata dolphin, also known as Franciscana (Pontoporia blainvillei); this dolphin is on the list of the Convention on Migratory Species.

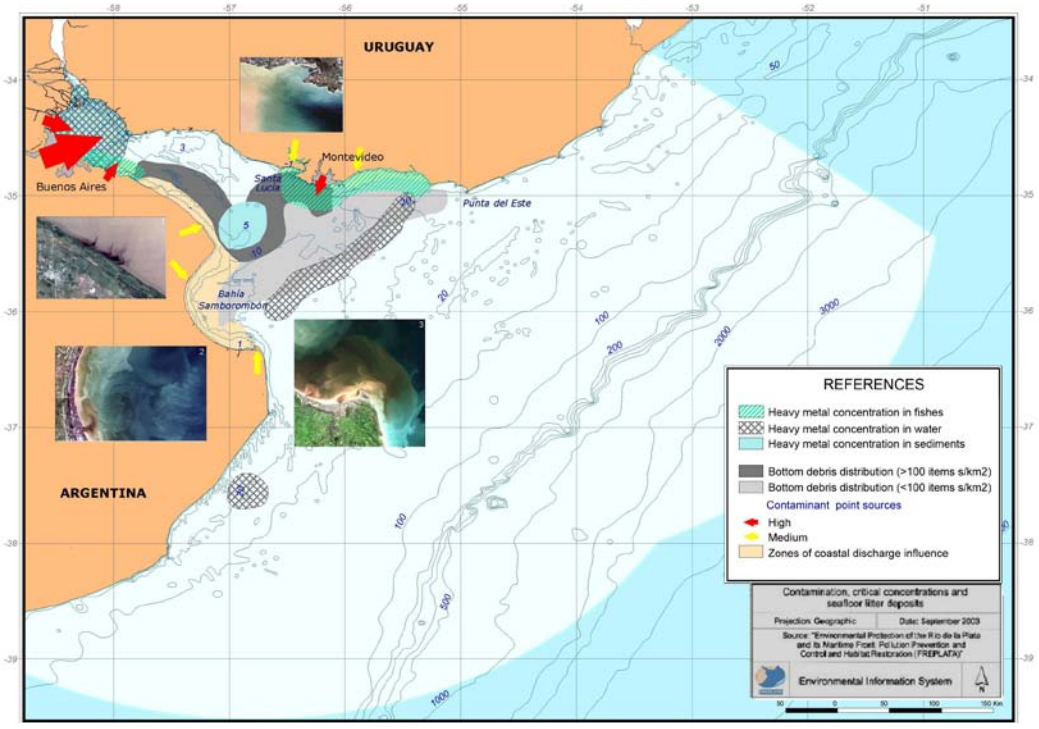
Several of these species are of outstanding global importance, from an ecological, economic and social standpoint (i.e., tuna and marine mammals). In the upper Rio de la Plata, populations of migratory fish - sábalo (Prochilodus lineatus), boga (Leporinus obtusidens), patí (Luciopimelodus pati) and dorado (Salminus maxillosus) – are prevalent. The delta of the river is a feeding area for the offspring of these species. Several populations of pinnipeds (Arctocephalus australis and Otaria flavescens) are also found in this area.

In the RPMF several aquatic species under different levels of threat worldwide inhabit the area either permanently or on a transitory basis. The list includes 19 seabirds, 5 freshwater birds (closely linked to the coastal zone), 13 marine mammals, 4 sea turtles, 22 sharks and rays, and 5 fish species.

The main urban centres of both countries are located along this basin with a population that concentrates around 20 million people (35% of Argentina and 70% of Uruguay). Economic activities developed along the coastal area include agricultural, fisheries, industrial and port activities, and generate most of the industrial GDP in both countries (65% Argentina and 87% in Uruguay), but also contribute to several transboundary environmental issues.

Despite its significant flow (24,000 m^3/s average) and coastal extension, the Rio de la Plata is evidencing stress from land-based pollution impacts, key habitat degradation and alteration of hydrological processes (sedimentation, erosion) (Figure 21). Coastal areas are also becoming rapidly urbanised, with projections of increased demand for water, sewer systems and solid waste disposal. An increase in toxic tides and alien species is also affecting this water system. Primary production levels in the RPMF generally exceed 1,000 mg C/m^2/day throughout the year.

Figure 21: Pollution sources and hot spots in the Rio de la Plata/Maritime Front



Source: UNDP-GEF FrePlata programme

On the southeastern edge of the Rio de la Plata, Samborombón Bay, declared a Ramsar Site, is threatened by point and non-point source pollution from land-based activities (such as sewage effluents that increase significantly in the summer season and nutrients originating from agricultural and livestock activities). The presence of heavy metals in the wetland water and sediments, as well as high concentrations of nutrients in the tributaries, has been determined.

In Uruguay, the Santa Lucía River wetland (SLW) in the lower watershed, is one of the largest wetland systems in the country (approximately 22,500 ha), and has been designated as an important bird conservation area due to the high concentration of globally threatened birds that make use of the diverse environments of the system. Proximity to Montevideo entails a high risk of degradation of the area. Currently there are slaughterhouses, dairy processing plants, tanneries, fertiliser plants, and wool washing plants, among others, in the area. The Santa Lucia basin discharges significant organic loads into the RPMF, estimated at 34.6 mt/day of total N and 1.7 mt/day of total P. Non point sources (e.g. from livestock and agricultural activities) dominate: 90% of total N and 63% of total P are linked to non-point source emissions.

UNDP-GEF Strategy:

Starting in 2000, UNDP-GEF supported a pioneering bi-national initiative – FREPLATA - in the region that facilitated preparation of a Transboundary Diagnostic Analysis (TDA) and a Strategic Action Programme (SAP) and associated National Action Plans (NAP) that were endorsed across multiple jurisdictions in both countries (Rio de la Plata SAP, 2007). The FrePlata TDA (FrePlata TDA, 2007) identified a number of barriers to sustainable management of the RPMF ecosystem which are summarised in Table 6:

Table 6: Identified barriers to sustainable management of the Rio de la Plata/Maritime Front

Type of \ Barrier	Barriers	Stakeholders			
		Consumers/ Users	Policy Makers	Local & Multi-lateral Financiers	Supply Chains
Regulatory	Overlap or lack of coordination between local, regional and national legislation		✓	✓	
	Environmental regulations focus on resources rather than ecosystem issues (sustainability)		✓		✓
Institutional	Jurisdiction of environmental agencies is subordinate to local development priorities		✓	✓	
	Regional governance institutions have capacity gaps in the domestic concerns of each country (land-based pollution, inland basins)		✓	✓	
Financial	Environmental regulations lack the appropriate financial instruments and the proper means to access and apply them	✓		✓	✓
Economic	Market growth objectives and targets lead to unsustainable coastal resource utilisation practices (overfishing, pollution, invasive species, etc.)	✓	✓	✓	✓
Informational	Inadequate access of available environmental information limits policy decisions on sustainable coastal and ocean management	✓	✓		✓
	Insufficient knowledge of available financial and economic instruments for sustainable ocean management		✓	✓	✓
Political	Political changes (cycles) require long-term visions in trans-boundary cooperation between countries				
	Differences in regional strategies limits possibilities for integration of bi-national priorities and programmes				
Technological	Limited experience in the use of innovative and suitable technologies		✓		✓
	Low valuation of clean technologies in the marketing strategy of companies and investors	✓			✓

Source: FrePlata TDA

Currently, UNDP-GEF is supporting both governments to build on these achievements to promote an integrated ecosystem approach for the sustainable management of the RPMF. The FrePlata project, executed by the governments of Argentina and Uruguay and implemented by UNDP, contributes to strengthening the institutional basis and cooperation frameworks for SAP implementation at all levels: bi-national Commissions, national agencies with mandates over land-based activities, and local governments (Box 3).

Box 3: Rio de la Plata and Maritime Front Strategic Action Programme – Policy, Planning and Regulatory Drivers for Pollution Reduction and Habitat Protection

Regional – Treaty of the Rio de la Plata, Chapter IX:

- Identification of critical areas of urban and industrial pollution (hot spots map), ecologically sensitive areas (Law 16272) and key conservation areas;
- Shared water and sediment quality objectives in the common area of the RPMF, including a set of reference values for 42 pollutants (metals, pesticides, hydrocarbons and other toxins);
- Bi-national monitoring plans and procedures for toxicological assessments for water and sediments in the RPMF;
- Operating Procedures for Waste Management in ports and wastewater treatment;
- Identification of pilot projects for Cleaner Production practices in key sectors of industry.

Argentina

Coastal Management

Province of Buenos Aires Decree 1802/2008 establishing the Coordination Unit of Integrated Coastal Management, an "Inter-ministerial Commission" to coordinate actions of the coastal municipalities to implement integrated coastal management and establish river basin planning in the coastal zone of Argentina draining to RPFM.

Water quality and pollution control

Resolution 42/06 adopted by the Water Authority of the Province of Buenos Aires, Argentina, sets the criteria and parameters for fresh and marine RPMF water quality to protect aquatic biota, recreational uses and as source of drinking water, in Argentina's exclusive use zone of the RPMF.

Resolution ACUMAR 3/2009 for the Authority Matanza-Riachuelo Basin of Argentina sets pollution limits for this hot spot of pollution from industries and sewage.

Wastewater treatment

Sanitation Master Plan (SMP) for the Matanza-Riachuelo Basin adopted by Argentine Company of Water and Sanitation Services (AySA), (2009 - 2011); includes construction of wastewater treatment plant for metropolitan population of 4 million.

The Municipality of the Coast in Argentina adopted plan (63/2012) of action and investment to address the problems of pollution from sewage in San Boronbom Bay.

Public Private Partnerships (PPP)

Agency for Scientific and Technological Promotion of Argentina supports with funds (Res.468/2011), a PPP between the Cooperative Provision of Public Works and Services of San Clemente del Tuyu, La Plata University and the provincial agency for the sustainable development (OPDS) in an innovative strategy (developing an artificial wetland) to reduce pollution in the bay of San Boronbom).

Protected Areas

Argentina National Parks Administration created Law 28.499/2009 establishing the National Park "Campos del Tuyu (3,040 hectares) in the Bay of San Boronbom, a Ramsar site in the more extended coastal wetland of RPMF (254,000 hectares).

Uruguay

Water quality and pollution control

The National Ports Administration of Uruguay adopted (2007) protocols for management of ship waste within its Environmental Management Plan, in accordance with the guidelines prepared with assistance from FREPLATA and approved in 2005.

Wastewater treatment

Fourth phase of Urban Sanitation Plan (PSU-IV 2006 – 2011) approved by Montevideo Government, aimed at extending urban sanitation, remediating Montevideo Bay and achieving ISO 14000 certification of its beaches.

Protected Areas

Joint initiative by FREPLATA and a local NGO resulted in 70 km^2 of coastal-marine area at Cerro Verde (Rocha, Atlantic coast of Uruguay) being declared a Natural Protected Area (Biosphere Reserve, MAB-UNESCO in 2006), and then included in the National Protected Area System (Decree Nº285/2011).

Source: UNDP-GEF FrePlata programme

The strategy includes the development of an institutional framework for effective inter-ministry coordination. Bilateral commissions (CARP and CTMFM) --formed under the Treaty of RPMF-- and both national environmental agencies are working at the highest political level to ensure sustainable implementation of National Action Plans through public policies and government programmes.

Funding mechanisms and co-financing arrangements to ensure long-term sustainability of outcomes are a key component of this approach, as is the monitoring and information system.

UNDP-GEF also helped both countries to prepare an investment portfolio of 20 projects totaling $2.62 billion, focused on reducing releases of untreated sewage waters and industrial pollutants into the basin, as well as on reducing nutrient discharge in key wetland protected areas.

Innovative platforms to enhance collaboration between public and private sectors (Public-Private Partnerships) are being promoted through Cleaner Production (CP) approaches through pilot projects testing reduction of toxic loads (point source pollution reduction) in RPMF with strong replication potential for upscaling throughout industrial sectors. Incentives and fiscal benefits are some of the tools for promoting public-private investments in clean technologies.

In both countries, facilitated by the SAP process, legal frameworks have evolved into legislation for pollution control and integrated water resource management concerning the RPMF (Box 3). In Uruguay there is now a national public policy for mainstreaming environment into water resource management, as well as rules based on land use planning to protect the coastal zone.

In Argentina, a regional basin authority (ACUMAR) for managing the most contaminated effluents to the RPMF has been established and its jurisdiction on this region has proved to be a solution for the inter-institutional and inter-ministerial coordination gaps affecting the Matanza-Riachuelo Basin (5.7 million people and the highest concentration of industrial facilities in the RPMF). The regional authority for water management in the Buenos Aires province adopted rules and standards for reduced releases compatible with improved water quality and protecting aquatic life.

Results – Stress Reduction through Governance Reform and Investment

The UNDP-GEF FREPLATA project assisted both countries to prepare a portfolio of investment projects (Table 8), under the SAP framework, focused on reducing releases of untreated sewage waters and industrial pollutants into the basin as well as on reducing nutrient discharge in key wetland areas. Both governments have strengthened their institutional and cooperation frameworks for the shared management of the RPMF. Through the establishment of bi-national Commissions, national agencies and local governments dealing with RPMF issues, the project has helped to catalyse actual investments that were almost twice the original goals ($2.62 billion vs. $1.45 billion).

NAPs in both countries have supported the creation of policy frameworks and investments for treating urban and industrial releases, adopting clean technologies, and improving health and public information. In the Argentinean margin of the basin, releases coming from 5.7 million inhabitants are now treated in four plants employing primary and secondary treatment prior to their release into the basin. A $500 million treatment plant is being built in the Matanza-Riachuelo basin and will contribute to significant pollution reduction as shown in Table 7:

Table 7: Removal of Matanza- Riachuelo basin pollutants after primary treatment

Pollutant	Percentage removal
Suspended matter	47%
Fatty substances	20%
BOD	39%
Cyanide	27%
Mercury	10%
Cadmium	15%
Copper	22%
Chromium	27%
Zinc	27%
Lead	57%

Source: UNDP-GEF FrePlata programme

Pilot projects in rural areas are also being implemented to reduce nutrient discharge in key wetland protected areas, through promoting good agricultural practices in dairy sectors of Santa Lucia wetlands (58,000 ha NPA), and innovative artificial wetland techniques for urban sewage treatment in Sanborombón Bay (224,000 ha NPA, Ramsar site). These pilot projects work closely with National Protected Areas Systems in both countries (SNAP, SIFAP) towards effective integrated management of coastal protected areas.

Table 8: FrePlata Strategic Action Programme - Project Investment Portfolio in Rio de la Plata and Maritime Front to reduce and prevent pollution

Country	Project location (municipalities and beneficiary population)	Type of investment	Amount of investment (US $ million)	Source of Funding	Number of projects
Uruguay	National	Industrial Pollutants Reduction (Plastics recycling, PCB, Others)	1.52	MVOTMA - National Government Budget	3
Uruguay	Maldonado (450,000)	Sewage treatment	68	OSE - National Government Budget	1
Uruguay	Colonia (120,000)		5		1
Uruguay	Canelones (83,900)		170		1
Uruguay	Montevideo (1,350,000)		118.6	IADB	1
Uruguay		Integrated basin management	1.96	European Union	2
Uruguay	San José, Canelones	Pollution control and water quality	2.1	JICA - Japan International Cooperation Agency	1
Uruguay	National	Land use planning	0.68	MIDES - National Government Budget	1
Uruguay	National	Information and environmental management	1.3	AECID	1
Argentina	17 municipalities GBA (6,103,000)	Sewage treatment	482	IADB	1
Argentina	14 municipalities Riachuelo Basin (5,340,000)	Sewage treatment, Pollution management and environmental health	1000	World Bank	1
Argentina		Public administration- Water, sanitation and flood protection	249.58	IADB	1
Argentina		Promotion of clean production	12.6	ACUMAR - National Government Budget	2
Argentina		Pollution management and environmental health	3.14	ACUMAR - National Government Budget	1
Argentina	Tigre, San Martin, Hurlingham, La Matanza (1,500,000)	Sewage treatment	250	AySA - National Government Budget, IADB	1
Argentina	18 municipalities Reconquista Basin (4,239,000)	Sewage treatment	250	AySA - National Government Budget, IADB	1
Total			**2,616.48**		**20**

Source: UNDP-GEF FrePlata programme

Municipalities Riachuelo Basin: Almirante Brown, Avellaneda, Cañuelas, Esteban Echeverría, Ezeiza, General Las Heras, La Matanza, Lanús, Lomas de Zamora, Marcos Paz, Merlo, Morón, Presidente Perón y San Vicente. Municipalities Reconquista Basin: Tigre, San Fernando, San Isidro, Vicente López, General San Martín, Tres de Febrero, Malvinas Argentinas, José C. Paz, San Miguel, Hurlingham, Ituzaingó, Morón, Luján, Moreno, Merlo, General Rodríguez, General Las Heras y Marcos Paz. GBA: Buenos Aires urban conglomerate.

Results – Environmental Benefits

While it is too early in terms of completed and ongoing investments, implementation of pollution reduction practices and protected and/or restored habitat, to detect measurable environmental improvements in RPMF water, sediment and biodiversity, the UNDP-GEF FrePlata programme established an outstanding environmental status baseline against which the anticipated improvements to ecosystem integrity and livelihoods can be tracked over time as the impacts of these investments and practices begin to manifest themselves.

Catalytic Ocean Finance Summary	Amount (US $)
Total GEF Grant Financing	$9.31 million
Total Programme Co-financing	$19.83 million
Catalysed Public and Private Sector Financing	$2.62 billion
Catalytic Finance Ratio (Total Catalysed Finance : UNDP-GEF Finance)	281:1

2. Applying the Integrated Coastal Management (ICM) methodology to catalyse finance for coastal and ocean management

2.1 Introduction

In Chapter 1, we saw through three case studies how the multi-country TDA/SAP strategic planning approach delivered commitments to regional and national governance reforms which put in place the necessary enabling environment to catalyse sizeable sums of environmental investments to protect and restore shared marine ecosystems and the economies that depend upon them. UNDP-GEF has also successfully applied, refined and scaled up a more 'bottom up' approach, working primarily at municipal and provincial scales, to strengthening ocean and coastal governance, Integrated Coastal Management (ICM), which, in combination with the negotiation, adoption and implementation of regional ocean strategies, creates a powerful, two-pronged tool for advancing sustainable use of marine ecosystems. This chapter reviews the ICM methodology and describes a case study documenting the effectiveness of ICM in *Catalysing Ocean Finance*.

Our coasts and oceans represent critical socioeconomic assets because of their contributions to human livelihoods, food security, and well-being. More than half the world's population now inhabits coastal areas and this trend continues unabated. The ocean plays a dynamic role in regulating and moderating the earth's physical, chemical and biological processes, including climate, the hydrological cycle and cycling of material run-off from the continents. The inextricable linkages between coasts and oceans underscores the need to take integrated approaches to sustaining the coastal and ocean ecosystems that generate goods and services — food, energy, water, medicines, climate change regulation, nutrient recycling and other essential needs — necessary for the sustainable development of our economies.

The ocean supports 90% of ship-based global trade (ICS, 2009) and hundreds of millions of people are dependent on coasts and oceans to provide them with incomes from marine based livelihoods, such as small-scale fishing, coastal tourism, etc. Seafood contributes at least 15% of average animal protein consumed by about 3 billion people and as much as 50% by small island and West African states (FAO, 2009). In most countries in East and Southeast Asia, over a third of animal protein intake comes from fish (Dey, et al. 2008).

Although the important roles of oceans and coasts are well recognised—and their management well enshrined in various international, regional, national and local commitments—much of the world's oceans and coasts continue to be degraded while reforms in policies and interventions remain inadequate (and in most cases, unenforced). Negative development drivers are outpacing our capacity to respond to increasingly complex ecological challenges.

We are now beginning to realise that both the challenges and opportunities in sustainable ocean and coastal governance and management have grown very complex. This is because of the multiplicity of issues and actors that are inherently embedded in larger sociopolitical, economic and cultural contexts.

Continued population and economic growth are the main drivers of coastal and ocean resource use, consumption and management. Over-extraction of resources has significantly depleted and altered resource stocks and ecosystems (and their capacity to provide food and other ecosystem services as well.) Chronic poverty, habitat loss and conversion, and land-based pollution also contribute to the challenge of coastal sustainability. Current and projected (in 'business as usual' scenarios) increases in the impacts of climate change on habitats and the environment, coastal settlements, other built-up areas and livelihoods further compound this complexity. In fact, many of the recent emergencies and disasters are known to have "no analogue states," whereby current emergencies cannot be addressed by past "solutions."

There is no doubt that managing the sustainable uses of coasts, islands, and oceans represents a formidable challenge. The need for innovations in policies, structures, mechanisms and leadership strategies is thus very urgent and has increasingly driven ocean and coastal policy agendas in recent years. As a result, the growth in integrative and collaborative coastal governance approaches is increasing; this has consequently widened the policy and action spaces needed to accommodate the many and varied perspectives required by these approaches.

2.2 Methodology – Framework for Sustainable Development of Coastal Areas (SDCA)/ Integrated Coastal Management (ICM)

Both the integrated coastal management (ICM) and ecosystem-based approaches (EBA) have been advocated over the years to address the above complexities. Both have been widely recognised by various international conventions, the United Nations and other international organisations, non-governmental organisations (NGOs) and multilateral and bilateral aid agencies and financial institutions as the appropriate policy and management frameworks for implementing relevant international agreements and conventions, such as Agenda 21, WSSD, the Millennium Development Goals (MDG), the Convention on Biological Diversity, the UN Framework Convention on Climate Change, and the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities.

In particular, ICM, which has been practiced for over four decades, evolved from the practical need to plan and manage the various economic activities that occur in the coastal area, regulate human behavior, coordinate policy and management intervention, and integrate the use of coastal waters into land-use planning. The ultimate purpose of ICM is, therefore, to increase the efficiency and effectiveness of coastal governance in terms of its ability to achieve the sustainable use of coastal resources and of the services generated by ecosystems in coastal areas. It aims to do this by protecting the functional integrity of these natural resource systems while allowing economic development to proceed (Chua, 2006).

Figure 22: PEMSEA ICM Demonstration and Parallel Sites, East Asian Seas

Source: PEMSEA (2010)

Over the last 18 years, UNDP-GEF has supported the creation, operation and institutionalisation of PEMSEA, Partnerships in Environmental Management for the Seas of East Asia, into the East Asian Seas region. Over this period, PEMSEA has developed, demonstrated and applied ICM programmes at various locations across the East Asian Region as a systematic approach to achieving sustainable development of coastal and marine environment and resources, specifically through on-the-ground implementation by local governments (see map Figure 22). To date, ICM programmes have been initiated covering about 11% of the coastline in the East Asian region or 26,829 km (Table 9).

To govern its ICM programmes, PEMSEA utilises two important methodological frameworks developed during its first phase of GEF support (MPP-EAS): (1) the Framework for Sustainable Development of Coastal Areas (SDCA) and (2) the ICM cycle. Both serve as a conceptual map and an analytical/decision-making tool that enable how ICM is operationalised and institutionalised in the sites.

The Sustainable Development of Coastal Areas (SDCA) Framework

PEMSEA has developed and implemented a comprehensive, multi-faceted, ecosystem-based approach—the Framework for Sustainable Development of Coastal Areas (SDCA)—to provide as comprehensive a platform as possible by which to achieve sustainable development goals in coastal areas (Figure 23). The SDCA Framework is based upon initiatives in the East Asian Seas region in the last decade; it encapsulates the principal elements that contribute to sustainable ocean and coastal governance. The SDCA Framework ensures more focus and accountability in coastal governance.

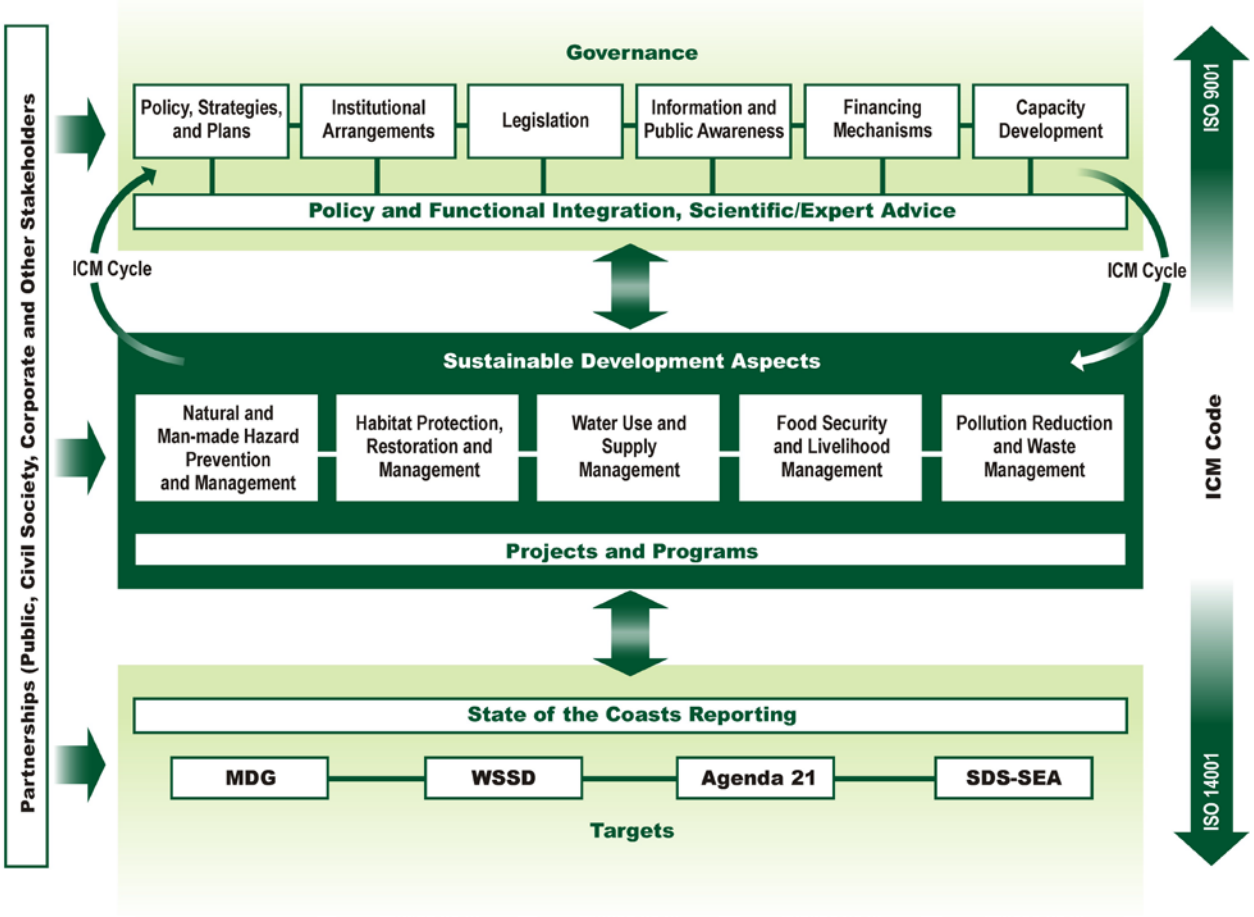
The governance component of the SDCA Framework emphasises the integration of policies and strategies in developing actions as well as creating a policy environment for environmental financing, stakeholder participation,

including scientific and expert advice, and capacity development. It also promotes institutional arrangements that facilitate interagency and multi-sectoral cooperation and collaboration, develops appropriate legislation to ensure policy and functional integration across sectors, and provides a legal basis for their enforcement. It is a strategic attempt to streamline and fast track government actions.

Embedded in the Framework is a call for action to create food security, sustainable livelihood and other programmes on coastal habitat protection, restoration and management; water use and supply management; pollution reduction and waste management; and natural and manmade hazard prevention and management. Thus, the Framework emphasises the link that exists between governance of coastal and marine activities, the rehabilitation and sustainable management of ecosystem services, and the benefits and impacts to people.

Ideally, a harmonious, peaceful co-existence between these mutually linked (but oftentimes competing) concerns can be established. But pragmatically—and given the increasing trend in coastal urbanisation, development of the ocean economy, and the pressure coming from climate variation and change—trade-offs and priorities need to be determined and agreed upon; local governments have to choose which coastal activity in which area is the main concern and is in need of the financing and investment portfolios that can better achieve the goals of sustainable development.

Figure 23: Process-oriented Common Framework for Sustainable Development of Coastal Areas (SDCA) through ICM Implementation



Source: PEMSEA (2007)

Two other important components of the SDCA Framework are the State of Coasts Reporting System (SOC) and the ICM Code. The SOC serves as a tool for assessing baseline conditions at a site (e.g., demographic; socio-economic; ecological) and for measuring changes and determining trends over time. The SOC provides local Chief Executives with a report card on the effectiveness and impact of ICM programmes, and gives direction for future actions.

The ICM Code provides the rules of practice in an integrated coastal management system. The Code enables local governments to undertake an ICM programme following a standard planning and management framework and set of procedures, and for measuring progress toward and conformity with recognised international standards e.g., ISO 9001 (Quality Management System) and ISO 14001 (Environmental Management System).

The ICM Cycle

The SDCA Framework utilises the integrated coastal management (ICM) cycle—comprised of mechanisms and processes that have matured over four decades—as the principal driver to operationalise ICM. In other words, the ICM cycle provides a stepwise, iterative approach and the necessary innovative tools, which facilitate a systematic and integrated policymaking, planning and management approach. The SDCA Framework represents the result of the conceptual and operational "loop" of the ICM cycle. This confers the dynamism through which the SDCA Framework operates; as such, in the spirit of adaptive management, the SDCA Framework adjusts as new challenges (and opportunities) in investments arise.

What follows is a stage-wise discussion on how the ICM cycle is applied by local governments in developing and implementing ICM programmes (see Figure 24). The ICM cycle has primarily taught us that a coastal governance policy must not exist separately from its implementation; that this is a long-term endeavor. And as an ICM programme matures, both the SDCA Framework and the ICM cycle provide robust, scaling-up platforms to accommodate increasing (and evolving) needs and aspirations in the coastal areas.

Figure 24: ICM Development and Implementation Cycle

Source: PEMSEA (2011)

The Preparing stage focuses efforts on setting up the management and administrative aspects of the ICM site, which includes: 1) establishment of a project management office (PMO) to coordinate the implementation of identified activities and selection of project staff; 2) establishment of an inter-agency, multi-sector coordinating body (normally in the form of project coordinating committee or PCC) that will coordinate diversified project activities and direct the programme; 3) establishment of a technical working/advisory group to provide technical and scientific advice to the project; and 4) clarification of working relationships within the local government and among national government agencies and other stakeholders.

It is also essential to prepare a work plan and arrange available financial and other administrative resources. To effectively implement the work plan, project staff is trained at this stage and stakeholders are provided with information on the rationale and benefit of ICM. Proper communications with stakeholders minimises their resistance to the project and increases their participation and support in implementing project activities.

At this early stage, a project monitoring and evaluation (M&E) system is set up to monitor and measure the progress and achievements of the project. The M&E system, designed for long-term application, should be practical and easy to apply, and provide useful information to local governments and stakeholders for mapping and tracking the ICM work plan and budget. At this point in time, an initial status review can also be conducted using the ICM Code as a standard for assessing existing governance and management conditions at the local level. The outcome can be useful in providing direction and support to local governments to further strengthen their management and administrative capacity and efficiency through an integrated management approach.

The Initiating and Developing stages are time consuming as they literally cover the development of comprehensive strategies and implementation plans following the requirements of the ICM Code.

Table 9: ICM Scaling Up Programmes across the East Asian Seas Region

Country	ICM/Pollution Hotspot Site	Length of Coastline (km)
Cambodia	Preah Sihanouk Province	119*
	Koh Kong Province	237*
	Kampot Province	73*
	Kep Municipality	6*
China	Xiamen	194*
	Quanzhou	541.0
	Yangjiang	341.5
	Haikou	30
	Panjin	included in the Bohai Sea coastline
	Laoting	
	Dongying	
	Lianyungang	13
	Fangchenggang	584
	Wenchang City	48
	Qingdao	730
	Bohai Sea	3,748*
DPR Korea	Nampho	127*
Indonesia	Bali	219*
	Sukabumi	117*
	Tomini Bay	2,500*
	Jakarta Bay	72*
	15 provinces/43 coastal districts and cities covered by the MCRMP of MOMAF	
Malaysia	Klang	101.75*
Philippines	Batangas Province	492*
	Guimaras	409*
	Manila Bay (Bataan, Cavite, Pampanga, Bulacan, NCR)	395.5*
	Tayabas Bay (Quezon side)	305.7*
	Macajalar Bay	176
	Camiguin	55%
	Ilocos Coast	596
	Palawan	1,921*
	Boracay Island	7
RO Korea	Entire Coastline	11,542*
Thailand	Chonburi	160*
Vietnam	Danang	92*
	Thua Thien Hue	128*
	Quang Nam	125%
	Quang Ninh	270
	Hai Phong	125
	Nam Dinh	72
	Va Ria-Vung Tau	156
Total regional coastline (km)		**234,000**
Total regional coastline coverage with ICM programmes initiated		**26,829 (11%)**
*Total regional coastline with coastal strategy or similar sustainable development strategy in place and being implemented at the local level		**22,658 (9%)**

Source: PEMSEA (2010)

In the Initiating stage, environmental issues and concerns are identified and prioritised for management interventions. Preparation of a baseline State of the Coasts (SOC) report consolidates the socio-economic, cultural, political, religious and ecological characteristics of the site. Such information will determine the types and level of policy and management interventions needed. An integrated information management system can be set up at this stage, in order to store relevant data and information and to facilitate easy retrieval, information-sharing and use among participating agencies/institutions.

By conducting an environmental risk assessment using the collected secondary information, a priority ranking of environmental concerns can be developed.

The SOC, integrated information management system and environmental risk assessment entail extensive stakeholder consultations, which contribute to improved understanding and appreciation of the linkages between human activities and the coastal and marine ecosystem. This awareness translates into increased interest and participation in the preparation of a coastal strategy. The coastal strategy involves consultations among stakeholders from different sectors with different perspectives. The objective of the coastal strategy is to formulate and agree upon a common vision and long-term framework of actions in developing and managing their shared coastal area.

To address the perceived environment risks, the Developing stage prioritises the action programmes within the coastal strategy for short-, medium- and long-term implementation. A coastal strategy implementation plan is developed as a collaborative planning exercise involving the lead agency and line agencies. It identifies goals, targets, measurable indicators of progress and outcomes for key management interventions, based on the coastal strategy. The implementation plan also specifies an indicative budget and financing strategy for each action programme. It enhances the coordination and integration of many diverse projects to ensure effective use of time, funding and resources.

Although financing is a critical need for the development and implementation of an ICM programme, it is not a limiting factor. An ICM programme can be initiated within the limits of existing financial resources using available line agency budgets. The key is the strong support and participation of the relevant agencies because benefits are accrued from such participation. In particular, line agencies with a mandate in disaster, water, habitat, pollution and fisheries management are able to benefit from the ICM approach. It provides an opportunity to pool interagency resources – an important step towards securing needed financing - for achieving common objectives and implementing agreed plans of action.

When executing the implementation plan, a multi-stakeholder and integrated environmental monitoring programme is operationalised in order to monitor changes in environmental conditions and assess the effectiveness of management actions. The monitoring programme is designed to provide information to the SOC (to determine changes and trends in governance, socio-economic and environmental conditions), as well as to the environmental risk assessment (to determine levels of risk as a consequence of environmental changes and trends).

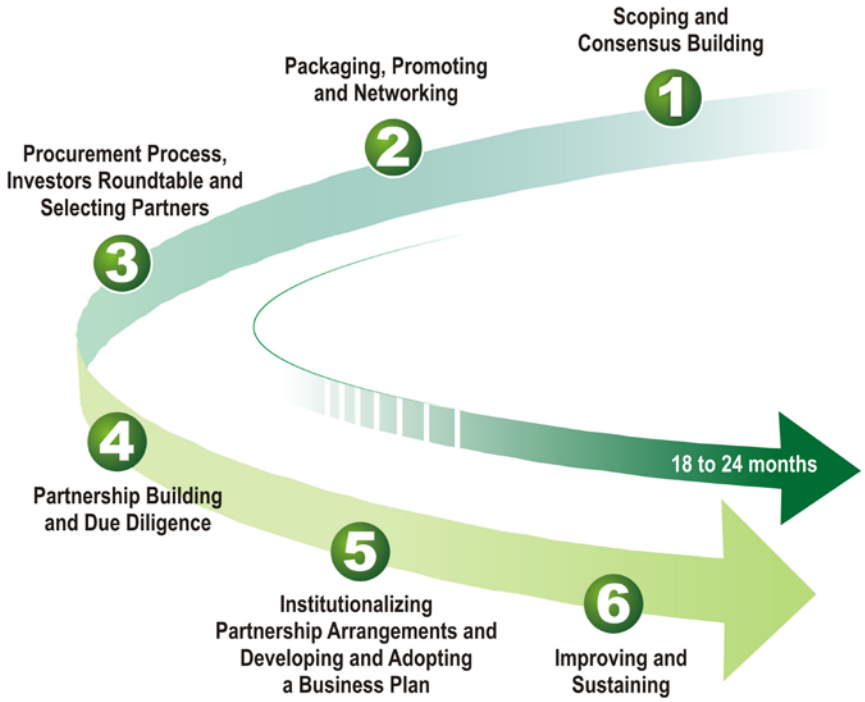
Other key outputs from the Developing stage are: 1) institutional arrangements and supporting sustainable financing mechanisms are established to ensure the programme's sustainability within existing social, political and legal structures; and 2) a coastal use zoning scheme and its implementing arrangements are set up to provide local governments with a mechanism for planning and managing development and human activities in coastal areas, as well as for establishing permits, user fees, etc. for access to/use of coastal and marine resources and services.

Adoption of the above plans and arrangements by the local government guarantees the integration of the plans into the development planning framework of the local government, allocation of budget, harmonisation of efforts, and institutionalisation of coordinating arrangements for implementation of the action plans. Involvement of the lawmakers and public to pass local laws in support of the proposed plans in the Adopting stage requires intensive public awareness and political will. Thus a target-oriented communication plan needs to be developed and started during the Initiating and Developing stages in order to prepare the concerned policy-makers and stakeholders for the Adopting stage.

The Implementing stage demands the availability of competent personnel, financial resources, as well as the political commitment to implement action plans. Thus, this stage emphasises setting in place institutional/legal arrangements

and financial mechanisms (Figure 25) to operate the ICM programme, which were committed under the coastal strategy implementation plan. The project management arrangements at this stage can be transformed, becoming integrated into the local government's institutional structure through appropriate legislative procedures.

Figure 25: ICM Environmental Investment Process



Source: PEMSEA (2011)

Training and development of competent personnel in the different line agencies and sectors involved in ICM implementation is also a key aspect at this stage. A critical mass of human resources must be available at the local level or available within reach of the local government. A successful ICM programme is built on the local capacity to plan and manage the coastal and marine areas. One good practice is to link an ICM programme with a local university or research institution whose staff can be further developed and knowledge and skills improved so that they will be capable and effective in providing the needed technical support to the concerned local government.

The cyclical nature of ICM allows improvements in methodology, approaches and actions as ICM practitioners gain experience and acquire technical expertise.

During the Refining and Consolidating stage, a practical and efficient M&E system, established at the onset (Preparing) facilitates the process of assessing ICM programme implementation and management. Updating the SOC report provides the local government and their stakeholders with an assessment of ICM achievements and resulting changes, and contributes to the planning for the next ICM cycle.

The time frame required for developing and implementing an ICM programme may vary depending on the geographical scope, the severity of environmental issues, complexity of the management issues and the institutional and financial capacity of the local government. In most instances, it may take several decades to attain the common vision and desired outcomes of the coastal strategy. Five years, however, is sufficient to develop and implement the first ICM cycle. With experience, the project timeframe should be reduced to 3-5 years, preferably coinciding with the planning cycle of the local government.

The next programme cycle begins when new action plans are being formulated and implemented, based on the experience and foundation established in the previous cycle. The new cycle can address the challenge of scaling up the ICM programme with regard to the following contexts: 1) geographic expansion of existing ICM programme and/or

replication of ICM in other coastal areas; 2) functional expansion of ICM with regard to management issues, including the linking of coastal management and watershed and river basin management; and 3) temporal considerations, as ICM needs to become an integral part of government programmes instead of being implemented as a separate project.

2.3 Catalysing Ocean Finance Case Study

Catalysing Ocean Finance Case Study #4: Partnerships in Environmental Management for the Seas of East Asia (PEMSEA)

Context:

The East Asian Seas have been facing increasing stress over the past few decades as a consequence of rapid economic growth coupled with the expansion of maritime trade and global demand for marine products, as well as population increases and large scale migration of people and commerce to coastal areas. As a consequence, 11% of the region's coral reefs have collapsed in the last 30 years, while 48% are listed in critical condition. Mangroves in the region have lost 70% of their cover in the last 70 years. The loss of seagrass beds in the region ranges from 20% to 60%. In terms of land-based pollution, the estimates of domestic sewage treated prior to discharge amounts to only 11%, while billions of tonnes of industrial wastewater are being discharged annually from major coastal cities without pretreatment. About 300 oil spills (over 200 million gallons of oil) have occurred in the region since the mid-1960s. The highest number of oil slicks occurred in the Gulf of Thailand, the South China Sea (south of Viet Nam), and the Straits of Malacca.

Climate change, and associated sea level rise, flooding, ocean acidification and other hazards also pose a tremendous threat to the region. From 1995 to 2004, the cost of natural disasters in the region was estimated at more than $300 billion in damages, and in excess of 445,000 human fatalities. And the situation appears to be getting worse, with more frequent and more severe tropical storms hitting the area.

Addressing these concerns and issues is critical to the survival and livelihoods of the billions of inhabitants of the region who are highly dependent on coastal and marine resources. Recent findings show that the contribution of the marine economy to the national economies of developing countries in East Asia is higher than those of highly industrialised economies, including the United States, United Kingdom and Canada, which are usually between one and four percent. Preliminary estimates indicate that for several nations in the East Asian Seas region, the contribution of the marine economy to the national economy is in excess of 5%, and may reach 20% in two countries, Indonesia and Vietnam (Tropical Coasts, July 2009).

UNDP-GEF Strategy:

The social, environmental and economic impacts of the continuing degradation of the East Asian Seas called for concerted action by the countries of the region. With support from UNDP-GEF, a series of four GEF International Waters projects were initiated, starting in 1993, with a cumulative GEF investment of $36.1 million, including the ongoing project that is scheduled to be completed in 2012. The projects have focused on improved regional ocean and coastal governance and on-the-ground management responses to existing and potential hazards being faced at the local, national, sub-regional and regional levels. While local and national contexts naturally vary across the East Asian Seas region, a number of common barriers to sustainable management of ocean and coastal areas in the region were identified through PEMSEA; these are summarised in Table 10.

Table 10: Common barriers to coastal and ocean sustainability in the East Asian Seas region

Type of Barrier	Barriers	Stakeholders			
		Consumers/ Users	Policy Makers	Local & Multi-lateral Financiers	Supply Chains
Regulatory	Non-existent or insufficient ICM and related ocean and coastal policies and legislation		✓		
	Lack of enforcement capacity by local authorities	✓	✓		
	Unregulated application of fertilisers and pesticides on agricultural lands	✓	✓		✓
	Informal settlers and unregulated/uncontrolled development along river banks and coastal areas	✓	✓		
Institutional	Weak governance system; many institutions have sanitation-related mandates, no one institution takes the lead resulting in policy and operational gaps in implementation and enforcement	✓	✓		
	Low public sector capacity particularly at the local level, where responsibility for coastal and ocean environmental services rests in most East Asian countries	✓	✓	✓	✓
Financial	Lack of suitable financial instruments to provide incentives/leverage public and private sector investments in pollution reduction, particularly at the local government level and through the PPP process	✓	✓	✓	✓
	Low investment levels, combined with rapidly increasing populations and increasing frequency of disasters, mean that sanitation and sewerage services are not keeping pace with plans	✓	✓	✓	✓
Economic	Poor infrastructure (e.g., roads; access to households; septic tanks, etc.) impedes collection systems for solid and sanitary wastes	✓	✓		
	Underdeveloped system of water rights	✓	✓		
	Excessive reliance on administrative and control measures rather than market based instruments	✓	✓	✓	
Informational	Lack of awareness and information on modes of waste segregation, recycling, recovery and reuse	✓	✓	✓	✓
	Insufficient knowledge of available financial and economic instruments	✓	✓	✓	
Technological	Limited availability of suitable technologies, particularly low-cost but effective technologies for local governments	✓	✓	✓	✓
	On-site wastewater treatment and disposal, mainly septic tanks, are often poorly designed, operated and maintained and perform badly.	✓	✓	✓	✓
	Inappropriate technology being applied; expectations regarding water quality improvements not being met	✓	✓	✓	✓
	Limited monitoring capacity to measure water quality conditions and impact of pollution discharges on environment and human health	✓	✓		✓
	Low water use efficiency by agriculture and industry	✓	✓		✓
	Lack of capacity to control non-point sources of pollution, including urban and rural runoff and livestock wastes	✓	✓		✓
Political	Solid waste and sewerage service not high on political agenda at the local government level; many competing issues	✓	✓		

Source: PEMSEA

A major output of the projects was the development and high-level adoption in 2003 of the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA) by 12 countries, and recognition of PEMSEA (Partnerships in Environmental Management for the Seas of East Asia) as the regional coordinating mechanism for the long-term implementation of the SDS-SEA. Various on-the-ground actions included the development and implementation of ICM (Integrated Coastal

Management) programmes with 29 local governments, covering challenges such as sanitation, sewerage and waste management, habitat restoration and management, food security, livelihood improvement and natural and man-made hazards management.

On a sub-regional scale, management interventions have focused on oil spill preparedness and response from sea-based sources of marine pollution, as well as addressing land-based pollution of coastal areas through integrated river basin and coastal area management initiatives.

Results:

Increasing adoption of ICM or coastal development policies and strategies

Since the adoption of the SDS-SEA in 2003, changes in coastal and ocean governance and management approaches have occurred in the East Asian Seas at the regional, national and local levels. For example, 9 countries (Cambodia, China, Indonesia, Japan, Philippines, RO Korea, Singapore, Thailand, and Vietnam) have formulated and/or are now in the process of adopting and implementing their respective national ICM or coastal development policies and strategies, which create and/or strengthen the policy environment for investment (Box 4).

PEMSEA's emphasis on on-the-ground management action over the years, through ICM programme development and implementation, has also strengthened government confidence and increased commitments from both the public and private sectors. This is demonstrated by the increasing number of ICM sites in the region. Based on a recent survey (June 2010), countries confirmed that ICM programmes now cover approximately 11% of the region's coastline. The target adopted by PEMSEA countries in 2006 under SDS-SEA is 20% of the region's coastline with ICM programmes by 2015.

Box 4: East Asian Seas/PEMSEA – SDS/SEA and ICM Policy, Planning and Regulatory Drivers for Environmental Protection Investments

Location	SDS-SEA Outputs	National Policies/Plans/Programmes	National Legislation
Regional	Sustainable Development Strategy for the Seas of East Asia (2003)		
	Putrajaya Declaration of Regional Cooperation for the Sustainable Development Strategy for the Seas of East Asia (2003)		
	Haikou Partnership Agreement on the Implementation of the Sustainable Development Strategy for the Seas of East Asia (2006)		
	Manila Declaration on Strengthening the Implementation of ICM for Sustainable Development and Climate Change Adaptation in the Seas of East Asia Region (2009)		
	Changwon Declaration toward an Ocean-Based Blue Economy: Moving Ahead with the Sustainable Development Strategy for the Seas of East Asia (2012)		
China (Bohai Sea; Xiamen; Haikou; Laoting)	Bohai Sea Declaration (2000)	Bohai Blue Sea Programme (2001) $6.7 billion investment	Regulations on the Administration for Application and Registration of Pollution Discharge (2003)
	Bohai Sea Sustainable Development Strategy (2003)	Eleventh 5-year Programme on the Prevention and Control of Water Pollution for Priority Basins (2006-2010)	Regulations on the Administration for Area and Functional Zone Adjustment (2003)
		Master Plan on Bohai Sea Environmental Protection (2008-2020) $18.6 billion investment	Regulations for the Management of Water Resources (1995)
		Liao River Water Pollution Control Plan (2006-2010) $1.26 billion investment	Government Notice on Implementation of Xiamen Marine Functional Zoning Scheme (1997)

Location	SDS-SEA Outputs	National Policies/Plans/Programmes	National Legislation
China (Bohai Sea; Xiamen; Haikou; Laoting)		Hai River Water Pollution Control Plan (2006-2010) $3 billion investment	Municipal Ordinance for Managing Yuandong Lagoon (1997)
		The Framework of China's Implementation Plan of the Sustainable Development Strategy for the Seas of Easy Asia (2012-2016)	Regulations for the Uses of Sea Areas (2003)
	Xiamen Strategic Environmental Management Plan (1995)	Yuangdang Lagoon Integrated Treatment Project (1992-1999; $42 million)	Regulations for Marine Environmental Protection (2004)
	Yuandang Lagoon Cass Study (1996)	Xinglin, Jimei and Haicang sewage treatment facilities (1995-2003; $175 million; 2004-2007; $187 million)	National Marine Environment Protection Law
	Integrated environmental monitoring programme established (1996)	Jiuling River Management Framework (2003)	
	Functional zoning scheme developed (1997)	Rehabilitation of Maluan Bay (2006; $87 million)	
	Xiamen Sustainable Development Strategy (2005)		
	Jiulong River-Xiamen Bay Ecosystem Management Strategic Action Plan (2012)		
	Haikou Marine Environment Protection Plan (2010)	Haikou waste water collection system (2009-2010; $100 million)	
	Laoting Ocean Master Plan (2010)	Sewage treatment facilities (2009-2010; $45 million)	
		River channel dredging and restoration (2010; $115 million)	
Indonesia (Bali)	Bali coastal and marine environmental profile (2001)		
	Bali initial risk assessment report (2002)	National Long-Term Development Plan (RPJPN) (2005-2025)	Act Nos. 32 and 33/2004 on development and management of provinces and districts, decentralisation of authorities and responsibilities in natural resources and environmental management
	Bali Coastal Strategy (2004) and Implementation Plan (2005)	Millennium Development Goal targets on water supply and sanitation and Environmental Sanitation National Policy No. 23/2003	Act No. 7/2004 on Water Resources Management
	Coastal Use Zoning Plan for the SE Coast of Bali (2005)	Community-Based Water Supply	Government Regulation No. 16/2005 on Water Supply System
			Act No 27/2007 on Management of Coastal Zones and Small Islands
	Denpasar Sewerage Scheme Development Pre-Feasibility Study Report (2002)	SANIMAS – community-based sanitation scheme applying multi-source financing from provincial government, municipalities or local government funds, NGOs/ donors, and beneficiaries; adopted as national programme in 2006, implemented in 27 provinces in 180 cities by 2007	Act No. 26/2007 on Spatial Planning, including coastal and marine areas
	Bali Integrated Solid Waste Management Scheme Pre-Feasibility Study Report (2002)		
	Environmental investment opportunity briefs (2002)	Bali:	Act No.23/1997 on Environmental Management, amended as Act 32/2009 on Environmental Protection and Management

Location	SDS-SEA Outputs	National Policies/Plans/Programmes	National Legislation
Indonesia (Bali)		Denpasar Sewerage Development Project (DSDP; 1991-2009; $54,620,879)	Act No. 18/2008 on Municipal Solid Waste Management
	Pilot Beach Integrated Environmental Monitoring Programme (2005)	Integrated solid waste management plant in the south of Bali, SARBAGITA (2007-2012, $20,000,000 private sector)	Laws supporting PPP and procurement process:
	4th Bali Regional network of Local Governments Implementing ICM (RNLG) Forum, Bali, 2005		Presidential Decree No.7/ 1998 about Public Private Partnership includes guidance for private sector involvement in solid waste management
			Presidential Regulation No. 67/2005 about Government and Private Partnership on Infrastructure Development
	National Leadership Forum on ICM, Jakarta, 2005	SANIMAS implemented by 6 city/ regencies in 8 locations in Bali (2008; IDR 50 million per location). SANIMAS integrated into the sanitation strategy of some local governments, combining the existing centralised sewerage system with SANIMAS-type system.	Presidential Decree No. 80/2003 on Procurement, amended as Presidential Decree No. 8 year 2006 on Procurement
	National Leadership Forum on Sustainable Development in the Coastal and Marine Areas in Indonesia, Jakarta, 2010	Roadmap to a Bali Green Province (2010-2028) adopted 2010	Law No. 23/2005 about Public Service Body
			Bali Governor Regulation No. 23 Year 2005 about Zoning for Coastal and Marine Area Uses in Southeastern Bali
			Local Regulation of Bali Province on Pollution Control and Environmental Damage Number 4 Year 2005
			In 2001, City of Denpasar and Regencies of Badung, Gianyar and Tabanan established Agency Badan Pengelola Kebersihan (BPK) SARBAGITA to administer municipal solid waste within these areas through local regulations.
			Management body for DSDP called BLUPAL set up based on Governor of Bali decree No.404/04-F/HK/2007,
Philippines (Manila Bay)	Manila Bay Coastal Strategy (2000); Manila Bay Declaration (2001)	Medium-Term Philippine Development Plan 2004-2010	Ecological Solid Waste Management Act 2000
	Refined Risk Assessment (2003)	Philippine Development Plan 2011-2016 [Chapter 5; Chapter 10]	Clean Water Act 2004
	Operational Plan for the Manila Bay Coastal Strategy (OPMBCS) (2006); updated in 2011	World Bank/GEF Manila Third Sewerage Project (2007-2012; grant $5 million and loans $67 million)	Supreme Court of the Philippines Decision (2008) and its Resolution (Feb 2011) ordering 13 government agencies through "continuing mandamus" to clean, rehabilitate and preserve Manila Bay
	Integrated Environmental Monitoring Programme (2006)	Extension of Concession Agreements of Manila Water Company Inc. and Maynilad Water Services Inc. from 2022 to 2037 through Metropolitan Waterworks and Sewerage System (2008-2037; total investments $1.62 billion (Cavite province) and $1.75 billion (Rizal province)).	

Location	SDS-SEA Outputs	National Policies/Plans/Programmes	National Legislation
Philippines (Manila Bay)	Integrated Information Management System and Manila Bay Information Network (2006)	Manila Water Company Inc. Three-River Master Plan (2010-2018) – 100 percent sewer coverage by year 2018	
	Advocacy and Communication Plan (2006)	Draft National Solid Waste Management Strategy (2011))	
	Coastal Land and Sea Use Zoning Plan for Bataan Province (2007)		
	Manila Bay Oil Spill Contingency Plan (2006)		
	Macro-scale land- and sea-use zoning plan for Manila Bay based on 50 year climate change scenarios.		
	Public Private Partnerships through Corporate Social Responsibility for Manila Bay (ongoing)		
Vietnam (Danang City)	Danang Coastal Strategy (2001) and Coastal Strategy Declaration (2002)	Danang City Socioeconomic Development Plan to 2020 Vietnam Socioeconomic Development Strategy 2011-2020	Law on Environmental Protection (2005)
	Communication Plan (2001)	Action Plan of Danang City for 2006 – 2010 on environmental protection in support of National Strategy on Environmental Protection and National Environmental Action Plan	Decision No. 114/2006/QD-UBND (2006) issued by Danang People's Committee on the basis of Politburo's Resolution No. 41-NQ-TW (2004) on environmental protection
	Danang Initial Risk Assessment (2004)	National Target Programmeme for Rural Water Supplies and Sanitation (2012-2015; $300 million)	Decree No. 149/2004/ND/CP dated (2004) of the Government on regulating licensing of exploration & exploitation of water resources and discharge of wastewater.
	Integrated Information Management System (2004)	Environmental City Plan developed based on Coastal Strategy (2008-2020; $204 million).	Decision 9763/QD- UBND issued by Danang Party Committee for the implementation of Action Plan on Vietnam's Marine Strategy until 2020
	Environmental investments; pre-feasibility studies completed on Industrial Wastewater Treatment Facility in Hoa Khanh Industrial Park and Hazardous Waste Management System for Danang City (2004)		Decision No. 60/2007/QD-UBND (2007) issued by the People's Committee to promulgate regulations on the management of water resources in Danang City
	Integrated Environmental Monitoring Programme (2005)		People's Committee Decision No. 34/2008/QD-UBND (2008) on environmental quality monitoring in Danang City
	Coastal Strategy Implementation Plan (2005)	Drainage and Environmental Sanitation Project in support of the Danang Environmental City Plan, Danang City ($44 million).	Decision No. 41/2008/QD-UBND (2008) issued by the People's Committee approving the project "Development of Danang into an Environmental City"
	Coastal Land and Sea Use Zoning Plan (2005)	Integrated Environmental Monitoring Programme established under the ICM Programme expanded to cover 35 water quality monitoring stations, 11 air quality monitoring stations, 2 seafood tissue monitoring stations and 3 marine sediment monitoring stations	

Location	SDS-SEA Outputs	National Policies/Plans/Programmes	National Legislation
Vietnam (Danang City)		World Bank Three Cities Sanitation Project (1999-2008; $119.53 million)	
		JFE Engineering Corporation, Nihon Suido Consultants Company and Danang City Government PPP agreement to build wastewater and garbage treatment plants (2011; $190 million).	

Source: PEMSEA

Pollution reduction, waste management and investment

ICM development and implementation has paved the way for environmental improvements and investments in the East Asian Seas region by putting in place the necessary enabling environment (national and local policies, legislation and institutions) for such investment (Box 4).

For example, in Xiamen, China, the local government invested more than $190 million in 7 sewage treatment facilities covering the entire municipality, while in Danang, Vietnam, $43.5 million was directed to sewage treatment facilities and the construction of a sanitary landfill. In each case, the investments were in accordance with the policies and coastal strategies developed and adopted by the local governments under their respective ICM programmes.

In Puerto Galera, Philippines, the Sabang Sewerage Collection and Treatment System was designed to eliminate the direct discharge of domestic wastewater to the coastal area, improve the functionality of the existing wetland on the island, recharge groundwater and safeguard the quality of marine environment and health of the community and its visitors, which are estimated to be 400,000 every year. Along with the installation of the sewerage system, several enhancements, such as the construction of a jetty pier and pedestrian boulevard in the foreshore area (under which the sewerage interceptor pipes will be laid) are included in this investment project. The capital cost of this project is $2 million, jointly funded by the local government and a private sector partner.

The integrated Solid Waste Management Project for SARBAGITA (DenpaSAR City, BAdung Regency, GIanyar Regency and TAbanan Regency) in Bali has been developed and implemented as part of Bali's Coastal Strategy. The project entails the development of an alternative energy supply from municipal solid waste through methane gas production, recovery and use, which is projected to generate 9.6MW and could contribute about 2% of total power supply in Bali. The total cost of the Bali project was $20 million, funded by the private sector. At the same time, a sewerage development project was implemented in Denpasar, involving JBIC, the Government of Indonesia, Bali Province, Denpasar City and Badung Regency. The total cost of the public sector investment was $54.6 million.

At the sub-regional level, PEMSEA-supported ICM development and implementation in the Bohai Sea and Manila Bay have resulted in the adoption of sustainable development strategies and action plans. The PEMSEA-promoted Bohai Sea Declaration (2000) which is also signed by 3 coastal provincial governments and one city bordering the Bohai Sea, has provided the political commitments to take on the severe environmental challenges of the Chinese only inland sea. This has resulted in promoting concerned national agencies to develop land and sea-based pollution prevention and management action programmes. The Blue Sea Action Programmeme is one such national major initiative which has catalysed investments by the public and private sectors for improved sewerage services. The central and local governments and the enterprises in the region have committed $6 to $7 billion for the control and prevention of marine pollution. Seventy-eight sewage treatment plants have been built thus far with a total capacity of 4.7 million m^3 per day. In Manila Bay, the Philippines Supreme Court ruling in December 2008 cited the Operational Plan for the Manila Bay Coastal Strategy, prepared under the 1999-2008 phase of PEMSEA, as the road map to recovery for Manila Bay. $84.5 million has been invested in Manila Bay sanitation and sewerage facilities over the past 5 years and another $500 million investment package is currently under development. The total required

investment for wastewater treatment facilities in the Manila Bay area is estimated to be of the order of $3 to $4 billion.

A small but important demonstration component of the cumulative GEF investment in PEMSEA was the Medium-Sized Project, Development and Implementation of Public-Private Partnerships in Environmental Investments. A number of the private sector investments that PEMSEA helped to catalyse in Indonesia, China and the Philippines were enabled through efforts under this project (Tables 11, 12). The project also provided valuable lessons on how best to engage the private sector in promoting investments in ocean restoration and protection (Box 5).

Box 5: Lessons Learned in the Development and Implementation of Public-Private Partnerships in Environmental Investments for the East Asian Seas

Lessons Learned in the Development and Implementation of Public-Private Partnerships in Environmental Investments for the East Asian Seas	
#	**Lesson**
1	A comprehensive approach is needed for packaging and promoting environmental investment projects, including detailed technical evaluations of alternative sites, all possible technological options, and desired project outcomes.
2	Credible and sustainable cost-recovery mechanisms are critical in getting investor confidence.
3	Although the levels of ODA, particularly for middle-income countries, have been declining in recent years and can be expected to decline further, they are still available and remain an attractive option for some countries and their local governments.
4	In some countries, the role of the private sector and need for transparency and competition in the procurement process are not so clearly defined in law, in policy or in practice.
5	In some countries, even those that are supposed to have decentralised structures, the local governments are not as autonomous as they might appear on paper. National government agencies still have a big role in approving some local government projects, particularly those related to the environment. Definitely, national government agencies continue to have a role to play in enforcing national environmental laws and standards and in providing technical and financial support to local governments.
6	Institutional arrangements that clearly define lines of authority and communication among the concerned local governments and national government agencies lower risks and transactions costs for private investor
7	Capacity building for local government officials and local stakeholders promote better understanding and appreciation of and commitment to the proposed environmental projects.
8	Not only can the PPP approach be applied at all levels including the village or community level, the success of projects using the PPP approach rests ultimately on the commitment and support they get from the communities involved. This can be facilitated through the promotion of Integrated Coastal Management.
9	Projects such as the MSP-PPP that promote PPPs at the local level for environmental infrastructure projects and that require multi-stakeholder consultations, awareness-raising and commitment should be given enough time and resources to achieve their objectives.

Source: Terminal Evaluation Report, GEF/UNDP/IMO PEMSEA Medium-Sized Project, "Development and Implementation of Public-Private Partnerships in Environmental Investments", Dr. Ma. Cecilia G. Soriano (2011)

Not all projects entail such substantial investments in order to achieve important impacts. The Public-Private Partnership (PPP) solid waste management (SWM) project in Sihanoukville, Cambodia, for instance, initially involved 280 families in Village 1 of Sangkat 4 and a private company that was responsible for waste collection and disposal. The project involved a collaborative partnership, and allowed the community to generate income. It was eventually scaled up to include 1,155 families in all the five villages of Sangkat 4. A village revolving fund was also established from revenues from the SWM project. The success of the project has been recognised by nearby areas and the experience is already being replicated in Tomnob Rolok Commune, Stung Hav, and Sihanoukville. Total investment was less than $240,000.

Environmental Benefits

In terms of stress reduction, the above referenced projects were able to substantially reduce total loadings of nutrients and oxygen-demanding substances discharging into their respective coastal waters. The Xiamen case study indicates that domestic sewage treatment rose from 28% of the population in 1995 to 85% in 2007. Improvements in water quality in sea areas around Xiamen have been documented, particularly in Yangdong Lagoon where the transition was from heavily polluted waters to fishable waters. Other sea areas around Xiamen have been able to maintain their water quality despite substantial increases in population and economic development. A major effort is currently underway to address nutrient pollution of Xiamen's coastal waters, as a consequence of river discharges from adjacent upstream cities.

Environmental, social and economic benefits from investments in environmental facilities and services catalysed through ICM programmes are only beginning to be monitored and documented in other ICM sites through the implementation of PEMSEA's State of the Coasts reporting system.

In total, environmental investments leveraged through PEMSEA-facilitated ICM and sub-regional programme implementation have amounted to $369 million (Tables 11 & 12), of which $78.65 million came from the private sector and the balance from the public sector. This translates to an environmental investment leverage ratio of 12.8 to 1 for GEF funds over the 4 projects. If the pollution reduction projects that have been catalysed by PEMSEA in the Bohai Sea and Manila Bay are considered, the ratio increases to more than 275 to 1. Equally notably, 1.46 billion or 47% of the world's 3.1 billion people who live in the coastal zone (<100 km from the ocean) live in the East Asian Seas region. This underscores that the impacts of PEMSEA on coastal sustainability through upscaling of ICM are not just regional, but global.

Catalytic Ocean Finance Summary	Amounts (US $)
Total GEF Grant Financing	$36.1 million
Total Programme Co-financing	$94.12 million
Catalysed Public and Private Sector Financing (through 2007)	$369.21 million
Catalysed Public & Private Sector Financing (incl. Manila Bay and Bohai Sea)	$9-11 billion
Catalytic Finance Ratio (Total Catalysed Finance : UNDP-GEF Finance)	13:1
Catalytic Finance Ratio (including Manila Bay & Bohai Sea)	277:1

Table 11: Summary of GEF grants, co-finance and public and private investments leveraged by PEMSEA, 1994-2008

GEF Project	Years	Participating Countries	GEF grant (US $)	Co-finance		Environmental Investments	
				Government	External resources	Government/ Public Sector	Private Sector
1.GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS	1994-1999	Brunei Darussalam, Cambodia, China, DPR Korea, Indonesia, Malaysia, Philippines, R.of Korea, Singapore, Thailand, Vietnam	$8,000,000	$3,206,807	$8,808,800		
2.GEF/UNDP/IMO Regional Programme Building Partnerships in Environmental Management for the Seas of East Asia (PEMSEA)	1999-2008	Brunei Darussalam, Cambodia, China, DPR Korea, Indonesia, Japan, Malaysia, Philippines, R.of Korea, Singapore, Thailand, Vietnam	$16,224,000	$23,076,196	$1,676,175	$191,460,000	
3.Implementation of the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA)	2008-2012	Brunei Darussalam, Cambodia, China, DPR Korea, Indonesia, Malaysia, Philippines, R.of Korea, Singapore, Thailand, Vietnam	$10,876,336	$55,366,901	$1,177,480		
4. Development and Implementation of Public/Private Partnerships in Environmental Investments (MSP-PPP)	2004-2009	Cambodia, China, Indonesia, Malaysia, Philippines, R. of Korea, Thailand, Vietnam	$1,000,000	$808,500		$99,103,509	$78,650,773
SUB-TOTAL						**$78,650,773**	**$290,563,509**
TOTAL			**$36,100,336**	**$82,458,404**	**$11,662,455**	**$369,214,282**	

Source: PEMSEA

Notes:

1. Counterpart fund resource based on MPP-EAS Technical Report No. 20, 1999, "Sharing Lessons and Experiences in Marine Pollution Management".
2. Counterpart fund resource based on internal tracking list of co-financing. Investment pertains to environmental investment in Xiamen.
3. In-country/government counterpart fund based on counterpart investment by countries and local governments for SDS implementation (2008-2012) and PRF Secretariat Services support from China, Japan, ROK (2008-2009) found in PEMSEA Accomplishment Report 2008-2010; External resources based on collaborators' investment for regional cooperation, e.g., capacity development, EAS Congress, etc. (2008-2009 only) found in PEMSEA Accomplishment Report 2008-2010.
4. Refers to Environmental Investments from public and private sector.

Table 12: Summary of public and private sector investments catalysed with support from UNDP-GEF PEMSEA Programme, 1999-2008

Project Site/ Country	Description of Investments	Year Started	Private Sector Financing ($)	Public Sector Financing ($)
Danang City, Vietnam	Danang Sanitation Project (DSP) including Kahn Son landfill	August 2002		$43,500,000
	Industrial Wastewater Treatment Plant for Hoa Khanh Industrial Park	Feb 2003		$982,630
Bali, Indonesia	Integrated solid waste management in SARBAGITA (Suwung landfill)	Nov 2002	$20,000,000	
	Denpasar Sewerage Development Project	Aug 2002		$54,620,879
Haikou City, China	Process optimisation and upgrading of sewage treatment plant	July 2006	$56,250,000	
Xiamen, China	Large scale wastewater treatment plants (Jimei, Haicang, Shi Wei Tou, Tong' an)	1999		$107,000,000
Sihanoukville, Cambodia	Community-based solid waste collection system	Mar 2006	$238,400	
Puerto Galera, Philippines	Sabang Sewerage Collection and Treatment System	Dec 2007	$2,162,373	
Manila Third Sewerage Project	Sewage collection and treatment facilities in Taguig, along the Pasig River, Quezon City and Marikina	2005		$84,460,000
SUB-TOTALS			**$78,650,773**	**$290,563,509**
TOTAL			**$369,214,282**	

3. Transforming industries to address global and regional ocean issues

3.1 Introduction

Our ocean faces a number of well-known environmental threats such as pollution, overfishing, habitat loss, invasive species and climate change. Each of these issues can impact ocean health, sustainability, livelihoods and economies at local, national, and regional levels. Some of these threats are truly 'global' in scope in terms of the breadth and scale of both the threats and the impacts. The latter include persistent organic pollutants (POPs) due to their long range transport, persistence and transfer between organisms via bioaccumulation; ozone depleting substances (such as chlorofluorocarbons) due to impacts of increased ultraviolet radiation on marine ecosystems; invasive species carried in ship ballast water and hulls due to their widespread transport across the world ocean; climate change vis a vis impacts on ocean ecosystems from sea level rise, ocean stratification and increasing ocean acidification; and weakly regulated and managed fisheries in areas beyond national jurisdiction (ABNJ).

Truly global ocean issues such as those summarised above in turn require responses at a global level. The Stockholm Convention on Persistent Organic Pollutants sought to reduce global POPs pollution and associated human health and ecosystem impacts via either bans or restrictions in the use of a number of manufactured organic chemicals and chemical by-products whose impacts were well-documented, such as PCBs, DDT, dioxins, chlordane, toxaphene and other pesticides, herbicides and fungicides. Risks to

ocean ecosystems, particularly in temperate and northern latitudes, were particularly acute for large fish (tuna, swordfish) and mammals (whales, dolphins, pinnipeds) as POPs tend to 'bio-accumulate' in fatty tissues and can reach levels threatening the health of both the animals and humans that consume them. The Stockholm Convention was adopted in May 2001 and came into force in May 2004; the GEF was approved as the financial mechanism for the Convention. Following initial approval in 2001 of the first dozen chemicals, 9 new POPs were listed in 2009 substantially increasing the scope of the Convention. 172 countries are now party to the Convention and 128 parties have submitted their National Implementation Plans (NIP). Regional and global monitoring reports examining baseline POPs levels in air, human milk and blood have been prepared to monitor long-term impacts of Convention implementation. Parties to the Convention have collectively destroyed 7,600 tons of PCB oil and contaminated equipment and over $414 million has been invested in GEF PCB projects covering 45 countries. Global DDT production fell by 43% between 2007 and 2009; as of 2011, only 3 of the 16 countries that notified of need to use DDT reported to have actually used it. In total, GEF investments in POPS of $494 million have catalysed $1.147 billion in leveraged co-finance, a ratio of 2.3 to 1.

The Vienna Convention for the Protection of the Ozone Layer (adopted 1985, in force in 1988) and its Montreal Protocol on Substances that Deplete the Ozone Layer (in force in 1989) are dedicated to the protection of the earth's ozone layer. With 196 parties, they are the most widely ratified treaties in United Nations history, and have, to date, enabled reductions of over 98% of all global consumption of controlled ozone depleting substances. As a result, atmospheric levels of ODS have decreased and it is projected that the ozone layer should return to pre-1980's levels by the middle of this century. US estimates alone are that $4.2 trillion in health care costs will have been avoided in the period 1990-2165 due to the effective effort to restore the ozone layer. Since ODS are also greenhouse gases, with very high global warming potential (GWP), the Montreal Protocol has also made a significant contribution to mitigating climate change, reducing the equivalent of 25 billion metric tons of CO_2 in the 1990-2000 period.

As the major global vehicle to transport 90% or more of the world's exported goods, shipping has for centuries been a truly global industry; the introduction of 'containerisation' in the 1950's further cemented shipping's position as the most efficient and cost effective means via which to move manufactured goods, mineral and energy commodities. The United Nations' International Maritime Organization (IMO) was created in 1948 in recognition that actions to regulate maritime operations would be more effective if carried out at an international level rather than by countries acting unilaterally and without coordination with other state actors. As the United Nations specialised agency with responsibility for the safety and security of shipping and the prevention of marine pollution by ships, IMO has promoted the adoption of more than sixty international conventions and protocols concerning maritime safety and security, the prevention of pollution, and other ship-related matters. IMO has a long history of identifying, negotiating, adopting and bringing into force global legal frameworks to reduce shipping's impact on the environment and human health. These include the International Convention for the Prevention of Pollution from Ships (1973) and its Protocols (1978, 1997), International Convention on the Control of Harmful Anti-fouling Systems on Ships (2001), Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, (2000) and others. By creating a level regulatory 'playing field' at a global level, IMO conventions that regulate the shipping industry have over the years helped to catalyse substantial private sector investment in the new shipping technologies and practices mandated under each new legal framework.

The examples above, and others, underscore the power of an anticipated global or regional legal framework to create the necessary enabling environment for both governments and the private sector to prepare for achieving compliance with the expected new legal framework. With targeted capacity building and awareness raising support, governments can reform their policies, legislation and institutions towards compliance with the incoming new regime. In parallel, industry ownership and compliance can be achieved through targeted private sector awareness raising, capacity building, facilitating technology research and development, helping to set standards and best practices, and creation of tools and methodologies to assist industry with compliance. With clear signals from the regulatory side, the private sector can quickly adjust its research, technology development and investment strategies and horizons, in some cases leading to wholesale transformation of impacted industries. These linked approaches can in turn synergistically help to accelerate ratification and coming into force of the new legal framework and facilitate rapid scaling up of convention implementation and compliance.

3.2 Approach – Building on Global or Regional Ocean Legal Frameworks

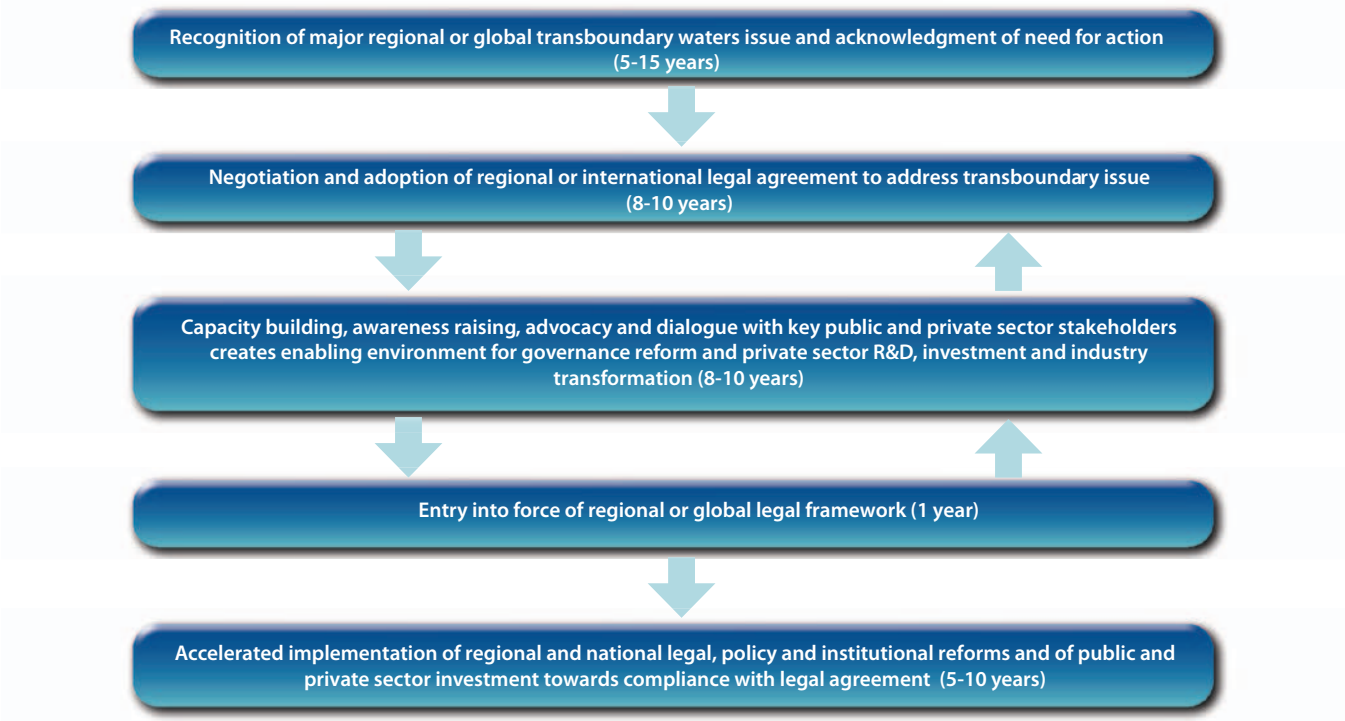
Chapters 1 and 2 reviewed two clearly defined methodological approaches (TDA/SAP, ICM) that have proven highly effective at facilitating local, provincial, national and regional governance reform that created the necessary enabling environment to catalyse sizeable quantities of environmental finance. In each of the four case studies examined so far, the GEF grant investment helped to put in place regional, national and/or local enabling environments which leveraged public and private sector investment as high as several hundred times greater than the GEF commitment. Through these case studies, Chapters 1 and 2 documented how these large sums of catalysed investment have measurably reduced environmental stress on several major marine ecosystems, and, in the most mature case of the Black Sea, demonstrated measurable recovery of the ecosystem including lowered pollution loads, reduced hypoxia, species and habitat recovery, and improved livelihoods.

This chapter examines a less formalised approach that nevertheless has also served to create the necessary enabling environment to catalyse billions of dollars in new finance, primarily from the private sector. The approach involves building upon and helping to advance an anticipated or existing intergovernmental process of negotiating a new regional or global legal framework to address a major ocean issue. In parallel to and closely associated with these multi-country negotiation processes, UNDP-GEF International Waters interventions were strategically designed to support a series of key outcomes which substantially increased the capacity of both the public and private sectors to achieve compliance with the anticipated new legal framework. These outcomes included:

- Enhanced public and private sector recognition and understanding of the issue, its impacts, and the need for action;
- Full involvement of GEF-supported countries in the convention negotiation process;
- Improved national, regional and global capacity to achieve compliance with the anticipated regional or global legal framework;
- Strong private sector participation in and buy-in of the anticipated new agreement;
- Significant catalysis of private sector research and development and investment;
- Industry transformation;
- An enabling environment for a rapid path to convention compliance following coming into force.

This approach can be generically summarised as follows:

Figure 26: Generic approach to building on global or regional legal framework to put in place enabling environment for catalytic ocean finance



Notably, the two case studies are markedly different in the nature of the catalysed finance. For Case Study #5, the W/C Pacific Ocean Fisheries, the net new realised finance is dominated by the increased fisheries revenue stream enjoyed by the Pacific Island countries via their enhanced participation and ownership of the new legal framework, their enhanced capacity for catch monitoring, control and surveillance, and their improved capacity to apply sustainable (ecosystem-based) approaches to management of fish stocks within their EEZs. The result was a more than tripling of gross revenue realised by the island nations while at the same time moving the industry towards sustainable practices in the management of these stocks that represents one-half of the world's tuna resources.

Case Study #6, GloBallast, demonstrates the extraordinary power of a global legal framework with very strong industry ownership and buy-in to catalyse not only transformation of the shipping industry itself, but also the creation of an entirely new, and very rapidly growing new industry, ship ballast water treatment technology, already valued in the tens of billions of dollars. The case study documents the effective use of private sector partnerships to promote industry awareness, technology R&D, and definition of standards and practices, all serving to create commitment to and capacity for accelerated industry compliance when the new Ballast Water convention enters into force. To date, over $100 million has already been committed by the private sector in ballast water treatment R&D and testing facilities, and the market for ballast water treatment to meet the obligations of the Convention – for 57,000 vessels - is estimated to grow to $35 billion over the next ten years.

3.3 Catalysing Ocean Finance Case Studies

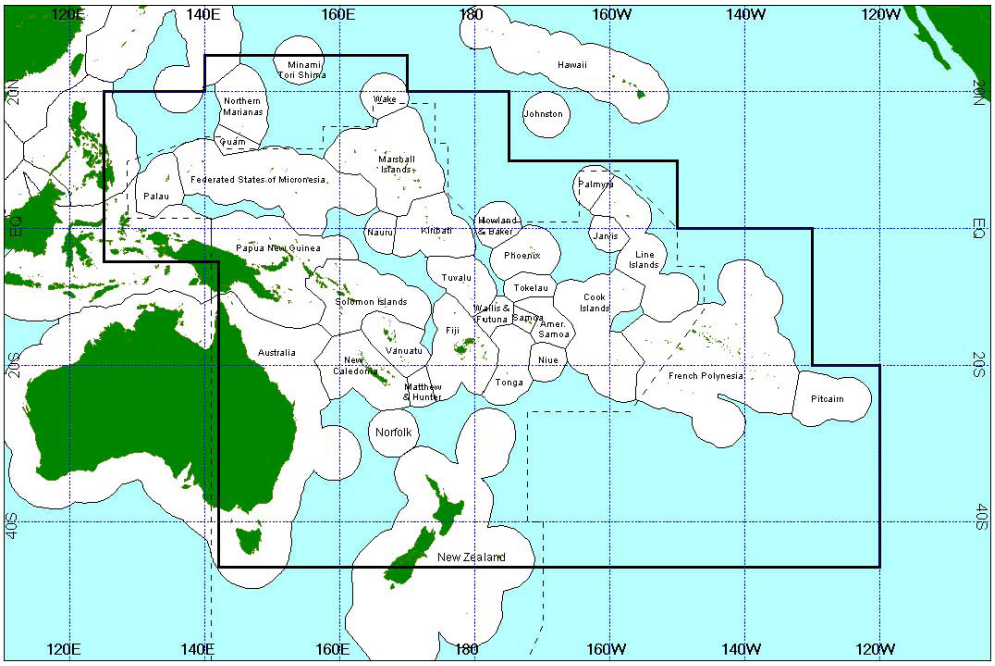
Catalysing Ocean Finance Case Study #5: West/Central Pacific Ocean Fisheries

Context:

The waters of the Pacific Islands region cover an area of around 40 million square kilometres, or over 10% of the Earth's surface, and most of this area falls within the national jurisdiction of 15 Pacific SIDS[1] (Figure 27), custodians of a large part of one of the Earth's major international waters ecosystems which unite them by substantial dependence on a shared marine environment and shared marine resources. These waters hold the world's largest stocks of tuna and related pelagic species and provide around a third of the worlds' catches of tuna and related species – and the broader Western and Central Pacific Ocean region, including Indonesia and Philippines, provides more than half of the world's tuna catches – over 2 million tonnes annually (Figure 28).

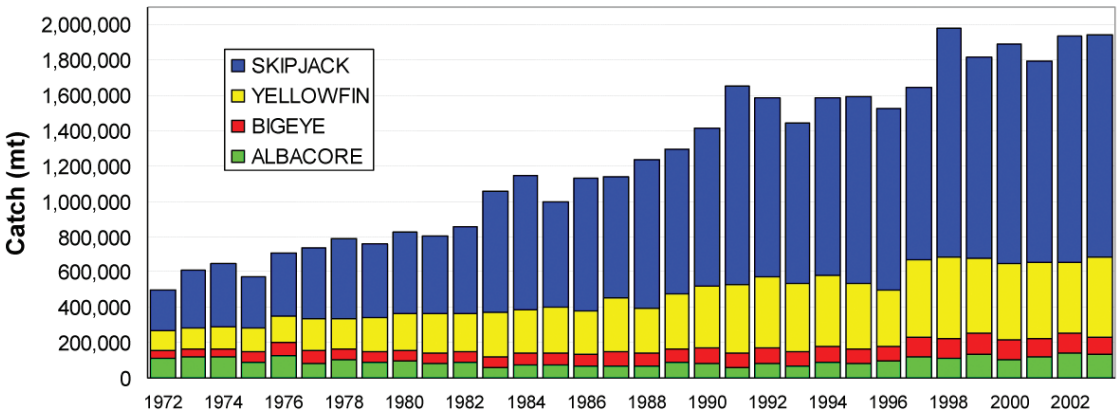
1 The Pacific SIDS are Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tokelau, Tuvalu and Vanuatu.

Figure 27: Pacific Islands Small Islands Developing States showing Exclusive Economic Zones (EEZs)



Source: Oceanic Fisheries Programme of the Secretariat of the Pacific Community

Figure 28: Annual catches of tuna in the Western and Central Pacific Ocean, 1972-2003



Source: Secretariat of the Pacific Community Tuna Fishery Yearbook (2002)

The UNDP-GEF supported Pacific Islands Strategic Action Programme (Pacific SIDS SAP, 1997) completed in 1997 identified the ultimate root cause underlying the concerns about and threats to, International Waters in the Pacific region as deficiencies in management, governance, and incomplete understanding of the ecosystem. For oceanic fisheries management these weaknesses occur at two levels, national and regional. The critical weakness at a regional level was identified as the lack of a legally binding institutional arrangement governing cooperation in the management of the region's commercial oceanic fisheries, making the West/Central Pacific region one of the only

tropical oceanic areas where fishing by the world's highly industrialised tuna fleets was completely unregulated. At the national level, the key weaknesses in governance that were identified as contributing to the threat of unsustainable fisheries in the Pacific Islands region included lack of compatible management arrangements between zones, leaving the risk that an array of independent and different measures at national levels would not be able to secure effective conservation outcomes, and the risk of a lack of political commitment to taking the necessary decisions to limit fishing and catches. These and other barriers to achieving sustainable management of the region's shared fish stocks are summarised in Table 13.

Table 13: Principal barriers to sustainable management of fish stocks in the W/C Pacific

Type of Barrier	Barriers	Stakeholders			
		Consumers/ Users	Policy Makers	Local & Multi-lateral Financiers	Supply Chains
Regulatory	Unregulated fishing on the high seas undermining in-zone efforts to ensure sustainable fisheries	✓	✓	✓	
	Lack of compatible management arrangements between zones	✓	✓		✓
Institutional	Lack of a legally binding institutional arrangement governing cooperation in the management of the region's commercial oceanic fisheries	✓	✓	✓	
	Lack of national capacity and systematic monitoring of catches	✓	✓	✓	
Financial	Cost of managing oceanic fish stocks largely financed by Pacific SIDS directly or using donor funds. Need to develop a financing mechanism that places the burden of management on States that fish	✓	✓	✓	
Economic	Illegal fishing eroding economic benefits for resource owners contributing to overfishing and avoiding the cost of management	✓			✓
Informational	Information and knowledge gaps of the main target species in oceanic fisheries	✓	✓	✓	✓
	Insufficient awareness and understanding of the kinds of measures that need to be taken and the legal, policy and institutional reforms needed to ensure sustainability	✓	✓	✓	✓
	Lack of strategic information for decision making and timely information on the current status of major physical oceanic features	✓	✓	✓	✓
Technological	Poorly resourced national oceanic fisheries management functions for enforcement and compliance and not established to cover the high seas pockets	✓	✓	✓	
	Absence of detection systems i.e. vessel monitoring system, covering high seas areas	✓	✓	✓	
Political	Well developed cooperation between Pacific States but relatively little coordinated management cooperation with other States in the region and distant water fishing nations	✓	✓		
	Lack of political commitment to take necessary decisions to limit fishing and catches	✓	✓	✓	

Source: UNDP-GEF Pacific Oceanic Fisheries Management Project

UNDP-GEF Strategy

Beginning in 2000, UNDP-GEF assisted the Pacific SIDS in a GEF-funded pilot phase to conclude negotiation and adoption of the Western and Central Pacific Fisheries Convention and undertake the legal steps necessary to ratify the Convention, bringing it into force in 2004. The Convention is one of the first major regional applications of the UN Fish Stocks Agreement, concluded in 1995 as an outcome of the call in the UNCED agenda for a UN intergovernmental conference on high seas fishing. The pilot phase also included assistance for Pacific SIDS to begin to establish in-country fishery monitoring programmes to close the gaps in information available for science and compliance, along with support to regional scientific efforts to assess stocks and apply an ecosystem-based approach to managing the regions' tuna resources.

Following completion of the pilot phase project, UNDP-GEF prepared and began implementing a new phase of GEF assistance for regional oceanic fisheries management in a partnership with regional organisations and NGOs. The Pacific Islands Oceanic Fisheries Management Fisheries Project (OFMP) has been supporting Pacific SIDS in the successful establishment of the Western and Central Pacific Fisheries Commission (with all major fishing states now Members of the Commission along with all Pacific SIDS) and in the reform, realignment, restructuring and strengthening of their national fisheries laws, policies, institutions and programmes to take up the new opportunities which the WCPF Convention creates and to discharge the new responsibilities which the Convention requires (Box 6). The establishment of the Commission includes the design of a comprehensive set of regional compliance programmes and the transfer to Commission funding of core scientific assessment programmes, initially UNDP-GEF-supported, which are now largely funded by those who fish. The OFMP Project Document identified $79 million in investment needs to implement the Convention based on a World Bank study, split roughly evenly between the Pacific SIDS and fishing states and fleets. The total cost of UNDP-GEF implemented Pacific Islands activities including the pilot phase, full project design and OFMP implementation is $15.1 million.

Box 6: Western and Central Pacific Fisheries Convention: Policy and Regulatory Drivers for Sustainable Fisheries

- The adoption, ratification and coming into force of the Western and Central Pacific Fisheries Convention (WCPFC) addressed the lack of legally binding institutional arrangement governing cooperation in the management of the region's commercial oceanic fisheries;
- The Convention provides for the conservation and management of oceanic fisheries across its range, including on the high seas;
- Regulates one of the worlds largest tuna fisheries in a major international waters ecosystem;
- Builds on principles from the 1995 United Nations Fish Stocks Agreement including the precautionary approach;
- Provides for management decisions to be based on the best available science, ecosystem considerations & recognises SIDS special requirements;
- Establishes a comprehensive set of regional compliance programmes and core scientific assessment programmes, largely funded by those who fish;
- Emerging comprehensive, but preliminary, set of measures aimed at conserving target stocks and reducing the impact of fishing on-target species;
- Development of measures to address concerns for the status of bigeye and yellowfin Pacific;
- Preliminary measures to avoid incidental catches of non-target species, especially sharks, turtles and seabirds.

Results – Stress Reduction through Governance Reform and Investment

Major outcomes of the institutional, legal and policy reforms undertaken to date through the UNDP-GEF support include:

a. A comprehensive set of monitoring and compliance programmes, including the establishment of the world's largest onboard observer programme, applying 100% coverage to the 1.5+ million tonne purse seine fishery from January 2010, with lesser coverage rates across all WCPO tuna fisheries by 2014; the establishment of the world's only regional satellite-based vessel tracking system requiring direct reporting to a regional fisheries management organisation, covering 2,150 vessels in 2009, and the first regional high seas boarding and inspection programme established in accordance with the UN Fish Stocks Agreement – all implemented largely at the cost of those who fish and their governments, including Pacific SIDS governments, with government agency costs also largely recovered from vessel operators.

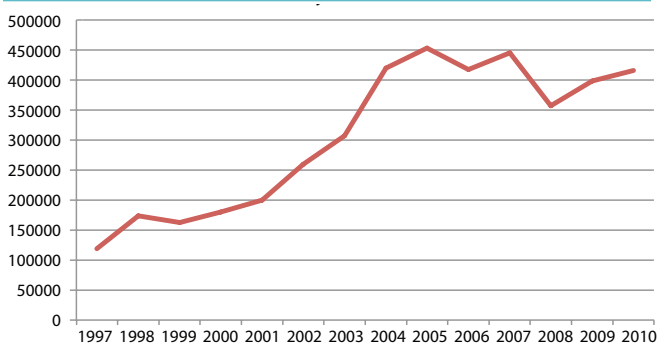
b. A comprehensive, but preliminary, set of measures aimed at conserving target stocks and reducing the impact of fishing on-target species. These include for different stocks and fisheries a mix of catch, fishing effort and fleet size limits, gear restrictions, closures of large areas of high seas to purse seining, and mandatory use of a range of mitigation procedures, devices and fishing practices to avoid incidental catches of non-target species, especially sharks, turtles and seabirds.

The costs committed to these programmes over the period 2005-2009 are conservatively estimated at $150 million, roughly double the level projected in the OFMP design phase. In practice, the Commission budgets are already at levels more than three times those projected in that work, the fishing fleets being covered by the regional programmes turned out to be 50% larger than expected, and the financial commitments by Pacific SIDS have been two and a half times the levels projected. In large part, these increases over initial expectations reflect accelerated and more extensive monitoring programmes than expected. These costs do not include the sizeable investments made by the private sector to implement by-catch mitigation measures including installation of by-catch mitigation devices, and the changes in fishing operations, particularly the reduced purse seine setting on floating objects in order to reduce by-catch.

The major costs of these reforms have fallen on private sector vessel operators, covering over 6,000 vessels authorised to fish outside their national waters in the WCPFC Convention Area, and applying also to a lesser degree to large fleets of wholly domestic vessels operating only within national waters. However, for many fleets these costs have been financed from the increases in the value of the fisheries generated by the application of limits which have tightened tuna supplies and increased the prices and values of tuna catches and tuna products to consumers. Ultimately this means that the bulk of the cost of financing the investments being made both to enhance the conservation and management of target stocks and protect non-target species have been passed on to global consumers of tuna products.

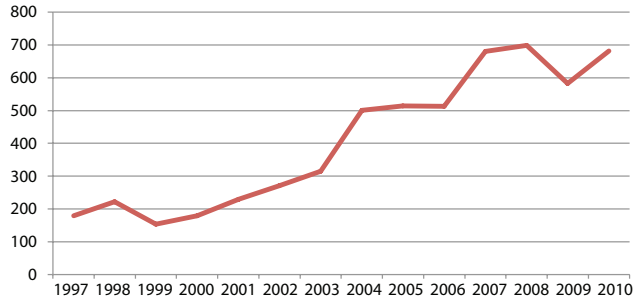
Since the GEF intervention began in 1997, concurrent with the major strides summarised above in moving the regional tuna fishery towards sustainability and internalising management costs, overall tuna landings by Pacific SIDS fishing fleets have roughly tripled as have the dockside dollar value of landed fish (Figures 29, 30). These enhanced landings and economic benefits to the Pacific Island Countries have been catalysed to a sizeable degree by the two UNDP-GEF interventions, through increased country capacities to fully participate in all WCPFC processes, to apply fleet and catch monitoring, control and surveillance, and to apply ecosystem-based approaches to fisheries management. Over the 1997-2010 period, the cumulative net economic benefits to the PICs totaled $3,214 million.

Figure 29: Annual Tuna catch by Pacific SIDS Fleets, 1997-2010 (mt)



Source: Forum Fisheries Agency data

Figure 30: $ value Pacific SIDS fleet tuna catch, 1997-2010 $ million



Source: Forum Fisheries Agency data

Results – Environmental Benefits

It is too early to be able to measure changes in the environmental status of the resources and ecosystem of the Western Tropical Pacific Warm Pool Large Marine Ecosystem from OFMP-related reforms. However, the measures already adopted by the WCPF Commission and Pacific SIDS, if fully implemented, are projected to maintain the two major tropical tuna species (skipjack and yellowfin), making up around 90% of the total regional tuna catch, and around 50% of global tuna supplies, at levels that will maintain Maximum Sustainable Yield (MSY). These measures are also projected to reduce fishing mortality on bigeye tuna, the most vulnerable stock, with additional measures necessary to maintain bigeye stocks at levels that will sustain the Maximum Sustainable Yield. A comprehensive, but preliminary, set of measures to mitigate ecosystem effects of oceanic fishing has also been adopted including measures for reducing the impacts of oceanic fisheries on sharks, turtles and seabirds but there is insufficient information available to provide any measure of their likely effectiveness – enhancing that information is a major target of a planned second phase of the OFMP.

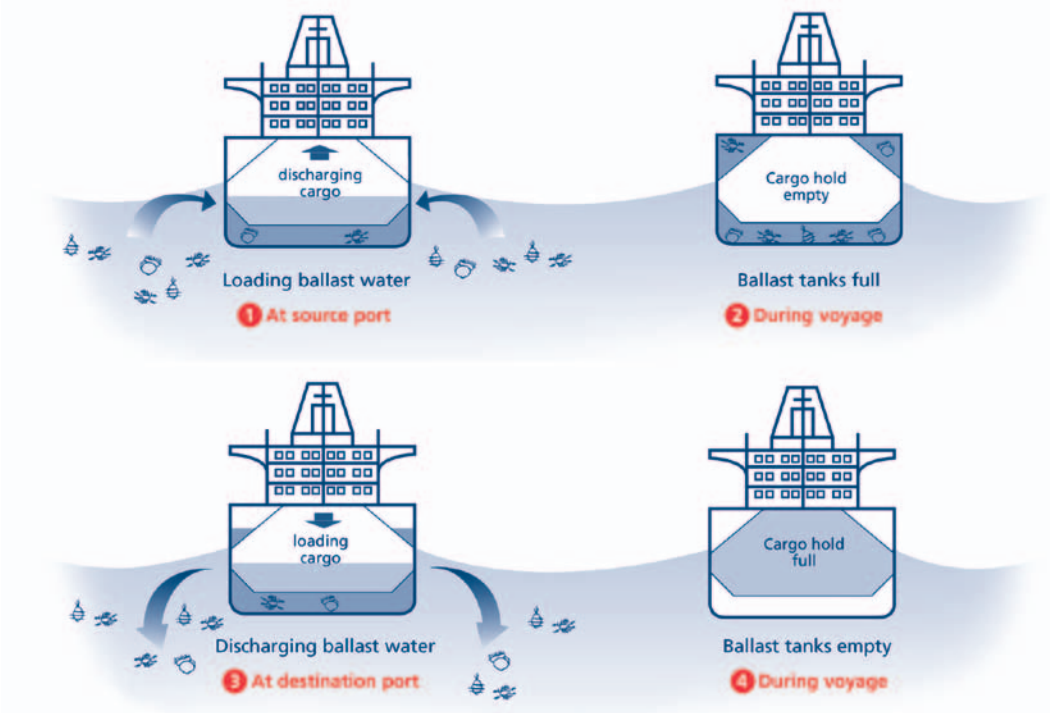
Catalytic Ocean Finance Summary	Amount (US $)
Total GEF Grant Financing	$15.1 million
Total Programme Co-financing	$150 million
Catalysed Public and Private Sector Financing	$3,214 million
Catalytic Finance Ratio (Total Catalysed Finance : UNDP-GEF Finance)	213:1

Catalysing Ocean Finance Case Study #6: Global Ballast Water Programme (GloBallast)

Context:

The introduction of aquatic species to new marine and freshwater environments, through ships' ballast water and sediments, is considered to be one of the greatest threats to the world's freshwater, coastal and marine environments. It is estimated that from 3 to 5 billion tonnes of ballast water are carried around the world by ships each year (Figure 31). While ballast water is essential to the safe operation of ships, it also poses a serious environmental threat, in that on average, more than 7,000 different species of microbes, plants and animals are being carried globally in ships' ballast water each day. When discharged into new environments these organisms may become invasive, severely disrupt the local ecosystem, seriously impact the economy and local livelihoods, and cause human disease outbreaks and even death. Developing countries are among the largest "importers" of ballast water due to their significant exports of bulk commodities.

Figure 31: Cross section of ship showing ballast tanks and ballast water cycle:



Source GloBallast Programme

As a result of ballast water mediated invasive species introductions over the last 20-30 years, several major marine and freshwater ecosystems have been severely impacted. In the USA, the European Zebra Mussel Dreissena polymorpha has infested over 40% of internal waterways requiring over $1 billion per year in expenditure on control measures alone. In southern Australia, the Asian kelp Undaria pinnatifida is invading new areas rapidly, displacing the native seabed communities. In South America, the South East Asian Golden Mussel is rapidly invading inland waters, displacing and impacting native plants and animals, and clogging water extraction and power generation infrastructure at a cost of many millions of dollars annually. In the Black Sea, the filter-feeding North American jellyfish Mnemiopsis leidyi has on occasion reached significant densities depleting native plankton stocks to such an extent that it has contributed to the collapse of entire Black Sea commercial fisheries. This species has now reached the Caspian Sea and Baltic Sea, causing unimaginable damage to local ecosystems and economies. In several countries, microscopic, 'red-tide' algae (toxic dinoflagellates), likely introduced via ships' ballast water, have been absorbed by filter-feeding shellfish, such as oysters. When eaten by humans, these contaminated shellfish can cause paralysis and even death. It is even feared that some of the cholera epidemics of southeast Pacific countries in the past that killed thousands of people were caused by transfer of cholera bacteria through ballast water taken from areas near ocean sewage outfalls. The list goes on, to include hundreds of examples of major ecological, economic and human health impacts across the globe. Despite the fact that the direct global economic impact of this issue likely exceeds one hundred billion dollars annually, until recently the environmental financing to support the governance reform and technology investment needs to address the issue has been almost non-existent in government and the private sector.

Despite the general awareness of growing impacts of the ballast water invasives issue, efforts to control and manage ships' ballast water faced severe constraints in most of the countries around the world and especially in most of the developing countries. The challenges were mainly due to:

1. The international and cross-boundary character of shipping;
2. Often insufficient or inadequate policy, legal and institutional arrangements to address this "invisible" pollution issue;
3. Lack of cost effective and viable technologies to address the issue;
4. Broad lack of awareness regarding management and mitigation approaches; and
5. Very limited financial resources allocated to address the issue.

These and other barriers that had been slowing progress on the issue are summarised in Table 14:

Table 14: Key barriers to reducing risks from invasive species in ship ballast water

Type of Barrier	Barriers	Stakeholders			
		Consumers/ Users	Policy Makers	Local & Multi-lateral Financiers	Supply Chains
Regulatory	No uniform global regulations in place. Local/national regulations creating impediments for a shipping as an international, cross-boundary activity	✓	✓		✓
Institutional	Insufficient public sector capacity to address the ballast water problem	✓	✓		✓
Financial	Limited financial resources allocated to address the ballast water issue		✓	✓	✓
Informational	Lack of awareness marine invasive species and, their impacts, and the role of shipping as a vector	✓	✓	✓	✓

Type of Barrier	Barriers	Stakeholders			
		Consumers/ Users	Policy Makers	Local & Multi-lateral Financiers	Supply Chains
Technological	Lack of readily available, cost effective and viable treatment technologies to prevent the introduction of unwanted organisms in ships' ballast water		✓	✓	✓
Political	Lack of cooperation between governmental departments (e.g. maritime administrations, environmental agencies, etc.) on cross-sectoral regulatory issues		✓		
	Poor and inconsistent regional cooperation		✓		

Source: UNDP-GEF GloBallast Partnerships Project Document

While member States of the International Maritime Organization (IMO), the specialised Agency of the United Nations dealing with global shipping matters, had been undertaking a long and complex debate on the international regulatory framework for ballast water control and management since the early 1990's, the international response to the issue remained very modest until UNDP-GEF and IMO joined together in 2000 to address some of the root causes of the issue and to remove some of the significant barriers faced by developing countries. The strategic use of GEF International Waters financial resources catalysed significant international momentum and environmental financing to support capacity building for global, national and regional legal and policy reforms while at the same time transforming global private sector interests to create an entirely new ballast water treatment technology market, now valued in the tens of billions of dollars.

UNDP-GEF Strategy

UNDP-GEF's strategy to deliver substantial progress on reducing the global threat from ships' ballast water invasives has been manifested through a tri-partite partnership between UNDP, GEF and IMO that resulted in a two-phased Global Programme under the GEF's International Waters focal area titled "GloBallast". The development objectives of the first phase (pilot phase) of this technical cooperation programme (2000-2004) were to assist developing countries to:

- Implement the then voluntary IMO Guidelines on ballast water, and
- Prepare the developing countries for the implementation of a new Ballast Water Management Convention.

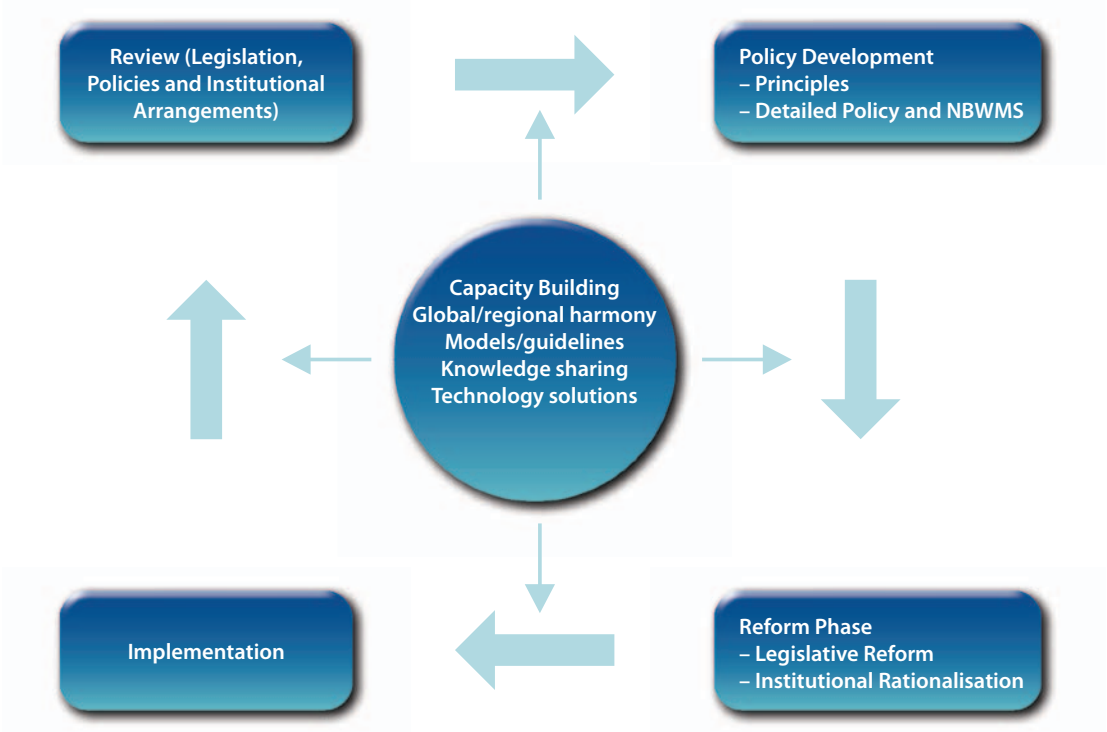
The Pilot Phase aimed to achieve these objectives through six initial demonstration sites, located in six Pilot Countries (Brazil, China, India, I.R. Iran, South Africa and Ukraine) representing some of the main developing sub-regions of the world. Activities carried out at these sites focused on institutional strengthening and capacity building and included establishment of National Lead Agencies and Focal Points for ballast water issues, formation of cross-sectoral/inter-ministerial National Task Forces, communication and awareness raising activities, ballast water risk assessments, port biota baseline surveys, training in implementation of the Ballast Water Management Convention, in-country research and development projects, assistance with national ballast water legislation and regulations, training and technical assistance with compliance monitoring and enforcement, assistance with developing national ballast water management strategies and action plans, assistance with developing self-financing and resourcing mechanisms, and initiation of cooperative regional arrangements for ballast water management.

As a result of this Pilot Phase project, an unprecedented momentum of concerted international action was precipitated which spurred an overwhelming demand from developing countries for ongoing programmatic support for replication of GloBallast activities. This interest grew constantly and this resulted in the development and GEF approval of a follow-up GEF-UNDP-IMO project titled Globallast Partnerships in 2008. With the help of tools and methodologies developed and lessons learned from the pilot project, the GloBallast Partnerships project is currently expanding government and port management capacities, instigating legal, policy and institutional reforms at the country level, developing mechanisms for sustainability, and driving regional coordination and cooperation (Figure 32). The project is also catalysing global efforts to design and test technology solutions, and enhancing global knowledge management and

marine electronic communications to address the issue. The partnership effort is three-tiered, involving global, regional and country-specific partners, representing government, industry and non-governmental organisations. 15 countries, from 6 high priority regions, are taking a lead partnering role focusing especially on legal, policy and institutional reforms for ballast water management. All told, more than 70 countries in 14 sub-regions across the globe participate in the programme, including the six pilot countries whose expertise and capacities are being drawn upon ('South-South' cooperation) for this global scaling-up effort.

GloBallast Partnerships also established strategic alliances with industry, and other organisations and programmes that are endeavouring to address the problem of invasive species. To support thesse strategic partnerships, the project established a Global Industry Alliance for Marine Biosecurity (GIA), which is an innovative and pioneering alliance of maritime industry leaders working together with GloBallast Partnerships on ballast water management and marine bio-security initiatives in general. The GIA has an objective of reducing the transfer of harmful organisms via ships and maximising global environmental benefits by addressing this issue in a sustainable and cost-effective manner through enhanced partnership between the public sector and the maritime industry, and the alignment of public, NGO and commercial activities toward common goals.

Figure 32: GloBallast Partnerships project strategy

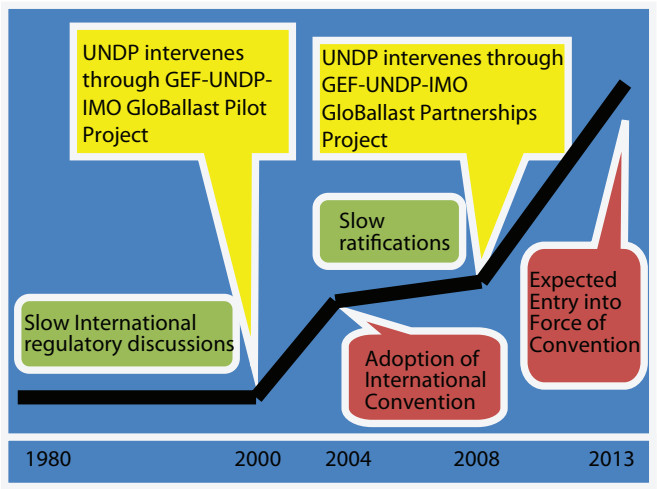


Source: UNDP-GEF Globallast Partnerships Project Document

Results: Reducing Risk from Ballast Water Invasives through Governance Reform and Technology Innovation and Investment

The first strategic intervention of UNDP-GEF through the GloBallast Pilot Project, during 2000-2004, assisted in significantly accelerating the global efforts to develop an international regulatory framework to address the ballast water issue, which ultimately led to the adoption of the International Convention for the Control and Management of Ships' Ballast Water and Sediments by IMO member States in 2004. Considering the complexity of the issue and the technological challenges involved, adoption of this Convention can be considered as one of the most significant environmental achievements in the early part of this century. The catalytic role that the GloBallast Pilot Project played in the Convention adoption process (Figure 33) was underscored by the fact that four of the GloBallast Pilot countries presided and vice-presided over the diplomatic conference that adopted the Convention.

Figure 33: GloBallast catalyses progress on new international ballast water instrument



The post-Convention follow-up by UNDP-GEF through the GloBallast Partnerships project (2008-2014), once again made a significant boost to the global efforts in addressing this serious transboundary issue, in terms of catalysing further environmental financing by IMO member States to support the legal, policy and institutional reforms and significant private sector financing to develop technological solutions. In addition to the $17 million committed as co-financing to the GloBallast Partnerships project, several partnering countries have committed significant cash co-financing for undertaking port biological baseline studies and implementing compliance monitoring and enforcement systems. A recent example includes a $15 million budgetary commitment by India, which is one of the GloBallast pilot Countries, to support ballast water related activities in India. The second UNDP-GEF intervention also accelerated the convention ratification by developing countries. As of December 2010, almost 90% of the countries who have ratified the Convention belong to GloBallast beneficiary regions. The catalytic outcomes of the GloBallast interventions in terms of international, regional and national governance reforms are shown in Box 7.

Box 7: GloBallast and the Convention on Ships' Ballast Water – Policy, Planning and Regulatory Drivers for Improved Ballast Water Management and Industry Transformation

Global level – Establishment of a global regulatory framework	Regional level – Harmonisation of implementation and enforcement	National level – Enforcement and compliance monitoring
■ Shipping moves around 90% of the world's trade and is an international and cross-boundary activity that needs global, uniform regulations. ■ The Ballast Water Management Convention, adopted in 2004, regulates how ships should perform their ballast water operations ballast water operations in order to reduce/eliminate the risk of transferring invasive species by ships. ■ Under the Convention, all ships in international traffic must manage their ballast water according to specific standards. ■ Interim measure: ballast water exchange in the open ocean (>200 nm from the coast) to avoid transfer of organisms from one port to another. ■ Long-term: on-board ballast water treatment using physical or chemical processes. Convention specifies treatment standards, as well as testing and approval procedures for systems. ■ Treatment technology market has developed, estimated to more than $35 billion over the next decade.	■ Regional strategies and action plans for harmonised implementation of the Convention have been developed in many regions, including: , – Mediterranean – Red Sea and Gulf of Aden – West and Central Africa – South-East Pacific – Wider Caribbean – Caspian Sea ■ Interim (voluntary) arrangements for ballast water exchange are in place in several regions, including the Gulf (ROPME Sea Area), the North East Atlantic, the Baltic Sea, and in the Mediterranean.	■ Based on the provisions of the Convention, countries are developing their national policies and legislation, ensuring that ships under their flag meet the requirements. Countries will also inspect ships arriving at their ports for compliance. ■ 35 signatories to the Convention to date; Albania, Antigua and Barbuda, Barbados, Brazil, Canada, Cook Islands, Croatia, Egypt, France, I.R. Iran, Kenya, Kiribati, Lebanon, Liberia, Malaysia, Maldives, Marshall Islands, Mexico, Mongolia, Montenegro, Netherlands, Nigeria, Niue, Norway, Palau, Republic of Korea, Russian Federation, Saint Kitts and Nevis, Sierra Leone, South Africa, Spain, Sweden, Syrian Arab Republic, Trinidad and Tobago and Tuvalu. ■ National or local ballast water regulations already established in Argentina, Australia, Chile, Georgia, Israel, Lithuania, New Zealand, Panama (through the Panama Canal Authority), Peru, Ukraine, United Kingdom, United States (both national and state level), etc.

Source: UNDP-GEF GloBallast Partnerships Programme

GloBallast has not only catalysed an international Convention development, adoption and ratification process, and national and regional governance reforms, but it has also catalysed the development of innovative technological solutions to the issue through facilitating critical activities such as ballast water treatment standards workshops, Global R&D Forums on Ballast Water treatment and management issues, and technology related activities such as lab-scale scale testing of innovative ballast water treatment concepts in pilot countries. The two-pronged UNDP-GEF intervention strategy supported both the development of a global regulatory framework and provided an enabling environment for technological developments that led to significant private sector participation in ballast water technology development around the world. This resulted in direct R&D and technology development investment of at least $100 million by private sector companies, ship owners and purpose-built, technology test facility operators around the world that in turn resulted in an explosion of technological solutions to cater to a rapidly evolving ballast water technology market. It is projected that the shipping industry would be investing at least 35 billion dollars over the next 10 years to meet the new regulatory requirements (for a projected 57,000 vessels) and to address the ballast water issue – further underscoring how the UNDP/-GEF-IMO GloBallast intervention catalysed significant environmental financing from industry.

In summary, the GEF-UNDP-IMO intervention through the GloBallast Programme mobilised a total of $14 million in GEF grant financing which was matched by at least $45 million in co-financing commitments from governments and partners and catalysed a projected $35 billion in private sector investment to address one of the most serious transboundary marine environmental issues facing the international community.

Catalytic Ocean Finance Summary	Amount (US $)
Total GEF Grant Financing	$14 million
Total Programme Co-financing	$45 million
Catalysed Private Sector Financing	$35 billion
Catalytic Finance Ratio (Total Catalysed Finance : UNDP-GEF Finance:	2500:1

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