UNDP/GEF PROJECT ENTITLED "REDUCING ENVIRONMENTAL STRESS IN THE YELLOW SEA LARGE MARINE ECOSYSTEM"

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Draft report of the Final Evaluation

Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem

Final Evaluation Report

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List of Acronyms

APR	Annual Project Review
CBA	Cost-Benefit Analysis
COD	Chemical Oxygen Demand
CPR	Continuous Plankton Recorder
DIN	Dissolved Inorganic Nitrogen
DPRK	Democratic People's Republic of Korea
DSP	Diarrhetic Shellfish Poisoning
ECC	Ecosystem Carrying Capacity
FAO	Food and Agricultural Organization
GCLME	Guinea Current Large Marine Ecosystem
GEF	Global Environment Facility
GEFSEC	GEF Secretariat
GIS	Geographic Information System
GPA	Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
IMCC	Interministerial Coordinating Committee
IMCF	Interministerial Coordinating Function
IMO	International Maritime Organization
IMTA	Integrated Multitrophic Aquaculture
IOC	Intergovernmental Oceanographic Commission
IOC/WESTPAC	Intergovernmental Oceanographic Commission Sub-Commission for the Western Pacific
IOCAS	Institute of Oceanology, Chinese Academy of Sciences
IW	International Waters
KORDI	Korea Ocean Research and Development Institute
LEARN	Learning Exchange and Resource Network
LME	Large Marine Ecosystem
M&E	Monitoring and Evaluation
MLTM	Ministry of Land, Transport and Maritime Affairs
MOFAT	Ministry of Foreign Affairs and Trade
MOMAF	Ministry of Maritime Affairs and Fisheries
MOU	Memorandum of Understanding
MPA	Marine Protected Area
MTE	Mid-term Evaluation
NFP	National Focal Point
NGFPA	National Government Focal Point Agencies
NGOs	Non-Governmental Organizations
NOAA	National Oceanographic and Atmospheric Administration
NOWPAP	Northwest Pacific Action Plan
NPC	National Project Co-ordinator
NYSAP	National Yellow Sea Action Plan
PCU	Project Coordination Unit
PDF	Project Development Facility
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PIR	Project Implementation Report
PMO	Project Management Office
POP	Persistent Organic Pollutant
PRC	Peoples Republic of China
PSC	Project Steering Committee

PSP	Paralytic Shellfish Poisoning
QOR	Quarterly Operational Report
ROK	Republic of Korea
RSTP	Regional Scientific and Technical Panel
RWG	Regional Working Group
SAP	Strategic Action Programme
SEPA	State Environmental Protection Administration
SMAG	Strategic Management Advisory Group
SOA	State Oceanic Administration
TDA	Transboundary Diagnostic Analysis
TNC	The Nature Conservancy
TOR	Terms of Reference
TPR	Tripartite Review
UNCLOS	United Nations Convention on Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNOPS	United Nations Office for Project Services
WWF	World Wide Fund for Nature
YSEPP	Yellow Sea Eco-region Planning Programme
YSLME	Yellow Sea Large Marine Ecosystem
YSP	Yellow Sea Partnership

Executive Summary

This report presents the findings of the final evaluation of the Yellow Sea Large Marine Ecosystem (YSLME) Project, a GEF International Waters Project, which was undertaken on the basis of a detailed desktop review of Project documentation and outputs, interviews with a range of participants and other stakeholders, and consultations with the Project Management Office (PMO).

The Area and the Project

The Yellow Sea is a semi-enclosed, shallow sea between China and the Korean Peninsula, and is one of 64 identified large marine ecosystems (LMEs). The Yellow Sea covers an area of about 400,000 km², with a mean depth of 44 m, and a maximum depth of 100 m. Inflows of fresh water and terrigenous material are very high, but have been reduced in recent decades as a result of land use changes. The connection to the open ocean is through the East China Sea, but water exchange is relatively low. The Yellow Sea has a variety of habitats, providing for high marine biological diversity that includes both resident and migratory populations. The Yellow Sea also supports substantial populations of marine mammals and seabirds, and is an important area for migratory shorebirds, several of global interest or concern. The Yellow Sea Ecoregion is considered a global representative of the earth's biodiversity. The Yellow Sea ecosystem has also provided food and livelihoods to the surrounding populations for millennia.

The Yellow Sea coast is one of the most densely populated and industrialized areas in the world. The three littoral countries share common problems of environmental deterioration, including degradation of biodiversity, loss of coastal habitats and degradation of pelagic and benthic habitats, overfishing and declines in fisheries, unsustainable mariculture, and harmful algal blooms.

As an international water body, the environmental problems of the YSLME can only be addressed through international cooperation. Prior to commencement of the YSLME Project, however, multilateral measures for consultation and cooperation among the countries on environmental management of the Yellow Sea were inadequate, and no joint, comprehensive studies of the area had been conducted.

The concept for the Project grew out of early meetings in 1992, and a preparatory phase of Project design commenced in 1999, resulting in GEF approval of the Project Document in 2000. Negotiations on logistical matters such as the location of the PMO delayed final approval by all signatories until 2004, with the Project Manager assuming duties late in the third quarter of 2004 and recruitment of PMO staff completed in early 2005.

The long-term objective of the Project is ecosystem-based, environmentally sustainable management and use of the YSLME and its watershed, .by reducing development stress and promoting sustainable development of the ecosystem. In order to achieve the objective, the Project aimed to prepare a Transboundary Diagnostic Analysis (TDA) and Strategic Action Programme (SAP), and to facilitate the development of National Strategic Action Plans (NYSAPs) and the initial implementation of the SAP.

The Project Implementation Plan defined three medium-term objectives for the Project:

- Enhancing national capacities in protection of the marine environment and sustainable use of marine and coastal resources, through preparation and development of the TDA and SAP, and preliminary implementation of the SAP;
- Strengthening regional co-operation in marine environmental protection and management through establishment of regional mechanisms established during the implementation of project activities in the Yellow Sea, and co-operative spirit enhanced by the project; and
- Facilitating cross-sectoral co-operation and co-ordination of relevant national institutions dealing with marine environmental management, through the Inter-ministry Committee established by the project for the Yellow Sea Large Marine Ecosystem.

Project Results

Objective 1: Enhanced national capacities

Medium-term objective1, enhanced national capacities in protection of marine environment and sustainable use of marine and coastal resources, was successfully achieved through the completion and endorsement by the governments of the TDA,SAP and NYSAPs. These provide regional strategies for sustainable management of the marine environment and marine and coastal resources, and for development of national and regional capacities in a coordinated way.

The TDA provides a scientific and technical assessment of the YSLME. It identifies, quantifies and prioritises the environmental issues, establishes their immediate, intermediate and fundamental (root) causes and identifies possible solutions through a logical, sequential evaluation. The major overall intervention recommended is improvement of the coherence and comprehensiveness of legislation. This would serve the national and international needs at the same time, and be based on national policies as to the appropriate balance between socio-economic development and environmental protection. The YSLME Project offers a vehicle for this, through the SAP.

The SAP aims to address the issues identified in the TDA by applying the ecosystem carrying capacity (ECC) approach. ECC is defined as the capacity of the ecosystem to provide provisioning, regulating, cultural and supporting ecosystem services. The SAP identifies a set of specific, concrete, and measurable regional targets to achieve sustainability of the YSLME's ECC, and provides a conceptual framework that links the targets both to the major environmental problems and to the different categories of ecosystem services. It also lays out for each category of ecosystem services a series of concrete management actions to achieve the regional targets, including both technical/scientific actions and governance interventions, with measurable indicators for implementation of the management actions. The time scale is decadal, aiming at achievements by 2020. The SAP includes governance actions addressing most of the root causes identified in the TDA.

The comprehensive national and regional synthesis reports of analysis of environmental status and trends in the YSLME, brought together some 30 years' worth of historical data and information, and created national and regional baselines for enhancing technical

capacity. They provide technically sound, in-depth overviews of wide scope and high quality, and identify critical gaps in data and information. The reports provided the necessary basis for the development of the TDA and the SAP.

A holistic approach to management of human activities is required to achieve sustainable management and use of marine and coastal resources. This was adopted in the YSLME Project in the form of ecosystem-based management on the basis of ECC. Implementation of approach requires the understanding and involvement of most stakeholders, through a governance system. The Project has succeeded in achieving this through training, awareness raising, workshops, conferences, internships, the Small Grants Programme and cooperation with intergovernmental and non-governmental organisations active in the region. The applicability and feasibility of the ECC approach has been investigated through pilot and/or demonstration activities for SAP implementation.

YSLME capacity-building efforts have addressed the development of skills and understanding over a wide range of disciplines, institutions and organizations. The Project has involved and addressed needs of local and national governments, as well as NGOs, the private sector and civil society. This has included training courses, workshops, scientific symposia, interdisciplinary conferences and cross-sectoral, country-driven dialogues. It has also included a wide variety of public awareness and grass-roots education activities, in particular through the Small Grants Programme.

A major accomplishment of the Project in building national capacity for protection and sustainable use of the YSLME was the production of an in-depth governance analysis at national and regional levels, including a detailed stakeholder analysis.

Outcomes and impacts of Project outputs and activities national review efforts include strengthened human, institutional, organizational policy shaping capacities in the context of protection of the marine environment and sustainable use of marine and coastal resources. Another important outcome is the synthesised evidence of the deteriorating situation of the YSLME, resulting in a much strengthened realisation of the need to take action not only among the scientific community, but also in the governance community and the public. Another important outcome of the Project is the acceptance and endorsement of the root causes being related to a high degree to lack of adequate legal instruments, and to weak or non-existing enforcement of existing rules and laws, with a resulting lack of compliance among most stakeholders. This has already had policy-shaping impact in elements of the next 5-year plan of China.

Other outcomes of the Project include:

- Enhanced scientific capabilities to work across disciplines and with other stakeholders, and to participate in policy shaping activities;
- Stronger local and provincial government awareness of and engagement in issues of marine environmental protection and sustainable use of resources;
- Enhanced interagency cooperation at government level;
- Improved environmental and human health standards, e.g., in the context of harmful algal blooms, marine pollution and manmade disasters;

- Extensive cooperation through the Yellow Sea Partnership framework, with public awareness creation, youth programme, training of local governments, regional conferences, voluntary and full-time internships and Small Grants Programmes;
- The development of data and information sharing and an ocean colour algorithm to determine chlorophyll concentrations from satellite data on basis of scientific workshops, displaying the positive spirit of cooperation obtained through the Project;
- Agreement on stock assessment methodology;
- Agreement on the process of determining of ecological carrying capacity for mariculture;
- Contributions to the diagnosis and prevention diseases in mariculture; and
- A review of techniques used in genetic analysis;
- Presentation of an initial continuous plankton recorder (CPR) survey;
- Data quality assurance and inter-calibration exercises for nutrients, metals, and organic contaminants, identifying needs for further exercises in 2008;
- The preparation of guidelines for cost-benefit analysis of management actions by the PMO, noted by the MTE as "a first attempt to develop guidance for GEF projects to incorporate economic aspects into environmental decision-making"; and
- Based on improved understanding of the marine environmental issues in the YSLME, substantive financial support was provided to implement conservation activities.

The evaluation team rates the relevance, effectiveness and efficiency of outcomes with regard to enhanced national capacities as **highly satisfactory**.

Objective 2: Strengthening regional cooperation

The Project has successfully met the objective of strengthening regional cooperation in marine environment protection and management. Preparation of the TDA and the SAP have identified the issues requiring multilateral cooperation, brought together many key stakeholders, and generated dialogues and partnerships, including with the DPRK. This provides a strong foundation for cooperation at national and regional levels. The establishment of a Yellow Sea Partnership involving most stakeholders, international bodies, and NGOs, as well as the private sector provides a fundamental mechanism for regional cooperation.

Process of preparing the analysis of environmental status and trends in the YSLME were a key driver of improved regional cooperation, and the results provide a regional perspective and information baseline as a firm foundation for continued strengthening of regional cooperation.

One of the most important examples of the Project's role in strengthening regional cooperation was the completion of joint winter and summer cooperative research cruises in 2008. The data and selected samples from the joint cruises were fully shared between the participating countries, and intercalibrations of analytical measurements were carried out. All the data will be available to all users following the publication of the summary cruise reports. The original Project Document called for the completion of winter and summer cruises in each of the first three years of the Project but, apart from the financial constraints, this grossly underestimated the complexity of the technical, logistic, and political issues involved in undertaking the cruises. Successfully resolving these issues was arguably the

single most difficult task for the Project, and it would be difficult to overstate the significance of this achievement for establishing mutual confidence and trust, as well as a precedent for regional cooperation. The successful implementation of the cruises provides the foundation for the gradual development of a joint regional monitoring system.

Joint regional biodiversity and fish stock assessments were conducted by the Project, resulting in common methodologies that provide the foundation for continued and strengthened cooperation. The joint regional fish stock assessment was initiated through workshops agreeing on and testing methodologies. The harmonization of methodology is a key result, along with a much improved understanding of the state of the selected fish stocks, reducing gaps in knowledge about the life cycle and ecology of the selected species for the Yellow Sea as a whole. The joint fisheries stock assessment highlighted the necessity of a holistic approach to fisheries management, brought out the need for further joint and integrated research in support of cooperative management of the marine living resources.

The joint cruises and joint biodiversity and fisheries stock assessments provide critical precedents for future regional cooperation.

The Project has developed several scientific and technical management tools supporting regional cooperation. These include a regional algorithm for estimation of chlorophyll-a concentration and total suspended matter from satellite imagery, regional guidelines for economic analysis of environmental management actions, scientific and management tools for the sustainable development of multi-trophic mariculture, and genetic analysis of shrimp populations in the Yellow Sea.

The implementation of some 21 pilot demonstration activities to test the feasibility and effectiveness of management actions defined in the SAP has supported regional cooperation in implementing the SAP. The demonstration projects were developed on the basis of regional cooperation, as each of the thematic Regional Working Groups (RWGs) identified short lists of activities. Implementation of the demonstration activities has been a critical aspect of maintaining and strengthening regional cooperation during the critical bridging period to full implementation of the SAP.

Outcomes of these achievements include cooperation and synergy between national and regional levels, through connections between local governments, national working groups, politicians, NGOs, scientific bodies and international organisations. The Project has generated data exchange, a data base with data from the past several decades, interdisciplinary work and dialogue between scientific disciplines and authorities. The Project has also provided a mechanism for collecting comparable data and information on conditions in the YSLME. The RWGs have reached agreements on the formats and types of environmental and socio-economic data and information to be collected from each nation. This provides a scientific foundation for joint regional periodic assessments of management actions and a basis for achieving a joint regional monitoring network as part of the regional strategy of the SAP.

The evaluation team rates the relevance, effectiveness and efficiency of the outcomes with regard to enhanced regional cooperation as **highly satisfactory**.

Objective 3: Facilitating cross-sectoral cooperation and coordination

The Project has successfully facilitated cross-sectoral cooperation and coordination of relevant national institutions dealing with marine environmental management through the Project Steering Committee (PSC), Regional Scientific and Technical Panel (RSTP), and RWGs. The Project has also established national Interministerial Coordinating Committees (IMCCs) involving the major relevant national institutions. These committees have provided substantial support in cooperation with the PMO to successfully implement the regional joint cruises and joint fisheries stock assessment, with data exchanges and the creation of related cooperation mechanisms. The SAP recommends strengthening of the IMCCs to increase country ownership of SAP implementation. A regional governance analysis carried out by the Project identifies the key national institutions relevant to implementation of the SAP, and has a strong focus on enhanced cross-sectoral coordination and decreased fragmentation.

Two regional parliamentary conferences addressing the roles of parliaments, national assemblies and local governments in protecting the marine and coastal environments and achieving sustainable use of the marine resources were an important and unique outcome of the Project. These conferences and related efforts of the PMO have strengthened the interest, understanding and involvement of policy- and decision-makers. They will greatly assist in implementing major management actions in the region, including the harmonisation of legislation, institutional reform and increased budgetary support for environmental protection.

Important outcomes of these achievements include evolving policy changes at local, national, and regional levels to address the environmental issues of the Yellow Sea in a cooperative framework. This is evidenced by increased involvement at all levels of government, the participation of policy and law makers, the influence of enhanced public awareness on the policy process, and the involvement of the private sector. There are significant indications of changes of attitudes and perceptions with respect to marine environmental protection and sustainable use of marine and coastal resources. This is demonstrated the endorsement and acceptance by the governments of the SAP together with the soft-law voluntary approach to the YSLME Commission,

The evaluation team rates the relevance, effectiveness and efficiency of the outcomes with regard to facilitation of cross-sectoral cooperation and coordination as **highly satisfactory.**

Prognosis for meeting the overall objectives and expected outcomes

The foundation for achieving the long-term objective of ecosystem-based, environmentally sustainable management and use of the YSLME is the implementation of the SAP. The adoption of the SAP, including the establishment of a YSLME Commission, by governments, the achievements of the pilot demonstration activities and other activities of the Project, and the formation of the Yellow Sea Partnership provide a sound foundation for achieving the goal.

Risks to sustainability of Project outcomes

The evaluation team considers financial risks to the sustainability of outcomes to be low given the high participation of and ownership by stakeholders, and the commitments already made by governments. There are moderate risks to sustainability associated with

the evolution of socio-political conditions, the development of legal instruments, the strengthening of enforcement to achieve compliance, and continued degradation and alteration of parts of the ecosystem, including through potential climate change.

However, as noted above the ownership in the countries of this unique, community-driven integrated and multilateral programme for addressing Yellow Sea environmental issues is high. Key stakeholders agree that it is in their interest that the benefits of the Project continue and achieve full impact. There also appears to be a shift in attitudes in the appropriate balance between economic development and environmental protection in favour of more attention to environmental concerns.

Country ownership and stakeholder involvement

The Project is strongly country-driven. Extensive consultations have been conducted with government representatives, authorities, scientific community, other stakeholders and users of the marine resources at each stage since inception of the Project, to clarify and respond to country priorities and concerns. The financial commitments have been fully honoured by the participating countries. Governments at national and local level, and other stakeholders, have endorsed management frameworks and adjustments to policies as a result of the outcomes of the Project. At national and local levels, and including civil stakeholders such as fishers and coastal communities, ownership of the Project has been created by a wide range of activities. The YSLME Project has been adopted by stakeholders as a community-driven mechanism to achieve improvements of the condition of the Yellow Sea.

A wide range of stakeholders have been actively involved in Project activities, which have addressed issues of real concern to stakeholders. Local officials and managers have been trained in how to address the issues and carry out management actions. Stakeholder involvement has generated cooperation, dialogue, and communication across sectors and between institutions and communities.

Replicability

The Project has demonstrated the replicability of a number of its results, such methodologies developed for integrated multitrophic aquaculture (IMTA), nutrient loading studies, and remote sensing algorithms and surveys. In particular, the replicability of many Project approaches and outcomes has been recognized by GEF and the global LME programme. GEF plans to use the YSLME approach to TDA and SAP development as the model for a project in the East China Sea. GEF-IW and the global LME programme view the YSLME as a benchmark for LME projects.

Project Management and Coordination

The PMO has performed very well in performing and exceeding the roles defined in the Project Document. The PMO has been efficient and effective, with an appropriate proportion of administrative and overhead costs to expenditure on substantive project outputs and outcomes, within the constraints of the institutional administrative framework. The PMO team has worked well as a team and to a high professional standard, with low turnover of personnel and a collective commitment to the success of the Project.

The implementation and execution arrangements, and organizational structure of the Project were basically sound, although it is not clear that the UNDP Country Offices were as supportive as they might have been. Membership at various levels of the organizational structure (PSC, RSTP, RWGs) has overlapped to a certain extent, which has facilitated effective communication and country ownership. National representation on the PSC was firmly rooted in national government policy structures.

The implementation approach of the YSLME Project is exemplary, in the literal sense that it serves as a valuable example for other GEF projects. The PMO has gone beyond the basic roles of coordination, support for activities, and project management as defined in the Project Document and has played a critical and demanding catalytic and leadership role essential to the Project's success. The PMO has largely succeeded in striking a sometimes challenging balance between Project delivery (delivering products and outputs specified in the Project Document, to budget and schedule) and fundamental outcomes – such as confidence, cooperation, technical and institutional capacity, and stakeholder ownership - necessary to achieve the long-term objective.

Day-to-day work planning and financial management have been effective and efficient, with formal workplans and budgets updated at least annually and approved by the PSC. There have been several instances of delays in conducting activities and producing outputs, and financial expenditures generally fell short of budgets. In almost all significant cases these were due to externalities beyond the control of the PMO. The difficult process of reaching agreement on conducting the joint cooperative cruises, and the consequent delay, is a major example of this.

Implementation of Monitoring and Evaluation of the Project has conformed to GEF, UNDP, and UNOPS requirements. Annual Tripartite Reviews of the Project were not conducted as planned in the Project Document and Project Implementation Plan. The Project Implementation Plan, however, revised the Terms of Reference of the PSC to strengthen the PSC's role in Project policy and management. The PSC and RSTP, which met in conjunction, included all of the parties involved in Project implementation that were planned to participate in the Tripartite Reviews, and the evaluation team concludes that the PSC meeting fully discharged the functions of the Tripartite Reviews. Quarterly and annual reporting and reviews, and the mid-term and final evaluations, were conducted as planned in accordance with the Project Document and Project Implementation Plan, and GEF procedures.

The evaluation team rates M&E implementation for the Project as **satisfactory**.

Conclusion

Overall, the evaluation team concludes that the Project has achieved its medium-term objectives to a highly satisfactory degree, that the outputs are relevant for achieving the long-term goal, and that implementation has been effective and efficient, overcoming and addressing the considerable challenges that were encountered.

Project Performance Ratings

Final evaluation performance ratings

Criterion	Rating	Comments
Achievement of objectives and planned results	1	Key objectives of TDA, SAP and SAP implementation achieved to a high standard. Nearly all planned results achieved, and exceptions are largely a result of externalities. In some aspects the Project exceeded the objectives and planned results. The YSLME Project is in several aspect a model for other IW projects. Adaptive management has maintained achievable objectives and expectations.
Attainment of outputs and activities	1	Essentially all outputs and activities completed to a satisfactory or highly satisfactory level. Some activities, such as the cooperative cruises, were delayed by factors largely outside of PMO control, but were eventually achieved
Cost effectiveness	1	The Project has had achievements beyond those originally planned, and has leveraged cofinancing well beyond what was envisioned in the Project Document. This was accomplished while extending the budget to allow a bridging period to the proposed second phase, including preparation of the PIF for the second phase
Impact	2	The YSLME Project has had an impact on policy, including China's current 5-year plan. The engagement with parliamentarians has potential for significant future impacts, but to be sustainable will need to be ongoing. Interviews during the evaluation mission indicated significant impact on technical cooperation and public awareness at a local level at sites of Project activities. Impact on internal coordination of national agencies has been modest. Impact on the state of the environment is probably minor, and not measurable. It is unreasonable, however, to expect significant measurable impacts on the state of the environment, environmental management, or governance on the time scale of the Project.
Sustainability	2	The Project has strong stakeholder support, has provided a number of key management tools and precedents for continued cooperation, increased mutual understanding and trust between countries and among different stakeholder groups, and addressed issues of high relevance in the region, providing a good basis for the sustainability of outcomes. Agreement on the establishment, nature, and structure of a YSLME Commission significantly enhance the prospects for sustainability of Project outcomes.
Stakeholder participation	1	The various components and activities of the Project have involved a large number of stakeholders cutting across all levels of society in both countries, ranging from school children and community groups to high-level parliamentarians and government officials. Formal stakeholder analysis was done as part of TDA and SAP development. All major relevant stakeholder groups have been included.

Criterion	Rating	Comments
Country ownership	1	The Project has been strongly country-driven and consistently developed support and ownership by the two participating countries as well as DPRK. Strong country ownership is amply demonstrated by the provision by the ROK of finance to extend the bridging period from June 2010 through March 2011, and especially by the US $2.5 billion in cofinancing secured for the proposed second phase.
Implementation approach	1	Exemplary balance between delivery of immediate/medium-term results and establishment of fundamental conditions (confidence, cooperation, capacity, etc.) necessary to reach long-term objective, while mindful of national concerns and objectives. Effective efforts to build national government ownership and support, technical capacity, stakeholder ownership and support, and international contributions and recognition.
Financial planning	2	The Project regularly adapted the budget throughout implementation in light of changing circumstances, fully complied with all GEF and UNOPS financial procedures, and initiated and internal audit partway through the Project, which confirmed that financial management was sound. There were issues with under-expenditure of budgets, but these were largely due to external factors, as well as money-saving efforts that increased the Project's cost effectiveness.
Replicability	1	The parliamentary conferences are the subject of an IW:LEARN Experience note. The methodologies regarding multitrophic mariculture are being transferred to the GCLME, and GEF plans to use the YSLME approach to TDA and SAP development as the model for a project in the East China Sea. GEF-IW and the global LME programme view the YSLME as a benchmark for LME projects.
Monitoring and evaluation	2	Under GEF Terminal Evaluation Guidelines, the overall rating of M&E is based on M&E Implementation, with M&E design and funding as explanatory variables. M&E Implementation has conformed to GEF, UNDP, and UNOPS requirements. The TPRs were not implemented, but the PSC meetings fully discharged the functions of the TPRs.
Overall Project Rating	**1**	The PIRs since 2008 evaluate the Project's performance against the criteria listed in the Logframe Matrix of the Project Document, and all ratings since 2008 have been "Highly Satisfactory", with the sole exception of a rating of "Satisfactory" for overall Project Implementation by the UNDP Regional Technical Advisor in 2008. The evaluation team has reviewed the ratings in the PIRs against the Logframe Matrix and concurs with the ratings in the PIRs.

Lessons Learned

- The design of projects in politically and culturally diverse settings should not underestimate the time frame and complexity of establishing new mechanisms for technical cooperation.
- If this complexity and timing is underestimated in project design, considerable flexibility and pragmatism in project management and control are required to make the adjustments needed for successful outcome.
- Regular communication between participating countries at various levels of governance is necessary and needs to be enhanced as far as possible.
- Ongoing, proactive facilitation of government involvement in the Project is needed.
- Involvement of a broad spectrum of stakeholders is required to achieve understanding, participation, ownership, and sustainability.
- In order to enhance local participation and partnerships with local communities and NGOs, there is a need to use the local language, including the translation of key documentation such as application forms and instructions for applications and report writing on small grants.
- Expert groups are still largely defined by subject areas and associated disciplines. Increased efforts to enhance interdisciplinary synergism would be useful.
- The relationships among immediate causes, underlying causes, and root causes need to be clarified as part of SAP implementation.
- Planning from the Project design phase to include SAP demonstration activities in the first phase of the Project has been a key factor in maintaining momentum and leveraging of cofinancing.
- The requirement for a bridging period from the first phase to a possible second phase of the Project implies the need for flexible budget planning towards the end the first phase, together with fundraising efforts.

Recommendations

- Regional and national coordination and cooperation should continue to be strengthened.
- It is strongly recommended that the Project be continued into its second phase, with GEF support in the initial stages. Cofinancing from the participating countries has already been secured. GEF support is needed to secure the international, multilateral coordination and cooperation.
- A possible linkage with a potential East China Sea LME Project should be considered, provided this would not significantly delay the initiation of a YSLME second phase.
- Proactive efforts should be made to further pursue public awareness and participation, using the mechanisms and approaches already developed.
- The ecosystem-based management approach should continue to be developed, with clear guidelines and strengthened explanation of ecosystem services and ECC, so that all stakeholders can be fully involved.
- There should be further development of the MPA network in a logical structure related to environmental and oceanographic conditions so as to achieve sufficient coverage, and use of selected sites to establish baselines and test management strategies in each country, with comparisons across the network.
- Enhanced involvement of the private sector should be encouraged, possibly through the Yellow Sea Partnership and building on the positive experiences of the Project in the first phase.

- Stronger efforts for timely publication of scientific findings in scientific journals and on websites are recommended, as well as efforts to stimulate continued involvement of leading scientists.
- It is recommended that the YSLME Project, in its second phase, considers using the partnership/MOU with PEMSEA to function within PEMSEA's political framework.

1. Introduction to the Evaluation

A final evaluation of the UNDP/GEF Project entitled "*Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem*" (referred to hereafter as "the Project") has been commissioned by the Project's Implementing Agency, UNDP and Executing Agency, UNOPS. This document presents the results of the final evaluation.

1.1. Purpose of the Evaluation

The purpose of the final evaluation was to provide a comprehensive and systematic review of the performance of the Project in order to enable GEF, UNDP, government bodies in the participating countries, and UNOPS to assess the Project's relevance, efficiency, effectiveness, impact, and sustainability. This includes an assessment of the project design and objectives, implementation process, achievements of the project against its objectives, and factors that facilitated or impeded project success. The final evaluation also had the objectives in the context of broader GEF activities of promoting accountability and transparency, synthesizing lessons learned that may help improve other GEF activities, providing feedback on recurrent issues in GEF activities, and contributing to GEF Evaluation Office databases for aggregation, analysis, and reporting on the effectiveness of GEF operations.

1.2. Evaluation Methodology

Two evaluators appointed by UNDP and UNOPS conducted the final evaluation in accordance with the Terms of Reference (TOR, Annex 1), as well as the *Guidelines for GEF Agencies in Conducting Terminal Evaluations*. The evaluation methodology consisted of:

- In-depth desktop review of documentation, data sets, and other materials, undertaken at the evaluators' respective home bases and in the Project Management Office (PMO). Annex 2 presents a list of documents examined by the evaluators.
- Interviews and consultations with stakeholders involved in the Project. Interviews with stakeholders were conducted during a mission to China and Korea from 4 to 16 November, 2010. In some cases, the short time available for the mission did not allow for face-to-face interviews, and information was sought from stakeholders via e-mailed questionnaire. Persons interviewed included stakeholders from national and local governments, the scientific community, non-governmental organizations (NGOs), and partner organizations.
- In addition to one-on-one interviews with stakeholders, one of the evaluators (GK) participated in *World Ocean Week*, Xiamen, China (5-7 November, 2010), and the other (MEH) participated in the *International Symposium on Marine Ecosystem Assessment Systematic Design & Requirements*(8 November 2010) and the *YSLME Regional Workshop on Regional Network for Ecosystem Monitoring & Assessment* (9-10 November 2010), which afforded an opportunity for less formal, but wide-ranging discussions with a number of people familiar with the project.

- Consultations with the Project Manager and other project staff in the PMO over the period 9-16 November 2010, with follow-up by email for further clarification as required.

1.3. Limitations

The mission to the region for the final evaluation was initially envisaged to be conducted in October 2010, but was delayed until November 2010 for administrative reasons and to take advantage of the above-mentioned workshops that would bring together a large number of stakeholders. The original expectation was that the draft final evaluation would be presented to a meeting of the PSC during 25-26 November 2010. This placed severe constraints on the time available for the evaluation mission, and although the PSC meeting was subsequently delayed it was too late to reschedule travel and meeting arrangements.

As a result of the time constraints on the mission, it was not possible to conduct site visits to directly observe Project activities and meet local participants and stakeholders. This also meant that the evaluation team was not able to interview any trainees from the various workshops and training courses conducted by the Project. The evaluation team was, however, able to interview one of the interns who had worked in the PMO.

The delay in the mission also resulted in the mission coinciding with annual budget preparation and submission in government agencies. As a result, the implementation focal points and GEF focal points in both China and the ROK were not available to meet with the evaluation team. The evaluation questionnaire was sent to the focal points, but responses were not received at the time of drafting the evaluation.

The evaluation team reviewed the Project's annual budgets and expenditure reports, but it should be noted that the scope of the evaluation does not include a financial audit.

2. Project History, Context, and Design Summary

The Yellow Sea Large Marine Ecosystem (YSLME) Project has had a lengthy history. The initial concept grew out of meetings in 1992 sponsored by the World Bank and the United States National Oceanographic and Atmospheric Administration (NOAA). These and subsequent discussions eventually led to the submission, in late 1997, of a successful proposal for a regional PDF-B project, with China, the Democratic Republic of Korea (DPRK) and the Republic of Korea (ROK) as partner countries. The PDF-B project commenced in April 1999, with the main objectives of preparing a preliminary Transboundary Diagnostic Assessment (TDA) and a draft proposal for the preliminary elements of and framework development process for a Strategic Action Programme (SAP). In June and July 1999, the partner countries held their first inter-ministerial committee meetings and national stakeholder meetings.

The PDF-B process resulted in the completion of a Preliminary TDA in February 2000, and the submission of a Project Document for the YSLME Project to the GEF Council in April 2000, China and the ROK being the requesting countries. The Project was approved by the GEF Council in May 2000. Reaching agreement on project staffing and the location of the PMO delayed Project Commencement. The final Project Document (also known as the Project Brief) was signed by UNOPS and UNDP in 2003. The ROK signed in June 2003, and China in

April 2004. The Project Manager assumed duties in mid-September 2004, with the remaining PMO staff taking up positions in late 2004 and early 2005.

The interval between Project approval in 2000 and its commencement in late 2004 had a range of technical and management implications, resulting from changes in knowledge of the YSLME and experience gained from the challenges involved in moving from approval to implementation. The delay also had budgetary implications due to increases in salary and other costs in the intervening period. The first Regional Technical Meeting, in December 2004,agreed that, given the delay, changes from the original Project Document agreed by stakeholders should be allowed, and that and a second Regional Technical Meeting, in March 2005, developed a Project Implementation Plan that incorporated a number of adjustments from the Project Document, which was approved by the Project Steering Committee (PSC) at its first meeting, also in March 2005. Some of the adjustments were essentially procedural, for example the addition of UNDP and UNOPS to the organization chart, but the Project Implementation Plan also involved changes in Project structure and objectives from the original Project Document. These are described in more detail in Section 2.3.1.2 below.

The Project Document indicated a duration of five years, so that given its commencement in late 2004 the Project was originally scheduled to close at the end of 2009. In late 2008, the Project Steering Committee agreed to a no-cost extension of the Project to the end of June 2010, as a bridging phase to an anticipated Phase II. This extension was funded through adjustments such as combining or deferring certain activities as well as budgetary savings. In late 2009 the PSC extended the bridging phase to the end of March 2011, on the basis that GEF funds for Phase II were expected to become available at that time. This further bridging phase is funded by cash and in-kind contributions by China and the ROK.

2.1. Project Area

The Yellow Sea is a semi-enclosed, shallow sea between China and the Korean Peninsula, and is one of 64 identified large marine ecosystems (LMEs). The Project defines the southern boundary of the Yellow Sea as a line connecting the north bank of the Yangtze River (Changjiang River) to the south coast of Cheju Island, and from the north coast of Cheju Island to Jindo Island off the south coast of the ROK. The project defines the northern boundary of the Yellow Sea as a line from Penglai in the west to Dalian in the east. Thus, the defined project area excludes the Bohai Sea. Three countries, China, the ROK, and the DPRK border the YSLME.

The Yellow Sea covers an area of about 400,000 km², and is about 1,000 km long and 700 km wide at its widest. It is geologically unique, consisting of a shallow, post-glacially submerged, part of the continental shelf. The mean depth is 44 m, with a maximum of 100 m. Inflows of fresh water and terrigenous material are very high, but have been reduced in recent decades as a result of land use changes. This has altered the hydrographic and sedimentary regimes in the Yellow Sea. The open sea connection with the East China Sea provides for inflows from the Tsushima Warm Current and possibly the Kuroshio. Hydrographic conditions, however, limit water exchange between the Yellow and East China Seas, and circulation in

the Yellow Sea itself is weak, both factors that increase the Yellow Sea's vulnerability to pollution. The tidal range is high, up to 9 m in some places.

The Yellow Sea has a variety of benthic habitats, including bays, estuaries, tidal flats, sand dunes, coastal waters, islands, and rocky reefs, as well as the open sea bed and pelagic waters. Approximately 400 species of macroalgae, 500 marine invertebrate species, and some 339 fish species have been recorded from the Yellow Sea. The marine biota is primarily a mix of warm water and warm temperate species, with a smaller component of cold water species. The fish species can also be divided into resident species and those that are between the Yellow and East China Seas. The Yellow Sea also supports substantial populations of marine mammals and seabirds, and is an important area for migratory shorebirds, several of global interest or concern. The Yellow Sea Ecoregion is considered a global representative of the earth's biodiversity.

The Yellow Sea ecosystem has also provided food and livelihoods to the surrounding populations for millennia. Approximately 100 species are harvested commercially. Fishes account for almost 85% of the harvest, but cephalopods, crustaceans, other invertebrates, and algae are also harvested. Only 23 species have an annual catch exceeding 10,000 t, these commercially important species account for 40-60% of the total annual catch from the Yellow Sea.

2.2. Project Context

The YSLME is one of the world's LMEs mostly significantly affected by human activities. Some 600 million people inhabit the basins draining into the Yellow Sea, and the coast is one of the most densely populated (with population densities of the order of 500/km^2) and most industrialized areas in the world. Human activities include many maritime activities, such as fishing, mariculture, marine transport, land reclamation, offshore oil production, and tourism and recreation. There are at least 6 coastal megacities. The three littoral countries share common problems of environmental deterioration. The YSLME is subject to serious problems, including degradation of biodiversity, loss of coastal habitats and degradation of pelagic and benthic habitats, overfishing and declines in fisheries, unsustainable mariculture, and harmful algal blooms. The Yellow Sea is one of the most intensively exploited areas in the world, and most of the commercially valuable fish stocks are overfished, with competitive fishing efforts by the bordering countries. Landings in traditional demersal fisheries have decreased, while those of small pelagic fishes have increased. Only some short-lived pelagic species, such as anchovies, may have some potential for further exploitation. Over the last 3 decades, many coastal habitats in the Yellow Sea have been lost or modified, including freshwater marshlands, lakes, rivers, muddy and sandy foreshores, tidal flats, and seagrass beds, as well as modifications of the estuaries. By 2006, some 44% of the mudflat areas had been reclaimed, and reclamation has continued at a rapid pace.

As an international water body, the environmental problems of the YSLME can only be addressed through international cooperation. The PDF-B project, however, identified multilateral measures for environmental management in the area as deficient. Although the surrounding countries share some aspects of their historical and cultural background, they differ in their internal political systems, external political and economic alignment, and levels

of economic development. As a result, consultation and cooperation among the countries on management of the Yellow Sea has been insufficient. Similarly, few if any joint, comprehensive studies of the area had been conducted before the inception of the Project.

2.3. Project Design

The long-term objective of the Project is ecosystem-based, environmentally sustainable management and use of the YSLME and its watershed. This is to be accomplished by reducing development stress and promoting sustainable development of the ecosystem. In order to achieve the objective, the Project aimed to prepare a TDA, a SAP, and National Strategic Action Plans (NYSAPs), as well as to initiate and facilitate the implementation of the SAP.

2.3.1. Description of the Design

The Project was designed to achieve a series of improvements in knowledge and capacities, as well as legal, policy and institutional reforms, focused on sustainable management of fisheries resources, biodiversity conservation, and reduction of stress on the YSLME, and also the establishment of a regional framework and mechanisms for stakeholder cooperation and coordination on these issues.

2.3.1.1. Original Project Document

The Project Document defined four immediate objectives formulated around the thematic areas of fisheries, biodiversity, and ecosystem stress, as well as capacity building, each with a number of components(Table 1). For each component, it defined success criteria, a series of activities, and the responsible parties and partners.

Table 1 Immediate Objectives Defined in the Approved YSLME Project Document

Project Document Immediate Objectives
Objective 1. Develop regional strategies for sustainable management of fisheries and mariculture
Components: Stock Assessment Carrying Capacity Mariculture Production Disease in Mariculture Regional Fisheries Agreements and National Laws Fisheries Management Plan
Objective 2. Propose and implement effective regional initiatives for biodiversity protection
Components: Habitat conservation Vulnerable species Genetic diversity Introduced species Biodiversity regulations Regional biodiversity assessment and regional biodiversity action plan
Objective 3. Propose and implement actions to reduce stress to the ecosystem, improve water quality, and protect human health
Components: Stressors to ecosystem Carrying capacity of ecosystem Contaminant inputs Contaminant levels Harmful algal blooms and emerging disease Hot spot analysis Emergency planning and preparedness Legal and regulatory Fate and transport analysis to facilitate SAP analysis
Objective 4. Develop and Pilot Regional Institutional and Capacity Building Initiatives
Components Stakeholder involvement Regional coordination National institutions Financial instruments Data and information management Public awareness and participation

The Project organizational structure defined in the Project Document included:

- A Project Steering Committee, as the highest decision-making body in the Project;
- A Strategic Management Advisory Group (SMAG) to provide ongoing management advice on Project implementation. The SMAG was later re-designated as the Regional Scientific and Technical Panel (RSTP; see Section 2.3.1.2);

- A Project Coordination Unit, which is now the PMO;
- An Interministerial Coordinating Function (IMCF) in each country. Both China and the ROK established Interministerial Coordinating Committees (IMCCs) of key national agencies during the PDF-B phase of the project;
- A National Focal Point (NFP) in each country. The NFPs were senior government officers appointed by the designated National Government Focal Point Agency (NGFPA), responsible for Project implementation in that country;
- A National Project Coordinator (NPC) in each country to serve as the primary national contact for PCU/PMO and the Secretary of the IMCF; and
- Regional Thematic Working Groups (RWGs) on:
    - Fisheries and Mariculture (RWG-F);
    - Ecosystem (RWG-E);
    - Biodiversity (RWG-B);
    - Contaminant Control (now known as the Pollution RWG, RWG-P); and
    - Investment (RWG-I).

The direct recipients of Project outputs were identified in the project document as national, local, and municipal governments, national focal points, regional scientific and technical organizations, private sector organizations, and NGOs. The target beneficiaries were identified as residents of the Yellow Sea coastal zone, particularly women, fishermen, tourists who visit the region, future generations both within and beyond the region, and the world at large, given the global importance of the Yellow Sea for biodiversity and ecosystem services, and also because the YSLME Project was seen to have a high demonstration value for other regional seas.

A critical and innovative feature of the Project design was a focus on ecosystem-based management based on the concept of ecological carrying capacity (ECC).

The Project design included three phases, described below. Overarching all phases was the development of an institutional framework and an effective regional network including government agencies, scientific and other experts and NGOs, as well as enhancement of technical capacity and the willingness of the international community to assist.

Phase I: Stress assessment

The Project strategy involved three phases. All to be approached from a gender-disaggregated perspective with an eye to empowering women in coastal communities. The first phase was to assess the stress on the ecosystem through collating and reviewing existing information about the ecosystem, and targeted efforts to fill in gaps by gathering new information, and by assessing this information to identify the causes of problems and options for remedial actions. The TDA was the key output of the first phase and was scheduled to be completed in the first year of the Project Document.

Phase II: Stress reduction actions

The second phase in the Project design was to define actions to reduce the stress on the ecosystem, including the development of management plans, agreements, strategies and demonstration projects. The Project document identifies the NYSAPs and the SAP as the key outputs of this phase. In the original Project design, the NYSAPs were to be prepared first and serve as the basis for developing the regional SAP. Preparation of the NYSAPs and SAP were scheduled for years 2 and 3 of the Project.

Phase III: SAP implementation (demonstration phase)

This phase of the project, scheduled for the final two years, was designed to facilitate initial implementation of the SAP through pilot demonstration projects. Initial SAP implementation was included in the design on the basis of experience in other GEF projects where lags in moving from SAP approval to SAP implementation resulted in reduced government commitment and urgency in addressing the environmental issues. Initial implementation of the SAP was thus seen as a key bridging phase from the Project to full implementation of the SAP.

2.3.1.2. Project Implementation Plan

As noted previously, the delay between the approval and commencement of the Project necessitated some adjustments in the design, which were reflected in the Project Implementation Plan that was developed at two Regional Technical Meetings in early 2005 and approved by the Project Steering Committee. Some of these involved procedural matters such as modification of the organizational chart to better reflect the relationships among key parties. Key substantive adjustments to the Project design included:

- The SMAG was changed to the RSTP, with modified TOR to reflect the critical importance of scientific and technical issues, and that these are different from governance issues;
- The TOR for the PSC were modified to emphasize its policy and management functions, and the project structure was modified to reflect the top-down role of the PSC in making Project decisions;
- Project activities were re-prioritized, and the budget re-allocated accordingly, in light of the very wide range of activities and the budgetary pressures created by the delay in commencement;
- Adjustments were made to PMO staffing, for example to allow for more than one professional staff member during the last year of the Project and to add an IT professional rather than a receptionist to reflect the increased importance of information technology. Budgetary pressures due to an increase in staff costs between Project approval and implementation were offset in part by a reduced use of international consultants;
- An internship programme was added to increase national capacities to participate in international projects;

- The three phases of implementation from the original Project Document (TDA, SAP, SAP implementation) remained unchanged, but the scheduling was adjusted. The time allocated to preparing the TDA was increased from one to two years because the necessary information could not be assembled and assessed at national and regional levels in a single year. The two years allocated to preparing the SAP remained unchanged, but the increased time required to prepare the TDA meant that Phase III, SAP Implementation, was reduced to the final year of the Project;
- The order of preparing the Regional SAP and NYSAPs was reversed, so that the regional SAP was prepared first. The reason for this was to ensure that the NYSAPs could take into account the regional perspective and priorities provided by the SAP.
- Whereas the original Project Document planned for three years of basin-wide surveys, the Project Implementation Plan recognized that cost increases in scheduling ship time were likely to mean that two or three survey cruises could be conducted rather than the originally planned six cruises, although budget provisions for ship time were included in each of the first three years.; and
- The four immediate objectives defined in the Project Document (Table 1) were reformulated as three medium-term objectives:
    - Enhancing national capacities in protection of marine environment and sustainable use of marine and coastal resources, through preparation and development of the Transboundary Diagnostic Analysis (TDA), Strategic Action Programme (SAP), and Implementation of SAP;
    - Strengthening regional co-operation in marine environment protection and management through establishment of regional mechanisms established during the implementation of Project activities in the Yellow Sea, and co-operative spirit enhanced by the Project, and
    - Facilitating cross-sectors co-operation and co-ordination of relevant national institutions dealing with marine environmental management, through the Inter-ministry Committee established by the Project for the Yellow Sea large marine ecosystem.

Compared to the original immediate objectives, the medium-term objectives are formulated around the Project outcomes of enhanced regional capacity, strengthened regional cooperation and cross-sectoral cooperation, rather than the technical themes of fisheries, biodiversity and ecosystem stress. At least in part this appears to reflect the challenges experienced in moving from Project approval to Project implementation, which emphasized the central importance of cultural, institutional and governance changes in achieving the long-term objective of ecosystem-based, environmentally sustainable management and use of the YSLME and its watershed, which remained unchanged.

Although there were some adjustments, comparison of the activities defined in the original Project Document (Annex 6) and the Project Implementation Plan, which are organized around thematic objectives rather than the medium-term objectives listed above (Annex 7), demonstrates that the Project Implementation Plan remained closely aligned with the original Project Document.

2.3.2. Stakeholders

The Project involved a wide range of stakeholders at the international, regional, national, and local levels. The stakeholders included government agencies and parliamentary organizations, intergovernmental organizations, scientific institutions and universities, non-governmental organizations (NGOs), the private sector, other projects, and local communities.

At the international level, the primary stakeholder was the implementing agency, UNDP, but UNEP and IMO were involved in some aspects. The stakeholders involved also included the international NGOs World Wide Fund for Nature (WWF), Wetlands International, the Marine Stewardship Council, and the Nature Conservancy (TNC). The Project has also cooperated with other GEF IW activities, including the Interim Guinea Current LME (GCLME) Commission, IW:LEARN, and the Global Forum on Oceans, Coasts, and Islands.

Key regional stakeholders involved in the Project included the UNEP Northwest Pacific Action Plan (NOWPAP), the UNDP/GEF Project on Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), and the UNESCO-Intergovernmental Oceanographic Commission Sub-Commission for the Western Pacific (IOC/WESTPAC).

Government agencies were the most important stakeholders at national level. The key governmental stakeholders were the ROK's Ministry of Ocean and Fisheries (MOMAF), which was changed later to the Ministry of Land, Transport and Maritime Affairs (MLTM), and China's State Oceanic Administration (SOA). Other governmental stakeholders included national government agencies responsible for fisheries, environmental protection, land use planning, maritime safety, foreign affairs, and finance. In addition, the Project directly engaged individual parliamentarians from both China and Korea. The Project also cooperated with the UNDP/GEF Project on "Biodiversity Management in the Coastal Area of China's South Sea", and a number of national NGOs were also involved.

Government agencies were also key stakeholders at the local level, with a number of provincial government agencies participating in the Project. Scientists and other experts from a number of universities and technical institutes in both China and the ROK participated in the Project. A variety of local NGOs were involved as well, in particular through the Project's Small Grants Programme. At the community level, the Project involved schools, community groups, and local enterprises.

The Yellow Sea Partnership was established as an initiative of the Project. The Partnership involves more than 20 international organisations, government institutions, research institutes, NGOs, and local governments. The Partnership has produced useful outcomes in the protection and conservation of the Yellow Sea marine and coastal environment. A good example is the cooperative project on biological diversity conservation in the Yellow Sea, with US $1.8 million in funding from Panasonic Corporation.

2.3.3. Evaluation of Project Design

The evaluation team concurs with the conclusion of the Mid-term Evaluation (MTE) that the Project design was clear and logical. Overall, the design was commensurate with the time and resources allocated, but the original design underestimated the time required to

prepare a final TDA given the complexity of first producing national reports sufficiently harmonized to support a regional synthesis of information on ecosystem status and trends, as well as governance. In this respect, the evaluation team does not agree with the recommendation of the MTE that it would have been preferable to produce the final TDA during the PDF-B phase, which we regard as unfeasible (though it may be worth considering for other projects).

The delay between Project approval and its commencement resulted in budgetary pressures, both as a result of inflation and because economic factors created cost imbalances between the two countries. These pressures necessitated the re-prioritization of activities and reallocation of resources when the Project did commence. If there was a deficiency in Project design, it was in underestimating the complexity of agreeing on logistical aspects of Project implementation rather than in budget allocations at the time of design. The adjusted priorities and budget allocations were realistic, commensurate with the available time and resources and consistent with the original Project design.

The evaluation team regards the reformulation of Project objectives from largely thematic to a greater focus on the fundamental outcomes of capacity building, regional cooperation and inter-agency coordination as appropriate, as it emphasizes the outcomes necessary to achieve the long-term objective. The reformulated medium-term objectives are entirely compatible with the original immediate objectives in the Project Document and the thematic focus and Project activities remained essentially unchanged.

In retrospect, the decision to include a preliminary SAP implementation phase in the Project design was a key factor in Project success. Implementation of demonstration activities has proved to be a key factor in maintaining the Project's momentum after approval of the SAP, including the leveraging of cofinancing for the bridging period through March 2011. This is a significant lesson learned for consideration in the design of other projects.

3. Project Results

As explained in Section 2.3, the extended hiatus between GEF approval of the Project and its commencement led to the re-formulation in the Project Implementation Plan of the original four immediate objectives of the Project into three medium-term objectives. Project results were evaluated in relation to both sets of objectives. The results are presented in relation to the three medium-term objectives.

3.1. Objective 1. Enhanced National Capacities in Protection of the Marine Environment and Sustainable Use of Marine and Coastal Resources

This was to be accomplished through preparation and development of the TDA and SAP, and by initiating implementation of the SAP.

3.1.1. Attainment of outputs and activities

The Project has successfully met the objective through completion of the TDA and the SAP. These are based on national reviews/reports, regional syntheses thereof, and thorough consultations with a wide range of stakeholders. The results provide regional strategies for

sustainable management of the marine environment and marine and coastal resources. The activities include SAP pilot demonstration sites with joint, cross-sectoral activities. NYSAPs have been developed following the regional SAP, thus taking transboundary issues into account in the national plans.

3.1.1.1. A regional strategy

The Project has established a regional strategy and framework within which the national and regional capacities are enhanced and further developed in a coordinated and organised fashion, including milestones, adaptations and adjustments required on basis of new knowledge and information. The training and capacity-building efforts have reached across the society from government level to municipalities and schools.

The Transboundary Diagnostic Analysis

The TDA is one of the major outputs and results of the Project. It constitutes a scientific and technical assessment of the international waters area, identifying and quantifying the environmental issues and problems and establishes their immediate, intermediate and fundamental (root) causes, and identifies possible solutions through a logical sequential evaluation that includes all 7 components of the TDA process. The scope defines the geographic region and the disciplinary requirements of the Project. The status and trends of environmental problems in the YSLME are assessed through the national reports and regional syntheses, supplemented in some cases with other relevant references. Priorities for action are identified. It provides a causal chain analysis for the identified problems in the four Project components of pollution, ecosystem, fisheries and biodiversity, with related analysis of the root causes. The causes are discussed separately for each of the four components, including in most cases primary, secondary, tertiary, quaternary and root causes. The TDA also identifies transboundary versus domestic-national problems and finally identifies and analyzes options for management interventions. In addition, some other issues worthy of consideration in the preparation of the SAP are brought out. This TDA served as the scientific basis for the Strategic Action Programme, SAP.

The dominant root causes identified in the TDA are:

- Pollution: an inadequate balance in policies relating to economic expansion and environmental protection;
- Ecosystem: limited progress in mitigating releases of carbon dioxide, weak enforcement of controls on fishing, and legislative and administrative weaknesses for adequate protection of the coastal zone in the context of rapid economic development;
- Fisheries: lack of a comprehensive and effective system of fish stock management and of compliance assurance infrastructure, as well as poor recognition in policy and governance circles of the limits of sustainable natural resource exploitation. For unsustainable mariculture, the lack of a comprehensive and coherent legislative framework for coastal zone and maritime resource development, a lack of coordination among sectors, and deficiencies in applying sound science to sustainable coastal development; and

- Biodiversity: several forms of root causes are identified, with the common message that development is proceeding in the absence of comprehensive and coherent legislation to ensure environmental and biodiversity protection in parallel with development, together with weak enforcement of existing legislation and inadequate provision of public information.

The analysis brings out strong commonality among the root causes. The most frequent root cause is stated as: 'development being undertaken with limited comprehensiveness and coherence of the legislative base for environmental and biodiversity protection coupled with poor enforcement and inadequate public information'. Another frequent root cause, 'inadequate balance between development and environmental protection policy', is very similar. The root cause 'weaknesses in legislation and/or inadequate enforcement of legislation relating to coastal zone management and protection' is closely related to control of land-based activities. The root cause 'limited influence of environmental constituency on government policy' may provide a partial explanation for the lack of related government action. Similar root causes are related to fisheries problems as 'weak enforcement of controls of fishing activities including illegal activities' and 'deficiencies in policy and regulation of traditional resource exploitation practices and inadequate public information'. Addressing many of the root causes will require application of scientific knowledge and thus securing adequate such knowledge, as in the root cause 'limited application of research knowledge to assimilative capacity and coastal zone development'.

The weakness of implementation of existing legal instruments is also brought out by the root cause 'limited infrastructure for compliance assurance or inadequate compliance assurance infrastructure', signalling the weakness of mechanisms for ensuring compliance with existing legislation and regulations. This root cause can justify interventions without having to re-examine policy or existing legal conditions.

Root causes addressing weakness in regulation of specific practices as sewage treatment and discharge, industrial waste- water discharges and other emissions from domestic and industrial sources and activities are also similar, facilitating the identification of interventions and their implementation.

It is also noted that interventions directed at primary, secondary or tertiary causes will essentially be sectoral and address small groups of problems and not their roots.

All the environmental problems covered in the TDA are seen as inherently transboundary, because of multiple sources or activities found in both China and the ROK. The exception is interactions among mariculture developments, except those between mariculture stocks and migratory wild stocks.

The TDA concludes with the identification and analysis of options for intervention. The major overall intervention recommended is to improve the coherence and comprehensiveness of legislation. This would serve national and the international needs at the same time, and be based on national policy as to the balance between socio-economic development and environmental protection. The YSLME Project offers a vehicle for this, through the SAP. Actions will have to be combined with the establishment of mechanisms to assure compliance, including surveillance, monitoring and possibilities to take adequate legal action

if required. This requires trained personnel. Such a mechanism might be compared with the port state control implemented in the case of shipping.

Other, lower-level, options include regulations in particular sectors. However, the experience gained in the Project as well as in other regions demonstrates that such individual actions alone would not suffice to reach the overall goal. A comprehensive approach is needed. This is also the approach followed in the SAP. This comprehensive approach will also need proper attention to climate change, e.g., in the context both of mitigation, possibly addressing energy policy, and of adaptation in coastal zone development planning.

The critical examination of options is based on the national governance reviews and the regional synthesis. The examination proceeds in a hierarchal way from the lowest-level option to the highest, i.e., the major option. The lowest level concerns tightening of sector regulations, and the next concerns improvement of compliance. A practical way of implementation could then be to start at these levels, with the goal of reaching the comprehensive options gradually. Practical steps have already been taken at national level, such as the introduction of buffer zones and use of impact assessments and fisheries management actions. These can be combined with scientific activities such as joint stock assessments and joint survey cruises also undertaken within the Project, and identified as needed in the national reviews. The aim of the Project, however, is to institutionalise ecosystem-based management, which really requires the comprehensive approach adopted in the SAP. The TDA concludes with bringing up some additional issues also raised in the national reports, and recommendations to the stewardship bodies.

The Strategic Action Programme

The SAP is a second major output and outcome of the Project. Preparation of the SAP in 2007 and 2008 included seven consultative meetings with regional scientists, government officials, other stakeholders, and NGOs. The first meeting prepared a concept paper outlining objectives and basic approach. Working group meetings identified regional management targets and associated actions. Two drafting group meetings prepared a draft SAP for a special meeting of the PSC, which reviewed and approved the final draft submitted to the governments for review and possible endorsement. This sequence demonstrates the careful and thorough working procedure adopted by the PMO to help ensure a successful outcome.

The SAP aims to address the issues identified in the TDA by applying the ECC approach. The approach departs from a customary sectoral one, which is of limited effectiveness since the environmental problems are not the result of one single cause. In the case of the Yellow Sea, this is well-documented in the TDA and national reviews.

The SAP first reviews the environmental problems identified in the TDA and the current institutional and legal framework for environmental management of the YSLME. It also provides a brief and clear overview of the ecosystem services provided by the YSLME.

The SAP identifies a set of specific, concrete, and measurable regional targets to achieve sustainability of the YSLME's ECC, defined as the capacity of the ecosystem to provide provisioning, regulating, cultural and supporting ecosystem services. It also provides a

conceptual framework that links the targets both to the major environmental problems and to the different categories of ecosystem services.

The SAP then lays out for each category of ecosystem services a series of concrete management actions to achieve the regional targets, including both technical/scientific actions and governance interventions. It also identifies measurable indicators for the successful implementation of the management actions. The time scale is decadal, aiming at achievements by 2020. The SAP includes governance actions addressing most of the root causes identified in the TDA.

The SAP recognizes that management actions are more likely to gain public and political support if they are economically beneficial, and establishes economic cost-benefit analysis (CBA) as the appropriate tool for assessing the economic consequences of management actions. The SAP outlines the concept of CBA, which endeavours to answer the question of "what are the economic consequences if the environmental management measures were implemented compared to what would have happened if they were not". The SAP provides a case study of the use of CBA to determine whether proposed management actions are economically efficient, and recommends that economic analysis be integrated into ecosystem management, identifying specific actions to achieve this. CBA of management actions relies upon various methods for economic valuation of ecosystem services, which can be difficult, and requires considerable effort to explain to decision makers and other stakeholders.

The aim of the institutional and legislative actions identified in the SAP is to improve the effectiveness of legal instruments, promote involvement of a wide range of stakeholders, and establish over a period of time a YSLME Commission. The SAP provides a framework for a YSLME Commission, which includes:

- The objectives, which are to improve co-ordination of national efforts and enhance the effectiveness of regional efforts;
- The nature of the YSLME Commission, which is a soft, non-legally binding institution based on cooperation; and
- The institutional framework, consisting of a Steering Committee, a secretariat, and sub-commissions as required.

This seems to be a pragmatic and flexible approach, well suited to the political situation in the Yellow Sea region. At the national level, the existing IMCCs are proposed to be strengthened to take more responsibility for implementation of the SAP and the NYSAPs.

The financial mechanism for SAP implementation is envisaged to be established following the creation of the proposed YSLME Commission on the basis of a staged arrangement. For the first five-year period, the incremental costs of management activities are anticipated to be covered by GEF funding.

Finally, the SAP describes a monitoring and evaluation process including process, stress reduction and environmental status indicators for SAP implementation. The mechanisms for monitoring and evaluation include annual Project Implementation Reviews, and mid-term and final evaluations during the GEF-funded phase of SAP implementation.

In conclusion, the SAP provides a road map for improving the ECC of the YSLME by 2020 through the combination of strengthened environmental legislation and enforcement thereof, regional co-ordination and co-operation between government agencies at national level, elimination of environmentally damaging subsidies, enhanced public awareness and participation, capacity building, and use of regional monitoring networks.

The SAP was formally signed by China and the ROK on 19 November 2009 at the sixth PSC meeting.

3.1.1.2. National and regional baselines

The comprehensive national and regional synthesis reports prepared for the analysis of environmental status and trends in the YSLME (see Section 3.2.1.2) have created national and regional baselines for enhancing technical capacity, including developing and synthesising knowledge, development of required skills, and strengthened institutions and organizational structures and the formation of new mechanisms. The environmental status and trends reports provide technically sound, in-depth overviews of wide scope and high quality, and include identification of critical gaps in data and information. They cover all main subjects included in the immediate objectives specified in the original Project Document.

The reports provided the elements necessary to achieve the overall objective of the Project in that they bring out the need for action to all stakeholders. They can then support the possible development of a common vision of development. Thus, they represent the backbone of the results and outputs, with high significance, of the Project.

The data gathering and analysis appear to be very competent. The results provided the necessary basis for the development of the TDA and the SAP, and very valuable baseline information for subsequent work. The reports include data, information and extensive references. They also address the original immediate objectives of sustainable management of fisheries and mariculture; regional initiatives for biodiversity protection; actions to reduce stress to the ecosystem, improve water quality, and protect human health; and regional institutional and capacity building.

3.1.1.3. Development of ecosystem-based management

A holistic approach to management of human activities is required to achieve sustainable management and use of marine and coastal resources. This was adopted in the YSLME Project in the form of ecosystem-based management on the basis of ECC. The approach is based partly on science, taking into account recent developments in sustainability science and the results of the Millennium Ecosystem Assessment. This identifies the need to address linkages between uses of natural resources, the associated impacts on the ecosystem and their inter-relationships, and impacts on ecosystem services and human well-being and socio-economics.

This understanding is taken into account in the approach of the SAP of applying the ECC concept, as described above. The approach requires the involvement of the scientific community. This has been secured in the Project, as evidenced by the preparation of the

TDA, SAP and national reviews. Implementation of the management actions requires the understanding and involvement of most stakeholders, through a governance system. The Project has succeeded in achieving this through training, awareness raising, workshops, conferences, internships, the Small Grants Programme and cooperation with intergovernmental and non-governmental organisations active in the region.

The applicability and feasibility of the ECC approach has been investigated through pilot demonstration activities for SAP implementation. A workshop on determining the carrying capacity in a mariculture area successfully demonstrated the feasibility of applying the concept, but early results from demonstration activities also demonstrate the considerable difficulties. This will be the case, in particular, for up-scaling to larger areas. A gradual approach is envisaged to establish the ECC on the basis of strengthened scientific capacity and the enhanced, quality-controlled database established by the Project. The scientific community is committed to this effort, continuing previous scientific cooperation in the region, demonstrated through several international programmes. These have all been partners in the YSLME Project. Hence, the evaluation team concludes that sufficient capability is developing in the region to achieve a gradual, stepwise implementation of the SAP.

3.1.1.4. Capacity building

YSLME capacity-building efforts have addressed the development of skills and understanding over a wide range of disciplines, institutions and organizations. The Project has involved and addressed needs of local and national governments, as well as NGOs, the private sector and civil society. This has included training courses, workshops, scientific symposia, interdisciplinary conferences and cross-sectoral, country-driven dialogues. It has also included a wide variety of public awareness and grass-roots education activities, in particular through the Small Grants Programme.

The Project has had a significant impact in building scientific capacity. Intercalibration exercises were conducted in the context of the joint cruises using samples from the cruises. Scientists, local government officers and staff of institutions have been trained in analysis, sampling, economic valuation and reporting. Two Yellow Sea Regional Science conferences were organised. The first covered the ECC of the Yellow Sea and scientific approaches to marine environment management. This introduced the concept of ECC to a broad scientific audience, with about 50 participants, including from the Benguela Current LME Programme, and partners such as UNEP-NOWPAP from the Pollution Monitoring Regional Activity Centre. Training workshops introducing the concepts of the TDA and SAP have been conducted, and included participants from DPRK.

Specific capacity-building activities executed by the Project include:

- Training for local government officials in decision making with respect to marine environmental issues, addressing the how-to-do part of management and governance. The training included report writing so as to ensure delivery of information in compatible form.

- A workshop for local government officers on “coastal development versus protection of the marine environment: how to make a decision”, involving 7 trainees from China and 9 from ROK. Most of the participants found the training so useful that they would endeavour to put the techniques into practice. They also confirmed the need for more management skills on marine environmental legislation and enforcement, as identified in the governance analysis.
- A workshop on “marine spatial planning, how to manage the sea and coast”, with 8 trainees from China and 10 from ROK.
- Workshops on a Yellow Sea Network of Marine Protected Areas, which brought together officers managing the MPAs. The workshops addressed the problems facing the countries regarding establishment and management of marine protected areas, the causes and how a regional MPA network could contribute to sustainable development. The first workshop agreed that a network mechanism would be of considerable help. They accordingly signed an agreement to establish the MPA network, and start identified agreed activities thus initiating the network operation. The agreement was signed by 25 officers.
- Institutional and organizational problems have been addressed through conferences involving ministerial and national assembly level policy and decision makers. The relevance and effectiveness of these efforts were confirmed by persistent participation of the high level persons throughout the duration of the conferences.
- The internship and Small Grants Programmes have supported development of a core group of human resources able to work on marine environmental problems at different levels and localities.
- A public awareness and communication strategy was developed to provide a framework for coordinated actions of the groups involved in the Yellow Sea Partnership: the YSLME, NOWPAP, WWF-KEI-KORDI Yellow Sea Ecoregion Planning Programme, the Marine Stewardship Council, and Wetlands International. The strategy targets the communities living around the Yellow Sea, using the watersheds and resources, and also reaches beyond the region. This has endeavoured to create a strong awareness about the issues facing the Yellow Sea LME by demonstrating the impacts of unsustainable uses of the resources and how the conditions can be improved. The strategy has worked on 9 sub-strategies focused on:
    - Community-based organizations, which the small grant programme specifically targeted because these organizations often have difficulty in securing funding for environmental activities. A training workshop on report and proposal writing was organised for community-based organizations and NGOs
    - The scientific and academic community, in part through the two regional science conferences designed for scientists to share their views.

- National and local government agencies, for example, the MPA network involved local government. The SAP demonstration activities not only involved local government, but also generated cash cofinancing.
- Legislative bodies, including through the two parliamentary conferences
- NGOs and religious groups, including through the Yellow Sea Partnership, A fund raising workshop was organised for NGOs, as well as national and local government officers and others.
- The general public and media. A number of articles on the YSLME Project appeared in newspapers in both countries. Project activities in mariculture was covered on Korean national television. The China Ocean News assisted in organising a youth programme involving both Chinese and Korean students;
- The donor community;
- Industry; and
- Youth groups through the organization of youth programmes in both Korea and China, as well as jointly. Painting and photo competitions were also organized.

Implementation of the public awareness and communications strategy has been evolving through the Yellow Sea Partnership Workshop mechanism.

3.1.1.5. Governance analysis

A major accomplishment of the Project in building national capacity for protection and sustainable use of the YSLME was the production of an in-depth governance analysis at national and regional levels, including a detailed stakeholder analysis. This identified stakeholders and evaluated their level of involvement in and understanding for the need of management and protection of the Yellow Sea. It also strengthened understanding of the root causes of environmental problems in the context of the whole political system.

The basis for the Governance Analysis was the need to identify policy recommendations to support management strategies identified in the SAP. Accordingly, the national reports deal with stakeholders, institutions, legal and policy issues. Background material included responses to questionnaires sent to wide range of stakeholders. Extensive data sets are provided in both national reports. This effort involved social sciences over a wide range.

Governance: China

Questionnaires were sent to government departments, coastal enterprises, coastal residents, fishermen and NGOs, selected on the basis of an apparently thorough market analysis. An analysis illustrates the inter-relationships, overlaps and potential conflicts of stakeholders. The rapid development of marine and coastal activities, the economy and urbanization led to a deterioration of relationships between different stakeholders/interests. The responses to the questionnaires also revealed that 35% believed that industrial pollution was the major threat and 40% considered that coastal enterprises should bear responsibility for environmental destruction they cause; 25% felt raw domestic

sewage was the main threat, but only 6% acknowledged their responsibility. Some 61% considered that scientists play a very important role in marine policy-making, but most were unaware of the role of coastal enterprises in this context. Furthermore, 54% of coastal residents considered law enforcement government departments to be insufficient, and 90% expressed willingness to work as volunteers in protecting the marine environment. The report concluded that, with 44 million residents in the coastal area of the Yellow Sea, it is vital to enhance the knowledge and awareness of residents with respect to protecting the Yellow Sea. The national report proposed the establishment of an education programme called “Know ocean, love ocean” in primary and middle schools in each coastal city.

The institutional analysis brings out the initial sectoral approach with some overlaps, the gradual adjustments and expansions over time as development required adaptation to respond to new conditions. The change from promoting economic development to a more sustainable development approach is coupled to globalisation and association with OECD and WTO. A table showing the responsibilities of SOA, SEPA, five other central administrations, the provincial governments, local and city governments, brings out the possibilities for turf fights and potential conflicts. This also shows the need for having all relevant institutions involved in the Project. This is underlined by the presentation of the legal status of marine environmental protection of the Yellow Sea.

The final synthesis analysis identifies major existing problems with respect to governance and makes several policy suggestions. First, legislation enhancement is proposed, but enforcement is considered to be a key. The major problem influencing enforcement is considered to be inconsistency among the many enforcement departments. The limits of their authority are ill-defined, and several gaps and overlaps exist. A unifying planning and coordinating mechanism would help address this problem, as well as cooperation, transparency and dialogue. In particular the need for promotion of regional cooperation is noted: the report concludes that a regional agreement on protection of the marine environment of the Yellow Sea is required as a priority, and that this should go hand in hand with harmonization among the ministries concerned. These two actions would be mutually reinforcing. At the same time, the skills and qualifications of managers and technicians involved should be enhanced through adequate training. The public should become more involved, with public participation in both development and implementation of activities, with associated incentives. In parallel, efforts and funding should be devoted to education in marine affairs, marine policy and law at the appropriate institutions.

Governance: Republic of Korea

The national study aimed at understanding the root causes of the problems of the Yellow Sea ecosystem, through an analysis of the whole political environment that effects environmental problems. This included stakeholders, institutions, laws, policies and projected investments. Thus, the governance analysis was conducted through stakeholder analysis, institutional analysis and law and policy analysis.

The major ecosystem issues considered were high demand for intensive coastal development, loss of wetlands, declining water quality, declining near-shore fisheries, a decreasing population of fishermen due to a decreasing quality of life, limited public access to coastal areas, intensifying industrial urban development, and growth in tourism facilities.

Extensive socio-economic data are summarised in tables for easy reference. The governance issues concerning the four components of biodiversity, ecosystem, fisheries and pollution are analysed. It is noted that the problem areas are inter-related. It is also noted that many of the problems are coupled to socio-economic and management practices, and are not only dependent on physical-chemical-biological processes. The report also raises some concern about the practicality of the approach to delimiting causes: can immediate causes, underlying causes and root causes be distinguished in practice? This may be an important lesson to learn.

The national governance analysis for the ROK found that:

- Governance/management is weak for the biodiversity component because of a lack of relevant laws or programmes, as well as the lack of a comprehensive survey of marine biodiversity;
- Governance/management of the marine ecosystem component is weak due to absence of relevant laws or programmes, together with limited recognition of the marine ecosystem by the public and NGOs;
- The priority governance/management needs in the fisheries component are to address illegal fishing and over-exploitation, and to conduct stock assessment; and
- Governance/management in the pollution component is weak with respect to land-based sources and intense socio-economic development at the local level.

The summary of stakeholders identifies the Congress, the central government, industry, NGOs, scholars and journalists representing the public as major stakeholders. The government sector also includes local governments and establishments owned and managed by the government. Industry stakeholders include fisheries, shipping and ports, oil and mining, tourism, and other maritime industries.

The report concluded that NGOs have a very strong impact on political decisions and public opinion in ROK, but have only recently recognized the importance of the coastal marine environment and its resources. Currently the public and most NGOs oppose large development projects in the coastal zone. This led to the government officially cancelling the fourth phase of the Young San River reclamation development in 2000.

The fisheries industry is structured in cooperatives at national, regional and village levels. Before this was established, village councils managed community enterprises in a decentralised mode. The structure of cooperatives, however, is a top-down one established by the government in order to remove middlemen, to organize dispersed fishing communities and to upgrade the productive and social status of fishermen. This was a very hierarchical system, and was gradually revised in the 1970s and 1980s. This process returned control to the local village cooperatives, making them the key local resource managers. The fish sale reporting system has also been abolished. The government has established direct linkage with the village cooperatives in matters concerning local fisheries management.

The need for an oil spill response organization was brought out by the VLCC oil spill accident in 1995, which had serious impacts on fisheries, aquaculture and the environment. This led

to the creation in 1997 of the Korea Marine Pollution Response Corporation. The government has directed that an Environment Impact Assessment should be conducted in cases judged by the Ministry of Environment to potentially have important impacts. It is noted that most marine management actions are top-down and that some deregulation with self-management is needed and is underway. It is understood that the marine ecosystem and resource management needs active participation of all stakeholders. However, the participation of stakeholders in decision-making is low due, e.g., to the short history of marine ecosystem management, the short history of NGOs, the lack of a culture of dialogue among the interests, and overall development policy.

For each of the components the legal and policy system is presented. It is noted that fisheries policy changed from a growth orientation to sustainable development of fisheries resources when ROK entered the OECD and the WTO. New policies include a quota system, a marine ranch and restricted access in aquaculture- and a buy-back- programme, responding to a need to reduce fishing capacity by 20-25%. However, the scientific assessment of fisheries resources has not been conducted effectively due to lack of agreement between neighbouring countries on transboundary fisheries and illegal fishing. The latter is under surveillance by a Comprehensive Task Force Team, delivering reports twice a year; 3,673 cases were raised in 2004.

The analysis concludes with a series of 23 policy recommendations directed at five general areas: stakeholder participation in decision-making, institutional reform for coordination and harmonization, national legislation for marine ecosystem programmes, a national plan for marine ecosystem programmes and sustainable fisheries management. The analysis identifies the priority recommendations within each of these areas based on a stakeholder survey.

Regional Synthesis

The regional synthesis report draws from the national governance analysis report to provide a regional perspective. Governments are identified as the most important regional stakeholders for the YSLME. The role of international organizations, however, is significant. These include UNDP, UNEP, and the World Bank through GEF. The role of NGOs is, however, limited in the regional governance. In order to achieve an effective regional governance, the regional synthesis recommended increased involvement of all stakeholders, in particular the private sector, international organizations, and NGOs.

Existing international cooperative mechanisms include the YSLME Project, NOWPAP, IOC/WESTPAC, PEMSEA, and the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA). The regional synthesis considered the YSLME and NOWPAP to be the most significant mechanisms in the region. Existing legal institutions that need to be considered include UNCLOS, the London Convention and its 1996 Protocol, MARPOL, the FAO Code of Conduct for Responsible Fisheries, and bilateral treaties between the ROK and China dealing with the marine environment and fisheries. Other institutions that are mentioned include the Convention on Biological Diversity and the RAMSAR convention. The regional synthesis considered the effectiveness of these international agreements in the YSLME to be strong in relation to pollution and fisheries,

medium in relation to biodiversity, and weak in relation to ecosystem protection. The UNFCCC and the Kyoto protocol are not mentioned in the regional synthesis.

The regional synthesis makes several recommendations for strengthening regional environmental governance in the YSLME. It has strong focus on increased participation of stakeholders in addition to central governments, including local governments, NGOs and the private sector. The synthesis also recommends increased coordination and cooperation of the most important relevant national institutions. At the international level, UNDP is seen to continue being most important, but the involvement of IMO and UNEP should also be encouraged.

The regional synthesis concludes by recommending the establishment of a YSLME Commission as the central mechanism to address the identified environmental and institutional issues. The regional synthesis recommends two phases in establishing the YSLME, with support by GEF for the first phase, through 2015.

3.1.2. Outcomes and impact

Outcomes and impacts of Project outputs and activities national review efforts include strengthened human, institutional, organizational policy shaping capacities in the context of protection of the marine environment and sustainable use of marine and coastal resources. This is based on the stimulation of inter-disciplinary and cross-sectoral exchanges and dialogues, involving stakeholders over a broad range and the scientific community including natural, social, economic, law and management sciences. Another important outcome is the synthesised evidence of the deteriorating situation of the YSLME, resulting in a much strengthened realisation of the need to take action not only among the scientific community, but also in the governance community and the public. These outcomes relate to and cover all the Project components.

Another important outcome of the Project is the acceptance and endorsement of the root causes being related to a high degree to lack of adequate legal instruments, and to weak or non-existing enforcement of existing rules and laws, with a resulting lack of compliance among most stakeholders. This has already had policy-shaping impact in elements of the next 5-year plan of China.

Other outcomes of the Project include:

- Enhanced scientific capabilities to work across disciplines and with other stakeholders, and to participate in policy shaping activities;
- Stronger local and provincial government awareness of and engagement in issues of marine environmental protection and sustainable use of resources;
- Enhanced interagency cooperation at government level;
- Improved environmental and human health standards, e.g., in the context of harmful algal blooms, marine pollution and manmade disasters;
- Extensive cooperation through the Yellow Sea Partnership framework, with public awareness creation, youth programme, training of local governments, regional conferences, voluntary and full-time internships and Small Grants Programmes;

- The development of data and information sharing and an ocean colour algorithm to determine chlorophyll concentrations from satellite data on basis of scientific workshops, displaying the positive spirit of cooperation obtained through the Project;
- Agreement on stock assessment methodology;
- Agreement on the process of determining of ecological carrying capacity for mariculture;
- Contributions to the diagnosis and prevention diseases in mariculture;
- A review of techniques used in genetic analysis;
- Completion of an initial continuous plankton recorder (CPR) survey;
- Data quality assurance and inter-calibration exercises for nutrients, metals, and organic contaminants, identifying needs for further exercises in 2008;
- The preparation of guidelines for cost-benefit analysis of management actions by the PMO, noted by the MTE as "a first attempt to develop guidance for GEF projects to incorporate economic aspects into environmental decision-making"; and
- Based on improved understanding of the marine environmental issues in the YSLME, substantive financial support was provided to implement conservation activities.

Institutional, local governance and civil society practices have as a consequence of the Project been adjusted and strengthened with respect to marine environmental management. The increased awareness among stakeholders and the public has generated more participation in protection efforts. Policies at national and provincial level have been changed.

On the basis of the review of documentation and interviews with participants and other stakeholders, the evaluation team rates the relevance, effectiveness and efficiency of outcomes with regard to enhanced national capacities as **highly satisfactory**.

3.2. Objective 2: Strengthening Regional Cooperation in Marine Environment Protection and Management

This was to be accomplished by establishing regional mechanisms and enhancing a cooperative spirit between the countries and among stakeholders. Preparation of the TDA and the SAP have identified the issues requiring multilateral cooperation, brought together many key stakeholders, and generated dialogues and partnerships, including with the DPRK. This provides a strong foundation for cooperation at national and regional levels. The implementation of the SAP demonstration activities has further strengthened this.

3.2.1. Attainment of outputs and activities

3.2.1.1. Partnerships

The establishment of the Yellow Sea Partnership provides a fundamental mechanism for continued cooperation, with involvement of the partners in activities of the Project. This includes synergy with the FAO Regional Office, with WWF and the Yellow Sea Ecoregion Support Project, Ramsar wetland activities, the UNEP Regional Seas Programme, particularly NOWPAP, several of the most relevant national institutions, and several national and local NGOs. Private sector funding has been provided through the cooperation, with local government receiving the funding in the framework of the partnership of YSLME and YSEPP. The SAP, supported by the TDA and other Project results, proposes establishment of the Yellow Sea Commission as the main regional cooperative mechanism for achievement of the long-term objective of the Project.

3.2.1.2. Analysis of environmental status and trends

The analysis of environmental status and trends in the YSLME is a major output of the Project. The analysis provides regional syntheses of the four components of biodiversity, ecosystem, pollution and fisheries on the basis of detailed national reports from both countries. The syntheses brought together for the first time data and information collected by the two countries over the previous 30 years, supporting the development of comprehensive strategies for conservation and restoration. Each national report was prepared by one individual scientist from the region. The process of national reporting and the regional synthesis not only provided a sound scientific basis for the TDA and SAP, they have served as key drivers for regional cooperation. All of the information collected in the regional synthesis of status and trends is maintained in the Project's GIS database. The results of the regional syntheses provide a regional perspective and key information baseline as a firm foundation for continued strengthening of regional cooperation.

Biodiversity

The regional synthesis of biodiversity status and trends provided key information for developing a regional conservation strategy include establishment of a network of representative marine protected areas at the ecoregional level, evaluation of the effectiveness of existing protected areas and monitoring the status of biodiversity. The overview concluded that ecologically important species are vulnerable due to habitat and migration patterns, marine pollution and eutrophication, over-fishing, and climate-induced shifts in the ecosystem. The root causes are seen as inadequate valuation of the ecosystem, ocean dumping policy and lack of public awareness.

Introduced species generate a threat to biodiversity second only to habitat loss, with impacts on local ecosystems, human health, society and culture and economic development.

All types of mariculture will impact local biodiversity at genetic, species and ecosystem level. Unsustainable mariculture practices can give rise to HABs. Because of lack of data the degree of change in genetic diversity cannot be ascertained. A decrease in genetic diversity has been observed in clams and oysters due to mariculture and the release of hatchery

produced stock. Few studies are available on the genetic diversity of wild populations in the region.

Actions to achieve biodiversity conservation at regional level include marine protected areas (MPAs) including national, provincial and county/city nature reserves in China and 5 MPAs in ROK, together with 4 national parks. With the development of MPAs the overall environment has improved. Marine nature reserve strategies have laid the basis for improvement of economically important fish populations. Further developments of MPAs are planned, although competition with economic development is strong. Several management problems were also identified, including overlaps between authorities, insufficient analysis of the positive economic effects of MPAs, differences in objectives and between individual legal instruments.

In China there are 9 components of the fisheries management system, and in the ROK a fisheries law. Until recently the aim was growth in production, with strong government support. However, in the ROK the policy has changed to sustainable development of fisheries. International conventions play a potentially important role for fish species protection.

Increasing pollution has had an impact on human well-being, evidenced by a loss of 30-50% of coastal areas with potential for development of recreational activities, many rivers becoming unfit for swimming, and a 50% decrease in fishing activities. Pollution control actions include use of protected areas and application of international conventions with respect to sea-based pollution. However, at least in the ROK, land-based sources of pollution have not been effectively managed, with weak regulations in the Marine Pollution Prevention Act. Development of national legal instruments is in many cases based on international conventions and agreements. Successful biodiversity conservation will depend upon coordinated national policies together with regional strategies for implementing conservation on an ecoregional basis.

Ecosystem

The regional ecosystem synthesis underlines the limitation of a lack of basin-wide studies. This prevents a meaningful analysis of the status of the ecosystem. The synthesis nevertheless notes the domination of the phytoplankton by diatoms (67%) and dinoflagellates (30%), with a decreasing ratio toward coastal areas. The primary productivity is high, although estimates vary, ranging from 165 to 210 g C/m²/year. Copepods are the most abundant zooplankton group. Zooplankton biomass shows considerable fluctuations from around 1990, and decreasing biomass from the end of 1950s to mid-1980s. Benthic biomass remained stable at around 23 mg/m² over the period 1959-1992, recent studies indicating higher values. Occurrence of HABs has increased markedly since the mid-1980s, although with large inter-annual fluctuations.

The synthesis report provides an overview of data gaps regarding phyto- and zooplankton, benthos and HABs, together with recommendations on how to fill these gaps. These include more efforts to uncover existing data, and use of the YSLME PMO as a clearing house for all data collected to ensure easy data access.

The synthesis also concludes that basin-wide joint survey programmes also need to be established with appropriate frequencies and coverage. Such an effort could gradually provide a scientific basis for sustainable management of the YSLME. Remote sensing observations could supplement ground surveys, in particular with respect to low trophic levels with fast turnover times.

Pollution

The regional synthesis report on pollution was prepared in view of the Project objectives of taking action to reduce stress on the ecosystem, completing the transboundary diagnostic analysis, improving water quality, and protecting human health. The main objectives of the synthesis, however, were to provide a scientifically sound assessment of the pollution data and information collected from China and the ROK, and to prepare a comprehensive, retrospective environmental risk assessment. Besides the national reports, data from cooperative research and regular monitoring, and socio-economic data, were used. Water and sediment quality, seafood safety, and recurrence of HABs were assessed. Ecosystem health was evaluated against five criteria: biodiversity, stability, fisheries yields, productivity, and resilience. Riverine and direct inputs from urban areas, industry and agriculture to coastal areas are the most serious pollution inputs. Marine pollution loads from the atmosphere were estimated on the basis of air quality to be significant in coastal areas, in particular through sand storms. Four major concerns, oil, chemical oxygen demand (COD), inorganic nitrogen and inorganic phosphate account for almost all inputs in most cases. Nutrient inputs from human sources have steadily increased over recent decades. Eutrophication is high in most coastal zones. COD showed a significant increase in 2003/04 compared to the 5-year mean of 1997-2002, with the highest values close to the coast. The strong influence of river inputs is shown by high levels of suspended solids with an average of the order of 10 mg/L in central parts of the sea. The report concludes that there has been a gradual increase in eutrophication in recent years, and that the Yellow Sea is moderately eutrophic, while the Bohai Sea is highly eutrophic. Levels of heavy metals and persistent organic pollutants are still within acceptable levels in seafood, but precautionary preventive measures are recommended to protect aquatic life and aesthetic values. Eutrophication is recognized as one of the factors generating HABs. Elevated levels of faecal coliform bacteria have been found in particular in areas of recreation and tourism, with the highest levels during summer. Contamination by bacteria and viruses needs further study. The risk assessment concluded that paralytic shellfish poisoning (PSP) and diarrhetic shellfish poisoning (DSP) toxins in seafood are below critical levels. The pollution synthesis recommends that specific criteria for the YSLME be established for all substances attributable to waste water and other discharges with possible adverse effects on human health or biota. Land-based sources of pollutants, including nutrients, play an important role in the deterioration of water quality of the YSLME. The report confirms pollution hot spots around the major river inputs.

The pollution synthesis recommended that the SAP develop management strategies ranging from simple to comprehensive and from short to long term. It recognized that both scientific credibility and economic feasibility need be taken into account, and concluded that scientific assessments are needed that can lead countries to advance new policies to eliminate the root causes of transboundary environmental pollution.

Fisheries

The objectives of the fisheries synthesis were to provide at a regional level a scientifically sound assessment of fisheries and mariculture, a synthesis of national data to provide a regional picture of status and trends in fisheries, an identification of information gaps on the basis of available national information, and an analysis of regional problems in fisheries and mariculture. The effort was intended to provide a regional overview of data and information to serve as a baseline for future studies, assessments and management initiatives to achieve the long-term goals of the Project. The synthesis presents a description of Yellow Sea fisheries including status and trends, a review of biological and ecological studies used to estimate fisheries production potential as an ecosystem indicator, status and trends in mariculture, a summary of socio-economic data and information and an analysis of national fisheries laws and policies. The summary of socio-economic information, however, is limited to compilation and tabulation.

With respect to various aspects of fisheries and mariculture, the synthesis shows:

Fisheries: total landings increased from 425,000 t in 1986 to 1.9 million t in 1997, remained stable at 2.08 million t in 1998-2002, and slowly increased to 2.40 million t in 2003 and 2004. Landings in China averaged 92.6% of the total catch over this period.

Fishing effort: the number of fishing vessels increased from about 100,000 in 1986 to 153,000 in 1992, and remained in the range of 140,000-150,000 through 2004. The increase is mainly in China, the ROK fleet remaining at about 30,000 vessels throughout the period.

Biological and ecological data: estimated growth parameters for same species varied considerably between the two nations; these differences may cause significant inaccuracies in estimations of population characteristics such as mortality rates and cohort analysis. Estimates of minimum sizes at maturity and asymptotic lengths also differed between the nations for some species,.

Mariculture: Mariculture production jumped from 2.1 million t in 1995 to about 17.5 million t in 1996, increasing thereafter year by year to about 33.0 million t in 2004. This was essentially due to an increase in China, which accounted for an average of 96.4% of the total mariculture production. Finfish accounted for 55.8% of production on average, followed by molluscs at 33.2%, seaweed at 6.9% and crustaceans at 3.5%. The total area used for aquaculture increased significantly from 461,500 ha in 1995 to 1.1 million ha in 2004, with the area in China being about 95% of the total.

The major fisheries issues at the regional level are presented in a separate, very valuable section, of the Status and Trends Synthesis Report, summarizing the situation for all four subject areas. This provides a very good basis for continued efforts to achieve the overall objectives and expected outcomes of the Project. The synthesis also recommended that a regional fisheries database be established.

3.2.1.3. Regional joint cooperative cruises

One of the most important examples of the Project's role in strengthening regional cooperation was the completion of joint winter and summer cooperative research cruises in 2008. The data and selected samples from the joint cruises were fully shared between the

participating countries, and intercalibrations of analytical measurements were carried out. All the data will be available to all users following the publication of the summary cruise reports. The original Project Document called for the completion of winter and summer cruises in each of the first three years of the Project but, apart from the financial constraints, this grossly underestimated the complexity of the technical, logistic, and political issues involved in undertaking the cruises. Successfully resolving these issues was arguably the single most difficult task for the Project, and it would be difficult to overstate the significance of this achievement for establishing mutual confidence and trust, as well as a precedent for regional cooperation. The successful implementation of the cruises provides the foundation for the gradual development of a joint regional monitoring system.

The data and selected samples from the joint cruises were shared between countries, and intercalibrations of analytical measurements were carried out. The results show significant seasonal variation in physical, chemical and biological conditions. Contaminant analyses show PAHs to be most significant of the three POPs assessed, and levels of heavy metals (Copper, Cadmium, Chromium) most significant in the sediment surface. Seasonal variations were also present in primary and secondary production levels, with zooplankton showing significant increases from winter to summer.

3.2.1.4. Regional fisheries stock assessment

Joint regional biodiversity and fish stock assessments were conducted by the Project, resulting in common methodologies that provide the foundation for continued and strengthened cooperation. The joint regional fish stock assessment was initiated through workshops agreeing on and testing methodologies. The harmonization of methods included the processing of frozen specimens for aging fish for otolith and stomach content analysis to resolve differences in sampling and analysis. This is a key result of the effort, together with a much improved understanding of the state of the selected fish stocks, reducing gaps in knowledge about the life cycle and ecology of the selected species for the Yellow Sea as a whole.

The surveys were started in May and September 2008 on the Korean side. Catch composition, biomass, length-weight relationships, size at maturity, age composition, and stomach contents were investigated in four selected fish species: anchovy, small yellow croaker, chub mackerel, yellow goosefish, together with oceanographic conditions, zooplankton and ichthyoplankton, at 12 sampling stations.

In spring (May 2008) the total catch was 276.9 kg, with fish accounting for 87.8%, and crustaceans and molluscs 6.7% and 5.5%, respectively. By-catch, defined as all species except the target ones and jellyfish, ranged from 4.4 to 28.4 kg. In autumn (September 2008), total catch was 1,518.3 kg, with fish accounting for 67.5%, crustaceans 7.9%, and molluscs 5.4%. In addition 360.2 kg of jellyfish, which were not caught in the spring survey, were caught. By-catch ranged from 18.9 to 210.3 kg.

The mean estimated biomass density in spring was 6.1 kg/km² for anchovy, 11.9 kg/km² for small yellow croaker, and in autumn 225 kg/km² for anchovy and 24.4 kg/km² for small yellow croaker. A strong relationship between body weight and fork length was found for all

species. Ages ranged from 0 to 1 year for anchovy in both spring and autumn, and 0 to 1 year in spring and 0 to 2 years in autumn for small yellow croaker.

Stomach contents were collected only in the autumn survey, included 15 to 23 prey species, dominated by copepods and euphausiids. In all, 66 zooplankton species of 15 taxa were found, with copepods most abundant at all stations.

Fish egg density varied, being higher in the northern than the southern area in spring, while in autumn fish eggs were found mainly at the coastal stations. Anchovy eggs dominated, accounting for about 89% of fish eggs collected. Larval fish were more abundant in autumn than in spring. Species composition in the eastern part of the Yellow Sea has probably changed from dominance by high trophic levels with larger, more expensive demersal species to lower trophic levels with cheaper, smaller pelagic species like anchovy. The mean weight of total catch of anchovy decreased from 12 g to 6 g between the spring and autumn surveys. In general, the observations may be related to overfishing and climate change and variability. The results of the surveys were compared with some previous surveys to the extent the different methods permit. This analysis brought out the variability of fish stocks, and suggests a general decrease in stock biomass in spring from 2002.

However, the mean density of yellow goosefish in the autumn of 2008 was larger than that obtained from any previous survey, regardless of season and year. The density of small yellow croaker likewise indicated a recent increase. Comparison with results from surveys in 1981 with respect to density differences between areas showed that high-density areas were located in the south-western area in 1981 but were found in central and northern areas in 2008. This may indicate a northward migration of warm-water species, in conformity with a temperature increase of about 1 °C during the last 30 years in Korean waters.

The report of the Korean fish stock assessment concluded that the fish population in the Yellow Sea needs adequate management through an ecosystem-based approach, with re-establishment of a fisheries system, a stock rebuilding programme , stock enhancement, and habitat restoration and management.

Spring (May) and autumn (October) trawl surveys were carried out on the Chinese side in 2009. Methodologies harmonized with the ROK were used. Biological information was collected on the same species as in the ROK surveys, as well as pomfret. The main aims of the spring survey included further development of regionally agreed methods for observation, monitoring and sampling of the marine environment of the YSLME, and enhancement of a cooperative mechanism for regional monitoring and observation, which are contributions to future joint regional stock assessment. The autumn survey included catch composition and mapping of geographical distribution of target fish stocks.

Twelve coastal stations were agreed for each cruise, including spawning ponds. In the autumn survey some of the stations had to be adjusted due to government restrictions on entering the same areas surveyed in the spring. A total of 76 species were caught in the spring survey: 44 fishes, 24 crustaceans, and 7 cephalopods. In the autumn, 55 species were caught: 37 fishes, 14 crustaceans and 4 cephalopods. In the spring the average catch density was estimated at about 180 kg/km² (range among stations 10->200); in autumn it was on

average 1,262 kg/km², with seven stations over 500 kg/km². The Japanese anchovy dominated and was distributed throughout the survey area. Biological characteristics such as length-weight relationship; age structure; stomach contents, were reported.

Jellyfish characteristics and species were separately discussed. In spring jellyfish were found mostly in the northern area. They had a much wider distribution in the autumn survey. Ichthyoplankton (fish eggs and larvae) were investigated as to species composition, with the eggs of Japanese anchovy accounting for about 90% of fish eggs in the spring survey. In spring, fish eggs were found at 7 stations, with an average abundance index of about 1,776 individuals/1000 m^3, and in autumn at 6 stations with an average index of 20 individuals/1000 m^3. Fish larvae were found at 2 stations in the spring and 6 in the autumn.

By-catch was 91 kg in spring with a density of 200 kg/km² and 284 kg in autumn with a density of 918 kg/km².

The survey report presents an overview of variation in species composition, which was considered not to have altered in recent years. The changes in catch rate between spring and autumn are considered to be due to seasonal migration. Over-exploitation without optimal management is stated as having severely depleted fishery resources in the YSLME. Anchovy stocks are now similarly impacted, having gone through the stages of under-exploitation, full development and over-exploitation in the period 1985-2008. Changes in fish population structure are shown in the size spectra, with a decreasing size over recent decades. It is concluded that current fishery resources are over-exploited. Most individuals collected in the surveys were less than 1 year old, particularly in the autumn. Several significant conclusions are drawn from the surveys, including (i) under the intensive exploitation of commercially important species many large sized species have been replaced by small pelagic species in the Yellow Sea; (ii) the structure has changed towards a simplified structure found in the surveys; (iii) small sized commercial species and small pelagic species, both with low age compositions, dominate the fisheries, influencing the energy flow in the food web structure; (iv) catches of eggs were of reproductive stock in spring and recruitment stock in autumn.

The surveys present very valuable findings, mostly confirming what had been identified in the national synthesis reports. They also confirm the necessity of cooperation to achieve a verifiable, basin-wide assessment. Joint surveys, stock assessments and management are necessary to achieve sustainability, since most fisheries resources in the YSLME are trans-boundary migratory species. The combination of several factors influencing the marine living resources in the Yellow Sea including anthropogenic impacts as over-fishing, pollution, habitats deterioration and potentially climate change, and natural variability on seasonal and decadal time scales, with regime shifts from ocean climate change, necessitates a holistic approach to fisheries management. The surveys have highlighted this situation, and also brought out the need for further joint and integrated research in support of cooperative management of the marine living resources.

The value for management and policy making of the survey results could possibly be greater if there was more explanation of what the scientific findings imply for sustainability of the marine resources and the ecosystem.

3.2.1.5. Development of regional scientific and management tools

The Project has developed several valuable regional scientific and management tools that provide a basis for regional cooperation. One major effort was the formulation, testing, and agreement of a regional ocean colour algorithm for the estimation of chlorophyll-a concentration and total suspended matter in the euphotic zone from satellite imagery. This combined ground-truth data from several national cruises with remote sensing data. Careful quality control and validation was performed using shared data. In view of the difficult optical conditions in the Yellow Sea, with high levels of suspended matter and dissolved yellow substances (humus), the result is a major technical breakthrough. The activity also demonstrates that scientific data can be shared and exchanged. It should also be noted that, at a total cost of USD 30,000, the effort was very cost effective.

The Project developed regional guidelines for economic analysis of environmental management actions, involving economic, social and natural sciences in an inter-disciplinary team. This includes basic methods of economic valuation of environmental goods and services, as well as losses due to negative externalities, and cost-benefit analysis of environmental management actions. These guidelines are to be seen as evolving. They cover a very important part of the approach to ecosystem-based management in the SAP, of great value for policy and decision makers. They help ensure that environmental policies and management actions are economically efficient. They target practitioners, policy makers, and development planners as well as the scientific community.

The Project also developed scientific and management tools for the sustainable development of multi-trophic mariculture, including methods for estimation of ECC, economic analysis, and disease control. These tools support regional cooperation for implementation of the SAP, and have also been the basis for cooperation with other regions, beginning with the provision of a training course for the Interim GCLME Commission being planned.

An important study of genetic diversity in one of the economically most important shrimp species in the Yellow Sea, *Fenneropenaeus chinensis*, was conducted through cooperation between the YSLME Project and the Institute of Oceanology, Chinese Academy of Sciences (IOCAS). *F. chinensis* populations in the Yellow Sea are thought to share a common overwintering ground, so their management is a transboundary issue. Fisheries production from wild stocks has decreased from a mean of 20,000 t/y in the 1980s to 800 t in 1997. The objectives of the genetic study were to explore the possible genetic differentiation of *F. chinensis* populations to provide a scientific basis for sustainable utilization of the wild resources. The study demonstrated low genetic diversity compared to other shrimp species, consistent with earlier studies and probably due to reduction of the effective population size because of habitat instability during sea-level variations over geological timescales. However, the genetic diversity appears to have diminished in recent years. In order to replenish the stock, up to one billion larvae were released annually into the Yellow Sea over the last two decades. This can, together with escape from mariculture, affect the genetic structure of the Yellow Sea population. The *F. chinensis* stocks are also threatened by overfishing , viral diseases and habitat deterioration. An understanding of the species'

genetic structure will provide information needed to better manage the shrimp stocks and conserve the genetic variation.

The genetic diversity between different populations and hatchery stocks suggested that genetic variation in population in the ROK is higher than in China. The study used mitochondrial DNA methods. The genetic variation level was established as being low in *F. chinensis*. There may be some differences between the Korean and Chinese populations, with larger variation between than within the respective populations. This indicates a possible differentiation between the two populations. This could be related to the distances to spawning locations and migration routes to spawning and over-wintering grounds.

The report of the study presents a summary of the findings, with guidelines to management, bringing out several important results. The destruction of habitats and overfishing are the most important factors in the decrease of the wild shrimp resource. The commercial-scale release of hatchery-reared shrimp has not lead to the recovery of the wild spawning stock. The contribution of released shrimp to total landings has been consistently over 90% in some areas. This points to the need for further regulation of trawl fisheries, as well as restocking activities. The spawning habitats need be restored and protected, including from pollution. Stricter regulations and enforcement are needed to control pollution and provide safe spawning habitats. Effective regulations are needed to control fishing at all levels so that an adequate spawning biomass can be rebuilt. The release of hatchery-reared juveniles needs to be optimised, to avoid the fishery being a sea-ranching operation. Experiments to select the best sites and periods for release are needed. The study concluded that the carrying capacity is much larger than the population size, so the release of juveniles should not have negative impacts on the wild stock. Management regulations seems to be the most promising and cost-effective way to increase shrimp production, rather than the current sea-ranching operations. Tagging studies are suggested to help identify spawning locations and migration routes, filling important gaps in knowledge.

This study reinforces the need for regional cooperation and agreements on management of marine resources to achieve sustainability, including through joint studies and assessments. It is also noted that the study confirms the observations in the national reports of the need for regulation, enforcement and compliance, and supports the approach adopted in the SAP.

3.2.1.6. SAP demonstration activities

Following the completion of the SAP, the Project has implemented some 21 demonstration activities to test the feasibility and effectiveness of management actions defined in the SAP. This has supported regional cooperation in implementing the SAP. The demonstration activities were developed on the basis of regional cooperation, as each of the thematic RWGs identified short lists of demonstration activities in their thematic areas at their 4th meeting, in late 2007. The implementation of the demonstration activities has been a critical aspect of maintaining and strengthening regional cooperation during the critical bridging period to full implementation of the SAP.

Ecosystem and pollution

The “Demonstration Activity on Calculation of Nutrient Loads in Yalu River Estuary” demonstration activity in China established a model to determine nutrient inputs from

atmospheric, riverine, sea-based, and diffuse and point land-based sources, as part of the pollution component. The Dandong part of the river was selected because it is one of the most developed areas of industry and aquaculture. The objectives of this activity were to establish an effective calculation model for the total loading of nutrients applicable for coastal areas of the Yellow Sea, to establish a forum to begin discussing and improving understanding of environmental capacity, to make preliminary steps toward incorporating total loading control into national development plans for reducing total loading of N by 10% by 2010 compared to 2006, to advise on appropriate nutrient control schemes for local government agencies and to evaluate the applicability, effectiveness and efficiency of proposed management actions.

The activity involved the local government in Dandong through several consultations on pollution management and control techniques. Total annual loads of nutrients and other pollutants from relevant sources were determined. Historical data were reviewed and new data were obtained from four seasonal field surveys. While oil and phosphate levels have decreased, the inorganic nitrogen and COD levels have increased, due to fertilizers and pesticides, with a 30% increase from 2000-2005. Soil erosion and sediment runoff is a serious problem.

The research component of the activity included collection of data, monitoring of discharge sources, establishment of a model to calculate the total loading, seasonal field studies, identification of major sources and proposals for management actions. All data are included as annexes to the report. The field survey strategy was discussed with the local environmental agencies, and local experts were involved in implementation. The sampling area covered the downstream area and the estuary; it included a 24-hour monitoring station in the river close to Dandong. The locations of stations were adjusted in relation to the DPRK border. In all, 14 Direct Discharge Outlets along the river coastline were monitored to estimate nutrient loads from municipal wastewaters.

The conceptual model for the load calculations identifies land-based point and non-point sources, including riverine and effluent discharges, farmland surface runoff, town domestic sewage, livestock wastes, as well as the sea-based source of pond mariculture. Equations to calculate loads from these sources were formulated, using various coefficients from the literature. The land-based non-point contributions were estimated from 36 catchment cells of the Yalu River watershed. Soil-erosion source estimation was based on a Universal Soil Loss equation. The eutrophication level was assessed on the basis of a Eutrophication Index method, which was applied without further discussion. Summaries of the resulting loads are given, and a comparison with another calculation of one component shows good agreement. Fertilizer use is a major nutrient source. A loss rate coefficient of 5% was used without explanation of how it was obtained. For the soil erosion calculation, factors from the literature were obtained from a nearby river, the Liaohe River.

Since the Yalu River estuary is relatively small, atmospheric deposition could be neglected. The summary of the results on the annual loads are presented for 2005-2009, but need some clarifications. The Eutrophication Index varied in the range 0.5-1.3 in the period 2005-2009, with an increasing trend and peak values in 2006 and 2008. This is not explained further. The results show the Yalu River itself to be the major nutrient source to the estuary.

The major sources in the river are the Direct Discharge Outlets and the non-point sources. Lack of historical data is noted as a problem.

This study provides an important baseline for making comparisons after management actions have been implemented to reduce inputs. Advice on management actions to reduce the inputs of nitrogen and phosphorus, developed in consultation with the local authorities and managers, is presented.

The demonstration activity provided advice on nutrient load control without any consideration of socio-economic benefits or costs. It thus provides a good example where the economic tool developed by the YSLME Project could be applied. The points in the advice can also be re-visited after some period to check to what level they are being implemented.

The study is very thorough and represents a major case study addressing one of the most serious problems in the region. It remains to be seen how up-scaling and application to other localities will be achieved, but the activity provides a model for scientific analysis, cooperation and follow-up that is being applied elsewhere in the region. The provision of relevant data in the report can also stimulate application in other localities. Some points in the study merit further explanation in order for other users to fully understand the approach, as indicated in the comments above.

Another SAP demonstration activity for the ecosystem and pollution components was an investigation of the impacts of changes in the N:P:Si ratio on the Yellow Sea Ecosystem. Data on the current status and long-term variation of nutrient levels from the joint co-operative cruises and the National Comprehensive Marine Investigation Project in 2008 and 2009 were collected and analyzed. Large temporal fluctuations were revealed with no clear pattern, although in some coastal areas significant increases of dissolved inorganic nitrogen (DIN) and N:P ratio were found. Mesocosm and laboratory experiments that the N:P ratio may affect phytoplankton abundance, chlorophyll-a concentration, eutrophication, and the occurrence of HABs, while no significant impact of the N:P:Si ratio on phytoplankton species composition was confirmed. The field observations showed marked decreases over time in the relative abundance of diatoms, in favour of dinoflagellates, but with marked seasonal variation and high diatom abundance in spring.

Biodiversity and fisheries

Demonstration activities for the fisheries component have included an evaluation of effects of stock enhancement on the restoration of natural olive flounder resources through juvenile release experiments in September 2008. This included an assessment of the benefits to fisheries management, fishers and policy makers. It appeared that fishers understood very well that natural fisheries resources have declined dramatically and that stock enhancement was an important activity. Recapture surveys were conducted in November 2008 and June 2009. Survival rates were very high, in the range 90-96%, with larger juveniles having the highest survival. After enhancement, flounder yield and income had increased. Public awareness raising was carried out through release of posters about the activity.

Ecosystem

Addressing habitat loss and deterioration is a priority of the YSLME SAP. A demonstration activity to improve management of critical habitats was implemented in the Ganghwa Southern Tidal Flat, ROK. This is an important habitat for shore birds and migratory birds, and a feeding ground for estuarine fisheries. The demonstration activities included reviewing current management plans and laws related to environmental problems and impacts of environmental stress. This was a team effort involving natural scientific, social scientific, legal, management and economic expertise, as well as stakeholders. A team including the local community, research agencies, the local and central governments and an NGO was established. Existing data were used to assess current conditions. The Project confirmed the serious problems of the area, and in doing so greatly improved understanding for the need to conserve the habitat among stakeholders.

To study the feasibility of implementing the management plans developed from the activity, an economic study of the benefits of improved water quality was carried out based on a mainstream economic approach. The objective was to estimate the benefits of improving the water quality in terms of recreational opportunities in order to assess whether investment in treatment plants can be justified. The travel cost method with contingent behaviour analysis was applied on how much the approximately 100,000 annual visitors to the area spend to benefit from the ecosystem services, using questionnaire data. On-site, face-to-face surveys were carried out in 2009. The total value of the tidal flat with current water quality was estimated at 11 billion Korean won. The benefits of improved water quality through sewage treatment were estimated at 13 billion won. The estimated cost of the treatment plants was less than 3 percent of these benefits, providing a strong economic justification for implementing the management plan.

A regional habitat conservation assessment and review of vulnerable species was carried out in partnership with WWF, and a joint biodiversity assessment was conducted to help select demonstration sites for the SAP and the MPAs. This created a methodology for biodiversity and habitat assessment.

Pollution

Local community interests were addressed in the demonstration activity for the pollution component on management of recreational waters in Qingdao, China. This aimed at identifying gaps in ongoing monitoring, exploring the primary factors affecting water quality, and providing recommendations on management of recreational waters. The activity covered faecal coliform pollution, floating microalgae, marine litter and physical conditions. Lack of research about microbial indicators and of pollution sources, and time delays in forecasting water quality were identified as gaps. These gaps were addressed in the demonstration activity. A water quality forecasting model was developed and tested. Suggestions for improvements in the monitoring programme were made. A dedicated public awareness and education activity was carried out, including beach clean-up, release of monitoring products through media, and the development of a beach closure advisory system.

All these results provide sufficient evidence of attainment of outputs and activities in this medium-term objective.

3.2.1.7. Facilitating extension of regional cooperation

The Project has made extensive efforts to involve the DPRK. A three-party MOU on DPRK capacity building activities has been signed by KORDI, the Dalian Society of Oceanography and the Project, for example. The DPRK was represented with observer status at several RSTP and PSC meetings, including the 5th and 6th meetings in 2008 and 2009, respectively. At the 2008 RSTP and PSC meetings in 2008, the DPRK representative thanked the Project for having arranged two capacity-building workshops, one on the TDA and SAP concepts and processes and one on environmental pollution monitoring and assessment, for the DPRK to better understand the Project and be prepared to participate in a possible next phase. The representative also suggested that the Project arrange further training workshops in the DPRK. The Project Manager explained that details of DPRK's potential participation in the Project could be arranged through consultation with DPRK government officials and experts, as well as GEF.

The DPRK representative stated " the strong interest and willingness of the country to be fully involved in the on-going Project and hoped that the second phase would be realised with the DPRK as a full member of the Project." The delegation also noted the need to improve communication between the relevant national organisations and the PMO.

Following discussion of a non-paper introduced by the Project Manager, the PSC meeting "instructed the PMO to work closely with all relevant stakeholders and to explore the necessary financial resources for the DPRK to join the Project activities such as capacity building." The meeting also "requested the PMO to explore an appropriate venue where all the participating countries, including the DPRK, can participate."

Accordingly, at the 6th meetings of the RSTP and PSC in 2009, the representative of the DPRK reiterated the strong willingness of the country to be fully involved in ongoing and future Project activities, and noted that the DPRK had confirmed its support of the TDA and SAP in an official letter in December 2008.

Prior to the 2009 RSTP and PSC meetings, a capacity-building workshop was organised to aid implementation of the SAP in the DPRK, and a list of capacity-building requirements was identified. The GEF IW representative also noted that "the newly reopened UNDP Office in the DPRK would facilitate communication".

The Project progress report to the 6th PSC meeting noted the Project's efforts to facilitate cooperation between the participating countries and the DPRK in order to enhance the capacity of all stakeholders in the Yellow Sea region. These included the transfer of marine environmental monitoring equipment to the DPRK by the Dalian Society of Oceanography. It is noted that all the actions were carried out without drawing on GEF Project funding.

3.2.2. Outcomes and impacts

The Project has generated cooperation and synergy in each of its component activities, between national and regional level activities including through the national working groups, with members agreeing to exchange data and metadata, for example, on sampling gear and data limitations. The RWGs have reached agreements on the formats and types of environmental and socio-economic data and information to be collected from each nation.

This supports cooperative development of and agreements on robust and practical indices to use in assessments of status, helps identify gaps in data and information and helps convey the resulting messages to decision-makers, thus also enhancing national capacities.

The Project has provided a mechanism for collecting comparable data and information on conditions in the YSLME and carrying out a joint regional assessments. It has stimulated interdisciplinary work, generated dialogue between scientific disciplines, between sectors, and between scientific communities and authorities in the two countries. It has created a base for continued cooperation along these lines nationally and internationally, which is needed to achieve the long-term goals of sustainability and human well-being, contributing strongly to building national capacities.

The Project has demonstrated the strong need for not only research cooperation on long-term environmental studies and funding for such, but also joint decision making on policies, enforcement, monitoring and coordination at national and international levels, and laid the foundation for achieving this through the operational structures it has put in place.

As an example, the cooperation with the WWF/Yellow Sea Ecoregion Support Programme created significant synergy effects, e.g., avoiding duplication, maximising use of available resources, sharing of expertise, enhancing financial sustainability by involving the private sector, and broadening the participation of other stakeholders and NGOs.

The data quality assurance and inter-calibration exercises show progress as to sample analysis but also the need to ensure all participants carry out the analysis within the agreed time schedule. Workshops on assessment of marine pollution demonstrated several on-going activities in the Yellow Sea and also led to an expansion of the marine pollution network to include participants from other regions in northeast Asia. The strengthening of data and information management continued with improvements of the Regional GIS Database, including additional interfaces and implementation of a regional workshop. A biodiversity-pollution cross-component pilot activity was initiated in the Ganghwa tidal flat to show how such an approach can improve marine habitats.

Very important examples are the two joint cruises and the four joint regional fisheries stock assessment surveys, both completed in 2008. The Cruise Summary Workshop in mid-2009 reviewed the results. The outcomes demonstrated the use of the results in clarifying understanding of ecosystem conditions. They also confirmed the necessity of such cooperation in order to achieve an adequate understanding of the YSLME. The same holds true for the joint fisheries stock assessments. The overall outcome is the endorsement and signing of the SAP.

The significance of these outcomes is highlighted through the very positive evaluation of the Project outcomes so far from the global LME programme perspective, with reference to the contributions of the YSLME to the book “Sustaining the world’s LMEs”[1]. The initial results of the pilot demonstration activities for science-driven, ecosystem-based management as envisaged in the SAP also appear to confirm the validity of the approach. Results from the

[1] Sherman, K., M.C. Aquarone and S. Adams (eds.), 2009. Sustaining the World’s Large Marine Ecosystems. IUCN, Gland, 140 pp

joint cruises and stock assessments address several of the gaps identified in the national reports. They show the necessity for such joint undertakings. The results of the Ganghwa tidal flat activity were used to design a regulation plan for marine pollution, with related awareness-raising outreach activities. The development of a pilot network of MPA sites has been initiated.

Institutional cooperation and cross-sectoral interactions have been both strengthened and changed to address the issues of marine environmental protection and sustainable use of coastal and marine resources. The efficiency in use of human, infrastructure and organizational resources has increased, enhancing the effectiveness of joint actions. The application of good practices in research and management has been strengthened. Changes in perceptions and attitudes of officials, managers, decision makers and coastal communities and people have been noted with respect to the seriousness of the Yellow Sea situation and the need for adequate protection and management actions.

A significant outcome is the provision of scientific foundation for joint regional systematic periodic assessments of effectiveness of management actions, together with economic valuation, and a basis for implementation of a regional joint monitoring network as part of the common strategy endorsed through the SAP.

On the basis of these findings, the evaluation team concludes that the relevance, effectiveness and efficiency of the outcomes with regard to enhanced regional cooperation are **highly satisfactory**.

3.3. Objective 3: Facilitating cross-sectoral cooperation and coordination of relevant national institutions

3.3.1. Attainment of outputs and activities

3.3.1.1. Project structures supporting cross-sectoral cooperation

The PSC, RSTP, and RWGs have generated and created an understanding for regional and national cross-sectoral coordination and dialogue, including among relevant national institutions, achieving many positive results and laying a foundation for continued regional cooperation. The outputs and activities achieved through these mechanisms cover all components of the Project.

3.3.1.2. National Interministerial Coordinating Committees

The Project has successfully created the IMCCs to facilitate cross-sectoral cooperation and coordination of relevant national institutions. The IMCCs have provided substantial support in cooperation with the PMO to successfully implement the regional joint cruises and joint fisheries stock assessment, with data exchanges and the creation of related cooperation mechanisms. The SAP, approved by the governments, recommends strengthening of the IMCCs to increase country ownership of SAP implementation.

3.3.1.3. National and regional governance analyses

The regional governance analysis (see Section 3.1.1.5) identifies the key national government institutions relevant to implementation of the SAP, and has a strong focus on enhanced cross-sectoral coordination and decreased fragmentation. The analyses recommend the active involvement of the relevant national organizations in SAP implementation. At the international level the UNDP is seen to continue being most important, but the increased involvement of IMO and UNEP is encouraged. The regional governance analysis, whose recommendation to establishment a YSLME Commission has been carried forward into the SAP, considers the establishment of mechanisms to enhance cross-sectoral cooperation and coordination. This applies not only to national institutions, but also to international organizations, NGOs, and the private sector.

3.3.1.4. Regional parliamentary conferences

The Project established a mechanism to promote parliamentary roles in protection of the marine environment, which will facilitate cross-sectoral coordination of relevant national institutions, since many major management actions (e.g., harmonisation of legislation, changes in institutional structure, increased budgets for marine environmental protection) ultimately need approval by parliamentary organisations. Regional conferences addressing the roles of parliaments, national assemblies and local governments in protecting the marine environment and achieving sustainable use of marine resources in the Yellow Sea strengthened the interest and involvement of these policy and decision makers.

The first-ever activity of this nature in a GEF-funded programme was held in Qingdao, China in March 2006, with 51 participants including 14 members from parliamentary bodies, 4 from China and 10 from Korea. Members of the National Assembly of the ROK expressed the desire to establish a regular forum form parliamentary members of the ROK and China to share vision, knowledge and experiences to help achieve sustainable development in the Yellow Sea, and to help meet the responsibilities of parliaments in this context. Similar sentiments were expressed from China. Participants from the local government in Qingdao confirmed the crucial role of the marine environment for local-provincial socio-economic development and that the Qingdao Municipal Government developed a strategic plan to focus on related issues. Participants from the DPRK indicated that participation in relevant activities is crucial for more effective conservation of the marine environment of the Yellow Sea.

The need to include the application of economic consideration in environmental management decisions was emphasized and illustrated through examples. The continuation of parliamentary involvement was confirmed in context of the SAP development and implementation in the form of a network between the two parliaments, possibly gradually in the form of an Eastern Asia Parliamentary Forum.

Agreed follow-up actions included:

- Organisation of meetings with local governments for wider stakeholder participation;
- Increased interaction between scientists and government;

- Examination of good practices to address transboundary problems;
- Pursuit of partnerships among different stakeholders;
- Combining top-down and bottom-up decision making; and
- Pursuit of objectivity in policy-making.

It was agreed to hold regular meetings of this nature to sustain the outcomes of the first conference, which included development of common understanding, common goals, and support of regional cooperation.

The success of this first effort is demonstrated by the attendance for the duration of the conference of all high-level policy makers and politicians who attended, which is very unusual.

A follow-up conference was convened in the ROK in October 2007. Participants included parliamentarians, members of national and municipal assemblies in China and the ROK, and prominent scientists. The conference confirmed the great importance of the Yellow Sea ecosystem to socio-economic development. It stressed the need for:

- Continued regional cooperation, including of parliaments;
- Legislation and law enforcement for marine environmental protection and sustainable resource use;
- Economic valuation as a tool to support preparation and enforcement of legislation;
- Enhancing public awareness and participation; and
- Continuation in an appropriate fashion of the conference mechanism.

The need for involvement of national policy makers was noted also for achieving the participation of DPRK so as to obtain full geographical coverage of the Yellow Sea in regional cooperation; as well as in the context of preparing common policies of the ROK and China that can become the legal basis for sustaining the Yellow Sea environment and ecosystem services. The creation of a YSLME Commission was brought out as an example of strengthening regional governance. Throughout these activities efforts have continued to involve participation from the DPRK.

3.3.1.5. Stimulation of interagency disaster responses

The Project has stimulated interagency responses to natural and human-induced disasters. On the occasion of a significant oil spill, the PMO was able to organise at short notice scientific and technical advice from the scientific community to the response management team, and to stimulate cooperation between the authorities involved.

On the occasion of a macroalgal bloom, or green tide, in Qingdao Bay, the PMO responded by providing scientific and management advice. This effort was coupled to Project demonstration activities in the area.

On the basis of this overview the evaluation team assesses the Project's activities and outputs in relation to this medium-term objective as **highly satisfactory**.

3.3.2. Outcomes and impact

Important outcomes supporting the facilitation of cross-sectoral cooperation and coordination at regional and national level include evolving policy changes at local, provincial, national, and regional levels to address the issues of the YSLME in a cooperative framework. This is evidenced by increased involvement at all levels of government, the participation of policy and law makers, the influence of enhanced public awareness on the policy process, and the involvement of the private sector. There are significant indications of changes of attitudes and perceptions with respect to marine environmental protection and sustainable use of marine and coastal resources. Evidence of this includes data exchange and joint analyses for the joint cooperative cruises and joint fish stock assessment. These actions have provided a basis for an agreed assessment methodology and regional periodic surveys, gradually resulting in a joint monitoring network with reference stations. The governments see a model for such a network in the HELCOM and OSPARCOM networks in the Baltic and North Seas areas.

The policy adjustments are also seen in the endorsement and acceptance by the governments of the SAP together with the soft-law voluntary approach to the YSLME Commission, to be created over a bridging period. National financial support for this has already been allocated by both governments.

The evaluation team rates the relevance, effectiveness and efficiency of the outcomes with regard to facilitation of cross-sectoral cooperation and coordination as **highly satisfactory.**

3.4. Prognosis of the degree to which the overall objectives and expected outcomes are likely to be met

The adoption of the SAP and the completion of a number demonstration activities provide a significant basis for achieving the long-term objective . The SAP fully adopts an ecosystem-based approach and identifies measurable targets to be reached by 2020. The implementation of the joint cruises and fish stock assessments with regional surveys likewise give a convincing basis for a good prognosis of fulfilment of the long-term objective. Several other outputs give further support to such an assessment. These all validate the establishment of the YSLME Commission as the overall implementation mechanism. To facilitate the process, an organizational framework for the Commission has been drafted on the basis of extensive consultations with officials and other experts. Draft guidelines for the operation of an Interim Commission Council have also been prepared.

A good basis for achieving the overall objectives and expected outcomes is evidenced by the considerable efforts in data collection, through the national and regional Working Groups, leading to addressing important data gaps, and gaps in understanding the role of ecosystem services at the level of authorities and practitioners, and an associated recognition in government of the necessity to strengthen the related systems. This effort can furthermore be based on proposed alternative policies to help achieve sustainable fisheries (e.g., Table 5, page 275 in Analysis of Environmental Status and Trends, Vol.2, National Reports, ROK II), and generate related collaborative management systems. The regional syntheses, also present a summary of national issues which will help directing future efforts to achieve sustainability.

In view of the increasing role of mariculture in providing seafood, suggesting a doubling of production by 2020 to meet demand, the results in support of sustainable mariculture are both highly relevant and effective in moving toward the long-term objective.

The creation of databases using national data and information from both nations can serve as a baseline for introducing and implementing ecosystem- based management practices and related future regional assessments and cost-benefit analyses.

The regional syntheses, together with other activities and results, identify the type of data and information required for proper assessments. This can be compared with identified gaps, indicating priority needs to management and scientific institutions in both countries. This approach can also help ensure that data and information and analyses become compatible.

The Project has created communication and dialogue among institutions, authorities, and different sectors, including at government level. The Yellow Sea Partnership can support the continuation and strengthening of regional cooperation, including cooperation with regional and global organisations.

The outreach and public awareness efforts have significantly enhanced insights and understanding for the actions. The proposed introduction of education about the sea in primary and secondary schools in coastal cities in China, in the form of a course possibly entitled “Know Ocean, Love Ocean”, carried out in direct association with the coast would be a major breakthrough of global interest. It fits excellently with the aims of the ongoing UN Decade of Education for Sustainable Development (2005-2014).

The relevance and effectiveness of the Project for the countries and communities are very high: this is the only integrated, international, multilateral cooperative and community-driven programme in the Yellow Sea region. The YSLME Project has carried out very extensive work with high cost efficiency.

PEMSEA is another multilateral programme that includes the Yellow Sea. PEMSEA has been endorsed as an organization by the governments of the East Asian Seas Region, includes the DPRK as a member state. PEMSEA could thus potentially provided the political framework for the sustainability and possible continuation of the YSLME Project, which seems appropriate since this political framework already exists. Such an approach could facilitate the programmatic sustainability/continuation of the YSLME outcomes and achievement of the long-term objective.

3.4.1. Risks to sustainability of Project outcomes

3.4.1.1. Financial risks

The expressed ownership of Project outcomes by national governments, local governments, coastal communities, users of the marine resources, the scientific community, the private sector, and other stakeholders suggests that the financial risks are not significant. There are several potential financial sources to sustain the outcomes. It can also be noted that the two governments have allocated funding for the bridging period and the commencement of the second phase of the Project.

From a long-term perspective it should be noted that the ROK is a donor country, whereas China is as yet a developing country. This difference in status may hold financial risks in the future, but not in the medium term.

The evaluation team ranks financial risks as **likely (L)**, meaning that there are no or negligible risks that effect this dimension of sustainability.

3.4.1.2. Socio-political risks

The level of stakeholder involvement and interest in the Project has gradually reached a very significant level over a wide range of stakeholders. Ownership in the countries of this unique community-driven, integrated, multi-lateral programme for the Yellow Sea is high. The attitudes and perceptions of many stakeholders have changed in the course of the Project towards a more positive understanding for the need of such a programme. Key stakeholders agree that it is in their interest that the benefits of the Project continue and achieve full impact.

Nevertheless, there may always be some socio-political risks. Environmental knowledge has been enhanced in governance circles, including parliaments and government, but knowledge of how to protect the environment is still very limited, as is understanding of ecosystem services and ecosystem-based management. The evaluation team considers the risk **moderately likely (ML)**, meaning there are moderate risks that effect this dimension of sustainability.

3.4.1.3. Institutional framework and governance risks

The current weak enforcement of existing laws implies that the potential for non-compliance with management rules and regulations is significant. It may be cheaper to accept a fine, for example, than to implement proper treatment of wastewater. These concerns are serious. Inter-ministerial coordination and communication deficiencies, and possible conflicts of interests between ministries as to priorities pose risks for the success of the programme, although the sustainability of the existing outcomes may not be affected.

The evaluation team rates the risk as **moderately likely**.

3.4.1.4. Environmental risks

Environmental degradation of parts of the YSLME continues. The governments are changing attitudes to the balance between economic development and environmental protection in favour of more attention to environmental concerns. However, this does not necessarily mean better understanding of the protection of ecosystems and ecosystem services. Thus, it is very likely that land-reclamation or coastal profile changes in Yellow Sea coastal areas will continue, given that considerable plans for such activities are in place.

Although an agreement has been reached at the national level for a reduction in fisheries capacity, and this is being pursued, verification at regional level is difficult. This is also the case with respect to pollution control. The Project has addressed these issues, being the only multilateral mechanism available to do so. This is another major dimension in favour of continuation of this multilateral mechanism.

There are also moderate risks regarding the implementation of the ECC concept, which is of concern for the second phase of the Project, but also may influence the sustainability of the present outcomes.

Potential climate change impacts may in the long term pose environmental risks to the sustainability of some outcomes.

The evaluation team rates the environmental risks as **moderately likely**.

3.4.2. Scientific credibility

Many scientific results of high relevance and effectiveness for supporting further implementation have come out of the analyses and joint actions, such as the joint surveys, joint cruises, the nutrient input model, the cost-benefit analysis, and the demonstration activities. Specific examples include zooplankton distributions, biomass and production of bacteria in the surface layer outside the Yangtze River, together with high phytoplankton diversity, differences in catch composition on the two sides of the Yellow Sea, with a significant increase of jellyfish in the western part, and large increases in autumn biomass of anchovy, anglerfish, and yellow croaker related to the spring bloom. The results supporting achievement of sustainable mariculture in the Yellow Sea also are based on a solid and up to date scientific approach with respect to rearing, genetics, and disease control. The studies of the importance of various habitats also demonstrate scientific rigour and credibility. For instance, findings regarding the role of seagrass beds in the Rongcheng area are in full agreement with findings in other parts of the world. Scientific rigour is also demonstrated in the process for obtaining reliable estimates of primary production by means of remote sensing in combination with ground-truth data.

The Project could possibly have done more data quality control with respect to the historical data, with a slightly more critical approach. However, the harmonization of methodologies, inter-calibrations, provision of reference materials, and exchanges with other scientists are all major steps in improving the scientific credibility of outputs.

The Project has worked in a region of high political diversity and some suspicion, and has succeeded in changing attitudes toward scientific cooperation considerably. Scientific cooperation has been going on before, but not in the context of such an integrated approach. Due the constraints indicated, the efficiency in producing scientific outputs in the form of peer-reviewed scientific publications may be seen as moderate. It should be emphasized that this is essentially due to factors beyond the control of the Project. In conclusion, the evaluation team considers the scientific credibility of Project outputs to be high and fully satisfactory.

3.4.3. Processes effecting the attainment of Project results

3.4.3.1. Country ownership/drivenness

Extensive consultations have been conducted with government representatives, authorities, scientific community, other stakeholders and users of the marine resources at each stage since inception of the Project, to clarify and respond to country priorities and concerns. It is

clear that the outcomes are contributing to shaping policy and priority identification of both national and local governments.

The financial commitments have been fully honoured by both countries. Other participating institutions and partners have also contributed in-kind and in cash.

Governments at national and local level, and other stakeholders, have endorsed management frameworks and adjustments to policies as a result of the outcomes of the Project. At national and local levels, and including civil stakeholders such as fishers and coastal communities, ownership of the Project has been created by a wide range of activities. The YSLME Project has been adopted by stakeholders as a community-driven mechanism to achieve improvements of the condition of the Yellow Sea.

Ownership of the Project and outcomes at national and regional levels is confirmed by the final evaluation. This Project is clearly country-driven and not donor-driven.

3.4.3.2. Stakeholder involvement

A wide range of stakeholders have been actively involved in Project activities (see Section 2.3.2), which have addressed issues of real concern to the stakeholders. This includes the quality of recreational waters, contamination of habitats, eutrophication, litter on beaches, habitat destruction, biodiversity and fisheries and mariculture production. Local officials and managers have been trained in how to address the issues and carry out management actions. Stakeholder involvement has generated cooperation, dialogue, and communication across sectors and between institutions and communities.

Stakeholder involvement in the Project is regarded by the evaluation team as very satisfactory and of high value.

3.4.3.3. Replicability

The Project has demonstrated the replicability of a number of its results, such methodologies developed for integrated multitrophic aquaculture (IMTA), nutrient loading studies, and remote sensing algorithms and surveys. In particular, the replicability of many Project approaches and outcomes has been recognized by GEF and the global LME programme. GEF plans to use the YSLME approach to TDA and SAP development as the model for a Project in the East China Sea. GEF-IW and the global LME programme view the YSLME as a benchmark for LME projects.

These conclusions are confirmed by views expressed by Dr Ken Sherman in communication to the YSLME Project Manager in May 2010, as follows: "*It is clear from my visit to the IMTA sites in the Sanggou Bay, and from my close association as an external observer of the YSLME project, that China and Korea are carrying forward the best practices of any ecosystem-based project for the recovery and sustainability of LME goods and services.*

The Yellow Sea Large Marine Ecosystem is presently serving as the world standard in practice of LME recovery and sustainability. Marine experts engaged in GEF-supported projects in other parts of Asia, and in Africa, South America and Eastern Europe all look to the YSLME project as the best example of Transboundary Diagnostic Analysis (TDA) and Strategic Action

Plan (SAP) development and practice, for the recovery and sustainability of ecosystem goods and services.

The innovative and cost effective YSLME project is recognised as the most successful of the 17 GEF supported LME projects and should become the first project supported by the GEF for a second five year phase with funding from the up-coming 5th replenishment of the GEF donor countries."

3.4.3.4. GEF Agency backstopping

The cooperation with UNDP offices and UNOPS has functioned during the major parts of Project implementation. The PMO has experienced some difficulties in fulfilling the heavy reporting and management requirements of the implementing and executing agencies (see Section 4.6.2). The PMO also sometimes experienced that an insufficient understanding of marine environmental issues affected implementation of some Project activities. These issues led to some delays beyond the control of the PMO. There appears to be a need for the implementing agencies to recognize these kind of problems in their management approach. This is particularly sensitive when working in regions with large political differences, and when the country and regional ownership of the Project is as strong as it is in the YSLME Project.

4. Project Management and Coordination

The Project Document defined the roles of the PMO to be:

- Assist networking among the NFPs, IMCFs, and RSTP;
- Organize technical cooperation activities and consultative meetings;
- Collect and disseminate information;
- Provide support for technical and pre-investment activities;
- Establish and assist with networking of technical institutions and experts;
- Assist in implementing pilot activities;
- Coordination of international, multi-lateral, and bilateral environmental activities;
- Direct coordinate public awareness and participation and data and information management activities; and
- Financial, logistic, and strategic project management, including progress reporting.

Overall, the PMO has performed very well in performing and exceeding these roles. The PMO has been efficient and effective, with an appropriate ratio of administrative and overhead costs to expenditure on substantive Project outputs and outcomes, within the constraints of the institutional administrative framework. The PMO team appears to have worked well as a team and to a high professional standard, with low turnover of personnel and a collective commitment to the success of the Project.

4.1. Institutional and Organizational Structure

4.1.1. Project Implementation and Execution Arrangements

The international partners involved in project management and execution arrangements are the GEF Secretariat in Washington, UNDP-GEF Headquarters in New York, the UNDP Asia-Pacific Regional Centre in Bangkok, the UNDP Country Offices in Korea and China, and the UNOPS International Waters unit in Copenhagen. The PMO deals with UNOPS primarily on budgetary, financial, and contractual matters, including the recruitment of Project staff and consultants and management of contracts for Project activities. The PMO deals primarily with the UNDP regional office regarding technical aspects of Project implementation within the GEF-IW framework, with additional support from UNDP-GEF Headquarters as required. Overall, these arrangements have been satisfactory. As noted in the MTE, it is not clear that the UNDP Country Offices were as supportive as they might have been in facilitating Project activities and outcomes within the two countries. The evaluation team noted that the UNDP Country Office in the ROK was represented at the first four of the six PSC meetings to date, and the UNDP Country Office in China was represented at the first PSC meeting. Neither Country Office participated in the official signing ceremony of endorsement of the SAP, which was held at the sixth PSC meeting.

4.1.2. Project Organizational Structure and Roles

Aside from the PMO, the main groups involved in practical implementation of the Project at the regional level have been the PSC, RSTP, and the RWGs. In addition, the Project established an *ad hoc* working group on SAP development within the RSTP, which subsequently established a smaller SAP drafting group. At the national level, there were IMCCs, National Working Groups, National Coordinating Units and National Coordinators. As stated in Section 2.3.1.1, the evaluation team considers the design of the basic organizational structure to be sound. The use of the basic structure to form task-specific groups such as the *ad hoc* working group on SAP development, was appropriate and efficient.

As noted in Section 2.3.1.2, there were some adjustments to the role descriptions of the PSC and RSTP in the Project Implementation Plan adopted by the PSC at Project commencement. Specifically, the TOR for the PSC, and the organization chart, were modified to clarify that the PSC was the ultimate decision-making body for the Project, and what had been the SMAG was re-defined as the RSTP to provide a more technical focus given the critical importance of scientific and technical matters in the development of the TDA and SAP. The evaluation team considers these adjustments to have been appropriate, and to have contributed to the Project's success.

The membership of these various bodies overlaps considerably, so that a number of individuals have participated at two or even three levels in the organizational structure (PSC, RSTP, RWGs). Some cross-linkage of these groups was essential to provide effective communication and information flow between the various bodies, and it is standard practice for some members of technical groups to attend meetings of steering groups in order to present and explain results and progress. The overlap in membership also reflects to a considerable extent the long-standing interest and participation in the Project by a number

of senior, influential individuals from both countries, whose participation at multiple levels is viewed by the evaluation team as necessary and desirable. Several individuals who were interviewed by the evaluation team had been involved in the gestation of the Project since the first meetings in 1992. This continuity, along with the career progression of key individuals into more senior, and more widely networked, positions, is seen by the evaluation team as an important contributor to national ownership of the Project by both the scientific community and governments.

The evaluation team considered whether the partially overlapping membership of the PSC and RSTP weakened the Project oversight role of the PSC, and concluded that there was sufficient differentiation of the PSC and the RSTP, and that the national representation on the PSC was firmly rooted in national government policy structures. The three organizational levels (PSC, RSTP, RWGs) appear to have effectively and successfully fulfilled their functions.

The MTE of the Project concluded that the internal coordination functions established for the Project were only marginally effective, but also noted that effective internal coordination mechanisms are rare in GEF-IW projects for TDA/SAP delivery. Indeed, inadequate internal coordination of agencies with responsibilities related to marine environmental management is a common root cause of marine environmental problems around the world. During the evaluation mission, both the PMO and a number of persons interviewed identified inadequate internal coordination among national government agencies as a significant project risk (see Section 3.4.1.3). Nonetheless, cooperation between SOA and SEPA in China appears to have improved considerably since the MTE, when a lack of such cooperation was identified as an issue. The constructive relationship established between the former MOMAF and MOMAT in the ROK at the time of the MTE appears to have continued in the working relationship between MLTM, which has taken over responsibility for the marine environment, and MOMAT, if not improved somewhat. The PMO notes that the IMCCs in both countries relate specifically to the YSLME Project, and not to marine environmental management more generally.

4.2. Implementation Approach

The PMO's approach to implementing the YSLME Project is exemplary, in the literal sense that it serves as a valuable example for other GEF projects. The PMO has gone beyond the basic roles of coordination, support for activities, and project management as defined in the Project Document and has played a critical and demanding catalytic and leadership role essential to the Project's success.

The PMO has largely succeeded in striking a sometimes challenging balance between Project delivery (delivering products and outputs specified in the Project Document, to budget and schedule) and fundamental outcomes – such as confidence, cooperation, technical and institutional capacity, and stakeholder ownership - necessary to achieve the long-term objective of ecosystem-based sustainable development of Yellow Sea resources. From the commencement of the Project, the approach to implementation has demonstrated an understanding that, though the activities in producing the TDA and SAP had a largely technical focus, the ultimate causes and remedial actions are fundamentally related to governance and the sustainability of outcomes depends on long-term cultural and

institutional change. This understanding was reflected at the outset in the re-casting of "immediate objectives" formulated largely around technical thematic areas (fisheries, ecosystem, etc.) to "medium term objectives" formulated around the governance themes of capacity building, regional cooperation, and internal, cross-sectoral coordination (see Section 2.3.1.2). This reformulation established a wider context to the technical/sectoral activities, without substantively altering the specific actions and outputs identified in the Project Document (compare Annex 6 and Annex 7).

In some cases, this approach to implementation resulted in departures from scheduling and planned expenditures, but in general the end result was superior to what would likely have been achieved with a rigid programmatic approach to implementation. The cooperative study cruises are a key example of this. The approved Project Document schedule called for winter and summer cruises in each of the first three years of the Project, i.e., 2005-2007. Although the Project Implementation Plan recognized that this was probably not realistic given cost increases over the period between Project approval and commencement (see Section 2.3.1.2), the budget and schedule still included cruises in the first three years. In the first year of implementation, it was immediately clear that there were major barriers to implementing the cruises, including political differences, deeply held differences in methodologies and lack of confidence on the two sides, and a number of other issues. A rigid programmatic approach would almost certainly have resulted in a failure to implement cooperative cruises, or at best token cruises of little value to the Project or participating countries. Instead, the PMO led and catalyzed a lengthy and difficult process, including no less than four joint meetings, with the key result that the cooperative cruises, though not conducted in 2008, were productive and meaningful, and established an important precedent for joint monitoring surveys in support of ecosystem based management. While the data collected has not yet been published, and was therefore not available for development of the TDA and SAP as originally intended, the overarching achievement of building trust and scientific consensus, and establishing a key precedent for ongoing technical cooperation is a major success of the Project.

Another example of the benefits of the PMO's approach to implementation is that the Project established relationships with and ownership by key stakeholders – both institutionally and personally – that were positive enough to make it possible to convene special meetings of the PSC when critical decisions needed to be made at key junctures of implementation. This accomplishment was noted by several persons interviewed by the evaluation team.

Finally, the PMO was astute and effective in involving the DPRK throughout the Project. The DPRK was represented with observer status in major Project meetings, capacity building activities were conducted in the DPRK, and the DPRK has been recognized as a stakeholder in, and has provided an official letter of support for, the SAP (see Section 3.2.1.7).

4.3. Work Planning and Day-to-Day Project Management

Day-to-day project management has been effective and efficient. The PMO has closely managed the Project in line with the Project Implementation Plan, with approval from the PSC for all significant departures identified by the evaluation team. Work planning in the first

year of the Project was based on a simple MS-Excel spreadsheet developed for the PDF-B phase and Project Document, and thereafter on a Gantt chart project system in MS-Project for tracking of deliverables and milestones. The MS-Project workplans were updated annually and approved by the PSC. Internally, the PMO established workplans for each individual staff member, again based on MS-Project Gantt charts. The PMO appears to have used these as tools for ongoing adaptive management, rather than as products for annual progress reporting. For the most part, activities and outputs were consistently delivered on or close to schedule. Where there were significant exceptions, they were usually due to external factors and/or, especially early in the Project, unrealistic expectations. An example is the delay in conducting the joint cruises, which was a direct result of the difficulty in reaching consensus on the design and logistics of the cruises. Another example is the initial scheduling of delivery of the TDA in year 1, which was not realistic. In dealing with such external factors and overly ambitious scheduling expectations, the PMO displayed admirable adaptive management skills to keep the overall Project on track and deliver a very high proportion of expected outputs.

Meetings, Project activities, and deliverables directly controlled by the PMO have mostly been on-time and on-budget, within the normal variation for a project of this magnitude and complexity. Workplans and budgets have been realistic and achievable. Exceptions have mainly resulted from external factors beyond the control of the PMO. All individuals interviewed during the evaluation mission indicated their perception that the PMO has operated efficiently and effectively. This is rather remarkable, in that administrative arrangements for contracts, travel, per diems and so on are notorious lightening rods for complaints about project management and administration.

4.4. Financial Management

As noted in Section 1.3, the scope of the final evaluation did not provide for a detailed reconciliation of Project budgets and expenditures. However, the Project's delivery of outputs and outcomes beyond the original project design, while achieving budgetary saving sufficient to fund the first no-cost extension to June 2010 as a bridging phase (see Section 2), demonstrates the bottom-line effectiveness of the PMO's financial management of the Project.

Staffing costs rose significantly between Project approval in 2000 and the commencement of implementation in late 2004, necessitating adjustments to the budget and re-prioritisation of activities. In addition, at the commencement of the Project in 2004 it was recognised that the original Project budget was inappropriate in only providing for professional staff other than the Project Manager for the first three years of the Project, whereas lessons from other GEF projects indicated that dedicated professional inputs during the latter stages of the Project would be critical for the delivery of outcomes such as SAP finalization and SAP demonstration activities. Staffing costs were further increased by PSC-approved decisions to appoint a Fisheries Officer rather than a Public Advisor (although the Fisheries Officer also led the development of the Public Awareness and Communications Strategy), and an IT Specialist in place of a Receptionist. The budget was adjusted to reflect these increased staff costs, largely by re-allocating funds initially budgeted for short-term international consultants. This approach was approved by the PSC at its first meeting, in early 2005, and a

revised project implementation budget was approved by the PSC at its second meeting in late 2005.

The Project, particularly in its first three years, significantly underspent its planned budget. To a large extent this was due to external factors and not shortcomings in financial management. A major reason for underspending of annual budgets was the difficulty experienced in agreeing and implementing the joint cooperative cruises, so that expenditure for the cruises was pushed back from the original timeline. The Project also frequently experienced delays by contractors in responding to requests for proposals and providing bids, as well as in submitting deliverables required for final payments, resulting in delayed expenditures. In addition, the PSC, at its sixth meeting in November 2009, instructed the PMO to slow expenditure so as to provide for the subsequent bridging period to a possible Phase 2 of the Project.

Throughout the Project, the PMO appears to have conducted effective, adaptive financial management in response to externalities including consultant delivery, economic shifts (e.g., exchange rates, differential economic movements in ROK and China), and most importantly increasing national buy-in to Project outcomes. An adjusted budget was presented to and approved by the PSC annually, and the Project maintains the series of budget revisions on file. As noted in the MTE, there were some minor budget revisions not directly approved by the PSC, but in the opinion of both the MTE and the final evaluation team these have been financial adjustments that are normal and appropriate in the course of project management, and not substantive changes. All substantive changes to the budget reviewed by the evaluation team were approved by the PSC (including UNOPS and UNDP), and except for minor adjustments expenditures on Project components have been in line with the approved budget (Annex 11).

In terms of the mechanics of financial management, the PMO has complied with UNOPS practices and effectively applied appropriate controls. The internal budgeting and financial management system reconciles line items in the Atlas and IMIS systems to link the UNOPS Atlas system to specific project outcomes and activities. Ongoing administration of the Atlas account shifted from UNOPS to the PMO. The PMO has prepared detailed annual expenditure reports, as well as forward annual workplans and budgets, and reported against those budgets. The Project commissioned an internal audit in October 2007, which scored the Project's financial management as "Satisfactory" (the highest rating available) and concluded that internal controls and risk management practices were adequate and functioning well, with the only high-priority issue identified by the audit being some discrepancies in between the Atlas system administered at that time by UNOPS and the V-Imprest system administered by the PMO in records of disbursements. The PMO promptly rectified this issue as well as a few low-priority ones identified by the audit.

The MTE noted that expenditure on administrative and overhead charges appeared excessive, with some 50% of the total Project budget approved by the PSC in November 2006 being allocated to the PMO. The MTE acknowledged, however, that this was misleading because much of the expenditure allocated to the PMO was in fact directly related to producing substantive outputs. Much of the time of professional staff was spent in producing substantive outputs, for example, and the PMO budget also included major

cross-component substantive items such as meetings of the RSTP and PSC, regional scientific conferences, other regional meetings, scientific equipment, institutional contracts, and expert consultancies. Accounting of expenditures on administrative and overhead charges versus achievement of substantive outputs was discussed by the PSC in November 2007 in light of the recommendations of the MTE. It was affirmed that the high apparent cost of administration and overheads was an artefact of the inclusion of substantive activities in the administration costs. From 2008, the budget presentation was revised to allocate staff time spent on subsequent activities to the respective activities, and to more clearly separate substantive cross-component activities from the budget for PMO administrative budget. In the most recent approved Project budget, approved by the PSC in November 2009, PMO administrative and overhead costs amount to approximately 12.9% of the total budget, and when the 6% UNOPS administration charges allocated to the substantive budget components are included, the total administration and overhead expenses amount to 18% of the total Project budget. The evaluation team considers this to be an appropriate balance.

4.5. Cofinancing and Leveraging

The approved GEF contribution of US $14,394,089 has provided the core funding for the Project, in support of investment, scientific and technical analysis, and technical assistance. The Project has been highly successful in using the core GEF to leverage cofinancing from the participating governments, whose contributions have greatly exceed their commitments in the original Project Document (Annex 11). The Project has also leveraged cofinancing from other sources. The Project management has also involved the DPRK in several activities through cofinancing, without drawing from the core GEF funding.

Two components of cofinancing committed in the Project Document, US $650,000 from UNDP for marine pollution monitoring in the ROK and US $600,000 from US-NOAA for scientific and technical training, did not eventuate, at least in the context of the YSLME Project. In both cases, the cofinancing contributions were tied to projects in the region being undertaken by UND and NOAA. Because of the delay between Project approval and implementation, these projects had been completed when implementation of the YSLME Project commenced, so these sources of cofinancing were not available. This was an unavoidable externality and not a shortcoming of Project implementation.

4.6. Monitoring and Evaluation

In reviewing the YSLME Project's Monitoring and Evaluation (M&E) system, the evaluation team has been cognizant of the 2006 GEF M&E Policy, as well as the 2008 GEF terminal evaluation guidelines. Given that the Project Document was approved in 2000, however, the GEF M&E Policy and terminal evaluation guidelines cannot be stringently applied. It should also be noted that, under the GEF guidelines for terminal evaluations, the evaluation of a Project's M&E systems should be based on the implementation of M&E, with the original M&E design and funding for M&E as explanatory variables.

4.6.1. M&E Design

This section refers to the original design of M&E systems for the Project, and not the implementation of M&E. The Project does not have a formal M&E Plan as such, but the Project Document includes many components of M&E Project design specified in the GEF Policy. The Logframe Matrix in the Project Document identifies indicators for both project implementation and results that generally conform to the criteria for SMART indicators in the GEF Policy. In some cases, however, the indicators appear in hindsight to have been unrealistic with respect to time frames or the ability to measure progress. For example, one indicator of Project results specified in the Logframe Matrix was improved water quality for target contaminants by year 5 of the Project. In retrospect, it was unrealistic to expect ecosystem-scale improvements in water quality within five years of project commencement, and it is clear that water quality monitoring systems in the Yellow Sea are not adequate to measure such changes. Similar considerations apply to a number of other results indicators in the Logframe Matrix. The project implementation indicators were generally realistic. The Project Justification section of the Project Document describes the project baseline, but not explicitly in relation to the indicators in the Logframe Matrix.

The Project Reviews, Reporting and Evaluation section of the Project Document specifies five major M&E mechanisms (in addition to project planning documents prepared at the project design stage):

- Quarterly Operational Reports (QORs) to UNDP-GEF
- Annual Programme/Project Reviews (APRs) and Quarterly Progress Reports
- Annual Tripartite Reviews by the major stakeholders(Governments, UNDP Country Office, UNOPS, UNDP, and Project management)
- Annual Project Implementation Reports (PIRs), using the APRs as the basic document
- Mid-term and Final evaluations

The Project Implementation Plan includes separate sections on monitoring and evaluation of Project implementation and results, and retains the M&E mechanisms listed above.

The M&E plan for the Project was not fully budgeted. The Project budget included a provision of $8,000 annually for the Tripartite Reviews, and $48,000 for both the Mid-term and Final evaluations. The costs of quarterly and annual reporting, however, are subsumed in general project management costs, primarily staff costs.

The evaluation team rates the M&E Design for the Project as **moderately satisfactory**. The main shortcomings identified are a lack of clearly established baselines for the indicators in the Logframe Matrix, a lack of a complete M&E budget, and a lack of clear indicators for Project implementation versus Project results. Again, in assessing the M&E design it should be remembered that the Project design and approval preceded the GEF M&E Policy by six years, and GEF's approach to M&E evolved considerably over that time.

4.6.2. M&E Implementation

The QORs were delivered on schedule throughout the Project. The QORs were brief narrative descriptions of major technical achievements during the quarter, in keeping with

UNDP guidance limiting the reports to 150 words and the general audience outside UNDP-GEF for which the reports are intended. In addition to the QORs, the Project also provided much more detailed quarterly progress reports to UNOPS. These quarterly progress reports included:

- General summary of progress and issues
- Detailed outputs and outcomes against the objectives in the Project Logframe Matrix
- Detailed financial report
- Requests for authorisation of upcoming travel
- Staffing and status of employment contracts
- Status of supplier contracts
- Calendar of upcoming events
- Reports and publications

The APR/PIR reports were prepared annually in accordance with the Project Document and GEF procedures. In the first PIR, prepared in 2005, the indicators used for project performance ratings did not explicitly correspond to either the short/medium-term objectives specified in the Project Document or Project Implementation Plan, or to the indicators specified in the Logframe Matrix, and as a result did not encompass a number of Project components. The 2006 PIR, however, is directly based on the Logframe Matrix indicators, and furthermore explicitly establishes the baseline for each indicator, thus representing a significant improvement in M&E design and implementation.

In 2009 the reporting format for the PIRs was changed from an MS-Word format to an MS-Excel format. As a result, the structure of the M&E criteria was modified somewhat, but sufficient continuity was retained to allow for tracking of progress. In addition, commencing in 2009 more explicit and detailed criteria were established, with baselines, for tracking progress against the long-term objective of environmentally sustainable management and use of the YSLME. The MS-Excel based PIRs also separate more explicitly M&E criteria for results and implementation.

The planned annual Tripartite Reviews (TPRs) were never conducted. The TPRs were meant to be policy-level meetings of the parties directly involved in Project implementation, including governments, UNOPS, UNDP (country offices and GEF), the PSC Chair, RSTP Chair, working group Chairs ,and National Project Coordinators. The Project Document noted that the TPRs could be conducted in conjunction with other meetings, such as those of the PSC or RSTP (designated the SMAG in the Project Document, see Section 2.3.1). The TOR for the PSC and project organizational structure were modified in the Project Implementation Plan to strengthen the PSC's role in Project policy and management, and the meetings of the RSTP and PSC, which were held in conjunction, included all of the parties intended to participate in the TPR. The Project Manager presented a comprehensive progress report to each RSTP/PSC meeting. Thus, the RSTP/PSC annual meeting served the purpose of the TPR. The evaluation team, however, was unable to locate a formally documented decision to

forgo the TPRs and, as noted below, budgetary provisions for TPRs were carried forward throughout the Project even though the TPRs did not occur.

The mid-term and final evaluations were conducted as planned, and designed to cover the main issues.

The evaluation team rates M&E implementation for the Project as **satisfactory**. Improvements were made in implementation over the life of the Project.

4.6.3. M&E Funding

As noted above, quarterly and annual reporting was not explicitly budgeted, but was instead covered under general administration charges. Funding for these activities was presumably adequate, since all reporting was conducted on schedule. The detailed quarterly progress reports and annual PIRs required a significant investment of staff resources, which cannot be directly tracked. Similarly, a number of Project activities, particularly the RSTP and PSC meetings, had important M&E functions that were not separately budgeted. The evaluation team was therefore unable to estimate the proportion of the Project budget devoted to M&E.

Each year's annual budget retained a funding provision for future TPRs, but the Project budget for the following year was revised to show no funds budgeted for the TPR, because there was never any reported expenditure on TPRs did not occur. It is unclear why budget provisions for TPRs were retained for each future year.

The evaluation team rates the budgeting and funding of M&E systems as **moderately satisfactory**, the main shortcoming being lack of explicit, full budgeting for M&E activities.

5. Project Performance Ratings

The TOR for the Final Evaluation (Annex 1) specify the rating of listed criteria on a scale from 1 to 5, as follows:

1=Excellent	(90% -100% achievement)
2=Very Good	(75% - 89%)
3=Good	(60% - 74%)
4=Satisfactory	(50% - 59%)
5=Unsatisfactory	(49% and below)

The performance ratings by the evaluation team, with accompanying comments, are provided in Table 2.

Table 2 Final evaluation performance ratings

Criterion	Rating	Comments
Achievement of objectives and planned results	1	Key objectives of TDA, SAP and SAP implementation achieved to a high standard. Nearly all planned results achieved, and exceptions are largely a result of externalities. In some aspects the Project exceeded the objectives and planned results. The YSLME Project is in several aspect a model for other IW projects. Adaptive management has maintained achievable objectives and expectations.
Attainment of outputs and activities	1	Essentially all outputs and activities completed to a satisfactory or highly satisfactory level. Some activities, such as the cooperative cruises, were delayed by factors largely outside of PMO control, but were eventually achieved
Cost effectiveness	1	The Project has had achievements beyond those originally planned, and has leveraged cofinancing well beyond what was envisioned in the Project Document. This was accomplished while extending the budget to allow a bridging period to the proposed second phase, including preparation of the PIF for the second phase
Impact	2	The YSLME Project has had an impact on policy, including China's current 5-year plan. The engagement with parliamentarians has potential for significant future impacts, but to be sustainable will need to be ongoing. Interviews during the evaluation mission indicated significant impact on technical cooperation and public awareness at a local level at sites of Project activities. Impact on internal coordination of national agencies has been modest. Impact on the state of the environment is probably minor, and not measurable. It is unreasonable, however, to expect significant measurable impacts on the state of the environment, environmental management, or governance on the time scale of the Project.
Sustainability	2	The Project has strong stakeholder support, has provided a number of key management tools and precedents for continued cooperation, increased mutual understanding and trust between countries and among different stakeholder groups, and addressed issues of high relevance in the region, providing a good basis for the sustainability of outcomes. Agreement on the establishment, nature, and structure of a YSLME Commission significantly enhance the prospects for sustainability of Project outcomes.
Stakeholder participation	1	The various components and activities of the Project have involved a large number of stakeholders cutting across all levels of society in both countries, ranging from school children and community groups to high-level parliamentarians and government officials. Formal stakeholder analysis was done as part of TDA and SAP development. All major relevant stakeholder groups have been included.

Criterion	Rating	Comments
Country ownership	1	The Project has been strongly country-driven and consistently developed support and ownership by the two participating countries as well as DPRK. Strong country ownership is amply demonstrated by the provision by the ROK of finance to extend the bridging period from June 2010 through March 2011, and especially by the US $2.5 billion in cofinancing secured for the proposed second phase.
Implementation approach	1	Exemplary balance between delivery of immediate/medium-term results and establishment of fundamental conditions (confidence, cooperation, capacity, etc.) necessary to reach long-term objective, while mindful of national concerns and objectives. Effective efforts to build national government ownership and support, technical capacity, stakeholder ownership and support, and international contributions and recognition.
Financial planning	2	The Project regularly adapted the budget throughout implementation in light of changing circumstances, fully complied with all GEF and UNOPS financial procedures, and initiated and internal audit partway through the Project, which confirmed that financial management was sound. There were issues with under-expenditure of budgets, but these were largely due to external factors, as well as money-saving efforts that increased the Project's cost effectiveness.
Replicability	1	The parliamentary conferences are the subject of an IW:LEARN Experience note. The methodologies regarding multitrophic mariculture are being transferred to the GCLME, and GEF plans to use the YSLME approach to TDA and SAP development as the model for a project in the East China Sea. GEF-IW and the global LME programme view the YSLME as a benchmark for LME projects.
Monitoring and evaluation	2	Under GEF Terminal Evaluation Guidelines, the overall rating of M&E is based on M&E Implementation, with M&E design and funding as explanatory variables. M&E Implementation has conformed to GEF, UNDP, and UNOPS requirements. The TPRs were not implemented, but the PSC meetings fully discharged the functions of the TPRs.
Overall Project Rating	**1**	The PIRs since 2008 evaluate the Project's performance against the criteria listed in the Logframe Matrix of the Project Document, and all ratings since 2008 have been "Highly Satisfactory", with the sole exception of a rating of "Satisfactory" for overall Project Implementation by the UNDP Regional Technical Advisor in 2008. The evaluation team has reviewed the ratings in the PIRs against the Logframe Matrix and concurs with the ratings in the PIRs.

6. Lessons Learned

Lessons learned from the Project identified by the evaluation team include:

- The time frame needed to establish new mechanisms for complex technical cooperation in politically and culturally diverse regions, can be substantial and should not be underestimated in Project design. The joint regional cruises and fish stock assessment are examples of this. Underestimating the complexity of establishing technical cooperation created significant risks to Project success, and great effort was required for the YSLME Project to successfully manage these risks and establish the technical cooperation mechanisms. These successes represent breakthroughs that have led to changes in attitudes as well as the involvement of decision makers and a wide range of stakeholders, building a sense of ownership and responsibility to sustain the achievements/results and outcomes.
- Underestimation of the complexity of establishing the joint cruises and fish stock surveys necessitated major adjustments in financial planning, which required considerable flexibility and pragmatism in Project management and control.
- Regular communication between participating countries at various levels of governance is necessary and needs to be enhanced as far as possible. This can create synergistic effects. Synergism can also be created through cooperation in scientific and management initiatives, using mechanisms as workshops, training courses, and conferences.
- Is it necessary to proactively facilitate government involvement in the Project and in the endorsement of regional strategies and action programmes, through political and social acceptance analysis, as was done in obtaining approval of the SAP, as well as in negotiations for the joint cruises and fish stock surveys.
- Involvement of a broad spectrum of stakeholders is required to achieve understanding, participation, ownership, and sustainability. The Yellow Sea Partnership approach, Small Grants Programme, internships, workshops, and training involving local officials, communities and NGOs, addressing socio-economic needs and local priorities of regional importance, has generated strong involvement, has built capacity, and generated outcomes and sustainability.
- In order to enhance local participation and partnerships with local communities and NGOs, there is a need to use the local language, including the translation of key documentation such as application forms and instructions for applications and report writing on small grants.
- Expert groups are still largely defined by subject areas and associated disciplines. Interdisciplinarity was achieved to some extent through the joint meetings of the RSTP and PSC. Increased efforts to enhance interdisciplinary synergism through exchanges and joint actions would be useful.

- In governance and in implementing management actions, distinguishing immediate causes, underlying causes, and root causes can be difficult, demonstrating the need to clarify the relationships among causes as part of SAP implementation.
- Planning from the Project design phase to include SAP demonstration activities in the first phase of the Project has been a key factor in maintaining momentum and leveraging of cofinancing.
- The requirement for a bridging period from the first phase to a possible second phase of the Project implies the need for flexible budget planning towards the end the first phase, together with efforts to raise cash contributions from the participating countries to partly cover the costs of the bridging period as well as commitments for support to a second phase. The delays in the initiation of the Project created considerable risk of losing momentum and the interest of critical stakeholders, including the scientific community. Similar delays or uncertainties with respect to the confirmation and initiation of a second phase need be avoided as far as possible.

7. Recommendations

The recommendation of the evaluation team are as follows:

- Regional and national coordination and cooperation should continue to be strengthened, including through enhancing participation of representatives from all stakeholder categories and seeking increased continuity in the membership of key Project bodies, including the IMCCs.
- In view of the high level of performance of the Project and its unquestionable success and uniqueness, and the great desirability of ensuring continued multilateral cooperation in the Yellow Sea, it is strongly recommended that the Project be continued into its second phase. There should be appropriate support from GEF in the initial stages, building further trust and cooperation of all partners from the start. Cofinancing from the participating countries has already been secured. GEF support is needed to secure the international, multilateral coordination and cooperation.
- A possible linkage with a potential East China Sea LME Project should be considered, provided this would not significantly delay the initiation of a YSLME second phase.
- Proactive efforts should be made to further pursue public awareness and participation, including building networks of the communities involved, using the Yellow Sea Partnership, maintaining engagement with decision and policy makers, and using the media for appropriate communication.
- The ecosystem-based management approach should continue to be developed, with clear guidelines for implementation, so that all stakeholders can be fully involved. The importance of ecosystem services and ECC needs be further explained, in particular in economic and human well-being terms.

- There should be further development of the MPA network in a logical structure related to environmental and oceanographic conditions so as to achieve sufficient coverage, and use of selected sites to establish baselines and test management strategies in each country, with comparisons across the network.
- Enhanced involvement of the private sector should be encouraged, possibly through the Yellow Sea Partnership and building on the positive experiences of the Project in the first phase.
- Stronger efforts for timely publication of scientific findings in scientific journals and on websites are recommended, as well as efforts to stimulate continued involvement of leading scientists.
- It is recommended that the YSLME Project, in its second phase, considers using the partnership/MOU with PEMSEA to function within PEMSEA's political framework, since this framework has been endorsed by all the countries concerned, including the DPRK. This approach would imply that the political endorsement of the countries participating in the YSLME Project is already established for the second phase, and make a separate government endorsement process unnecessary.

Annex 1. YSLME PROJECT FINAL EVALUATION TERMS OF REFERENCE

1. PROJECT BACKGROUND

Among the large marine ecosystems (LMEs) in the world ocean, the Yellow Sea LME has been one of the most significantly affected by human development. Today the Yellow Sea faces serious environmental problems, many of a transboundary nature, that arise from anthropogenic causes. Large population lives in the basins that drain into the Yellow Sea. Large cities near the sea having tens of millions of inhabitants include Qingdao, Tianjin, Dalian, Shanghai, Seoul/Inchon, and Pyongyang-Nampo. People of these large, urban areas are dependent on the Yellow Sea as a source of marine resources for human nutrition, economic development, recreation, and tourism. The Yellow Sea receives industrial and agricultural wastes from these activities.

The Yellow Sea LME is an important global resource. This international waterbody supports substantial populations of fish, invertebrates, marine mammals, and seabirds. Many of these resources are threatened by both land and sea-based sources of pollution and loss of biomass, biodiversity, and habitat resulting from extensive economic development in the coastal zone, and by the unsustainable exploitation of natural resources. Significant changes to the structure of the fisheries have resulted from non-sustainable fisheries, reducing catch-per-unit effort. A fisheries recovery plan is essential to the continuation of the exploitation of this important resource. The three littoral countries, with their massive populations living in the Yellow Sea drainage basin, share common problems with pollution abatement and control from municipal and industrial sites in the Yellow Sea basin, as well as contributions from non-point source contaminants from agricultural practices. All of the littoral 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 Yellow Sea Large Marine Ecosystem. The objective of the project is: 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 urbanized, and industrialized semi-enclosed shelf sea.

2. PROJECT OBJECTIVES AND EXPECTED OUTPUTS

The long-term objective of this project is ecosystem-based environmentally-sustainable management and use of the Yellow Sea and its watershed: reducing development stress and promoting sustainable development of the ecosystem from a densely populated heavily urbanized and industrialized semi-enclosed shelf sea.

In order to achieve this objective this project will prepare a Transboundary Diagnostic Analysis (TDA), a regional Strategic Action Programme (SAP) and National Yellow Sea Action Plans (NYSAPs). This project will also initiate and facilitate the implementation of the SAP.

The project is relevant to the GEF Operational Strategy for International Waters, as well as for the Waterbody Based Operational Programme (#8), with relevance to biological diversity.

3. FINAL EVALUATION OBJECTIVES

The objective of the final evaluation is to enable GEF, UNDP, the Government bodies in the participating countries, and UNOPS to assess the relevance, efficiency, effectiveness, impact and sustainability of the Yellow Sea Large Marine Ecosystem Project. The evaluation will assess achievements of the project against its objectives, including a re-examination of the relevance of the objectives and project design. It will also identify factors that have facilitated or impeded the achievement of the objectives. While a thorough review of the past is in itself very important, the in-depth evaluation is expected to lead to detailed overview and lessons learned for the future.

4. SCOPE OF THE FINAL EVALUATION

The scope of the final evaluation will cover all activities undertaken in the framework of the project. The evaluators will compare planned outputs of the project to actual outputs and assess the actual results to determine their contribution to the attainment of the project objectives. It will evaluate the efficiency of project management, including the delivery of outputs and activities in terms of quality, quantity, timeliness and cost efficiency. The evaluation will also determine the likely outcomes and impact of the project in relation to the specified goals and objectives of the project.

The evaluation will comprise the following elements.

(i) Assess whether the project design is clear, logical and commensurate with the time and resources available;

(ii) A summary evaluation of the project and all of its major components undertaken and a determination of progress towards achievement of its overall objectives;

(iii) An evaluation of project performance in relation to the indicators, assumptions and risks specified in the logical framework matrix and the Project Document;

(iv) An assessment of the scope, quality and significance of the project outputs produced to date in relation to expected results;

(v) An analysis of the extent of co-operation engendered and synergy created by the project in each of its component activities, between national and regional level activities and the nature and extent of commitment among the countries involved;

(vi) An assessment of the functionality of the institutional structure established and the role of the Project Steering Committee (PSC), the Regional Scientific and Technical Panel (RSTP), the Regional Working Groups, and national committees and working groups;

(vii) Identification and, to the extent possible, quantification of any additional outputs and outcomes beyond those specified in the Project Document;

(viii) Identification of any programmatic and financial variance and/or adjustments made during the project period, and an assessment of their conformity with decisions of the PSC and their appropriateness in terms of the overall objectives of the project;

(ix) An evaluation of project co-ordination, management and administration provided by the PMO. This evaluation should include specific reference to:

- Organizational/institutional arrangements for collaboration among the various agencies and institutions involved in project arrangements and execution;
- The effectiveness of the monitoring mechanisms employed by the PMO in monitoring on a day to day basis, progress in project execution;
- Administrative, operational and/or technical problems and constraints that influenced the effective implementation of the project and present recommendations for any necessary operational changes; and
- Financial management of the project, including the balance between expenditures on administrative and overhead charges in relation to those on the achievement of substantive outputs.

(x) A qualified assessment of the extent to which project outputs have scientific credibility;

(xi) An assessment of the extent to which scientific and technical information and knowledge have influenced the execution of the project activities;

(xii) A prognosis of the degree to which the overall objectives and expected outcomes of the project are likely to be met;

(xiii) Lessons learned during project implementation;

(xiv) Recommendations regarding key lessons learned and identify best practices as well as recommendations, based on the experience of this project, for the design and execution of future GEF/UNDP projects

5. REVIEW METHODOLOGY

The Final Evaluation will be conducted in a participatory manner working on the basis that its essential objective is to assess the project implementation and impacts in order to provide basis for improvement in the implementation and other decisions.

An inception report should be produced before field interviews are undertaken to ensure that methods are aligned with the GEF guidelines for final evaluation (available at http://www.thegef.org/gef/sites/thegef.org/files/documents/Policies-TEguidelines7-31.pdf).

The Mission will start with a desk review of project documentation and also take the following process:-

(i) Desk review of project document, outputs, monitoring reports (such as Project Inception Report, Minutes of all Steering Committee meetings including other relevant meetings, Project Implementation Report (PIR/APR), Quarterly Operational Reports, quarterly progress reports, mission reports and other internal documents including consultant and financial reports and relevant correspondence);

(ii) Review of specific products including datasets, management and action plans, publications and other material and reports;

(iii) Interviews with the Project Manager and other project staff in the Project Management Office (PMO); and

(iv) Consultations and/or interviews with relevant stakeholders involved, including government representatives in PR China and ROK; local communities, NGOs, private sector, donors, other UN agencies and organizations.

6. PROPOSED SCHEDULE

The evaluation will involve a level of effort of 21 working days, by two consultants to be fully completed by November 2010.

Detailed schedule, including the desk reviewing, countries visiting, and preparing final evaluation report, will prepared in due time by UNDP/GEF, UNOPS, in consultation with the Project Management Office.

7. DELIVERABLES

The Evaluation mission will produce the following deliverables to UNDP/GEF, UNOPS and the Project Steering Committee:

(i) An executive summary, jointly prepared by the consultants, including findings and recommendations;

(ii) A detailed evaluation report covering items (i) – (xiv) of 4. Scope of the Final Evaluation with attention to lessons learned and recommendations; and

(iii) List of Annexes prepared by the consultants, which includes TORs, Itinerary, List of Persons Interviewed, Summary of Field Visits, List of Documents reviewed, Questionnaire used and Summary of results, Cofinancing & Leveraged Resources etc.

The report together with the annexes shall be written in English and shall be presented in electronic form in MS Word format.

8. RATING PROJECT SUCCESS

The evaluators may also consider the form of the rating used in the International Waters Program Monitoring Questionnaire prepared by the GEF Monitoring and Evaluation Unit. This will be provided to the consultants by the Project Manager at the inception of the evaluation.

The evaluation will rate the success of the project on a scale from 1 to 5, with 1 being the highest (most successful) rating and 5 being the lowest. The following items should be considered for rating purposes:

- Achievement of objectives and planned results
- Attainment of outputs and activities
- Cost-effectiveness
- Impact
- Sustainability
- Stakeholders participation
- Country ownership
- Implementation approach
- Financial planning
- Replicability
- Monitoring and evaluation

Each of the items should be rated separately with comments and then an overall rating given. The following rating system is to be applied:

1=Excellent	(90 % -100 % achievement)
2=Very Good	(75 % - 89 %)
3=Good	(60 % - 74 %)
4=Satisfactory	(50 % - 59 %)
5=Unsatisfactory	(49 % and below)

9. Education/Experience/Language of REVIEW TEAM

Two consultants with the following qualifications shall be engaged to undertake the evaluation working concurrently according the to planned schedule, and one of the international consultant will be designated as the team leader who will have the overall responsibility of organizing and completing the review, and submitting the final report.

Qualifications of Team Leader:-

- International/regional consultant with academic and/or professional background in natural resources management and extensive experience in coastal ecosystem, marine science and international water etc. A minimum of 15 years' relevant experience is required;
- Substantive experience in reviewing and evaluating similar technical assistance projects, preferably those involving UNDP/GEF or other United Nations development agencies and major donor;
- Excellent English writing and communication skills; demonstrated ability to assess complex situations in order to succinctly and clearly distill critical issues and draw forward-looking conclusions;
- An ability to assess the institutional capacity and incentives required;
- Understanding of political, economic and institutional issues associated with transboundary water and large marine ecosystem in the Yellow Sea;
- Experience in leading multi-disciplinary and multi-national teams to deliver quality products in high stress an short deadline situations;
- Excellent in human relations, coordination, planning and teamwork.

Qualifications of International Consultant:-

- International/Regional consultant with academic and/or professional background in natural resources management, especially in the areas of coastal ecosystem, marine science and international water etc.
- A minimum of 15 years' relevant experience is required;
- Experience in implementation of technical assistance projects;
- Skills in international water (Large marine ecosystem) assessment techniques;
- Knowledge and experience in coastal ecosystem planning;
- Experience and skills in biological diversity monitoring and information systems;
- Excellent English writing and communication skills;
- Excellent in human relations, coordination, planning and team work

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Annex 3. ITINERARY AND LIST OF PERSONS INTERVIEWED

Thursday 4 November – Sunday 7 November 2010 (Xiamen, China) World Ocean Week (4-6 November) International Academic Advisory Committee (7 November)
Persons Interviewed:
Stephen B. **Olsen** Director Coastal Resources Center University of Rhode Island Narragansett, Rhode Island, USA
Chua Thia-Eng Chairman PEMSEA Council Quezon City, The Philippines
Rafael **Lotilla** Executive Director PEMSEA Council Quezon City, The Philippines
Monday 8 November 2010 (Dalian, China) International Symposium on Marine Ecosystem Assessment: Systematic Design and Requirements National Marine Environmental Monitoring Center State Oceanic Administration People's Republic of China
Tuesday 9 November 2010 YSLME Regional Workshop on Regional Network for Ecosystem Monitoring and Assessment Xinghai Golf Hotel Dalian, China
Persons Interviewed:
Yihang **Jiang** Project Manager UNDP/GEF Yellow Sea Project Ansan, Republic of Korea
Mingyuan **Zhu** Professor First Institute of Oceanography State Oceanic Administration Qingdao, China
Sinjae **Yoo** Korea Ocean Research & Development Institute Ansan, Republic of Korea
Alexander **Tkalin** Coordinator NOWPAP regional Coordinating Unit Busan, Republic of Korea
Juying **Wang** SOA Key Laboratory of Coastal Ecosystem and Environmental Research National Marine Environment Monitoring Center Dalian, China
Jae-Ryong **Oh** Head, Marine Environmental Studies Laboratory IAEA – Marine Environmental Laboratories Monaco
Niambin **Wang** Director

Ocean Environment Liaoning Ocean and Fisheries Science Research Institute Dalian, China
Wednesday 10 November 2010 (Dalian, China)
Persons Interviewed:
Quan **Wen** Chief Scientist SOA Key Laboratory of Coastal Ecosystem and Environment Research Senior Scientist National Marine Environmental Monitoring Center Dalian, China
Yihang **Jiang** Project Manager UNDP/GEF Yellow Sea Project Ansan, Republic of Korea
Thursday 11 November 2010 (Dalian, China)
Persons Interviewed:
Suh-Yong **Chung** Division of International Studies Korea University Seoul, Republic of Korea
Thursday 11 November 2010 (Beijing, China)
Persons Interviewed:
Liang Fengkui Director, Division of International Organization Department of International Cooperation State Oceanic Administration Beijing, China
Zheng Wei Ecosystem Center First Institute of Oceanography State Oceanic Administration Quingdao, China
Shan Xiujuan Yellow Sea Fisheries Research Institute Chinese Academy of Fisheries Science Quingdao, China
Wang Shouqiang Project Assistant Department of International Cooperation State Oceanic Administration Beijing, China
Haiqing Li Director-General Department of General Affairs and Finance State Oceanic Administration Beijing, China
Saturday 13 November 2010
Persons Interviewed:
Jiang Yihang Project Manager UNDP/GEF Yellow Sea Project Ansan, Republic of Korea
Isao **Endo** Environmental Economics Officer UNDP/GEF Yellow Sea Project

Ansan, Republic of Korea
Helen **Davies** Marine Environment Officer UNDP/GEF Yellow Sea Project Ansan, Republic of Korea
Sungjun **Park** Finance & Administrative Officer UNDP/GEF Yellow Sea Project Ansan, Republic of Korea
Monday 15 November 2010 (Ansan, Republic of Korea)
Persons Interviewed:
Jong Geel **Je** Councilor, Office of Policy Research Korea Ocean Research & Development Institute Ansan, Republic of Korea (Former Korean parliamentarian who participated in Parliamentary Conferences)
Kye Sook **Lee** President Marine Environmental Education Center Ansan, Republic of Korea
Jiang Yihang Project Manager UNDP/GEF Yellow Sea Project Ansan, Republic of Korea
Responses to Interview Questionnaire by correspondence
Ministry of Land, Transport and Maritime Affairs (MLTM) Korea
Ministry of Foreign Affairs and Trade (MOFAT) Korea
Ministry of Unification Korea

Annex 4. INTERVIEW QUESTIONNAIRE

How long have you been involved in the YSLME project?

Please describe the nature of your involvement in the project.

Results/Outcomes

How do you rate the socio-economic and environmental value of the results of this project?

How would you rate the project in terms of the following:

Relevance and significance

Effectiveness

Scientific credibility

Do you see any enhancement of national capabilities, strengthening of institutions, more cooperation and coordination as a result of this project?

Do you see any possible long-term changes, such as joint research, joint regional monitoring, cooperation in capacity building, dialogue and data exchange as a result of the project? Any lessons learned?

What is your view of the extent to which project outcomes have been mainstreamed into national and local governance and management processes and structures?

Investment/Management

Do you think there is country ownership, readiness for continuation, and stakeholder participation to drive continuation of the project?

How do you think the involvement of politicians, parliamentarians, and government officials be strengthened or made more useful?

Do you think the use of marine protected areas or zones of no take for fisheries is a realistic tool for environmental management in the region?

What is your view of the project's approach to partnership with the private sector, including cofinancing from that sector? Do you see ways in which it could have been improved?

Has cooperation with and involvement of NGOs been satisfactory? Any advice on how it could have been strengthened?

Has the project been effective in generating cofinancing and in-kind support? Can it be continued?

Is/was the financial planning valid/good? Any lessons learned?

Are project's results matching expectations and investments?

What is your view of the effectiveness and relevance of project activities?

How do you rate the project management in terms of efficiency, effectiveness, and communication with stakeholders? Can you identify any gaps or lessons learned?

Relevance of project and outcomes: do you think stakeholders in general consider the project and its outcomes of relevance for their human well-being?

What would you suggest could have improved the outcomes or the continued implementation to achieve the end-goal? Do you know what the long-term objective is and do you agree with that goal?

How do you judge or see the Monitoring and Evaluation process?

Has there been sufficient dialogue with stakeholders? Has there been sufficient transparency? Any lessons learned?

Risks

Are there any financial risks that may affect/impact the sustainability of project outcomes? What is the likelihood of financial resources not being available after GEF and UNDP support ends?

Are there any social or political risks that may affect sustainability of project outcomes?

What is the risk that the level of stakeholder ownership, including by governments, will be insufficient to allow the project outcomes/benefits to be sustained?

Do you think the important stakeholders see that it is in their interest that the benefits of the project continue to flow?

How do you rate the project's effectiveness with regard to public awareness and communication? Is there sufficient public awareness to support achieving the project's long-term objective?

Institutional and governance risks: do legal frameworks, policies, governance structures and institutional processes within which the project operates pose risks that may jeopardize sustainability of project benefits? What about systems for accountability and transparency?

Environmental risks: are there any environmental risks that may jeopardize sustainability of project outcomes? Are there any particular activities that may pose a threat to the sustainability of the project outcomes-like construction, land-reclamation and habitats destruction?

How would you rate these risks: No or negligible risks? Moderate risks? Significant or severe risks?

Do you have any advice for the next phase of the project? What role could/would you play if there is a second phase?

Annex 5. SUMMARY OF INTERVIEW RESULTS

The interviews included participants-representatives from national and local governments, authorities and ministry officials, politicians; local stakeholders and users; scientific community; NGOs and other partners, including from international organizations; staff at the PMO; all interviews were face to face.

The summary reflects the statements from all the interviews. This means there may be apparent repetitions since similar views have been expressed in different contexts/questions. The layout of the list of questions is followed in the summary but the sources are not identified. This was not cleared with the participants.

Project Results

The Project has been very efficient, effective and highly relevant for the Region; has initiated multi-lateral cooperation, identified data and information gaps, the need for more and quality controlled data and information for reliable assessment. Such was obtained through the joint cruise and joint fish stocks surveys.

The Project could not have been done better, with very high efficiency and effectiveness in achieving the objectives; the PMO is efficient, very correct, and played crucial role in facilitating the actions, given the mandate of the Project; used most economic approach, efficient ways, cost-efficiency has been very high.

The Project has brought the countries together in cooperation, this would not have happened without the Project. The high relevance is related to the economic and cultural value of the Yellow Sea, and that the Project has addressed priorities as pollution and fisheries issues.

The scientific credibility is good with the scientific community and leading scientists involved from the initiation, back into the last century. The TDA is however based on historic, existing data and those are not all of good quality. New data were also used for the SAP. Efficiency in relation to release of the joint cruise results was not high, all the data were not released in November 2010. Furthermore methods were not all the same so all data are not compatible. Inter-comparison exercises have addressed this and are very useful. However overall not much benefit for the best laboratories. The regional scientific conferences were very useful.

The Project has been very successful in generating and getting agreement on the SAP, and in ensuring that national SAPs have been developed, representing all very significant outputs.

The Project has been good for local governments and authorities through training, education, awareness creation of the public and users; these will now participate in and better understand the governance and management actions.

The PMO has been very efficient in achieving regional cooperation, organizing the actions, budgets and work-plans time planning, reporting to the PSC with full transparency and meeting agreed time schedules. The governance analysis is very useful in bringing out the legal conditions, existing treaties and rules.

Capacity building of long-standing value has been achieved, including through the inter-comparisons, provision of standard reference material and links to outside reference

laboratories as the IAEA Monaco Laboratory. Long-term changes have also been achieved through the training and education and involvement of officials/managers, and involvement of a wide range of stakeholders, including parliamentarians, creating exchanges, dialogues across borders and disciplines. This will continue, be maintained, also through the networking, experiences and trust which has been gained. The concepts of TDA and SAP provide a very useful solid basis at national level, giving a lasting legacy and helping maintain international cooperation. This includes the operational activities, monitoring and assessment. Thus a long-term capacity building mechanism has been made available, involving also international laboratories.

Mainstreaming of Project outcomes and SAP is ensured through the demonstrations, the involvement of all relevant stakeholders, outreach to ministries, and the process of preparation with extensive consultations and partnerships developments. The progress is reflected in the new 5 year plan of China having reference to the SAP, and the existence of the national SAPs. Government attitudes and ideas have changed, also ensuring ownership of the SAP.

Environmental knowledge has increased at national and local government level, but governments still do not know how to protect the environment. The Project is the only community driven mechanism at regional level, and it is very important that geographical coverage extends, that DPRK becomes fully involved as a partner.

The economic valuation efforts are very important; the ECC can be understood if it can provide economic values of ecosystem services, but these must be more explained.

Cooperation has been ensured with other regional mechanisms from the start; and a solid science base ensured, with practical results for management, including data quality assurance.

Investment and Management

Strong ownership has been established with national and local governments and other stakeholders; the country ownership is confirmed, and the countries are ready to continue the action. In the case of ROK all is prepared and funds have been allocated, also for the bridging period. The Project is needed in the region and is highly relevant.

Stakeholders have been involved, the outcomes are very relevant, including for local governments, authorities, users as fishermen; the mechanism has reached a wide range of stakeholders, including the private sector, but this involvement needs be enhanced.

Communication between countries, governments is well established. Integration between different institutions is still a problem, and there is a need for increasing understanding for ecosystem based management and the ECC approach.

The Project has involved the DPRK in many activities, including in the PSC meetings. There is a need to ensure its full participation in next phase.

Synergism has been achieved through the cooperation and partnership mechanism, including in capacity building and demonstration activities. Involvement of NGOs is limited partly because these are not as yet much involved in marine affairs. Cooperation with WWF, local NGO and MPA networking has been achieved. Some NGOs also think there is too much

science in the Project. The Project has developed interdisciplinary exchanges, dialogues and these will continue; we can see inputs from the Project to policy and thinking in governments and local authorities. However, there is a need also to involve more high level people from governments and find a way to connect to all relevant ministries.

There has been a bit too much stress and funds on the development of the TDA and the SAP; and not enough support for ground work which could have enhanced outputs. Further economic evaluation for the YSLME is required which could help the Project in the 2nd phase. Networks of NGOs need be strengthened including at national level, and the private sector needs become more involved.

Local, national language should be used for work at local level and with NGOs. Guidelines and reporting and application formats for small grants need be in national-local language.

Project management has been overall very efficient, with reporting, evaluation, monitoring to and for the PSC very satisfactory. The PMO has facilitated actions, and addressed certain political issues which needed much time. Manager spent much time dealing with these with successful results. The PMO applied flexible and adaptive management when needed. In some cases budget allocations were not sufficient; small grants and internships could have been given a bit more, and funding was also raised. Funds allocated for the preparation of national SAP were not sufficient. The situation in the region is complicated, difficult. The PMO organised special PSC meetings to address urgent, difficult issues, which turned out to be a very good approach.

Scientific efficiency could have been enhanced through more association with scientific bodies from outside the region. Small grants and demonstration sites could have been more advertised. All results from the joint cruise and fish surveys need come out. The progress in the pollution component was delayed due the delay of the joint cruise.

Co-financing with the private sector and NGO has been achieved, and cooperation established through the Project. NGO has been involved through the small grants for local people, this has worked well, including co-financing in association with WWF. However, NGOs only recently started addressing marine issues. Associations of fisheries, seaports, local governments have become partners through the small grants support from the Project; with the small grants bridging as seed funds to other sources. This shows relevance of the Project for livelihoods, local governments, enterprises. The fisheries associations also help in awareness creation.

The SAP preparations involved local governments with dialogue and feedback; a combination of bottom-up and top-down approach. The effectiveness and relevance is demonstrated through many local actions, also involving DPRK. The YSLME is the only community-driven mechanism with national, local governments involved and with economic valuations, which is very important. We now understand the issues of the open Yellow Sea much more, through the systematic approach of the YSLME Project. We agree with the long-term goal of this effort.

Risks

Financial risks are not significant. ROK is ready to proceed, with funding for a bridging period. So far there has been parliamentary discussions with governments on co-financing

next phase; there may be a risk if government changes. The risk of sustainability may also depend upon the status of the countries. ROK is now a donor country while China is not. It is nevertheless expected that China can provide support at same level as ROK after end of 2nd phase.

Socio-political risks can depend upon non-acceptance of management measures if stakeholders are not sufficiently involved, delays in delivering results-benefits or in start of 2nd phase, change of government and loss of progress so far made or loss of momentum. Quick results are needed from SAP implementation, e.g. on litter, pollution, mariculture. National, local languages need be used.

The geographical coverage is a problem. The participation of DPRK as full partner can be achieved, it is a matter of time, although the policy of the DPRK is not known. However, the DPRK has been significantly involved in the Project, including so as to understand the approach of the TDA and SAP. Socio-political risks may also be associated with weak law enforcement and some lack of rule of law. Hence a non-legally binding, soft law YSLME Commission seems best approach at this stage, as a first-ever in the region.

Cooperation as initiated will continue but a regional monitoring network will only develop gradually. The bridging period needs show some good results first, including evaluation of ecosystem services and demonstrating cost-benefits of ecosystem recovery. Economic valuation is very important.

The China fisheries sector is worried about environmental data exchange since they export much fish; pollution is number one priority, followed by over-fishing as number two, from socio-political point of view. The results on new mariculture techniques are very good and will be used in policy. The stakeholders are convinced and the ownership confirmed, as is the country ownership. The Project has indeed addressed the key areas as pollution, fisheries, ecosystem, and the main stakeholders are involved and committed. They want to continue to see the benefits flow, and they see the Project as very relevant for the region. Ownership at local level is also confirmed, the locals are prepared. The NGO community is also involved.

The science base for the SAP implementation is available, the scientific community is involved and governments are supporting it (the SAP). The people are more aware and are seeing the need for the Project, there is sufficient ownership to sustain the outcomes, all stakeholders are interested in that. Although public awareness has been much enhanced this needs continued efforts. The Project partnership plan needs more follow-up.

Institutional and governance risks are associated with the necessity to ensure involvement of all relevant ministries, and there are problems in this context, in both ROK and China, for instance with respect to areas of responsibility. The splitting of MOMAF in ROK may lead to problems since funding is divided, cooperation is new and the new organization is not research oriented. The risk is related to coordination between the different ministries. In ROK the Ministry of Foreign Affairs is working on facilitating cooperation and it looks good for the continuation of the Project. We need more cooperation between the ministries. In China we seek to establish such interagency collaboration through a protocol involving the

relevant ministries. The structure of the YSLME Project is very good, has worked well and solved many issues, as the joint cruise, the fish stock surveys.

Environmental risks are linked to control of land reclamation, verification of agreed management actions and goals, natural hazards, pollution incidents, and possibly climate change impacts. However, awareness is rising and it is good to focus on the ecological system, an eco-civilization, including the ECC approach.

Risks are related to data exchange and information sharing, where objections can come also from the military. We need a scientific basis for data, but data exchange is not critical, we can do with products as maps, trends, time series analyses. Verification can be done through reference stations, using standards and ecological health criteria as indicators. We should not force the issue of raw data exchange. The Project is not a scientific one but a management one.

Written responses to the questionnaire were received in early January 2011 from three ROK ministries, MLTM, MOFAT and Ministry of Unification. These responses are summarised separately.

Results

The Project is of high socio-economic values, but public awareness for conservation and sustainable fisheries need be enhanced in second phase with the implementation of SAP generating more direct outputs.

The Project is significant and of high relevance, providing an international framework, enhancing international cooperation and addressing issues of critical importance for the Yellow Sea. The Project has significantly contributed to the development of the National Maritime Protection Plan and strengthened cooperation within the Government through the IMCC. The preparation of the SAP involved many stakeholders, building a regional network, but strengthening of institutions and cooperation among stakeholders need further enhancement.

Joint research and regional monitoring efforts have been achieved through the Project and this cooperation will continue leading to long-term changes.

Investment and management

There is strong support from ROK, including for continuation of the Project, with country ownership. However, financial and political support are needed from PR China and GEF.

The Project has attracted attention of politicians and governance officials, but the Project management needs maintain the momentum for the Project to benefit.

There has been satisfactory involvement of the NGO mechanism, and efforts should continue to widen this involvement. However, it will take more time and efforts to enhance the participation and support from the private sector. The management of the Project and the results fully matches expectations, and the long-term objective is fully supported. There is need for continued effective management which can help generate agreements between different opinions, with regular monitoring and evaluation.

Risks

Financial and political risks are significant, but can be overcome. There is need for continued support from GEF for 2nd phase; an unbalanced increase in obligation from ROK constitutes a risk. The political and international tension in the region can effect the continuation of the Project. Environmental risks may be related to land reclamation.

Public support can be expected, the public understanding for the environment has been enhanced, even if this needs continued efforts to be maintained. Important stakeholders feel ownership of the Project and are involved.

The present management structure of the Project has worked well, but there may be need for an adjusted management structure for the continuation.

Annex 6. PROJECT ACTIVITIES DEFINED IN THE PROJECT DOCUMENT

Objective I. Regional Strategies for Sustainable Management of Fisheries, and Mariculture		
IA. Stock assessment		
Activities:	**Responsible Parties**	**Associated Partners**
Activity 1. Review of existing data and diagnosis of condition of stocks.	Fisheries WG	FAO
Activity 2. Perform demonstration of a Regional Survey.	Fisheries WG	FAO
Activity 3. Develop common methodology for joint regional stock assessment and perform initial joint regional stock assessment.	Fisheries WG	FAO
Activity 4. Perform initial joint regional stock assessment	Fisheries WG	FAO
Activity 5. Create mechanism for regional annual multi-species stock assessment, by introducing legal/policy changes to overcome existing barriers.	Fisheries WG	FAO
IB. Carrying capacity		
Activity 1. Review of existing state-of-knowledge and preliminary carrying capacity analysis (retrospective) and define gaps	Fisheries WG	FAO Contaminant Control WG Ecosystem Management WG
Activity 2. Fill the knowledge gaps for carrying capacity analysis.	Fisheries WG	FAO Contaminant Control WG Ecosystem Management WG
Activity 3. Perform iterative series of analysis of carrying capacity	Fisheries WG	FAO Contaminant Control WG Ecosystem Management WG
Activity 4. Annual carrying capacity determination	Fisheries WG	FAO Contaminant Control WG Ecosystem Management WG
IC. Mariculture Production		
Activity 1. Review existing status and trends of mariculture.	Fisheries WG	FAO
Activity 2. Develop joint applied research program for sustainable mariculture.	Fisheries WG	FAO
Activity 3. Pilot demonstration projects in mariculture	Fisheries WG	FAO
Activity 4. Assist region to implement mariculture techniques.	Fisheries WG	FAO

ID. Disease in Mariculture		
Activity 1. Review existing state of knowledge of disease in mariculture, particularly emphasizing emergent diseases.	Fisheries WG	FAO Contaminant Control WG Ecosystem Management WG
Activity 2. Joint development and demonstration of new methods for diagnosis, prevention, and control.	Fisheries WG	FAO Contaminant Control WG Ecosystem Management WG
Activity 3. Facilitate communication about new diseases, diagnoses, and control techniques.	Fisheries WG	FAO Ecosystem Management WG
I E. Regional Agreements and National Laws		
Activity 1. Review existing national laws and regulations on fisheries and mariculture, and pertinent international agreements	Fisheries WG	FAO
Activity 2. Develop regional agreement for sustainable use of fisheries resources.	Fisheries WG	FAO
Activity 3. Propose measures for strengthening laws and regulations,	Fisheries WG	FAO
IF. Management Plan		
Activity 1. Development of Regional fisheries management/implementation plans, including regional recovery programme.	Fisheries WG and PCU	FAO Ecosystem Management WG
Activity 2. Implementation of Regional Fisheries and ecosystem Management/Implementation Plans, including regional recovery programme.	Fisheries WG and PCU	FAO Ecosystem Management WG
Objective II Effective Regional Initiatives for Biodiversity Protection		
IIA. Habitat Conservation		
Activity 1. Review existing national practices of coastal habitat use, conservation, and restoration.	Biodiversity WG	
Activity 2. Develop regionally coordinated strategies of conservation and restoration of habitats.	Biodiversity WG	
Activity 3. Implement Regional Strategy for Conservation Areas.	Biodiversity WG	
IIB. Vulnerable Species		
Activity 1. Conduct national review of status of vulnerable species and vulnerable trophic linkages.	Biodiversity WG	CBD, IUCN
Activity 2. Develop regionally-coordinated strategies for protection of vulnerable species.	Biodiversity WG	CBD, IUCN
Activity 3. Implementation of regionally coordinated strategies for protection of vulnerable species.	Biodiversity WG	CBD, IUCN

IIC. Genetic Diversity		
Activity 1. Determine situations of genetic degradation of important bio-resources.	Biodiversity WG	
Activity 2. Develop regional consensus on the requirements for conservation of gene	Biodiversity WG	CBD
Activity 3. Prepare recommendations for conservation measures	Biodiversity WG	CBD
IID. Introduced Species		
Activity 1. Document introduced exotic species and their pathways, assess impacts and risks.	Biodiversity WG	IMO, CBD
Activity 2. Develop proposals for regulation and control of exotic species.	Biodiversity WG	IMO, CBD
Activity 3. Implement strategies for regulation and control of introduction of exotic species, including necessary legal, policy, and institutional reforms at national and regional levels.	Biodiversity WG	IMO, CBD
IIE. Regulations		
Activity 1. Review national regulations and effectiveness of protection measures.	Biodiversity WG	CBD
Activity 2. Develop regionally coordinated strategies	Biodiversity WG	CBD
IIF. Regional Assessment and Regional Biodiversity Plan		
Activity 1. Coordinate above activities into biodiversity assessment, regional Action Plan, and investment strategy.	Biodiversity WG	CBD
OBJECTIVE III Actions to Reduce Stress to the Ecosystem, Improve Water Quality & Protect Human Health		
IIIA. Stressors to Ecosystem		
Activity 1. Identify and rank stresses on the ecosystem; identify data and information gaps	Contaminant Control WG Ecosystem Management WG	
Activity 2. Identify corrective measures to minimize the human-induced stress.	Contaminant Control WG Ecosystem Management WG	
Activity 3. Identify policies and legal measures to reduce the stress.	Contaminant Control WG Ecosystem Management WG	
Activity 4. Develop strategy to identify long-term sustainable investments to improve the YSLME.	Contaminant Control WG Ecosystem Management WG	
Activity 5. Implement corrective measures to minimize the human-induced stress.	Contaminant Control WG Ecosystem Management WG	
IIIB. Carrying Capacity of Ecosystem		
Activity 1. Assess the carrying capacities of the ecosystem under	Ecosystem Management WG	Contaminant Control WG

changing human-induced and natural variability; identify data and information gaps: including demonstration of new and innovative technologies.		
Activity 2. Identify information gaps	Ecosystem Management WG	Contaminant Control WG
Activity 3. Develop strategies for monitoring changing status of ecosystem and its transboundary impacts.	Ecosystem Management WG	Contaminant Control WG
Activity 4. Prepare state-of-ecosystem reviews and reports.	Ecosystem Management WG	Contaminant Control WG
Activity 5. Facilitate implementation of strategies for improving the ecosystem status.	Ecosystem Management WG	Contaminant Control WG
IIIC. Contaminant Inputs		
Activity 1. Assess and monitor the contaminant and nutrient levels.	Contaminant Control WG	
Activity 2. Develop regional priorities and strategies to reduce contaminant and nutrients levels	Contaminant Control WG	Ecosystem Management WG
Activity 3. Facilitate implementation of these strategies; investment promotion activities including transfer/development new technologies.	Contaminant Control WG	Investment WG
IIID. Contaminant Levels		
Activity 1. Develop baseline data and summarize contaminant and nutrient levels in the YSLME.	Contaminant Control WG	
Activity 2. Develop regional monitoring network strategy.	Contaminant Control WG	
Activity 3. Develop funding mechanism to implement the monitoring strategy.	Contaminant Control WG	Ecosystem Management WG Investment WG
IIIE. HABs and Emerging Diseases		
Activity 1. Undertake comparative analysis of causes and impacts of HABs and Emerging Diseases on bio-resources and human health.	Ecosystem Management WG	Contaminant Control WG
Activity 2. Monitor HABs	Ecosystem Management WG	Contaminant Control WG
Activity 3. Develop management and mitigation strategies	Ecosystem Management WG	Contaminant Control WG
Activity 4. Facilitate regional management and mitigation implementation.	Ecosystem Management WG	Contaminant Control WG
IIIF. Critical Spot Analysis		
Activity 1. Determine and rank critical spot sources of water quality degradation.	Contaminant Control WG	
Activity 2. Develop procedures for remediation	Contaminant Control WG	
Activity 3. Develop investment strategies	Contaminant Control WG	

Activity 4. Facilitate implementation of procedures for re-mediation and prevention.	Contaminant Control WG	
IIIG. Emergency Planning and Preparedness		
Activity 1. Assess national emergency and contingency capabilities for transboundary contaminants.	Contaminant Control WG	
Activity 2. Develop strategies for rapid and long-term regional responses to catastrophic causes of pollution.	Contaminant Control WG	
Activity 3. Facilitate regional actions to enable contingency planning.	Contaminant Control WG	
Activity 4. Harmonize customs, training.	Contaminant Control WG	
IIIH. Legal and Regulatory		
Activity 1. Review and compare national regulations and laws on water quality and pollution control, develop proposals.	Ecosystem Management WG Contaminant Control WG	
Activity 2. Facilitate coordinated actions to improve regional water quality legislation and regulation	Ecosystem Management WG Contaminant Control WG	
III i. Analysis of the Fate and Transport of Contaminants to Facilitate SAP Analysis		
Activity 1. Review existing understanding of fate and transport of contaminants.	Ecosystem Management WG Contaminant Control WG	
Activity 2. Develop regional assessment strategies	Ecosystem Management WG Contaminant Control WG	
Activity 3. Perform fate and transport analyses for management and policy development, including EIA process, ICZM.	Ecosystem Management WG Contaminant Control WG	
Activity 4. Develop regional training activities for environmental risk assessment; facilitate use of risk assessment in investment decisions.	Ecosystem Management WG Contaminant Control WG	
OBJECTIVE IV Development of Regional Institutions and Capacities		
IVA. Stakeholders		
Activity 1. Identify stakeholders and asses their capacities for contributing to environmental management and decision-making.	PCU	NPC All WGs
Activity 2. Strengthen stakeholder capacities	PCU	NPC, All WGs
Activity 3. Encourage stakeholder involvement in environmental and resource management and decision-making.	PCU	NPC All WGs

IVB. Regional Coordination		
Activity 1. Create a functioning regional coordination mechanism to carry out the YSLME Project	PCU	SMAG, NFPs
Activity 2. Identify modes to sustain the regional coordination mechanism.	PCU	SMAG, NFPs,
Activity 3. Assist the Region in maintaining an effective regional coordination mechanism for the YSLME.	PCU	SMAG, NFPs
IVC. National Institutions		
Activity 1. Strengthen capacity to contribute to environmental management and decision-making	NFPs	SMAG, PCU
Activity 2. Facilitate ongoing management.	NFPs	SMAG, PCU
IVD. Financial Instruments		
Activity 2. Provide training in environmental project identification and preparation.	Investment WG	
Activity 3. Provide funding for pre-feasibility studies of promising technologies and industries to help achieve the goals of the YSLME, to create an investment portfolio (Priority Investment Portfolio).	Investment WG	
Activity 4. Identify a mechanism for participation by international development banks to learn of investment opportunities in the YSLME.	Investment WG	
IVE. Data and Information Management		
Activity 1. Determine regional data and information management capabilities.	PCU	GRID
Activity 2. Develop an effective regional DIM strategy to help achieve the goals of the YSLME.	PCU	GRID
Activity 3. Implement the regional DIM strategy, including equipment, facilities, and communications	PCU	GRID
IVF. Public Awareness and Participation		
Activity 1. Develop a public awareness campaign	PCU, Investment WG	NPC, All WGs
Activity 2. Demonstrate regional public awareness/participation campaign.	PCU, Investment WG	NPC, All WGs
Activity 3. Encourage ongoing public awareness and participation activities to help achieve the goals of the YSLME.	PCU, Investment WG	NPC, All WGs

Annex 7. ACTIVITIES DEFINED IN THE PROJECT IMPLEMENTATION PLAN

Objective I. Fisheries & Mariculture	
Activities Agreed	**Actions to be taken**
IA. Stock assessment	
Activity 1. Review of existing data (review of historical data commercial fisheries and research results)	Contract to relevant national institution(s) for data and info.
	Revise national data and info
	Inputs to final TDA
Activity 2. Diagnosis of stock conditions	Regional WG meeting 1
	Finalisation of data and info. WG meeting 3
Activity 3. Develop common methodology for joint regional stock assessment and perform initial joint regional stock assessment	Gathering existing methods & prepare suggested methods(consultant)
	Discuss & Modify the methods (WG meeting 1)
	Revise the regional methods (consultant)
	finalise the method (WG meeting 2)
Activity 4. Perform demonstration of a Regional Survey	Prepare guidelines for survey (consultant)
	Accept guidelines (WG meeting 1)
	Equipment
	Ship rental for Regional Survey (sub-contract)
	Analyse survey result (consultant)
	Publish survey result (printing)
Activity 5. Perform initial joint regional stock assessment	Prepare a plan for the stock assessment
	Technical discussion on the plan (WG meeting 3)
	implement the regional stock assessment (contracts)
	Discuss the results of assessment (WG meeting 4)
	Additional assessment if necessary (contracts)
	Accept the assessment result (WG meeting 5)
	Publication of assessment results (printing)
Activity 6. Create mechanism for regional annual multi-species stock assessment, by introducing legal/policy changes to overcome existing barriers	Identify major barriers in stock assessment WG meeting 2)
	Identify the species to be assessed (WG meeting 2)
	Prepare draft mechanism for annual assessment (PMO)
	Discuss the draft mechanism (WG meeting 3)
	Revise the draft mechanism (consultant)
	Finalisation of the mechanism (WG meeting 5)
IB. Carrying capacity	
Activity 1. Review existing state-of-knowledge and preliminary carrying capacity analysis (retrospective) and define gaps	Contract to relevant national institution(s) for assessing information
	Regional WG meeting 1
	Revise national state of knowledge
	Finalisation of Report (WG meeting 3)
	Inputs to final TDA
Activity 2. Fill the knowledge gaps for carrying capacity analysis.	Prepare guidelines for carrying capacity (consultant)
	Reg Training course on carrying capacity (Training 1)
Activity 3. Perform iterative series of analysis of carrying capacity	Prepare workplan for the analysis (consultant)
	discuss and agree on the workplan (WG meeting 3)
	Implement the workplan (contracts to national focal points)
Activity 4. Annual carrying capacity determination	Gathering results of the analysis (PMO)
	Scientific seminar (together with WG meeting 5). (Meetings)
	Annual carrying capacity determination (scientific seminar)
	Publication of regional carrying capacity

IC. Mariculture Production	
Activity 1. Review existing status and trends of mariculture	Contract to relevant national institution(s) for assessing information
	Regional WG meeting 1
Activity 2. Develop joint applied research program for sustainable mariculture	Prepare a draft joint research plan (consultant)
	Present draft to the WG meeting 2
	Revise the draft according to the agreement
	Finalise the plan in WG meeting 3
	Prepare technical guidelines (consultant)
	Training course on mariculture techniques
Activity 3. Pilot demonstration projects in mariculture	Selection sites for pilot, WG meeting 3
	Implementation of the pilot activities (contract)
	Present results to WG meeting 5
	Publication of the results (printing)
Activity 4. Facilitate communication about new diseases, diagnoses, and control techniques	Establish a regional network on information sharing and quick response (PMO)
	Agreement at WG meeting 3
	Prepare technical guidelines (consultant)
	Training course on disease diagnosis, prevention and control
ID. Regional Agreements and National Laws & Management Plan	
Activity 1. Review existing national laws and regulations on fisheries and mariculture, and pertinent international agreements	Contract to relevant national institution(s) to assess information on national laws & regulation, and national responsibility of regional and Int'l conventions
	Publication of the existing knowledge together with analysis and suggestions
Activity 2. Develop regional agreement for sustainable use of fisheries resources	Feasibility study on regional agreement, in particular to implement the FAO code of conduct for responsible fisheries
	Prepare draft regional agreement (consultant)
	Discuss the regional agreement WG meeting 4
	Revise the draft (PMO)
	Discussion WG meeting 5
	Repeat the actions if necessary
	Finalise the agreement and propose to the respective governments for approval
Activity 3. Propose measures for strengthening laws and regulations	Enforcement will be considered together with Activity 2
Activity 4. Development of Regional fisheries management/implementation plans, including regional recovery programme	Identify regional requirements and target for regional SAP (consultant)
	Prepare national SAP (contract to focal points)
	Discuss draft national SAP (WG meeting 3)
	Revise national SAP
	Finalise national SAP
	Discuss framework of Regional SAP (WG meeting 3)
	Prepare draft regional SAP (consultant)
	Discuss and revise (WG meetings 4, 5, 6)
	Implement reg'l management plan

Objective II. Bodiversity Protection	
Activities Agreed	**Actions to be taken**
IIA. Habitat Conservation &Vulnerable Species	
Activity 1. Review existing national practices of coastal habitat use, conservation, restoration, status of vulnerable species, and trophic linkages (including keystone species), and analyse and prioritise gaps of regional importance; Identify capacity gaps, and prioritise training needs **(IIA. Habitat Conservation)** Activity 1. Review existing national practices of coastal habitat use, conservation, and restoration **(IIB. Vulnerable Species)** Activity 1. Conduct national review of status of vulnerable species and vulnerable trophic linkages	Contract to relevant national institution(s) [Invite relevant government agencies and local govt to provide inputs] [Communicate with DIM management consultant]
	Present outcomes of national assessment in WG meeting 1
	Consider joint meetings with Pollution and Ecosystem WGs to discuss trophic linkage outcomes relevant to the other WGs
	Prepare a regional synthesis (consultant)
	Finalise national outputs and synthesis (WG meeting 2)
	Publish the outcomes (printing)
	Inputs to final TDA
Activity 2. Develop regionally coordinated strategies of conservation and restoration of habitats and for protection of vulnerable species (IIA. Habitat Conservation) Activity 2. Develop regionally coordinated strategies of conservation and restoration of habitats (IIB. Vulnerable Species) Activity 2. Develop regionally-coordinated strategies for protection of vulnerable species	Prepare draft regional strategy (consultant)
	Discuss & modify the draft (WG meeting High) (including approaches to improve management for protected areas, developing a regional network of well managed protected areas, developing a regional monitoring system for biodiversity, include selected vulnerable species action plans)
	Revise the draft accordingly
	Finalise strategy (WG meeting 3)
	Inputs to Regional SAP
Activity 3. Implement Regional Strategy for Conservation Areas and for protection of vulnerable species	Prepare draft implementation plan (consultant)
Activity 4. Implement Regional Strategy for Conservation Areas	Adopt implementation plan (WG meeting 4)
Activity 5. Implementation of regionally coordinated strategies for protection of vulnerable species	Implement the strategy (Contract to Nat'l focal points)
IIB. Genetic Diversity	
Activity 1. Determine situations of genetic degradation of important bio-resources	Prepare draft of current status of genetic degradation of important bio-resources, including a list of species, and current activities which address 'genetic degradation', and identify and prioritise gaps [Communicate with DIM management consultant]
	Discuss & finalise the current status (WG meeting High) Deliver data to DIM consultants
	Inputs to TDA
Activity 2. Develop regional consensus on the requirements for conservation of genetic diversity?	Prepare a draft list on conservation of genetic diversity (Consultant)
	Training Course on genetic techniques
	Agree on the list of genes (WG meeting 2)
	Prepare a plan for the conservation (consultant)
	Finalise the plan (WG meeting 3)
	Input to SAP

Activity 3. Prepare recommendations for conservation measures	The activities will be incorporated into Activity 2
IIC. Introduced Species	
Activity 1. Document introduced exotic species and their pathways, assess impacts and risks	Contract to relevant national institution(s) [Communicate with DIM management consultant]
	Discuss & modify the draft (WG meeting 1)
	Revise the draft accordingly
	Finalise strategy (WG meeting 2)
	Inputs to Regional SAP
Activity 2. Develop proposals for regulation and control of exotic species	Prepare draft regulation to control exotic species (consultant)
	Discuss the draft (WG meeting 3)
	Training course on implementation of the regulation
	Revise the draft accordingly
	Finalise strategy (WG meeting 4)
	Submit for approval of governments
	Inputs to Regional SAP
Activity 3. Implement strategies for regulation and control of introduction of exotic species, including necessary legal, policy, and institutional reforms at national and regional levels	Upon approval, prepare an implementation plan (consultant)
	Implement the regulation
	Inputs to Regional SAP
IID. Synthesis of reviews and development of coordinated strategies	
Activity 1. Synthesise reviews from IIA, B, and C	Consultant to synthesise output from activity High of IIA, IIB, and IIC [Ensure the consultant works with the WG for synergies and compatibility]
	Inputs to final TDA
Activity 2. Develop a coordinated strategy for biodiversity protection	Synthesise 3 regional strategies and 3 implementation plans to prepare a coordinated regional SAP (consultant)
	Discuss and prioritise actions in regional SAP (WG meeting 4)
	Revise the draft accordingly
	Finalise strategy (WG meeting 5)
	Inputs to Regional SAP
	Accept the Regional SAP
	Submit for approval of governments
Objective III. Ecosystem & Water Quality	
Activities Agreed	**Actions to be taken**
IIIA. Status of Ecosystem	
Activity 1. Prepare state-of-ecosystem reviews and reports.(including long-term and recent changes)	Contract to relevant national institution(s)
	Establish a regional editorial group /or use the WG
	Prepare a draft report (consultant)
	Discuss the draft (WG meeting 1)
	Revise the draft report (consultant
	Finalise the draft report (WG meeting 2)
Activity 2. Identify data and information gaps and develop strategies for monitoring changing status of ecosystem and its transboundary impacts	Prepare synthesis of the national assessment, and identify the info gaps (consultant)
	Prepare draft strategy, including: parameters, analysis, intercalibration, data exchange, etc.
	Discuss the draft (WG meeting 2)
	Revise the draft
	Finalise the strategy (WG meeting 3)

Activity 3. Demonstration of new and innovative technologies for monitoring	Contract to relevant national institution(s)
	Regional workshop on remote sensing
	Application of remote sensing
	Ship-of-opportunities monitoring
	Molecular probes
IIIB. Carrying Capacity of Ecosystem	
Activity 1. Establish the logistical and data requirements of estimating carrying capacity	Contract to relevant national institution(s)
	Discuss and coordinate with fisheries WG (joint workshop)
	Decide on the assessment methods of carrying capacity
	Training on carrying capacity
Activity 2. Conduct a basin-scale survey on lower-trophic level ecosystem	Conduct a basin-scale survey on lower-trophic level ecosystem
Activity 3. Assess the carrying capacities of the ecosystem under changing human-induced and natural variability	Prepare a regional synthesis (consultant)
	Finalise national outputs and synthesis
	Publish the outcomes (printing)
IIIC. Stressors to Ecosystem	
Activity 1. Identify and rank stresses on the ecosystem; identify data and information gaps	Contract to relevant national institution(s)
	Present outcomes of ranking, data and info in WG meeting 1
	Prepare a regional synthesis (consultant)
	Finalise national outputs and synthesis (WG meeting 2)
	Publish the outcomes (printing)
	Inputs to final TDA
Activity 2. Identify corrective measures to minimize human-induced stress	Identify major human induced stresses (contract)
	Causal chain analysis (contract)
	Identify measures to address the root causes (WG meeting 3)
	Inputs to final TDA
Activity 3. Develop strategy to identify long-term sustainable investments to improve the YSLME	Prepare a format for national strategy (PMO)
	Prepare nat'l strategy (contract)
	Discuss nat'l strategy (WG meeting 4)
	Revise nat'l strategy (contract)
	Prepare regional draft strategy (consultant)
	Finalise nat'l strategy (WG meeting 5)
	Discuss reg'l strategy (WG meeting 5)
	Finalise reg'l strategy (WG meeting 6)
	Inputs to nat'l & reg'l SAP
Objective IV. Pollution component	
IVA. Critical Spots	
Activity 1. Determine and rank critical spot sources of water quality degradation	Review previous and ongoing monitoring system and assess methodologies and/or technical guidelines (including target contaminants, QA/QC, intercalibration exercises, data exchange, etc.)
	Develop technologies for monitoring contaminants and nutrients
	Present outcomes of ranking, data and info in WG meeting 1
	Prepare a regional synthesis (consultant)
	Finalise national outputs and synthesis (WG meeting 2)
	Publish the outcomes (printing)
	Inputs to final TDA

IVB. Contaminant Levels	
Activity 1. Develop baseline data and summarize contaminant and nutrient levels in the YSLME	Review existing data & info on contaminant levels
	Data quality control for baseline data
	Present outcomes of ranking, data and info in WG meeting 1
	Environmental Survey with other working groups (if not, need ship time)
	Prepare a regional synthesis (consultant)
	Finalise national outputs and synthesis (WG meeting 2)
	Inputs to final TDA
Activity 2. Develop regional monitoring network strategy	Establish a monitoring network / or use the existing ones (PMO)
	Draft Monitoring guidelines / standards (consultant)
	Agree on the guidelines / standards (WG meeting 3)
	Intercalibration exercise of participating labs (Contract)
	Development of indicators to assess the implementation of relevant international conventions
Activity 3. Determine and rank critical spot sources of water quality degradation	Prepare format for data & info collection (PMO), no need to rank the spots
	Identification of hot spots
	Contract to relevant national institution(s) to collect hot spots data and information (contract to Nat'l focal points)
	Discussion & further requirements (WG meeting 1)
	Revise the hot spots data & info
	Inputs to final TDA
IVC. Analysis of the Fate and Transport of Contaminants to Facilitate SAP Analysis	
Activity 1. Review existing understanding of fate and transport of contaminants and nutrients	Review existing understanding
	Present outcomes of reviewing from national outputs in WG meeting 1
	Prepare a regional synthesis (consultant)
	Finalise national outputs and synthesis (WG meeting 2)
	Practice & intercalibration of the procedure
	Publish the outcomes (printing)
	Inputs to final TDA
Activity 2. Perform fate and transport analyses of contaminants and nutrients for management and policy development, including EIA process, ICZM	Analysis for fate and transport of contaminants and nutrients
	ICM actions for controlling discharge of contaminants and nutrients
	Impact prediction of impact of discharged contaminants and nutrients on the environment
IVD. Regional Strategy for Pollution Control	
Activity 1. Review and compare national regulations and laws on water quality and pollution control, develop proposals	Contract to relevant national institution(s)
	Regional review (WG meeting 3)
	Regional analysis and suggestion on harmonisation
	Publish review report
	Inputs to national and regional SAP

Activity 2. Develop investment strategies Activity 3. Develop funding mechanism to implement the regional strategy Activity 4. Develop regional priorities and strategies to reduce contaminant and nutrient levels	Economic valuation of hot spots, & identify the opportunities (Consultant)
	Identify hot spots in both source, and impact (WG meeting 4)
	Prepare draft strategy (consultant)
	Discuss the draft (WG meeting 5)
	Revise the draft (Consultant)
	Finalise the investment strategy (WG meeting 6)
	Publish the investment strategy
	Inputs to regional SAP
	Prepare an implementation plan (consultant)
	Agree on the implementation plan (WG meeting 4)
	Contracts for implementation
	Root cause analysis for contaminants
	Discuss the draft (WG meeting 2)
	Revise the draft
	Finalise the strategy (WG meeting 3)
	Input to SAP
OBJECTIVE V Development of Regional Institutions and Capacities	
Activities Agreed	Actions to be taken
VA. Stakeholders	
Activity 1. Identify stakeholders and assess their capacities for contributing to environmental management and decision-making	Contract to institutions(experts)(Contract)
	Produce a regional list (PMO)
Activity 2. Strengthen stakeholder capacities	Prepare training materials for all stakeholders (contract)
	Training for decision makers (Training 1)
	Training for community trainers (Training 2)
	Training for local governmental officers (training 3)
	Intern programme
	Site visits by local governmental officials
	"The Yellow Sea and Youth"
Activity 3. Encourage routine and effective involvement of stakeholders in environmental and resource management and decision-making	Publish newsletters of the project
	Printing newsletters
	Regular stakeholders conference (1/yr)
VB. Regional Coordination	
Activity 1. Create a functioning regional coordination mechanism to carry out the YSLME Project	Programme Coordinator
	Economist
	Scientific Officer
	Public Advisor
	Local Staff at PMO:
	Secretary
	Driver
	Administrative Assistant
	Administrative Officer
	IT Supporting staff

Activity 2. Prepare TDA	Review preliminary TDA, and suggest improvements (consultant)
	Discuss draft, and decide new format (WG meeting 1)
	Gathering data & info from national review report on the project components (PMO)
	Second draft of TDA (consultant)
	2nd discussion on the draft (WG meeting 2)
	Revise the TDA
	Finalise TDA (WG meeting 3)
	Printing the final TDA
Activity 3. Prepare nat'l SAP	Assess all national information & prepare for a framework of NYSAP (contract)
	National meetings-1 on NYSAP
	Revise NYSAP
	Finalise NYSAP
	Print NYSAP
Activity 4. Prepare Regional SAP	Review NYSAPs & identify regional priorities and actions (consultant)
	Prepare a draft regional SAP (consultant)
	Discuss the draft at the WG meeting 3
	Revise the draft SAP & prepare version #2
	Discuss version #2, & finalise the regional SAP (WG meeting 4)
	Revise the draft SAP, & prepare version #3
	Discuss version #2, & finalise the regional SAP (WG meeting 5)
	Printing regional SAP
VC. National Institutions	
Activity 1. Review and assess national institutions to support YSLME	Contract to nat'l focal points (Contract)
	Finalise the review report (WG meeting 2)
	WG meeting 6
Activity 2. Facilitate national institutions to be effective stewards of the YSLME.	Enhance communications
	Provision of necessary equipment
	Provide technical trainings
	Local travel
	local staff: coordination
Activity 3. Facilitate national institutions to be effective stewards of the YSLME	PSC to discuss
Activity 4. Establish National Coordination Unit within existing framework to assure intersectoral coordination in TDA/NYSAP/SAP process	To be carried out by National institutions
	National Co-ordinating Mechanism
Activity 5. Develop proposals to strengthen national institutions to enhance their ability to contribute to environmental management and decision-making	Together with Activity 3
VD. Financial Instruments	
Activity 1. Review status and potential for financial sustainability of YSLME regional institutional framework	Contract to national focal point (contract)
	Discuss & finalise the review report (WG meeting 2)
Activity 2. Provide training in environmental project identification and preparation	Identify the training needs (WG meeting 1)
	Training #1 Project document preparation
	Training #2 Fund raising

Activity 3. Assist and encourage the continuation of project preparation and feasibility studies for long-term environmental investment to implement the SAP and NYSAPs	Prepare draft proposal (consultant) PSC to discuss
Activity 4. Provide matched fund for small grant project	Identify the topics of small grant project (PMO) Provide matched funds for the approved projects (contracts) Matched grants
Activity 5. Provide funding for pre-feasibility studies of promising technologies and industries to help achieve the goals of the YSLME, to create an investment portfolio (Priority Investment Portfolio)	Prepare pre-feasibility studies (consultant) Discuss & finalise pre-feasibility study(WG meeting 3) Submit to PSC for approval Demonstration projects (contracts)
VE. Data and Information Management	
Activity 1. Determine regional data and information management capabilities	Review regional data & info systems, i.e. regional data centre, NEAR-GOOS, NOWPAP DINRAC, (consultant) Prepare a proposal for DIM (consultant)
Activity 2. Develop an effective regional DIM strategy to help achieve the goals of the YSLME	Discuss and approve DIM proposal (WG meeting 1) Equipment Training on DIM Operation of DIM
Activity 3. Implement the regional DIM strategy, including equipment, facilities, and communications	To identify sustainable means for the DIM
VF. Public Awareness and Participation	
Activity 1. Develop a public awareness campaign	Prepare public awareness campaign (PMO) Agree on the campaign (WG meeting 1)
Activity 2. Demonstrate regional public awareness/participation campaign	Organise public awareness conferences (contracts) Prepare public awareness materials (Contracts) Produce multi-media, e.g. project pins, mouse pads, posters, etc. Public awareness training-twice
Activity 3. Encourage ongoing public awareness and participation activities to help achieve the goals of the YSLME	

Annex 8. MEETINGS, WORKSHOPS, CONFERENCES, AND TRAINING COURSES CONDUCTED BY THE YSLME PROJECT

Component	Activity	Date	Length of activity (days)	Number of participants			Total
				China	ROK	Others	
Regional coordination	PSC 1	7-8 Mar. 2005	2	9	12	5	26
	PSC 2	19-20 Dec. 2005	2	6	4	2	12
	PSC 3	23-24 Nov. 2006	2	5	5	3	13
	PSC 4	29-30 Nov. 2007	2	8	7	3	18
	PSC 5	27-28 Nov. 2008	2	8	10	2	20
	PSC/RSTP 6	17-19 Nov. 2009	3	6	12	5	23
	Special PSC (Co-operative cruises)	25 Apr. 2006	1	7	3	0	10
	Special PSC (SAP)	8 May 2008	1	7	7	0	14
	RTM 1	14-16 Dec. 2004	3	11	7	3	21
	RTM 2	3-5 Mar. 2005	3	6	21	3	30
	RSTP 1	4-6 Jul. 2005	3	9	4	4	17
	RSTP 2	15-17 Dec. 2005	3	6	5	4	15
	RSTP 3	20-22 Nov. 2006	3	5	7	4	16
	RSTP 4	26-28 Nov. 2007	3	9	5	2	16
	RSTP 5	25-26 Nov. 2008	2	6	9	1	16
Regional cross component	SAP consultation meeting	6-8 Feb. 2007	3	10	6	0	16
	SAP ad-hoc 1	10-12 Apr. 2007	3	5	7	1	13
	SAP ad-hoc 2	18-20 Aug. 2007	3	15	9	0	24
	SAP ad-hoc 3	6-7 May 2008	2	8	11	0	19
	SAP drafting 1	5-9 Jan. 2008	5	2	2	0	4
	SAP drafting 2	13-15 Mar. 2008	3	2	2	0	4
	TDA/SAP intro workshop	21-22 Aug 2008	2	1	0	0	1
	Cruise techincal meetings 1	17-18 Oct. 2005	2	8	4	0	12
	Cruise techincal meetings 2	26-27 Apr. 2006	2	8	5	0	13
	Cruise techincal meetings 3	11-12 Jul. 2006	2	3	7	0	10
	Cruise techincal meetings 4	22-23 Nov. 2007	2	6	6	0	12
	Cruise techincal meetings 5	10-12 Jun. 2008	3	9	7	0	16
	Cruise summary workshop 1	17-18 Jun. 2009	2	5	12	0	17

Component	Activity	Date	Length of activity (days)	Number of participants			Total
				China	ROK	Others	
	Cruise summary workshop 2	9-10 May 2010	2	5	4	0	9
	Science conference 1	14-16 Aug. 2007	3	28	18	8	54
	Science conference 2	24-26 Feb. 2010	3	28	26	4	58
	EAS congress 1	12-16 Dec. 2006	5	0	1	7	8
	EAS congress 2	23-27 Nov. 2009	5	4	2	3	9
	Phase II working session 1	26-28 Aug. 2008	3	5	5	0	10
	Phase II working session 2	5-6 Oct. 2008	2	4	5	1	10
	Monitoring & assessment symposium and workshop	8-10 Nov. 2010	3	30	7	9	46
	Summary book preparation	11 Nov. 2011	1	2	2	0	4
RWG-B	RWG 1	19-22 Apr. 2005	4	6	3	2	11
	RWG 2	9-12 Nov. 2005	4	3	10	3	16
	RWG 3	20-23 Oct. 2006	4	7	4	3	14
	RWG 4	17-19 Sep. 2007	3	3	6	2	11
	RWG 5	2-4 Sep. 2008	3	5	5	2	12
	Genepool workshop	14-15 May 2008	2	6	8	0	14
	MPA network 1	20-21 Oct. 2009	2	7	12	5	24
	MPA network 2	5-9 Sep. 2010	5	16	8	5	29
RWG-E	RWG 1	10-13 May 2005	4	3	7	0	10
	RWG 2	29 Nov. - 2 Dec. 05	4	10	5	0	15
	RWG 3	18-21 Sep. 2005	4	2	5	1	8
	RWG 4	3-5 Oct. 2007	3	4	5	0	9
	RWG 5	23-25 Sep. 2008	3	4	5	0	9
	Ocean colour algorithm 1	3-4 Jun. 2007	2	1	4	2	7
	Ocean colour algorithm 2	31 Aug., 1-2 Sep. 2007	3	1	3	6	10
	Ocean colour algorithm 3	21-22 Jan. 2008	2	2	3	4	9
	Ocean colour algorithm 4	22 May 2008	1	2	4	6	12
	Ocean colour algorithm 5	15 Dec. 2008	1	1	3	4	8
	Ocean colour algorithm 6	12 Dec. 2009	1	0	2	7	9
	Co-operative cruise (Winter)	17 - 31Jan. 2008	15	20	20	0	40

Component	Activity	Date	Length of activity (days)	Number of participants			Total
				China	ROK	Others	
	Co-operative cruise (Summer)	2 - 13Aug. 2008	12	19	19	0	38
	Macroalgae regional project	24-27 Feb. 2009	4	45	8	0	53
RWG-F	RWG 1	11-14 Apr. 2005	4	8	3	1	12
	RWG 2	17-20 Nov. 2005	4	3	8	0	11
	RWG 3	25-28 Oct. 2006	4	4	6	0	10
	RWG 4	7-9 Nov. 2007	3	4	4	0	8
	RWG 5	23-25 Sep. 2008	3	4	5	0	9
	Stock assess workshop 1	14-16 Apr. 2008	3	4	3	0	7
	Stock assess workshop 2	19-20 Aug. 2008	2	4	5	0	9
	Stock assess workshop 3	14-15 Apr. 2009	2	4	4	0	8
	Stock assess surveys (Spring)	4-6, 24 May 2008	4	4	7	0	11
	Stock assess surveys (Autumn)	29, 31 Oct.; 1 Nov. 2008	3	4	7	0	11
	Carrying capacity workshop	4-6 Sep. 2007	3	7	7	0	14
	Sustainable mariculture symposium	18-20 Jun. 2007	3	8	12	0	20
	Mariculture disease workshop	15-17 Oct. 2007	3	8	8	0	16
	Special session, World Aquaculture Society meeting	20-23 May 2008	4	5	4	0	9
	Mariculture conference 1	9–11 Sep. 2008	3	16	15	0	31
	Mariculture conference 2	16–18 Jun. 2009	3	14	17	0	31
	Mariculture conference 3	27-29 Apr. 2010	3	18	13	1	32
RWG-I	RWG 1	17-20 May 2005	4	4	3	0	7
	RWG 2	14-17 Nov. 2005	4	3	3	0	6
	RWG 3	9-12 Sep. 2006	4	7	3	2	12
	RWG 4	16-18 Oct. 2007	3	6	4	0	10
	RWG 5	14-16 Oct. 2008	3	7	5	0	12
	Youth programme 1	14, 15, 19, 20, & 22 Sep. 2006	5	0	6	0	6
	Youth programme 2	11-12 Aug. 2007	2	15	0	33	48
	Youth programme 3	19-21 Aug. 2008	3	4	4	3	11
	YSP workshop 1	15-16 Mar. 2006	2	0	2	10	12
	YSP workshop 2	1 Oct. 2007	1	0	0	10	10

Component	Activity	Date	Length of activity (days)	Number of participants			Total
				China	ROK	Others	
	YSP workshop 3	2 Nov. 2008	1	3	2	23	28
	NGO workshop 1	15-16 Jun. 2006	2	0	4	18	22
	NGO workshop 2	28-29 Jul. 2006	2	0	3	33	36
	VIP 1 (Seoul, Incheon, ROK)	17 Sep., 11-13 Oct., & 26 Oct. 2007	5	2	2	2	6
	VIP 2 (MUN1)	14-16 Feb. 2008	3	2	2	2	6
	VIP 3 (MUN2)	10-13 Feb. 2009	3	2	2	2	6
	VIP 4 (MUN3)	2-5 Feb. 2010	4	2	2	2	6
	Associate expert/intern programme	2006-2010	3-6 months	4	3	0	7
	Local government training 1	25-27 Sep. 2006	3	7	12	0	19
	Local government training 2	10-12 Jul. 2007	3	16	10	0	26
	Parliamentary conference 1	28-30 Mar. 2006	3	27	18	0	45
	Parliamentary conference 2	11-13 Oct. 2007	3	8	11	1	20
	Political and social acceptance analysis	2008	1	14	11	14	39
	Regional valuation guideline	2006	1	7	1	7	15
	Proposal and report writing workshop	22-23 Oct. 2007	2	10	8	0	18
	Fund-raising workshop	21-23 Jul. 2010	3	8	3	4	15
	Technical workshop on GIS databases	23-24 Aug. 2008	2	9	4	8	21
RWG-P	RWG 1	6-9 Apr. 2005	4	9	3	0	12
	RWG 2	7-10 Nov. 2005	4	4	5	1	10
	RWG 3	4-7 Sep. 2006	4	7	5	2	14
	RWG 4	11-13 Oct. 2007	3	4	3	0	7
	RWG 5	8-10 Oct 2008	3	9	3	0	12
	Inter-calibration exercise (Nutrients)	16-20 Jun. 2008	5	3	1	0	4
	Inter-calibration exercise (Metals)	2-6 Jun. 2008	2.5	3	3	0	6
	Inter-calibration exercise (Organics)	2-6 Jun. 2008	2.5	3	3	0	6
	Inter-calibration summary workshop	8-10 Oct. 2007	3	9	8	2	19
	Fate & transport workshop	31 Aug.-2 Sep. 2006	3	5	4	0	9
	Visiting scientist (SSI)	20 Nov.-3 Dec. 2006	14	1	0	0	1

Component	Activity	Date	Length of activity (days)	Number of participants			Total
				China	ROK	Others	
	Monitoring and assessment workshop	2-4 Jun. 2008	3	9	8	6	23
	Co-operative cruise (Winter)	17 - 31Jan. 2008	15	15	15	15	45
	Co-operative cruise (Summer)	2 - 13Aug. 2008	12	15	15	15	45
	Capacity building for marine envt assessment	4-8 Mar. 2008	5	14	14	14	42
Total				**859**	**761**	**357**	**1977**

Annex 9. SAP IMPLEMENTATION DEMONSTRATION ACTIVITIES

Location	Activity	Contractor
Central Yellow Sea	Monitoring Jellyfish Bloom in the Yellow Sea	National Fisheries Research and Development Institute, ROK
Qingdao, China	Assessing impacts of N:P:Si change on the Yellow Sea ecosystem	First Institute of Oceanography, China
Qingdao, China	Assessing and Monitoring the Impacts of Climate Change on the Yellow Sea Ecosystem	First Institute of Oceanography, China
Qingdao, China	Management of Recreational Waters	National Marine Environment Monitoring Center, China
Dalian & Northern Yellow Sea, China	Monitoring and Assessing Atmospheric Deposition of Pollutants	National Marine Environment Monitoring Center, China
Yalu River Estuary, China	Calculation of Nutrient Loads in Hot Spot Areas	National Marine Environment Monitoring Center, China
Zhuanghe, China	Monitoring Assessing Sea-Based Sources of Nutrients	Liaoning Ocean & Fisheries Science Research Institute, China
Rongcheng, China	Environmentally Friendly Mariculture: Integrated Multi-Trophic Aquaculture	Yellow Sea Fisheries Research Institute, China
Rongcheng, China	Improved Biodiversity Management in Rongcheng Seagrass beds	Rongcheng Ocean and Fishery Bureau, China
Weihai, China	Stakeholder Training in Critical Habitat of the Rongcheng Seagrass Beds	Shandong University at Weihai, China
Weihai, China	Improved Public Awareness of the Benefits of Biodiversity Conservation at the Rongcheng Seagrass Beds	Association of Emeritus Professionals Weihai, China
China	Effectiveness of Closed Fishing Areas/Season in Reducing Fishing Effort	Yellow Sea Fisheries Research Institute, China
China	Effectiveness of Stock Enhancement in Rebuilding Fish Stocks	Yellow Sea Fisheries Research Institute, China
Taean, ROK	Environmentally Friendly Mariculture: Limited Water Exchange Shrimp Culture	West Sea Mariculture Research Center, ROK
ROK	Assessment of the Effectiveness of Improved Fisheries Management	Pukyong National University, ROK
Ganghwa Island, ROK	Improved Biodiversity Management of the Tidal Mudflats South of Ganghwa Island	Aqualab, ROK
Ganghwa Island, ROK	Stakeholder Training in Critical Habitat of the Tidal Mudflats South of Ganghwa Island	Aqualab, ROK
Ganghwa Island, ROK	Improved Public Awareness of the Benefits of Biodiversity Conservation for the Ganghwa Tidal Mudflat	Aqualab, ROK
Southern Ganghwa, ROK	Managing Pollution in Critical Habitats around the Yellow Sea	Academy-Industry Cooperation Foundation, ROK
Ganghwa Island, ROK	Economic Analysis of the SAP Demonstration Activity in Ganghwa	YSLME Project

Location	Activity	Contractor
Shandong Province, China	Cost-benefit Analyses of Strategic Action Programme Demonstration Activities: Improvement of Sustainable Mariculture Techniques	First Institute of Oceanography, China

Annex 10. Overview of Results in Relation to GEF Indicators

PROCESS INDICATORS

NATIONAL	REGIONAL
National policy and institutional reforms	Regional syntheses of component conditions
National evaluations of marine pollution, fisheries and mariculture, biodiversity, habitats and marine ecosystem conditions, national governance issues	Regional syntheses of governance and stakeholders
National marine environment management and protection tools	Regional environmental management tools concerning pollution (nutrients), fisheries and mariculture, habitats and ecosystem protection, monitoring network, regular assessments, economic valuation and cost-benefit analyses
National Inter-ministry Coordinating Committee and national focal point and working groups established	Regional mechanism for estimation of primary production and suspended matter in euphotic zone established and validated
	Regional mechanisms for cooperation, including the Regional working Groups, Regional Scientific and Technical Panel, Project Steering Committee
	Regional network of MPAs
	Regional YSLME Partnership for cooperation

STRESS REDUCTION INDICATORS

Habitat protection and management with improvements
Demonstration sites for water quality improvements, nutrient input reductions, flood reductions
Demonstration of need to protect genetic diversity and improve wild prawn stock through appropriate management, control and enforcement actions
Demonstration of poly-culture and hetero-culture in marine farming, with marine environment improvement through pollution reduction, and improvement of quality of output products
Demonstration of need to enhance regulations, control, enforcements and compliance
Demonstration of socio-economic benefits for fishermen and coastal communities through enhanced production, improved environmental quality and livelihoods
Biodiversity protection and restoration initiated
Information and data gaps on distribution of phytoplankton, zooplankton, benthos, fish eggs, spawning areas, harmful algal blooms covered through joint cruises and surveys with associated analyses
Data quality control and validation enhanced, and environmental stress indicators developed

ENVIRONMENTAL STATUS INDICATORS

Improvements in management of pollution sources, hotspots, habitats, biodiversity
Multi-stakeholders involvement through partnerships
Socio-economic benefits generated
Community participation and community concerns addressed, as coastal water quality, sanitation and land-based pollution control, clean-up of beaches and handling of sea-based sources of pollution, enhanced biological including fish production
Improved mariculture production technology, including addressing the related sea-based pollution by toxic and other material
Increased awareness about the Yellow Sea conditions over wide range of stakeholders and greater understanding for the need to address the environmental and ecosystem issues
Assessment methodologies for biodiversity, fish stocks, pollution, habitat protection, genetic diversity and ecosystem conditions established
Enhanced governance at local and provincial level, and changes in perception and attitudes with respect to the need for marine environmental protection and sustainable use of coastal and marine resources of the Yellow Sea
Proven ability to respond to hazards and accidents of environmental nature (e.g., oil spillS, plankton blooms)

Annex 11. Required Project Identification and Financial Data

I. Project Identification

GEF Project ID: 790

GEF Agency Project ID: 994

Countries: People's Republic of China and Republic of Korea

Project Title: Reducing Environmental Stress in the Yellow Sea Large Marine Ecoystem

GEF Agency: UNDP (Implementing Agency); UNOPS (Executing Agency)

Sources:

GEF project details (http://gefonline.org/projectDetailsSQL.cfm?projID=790)

Project Document

II. Dates

Milestone	Expected date[a]	Actual date
CEO endorsement/approval	-	1 May 2000
Agency approval date	ns[b]	12 April 2004
Implementation start	ns[b]	15 September 2004
Midterm evaluation	Year 3 (2007)	31 August 2007
Project completion	Year 5 (2009)	31 March 2011
Terminal evaluation completion	Year 5 (2009)	February 2011
Project closing	End Year 5 (2009)	30 April 2011

a: Expected dates per the expectations at the point of CEO endorsement.
b: Not specified in Project Document at the time of CEO endorsement.

III. Project Framework

		GEF financing (US$)		Cofinancing (US$)			
Project component	Activity type[a]	Approved	Actual[b]	Promised[c]	Actual (China + ROK[d]	Actual (Other)	Actual (Total)
1. Fisheries	I, S, T	2,774,527	2,784,102	2,901,348	48,398,661	274,399	48,673,060
2. Biodiversity	S, T	860,873	829,278	977,523	1,200,060	687,905	1,887,965
3. Ecosystem	S, T	1,434,202	1,387,529	1,377,523	1,754,430	360,245	2,114,675
4. Pollution	I, S, T	1,391,839	1,351,805	1,377,523	463,699,147	718,519	464,417,666
5. Investment	S, T	2,549,718	2,591,115	977,523	725,842	291,481	1,017,323
6. Cross component[e]	S, T	3,522,687	3,477,484	977,523	4,237,393	846,850	5,084,242
7. Project management	S, T	1,860,243	1,972,776	55,000	106,004	0	106,004
Total		14,394,089	14,394,089	8,643,965	520,121,536	3,179,399	523,300,935

Notes:

a: I = investment, S = scientific and technical analysis, T = technical assistance

b: Source: Proposed Budget for 2011 (UNDP/GEF/YS/RSP-PSC.7/7b).

c: Promised cofinancing refers to the amount indicated at the point of CEO endorsement.

d: Actual amount includes National management activities.

e: Cross component consists of regional coordination, regional cross component activities, national coordination, national cross component activities, and national working group activities.

IV. Cofinancing

		Project preparation		Project implementation		Total	
Source of cofinancing	Type[a]	Expected[b]	Actual	Expected[b]	Actual	Expected	Actual
Host gov't contribution	C, I			8,914,065	520,121,536	8,914,065	520,121,536
GEF Agency (ies)	C	349,650	349,650	1,300,000	1,300,000	1,649,650	1,649,650
Bilateral aid agency (NOAA)				600,000	0	600,000	0
Multilateral agency (UNDP)				650,000	0	650,000	0
Private sector							
NGO					3,179,399		3,179,399
Other							
Total cofinancing		349,650	349,650	10,214,065	524,600,935	11,813,715	524,950,585

Notes:

a: C = cash, I = in kind (GEF cofinancing types are grant, soft loan, hard loan, guarantee, in kind, or cash.)

b: Expected amounts are those submitted by the GEF Agencies in the original project appraisal document.