



**UNDP/GEF PROJECT ENTITLED “REDUCING ENVIRONMENTAL STRESS IN THE
YELLOW SEA LARGE MARINE ECOSYSTEM”**

UNDP/GEF/YS/RSP-PSC.6/3
Date: 19 November 2009
English only

**Sixth Meeting of the Regional Scientific and Technical Panel
And Project Steering Committee
For the UNDP/GEF Yellow Sea Project
*Xian, China, 17-19 November 2009***

Meeting Report

TABLE OF CONTENTS

1.	OPENING OF THE MEETING	1
1.1	Welcome addresses.....	1
1.2	Introduction of the members.....	1
2.	ORGANISATION OF THE MEETING	2
2.1	Election of Officers	2
2.2	Meeting Documents	2
2.3	Organisation of Work.....	2
3.	ADOPTION OF THE MEETING AGENDA.....	2
4.	REPORT ON PROJECT IMPLEMENTATION PROGRESS.....	3
5.	REPORTS OF THE NATIONAL PROJECT CO-ORDINATORS	5
6.	ENDORSEMENT OF THE STRATEGIC ACTION PROGRAMME (SAP)	6
7.	PROGRESS OF SAP IMPLEMENTATION (PROJECT PHASE 2)	8
7.1	Preparation of the Project Identification Form (PIF) and the Draft Project Document	8
7.2	Involvement of DPR Korea.....	9
8.	CONSIDERATION OF THE BRIDGING PHASE IN 2010.....	10
8.1	Relevant Information on Necessary Bridging Phase.....	10
8.2	Update on Bridging Phase Support.....	11
8.3	Proposed Activities and Workplan for 2010	11
8.4	Proposed Budget for 2010	13
9.	CO-OPERATION WITH OTHER ORGANISATIONS.....	13
10.	OTHER BUSINESS.....	14
11.	ADOPTION OF THE MEETING REPORT	14
12.	CLOSURE OF THE MEETING	14

LIST OF ANNEXES

Annex I	List of Participants
Annex II	List of Documents
Annex III	Agenda
Annex IV	Report of Project Implementation Progress
Annex V	Project Implementation Review
Annex VI	Endorsed SAP
Annex VII	Timetable for PIF and Project Document Submission
Annex VIII	Approved Workplan for 2010
Annex IX	Approved Budget for 2010
Annex X	List of Acronyms

1. OPENING OF THE MEETING

1.1 Welcome addresses

1. On behalf of the UNDP/GEF YSLME Project, Mr. Yihang JIANG, Project Manager, opened the meeting and welcomed participants. He briefly stated the importance of this meeting for the Project's on-going and future activities. He asked the meeting to engage in active discussion and produce fruitful results.
2. On behalf of the UNDP/GEF, Ms. Anna TENGBERG welcomed the participants and gave a brief overview of the progress in project implementation since the Fifth Regional Scientific and Technical Panel (RSTP) and Project Steering Committee (PSC) Meetings. Ms. Tengberg congratulated the Project on achieving significant successes in a number of activities, including demonstration activities to illustrate the effectiveness of proposed SAP management actions. Highly satisfied with the results, she believed that those activities would prepare for and contribute to the successful implementation of the Strategic Action Programme (SAP).
3. On behalf of the Government of China, Mr. Fengkui LIANG, welcomed participants to the meeting. He acknowledged that the Project had obtained remarkable results such as the preparation of Regional and National SAPs during the last inter-sessional period. He thanked the participating countries and the Project Management Office (PMO) for their efforts to realise the results. Considering those results as a solid foundation, Mr. Liang was convinced that the Project's next phase would be successful. He hoped that this meeting would be fruitful so as to facilitate project implementation in an even more productive way.
4. On behalf of the Government of Republic of Korea (ROK), Mr. Sang-Pyo SUH welcomed all participants, especially those from China and Democratic People's Republic of Korea (DPRK). He then thanked UNDP/GEF and UNOPS for the continuous support to the Project. Having noted that the Project had steadily proceeded with the preparations for its possible second phase, Mr. Suh hoped that this meeting would reach significant agreements on a number of issues, including the SAP and the bridging phase, that were critical for the successful implementation of the Project's future activities. He then expressed the strong support and co-operation of the ROK for those important issues.
5. Mr. Hyon Chol JANG from the State Hydrometeorological Administration (SHMA) of DPRK thanked the PSC for inviting DPRK to the meeting. He informed the meeting of the co-operative activities that had taken place between the SHMA and the Dalian Association of Oceanography in marine environmental monitoring and water quality analyses. Mr. Jang expressed the country's strong willingness to be fully involved in the Project's on-going and future activities. He hoped that the meeting would have a fruitful discussion to facilitate the country's full involvement.

1.2 Introduction of the members

6. The participants were invited to give self-introductions. A list of participants is attached as Annex I to this report.

2. ORGANISATION OF THE MEETING

2.1 Election of Officers

7. Ms. Tengberg invited the participants to nominate the Chairperson and Vice Chairperson for the meeting.
8. Reminding the meeting that ROK chaired the last meeting, Mr. Suh suggested that the Chairperson for this meeting be elected from China.
9. Mr. Zhanhai ZHANG was nominated as the Chairperson. Mr. Liang then nominated Mr. Suh to serve as the Vice Chairperson.
10. The meeting agreed on the nominations, and Mr. Zhang and Mr. Suh were duly elected as the Chairperson and Vice Chairperson, respectively. During absence of Mr. Zhang, Mr. Liang chaired the meeting on behalf of Mr. Zhang.
11. The PMO served as Rapporteur and Secretariat.

2.2 Meeting Documents

12. The Chairperson invited the Secretariat to introduce the documents prepared for the meeting.
13. Ms. Connie CHIANG introduced the Working and Information Documents for the meeting (Document UNDP/GEF/YS/RSP-PSC.6/inf.1 rev.1). The Working Documents were for the meeting to consider and make a decision, while the Information Documents were for reference. The list of documents is attached as Annex II to this report.

2.3 Organisation of Work

14. The Chairperson invited the Secretariat to introduce the meeting organisation.
15. Referring to Document UNDP/GEF/YS/RSP-PSC.6/inf.3, Ms. Chiang informed the meeting that the Provisional Working Programme would act as a flexible guide to the procedure of the meeting.
16. Given the fact that some participants could not take part in the meeting fully, it was suggested on the first day of the meeting to discuss Agenda 9 immediately after Agenda 5, followed by a brief introduction of Agenda 7. There would also be a consultation between China and ROK on modifying the final SAP.
17. The Members agreed on these suggestions and the proposed programme with the modification. The meeting was organised in plenary, and sessional working groups and consultative discussions were held as necessary.
18. The meeting was conducted in English.

3. ADOPTION OF THE MEETING AGENDA

19. The Chairperson introduced the Provisional Agenda (Document UNDP/GEF/YS/RSP-PSC.6/1) and the Provisional Annotated Agenda (Document UNDP/GEF/YS/RSP-PSC.6/2), and invited participants to provide comments on them.

20. The meeting adopted the agenda without change, which is attached as Annex III to this report.

4. REPORT ON PROJECT IMPLEMENTATION PROGRESS

Project Implementation

21. Project Manager and the staff members presented the Report of Project Implementation Progress (Document UNDP/GEF/YS/RSP-PSC.6/4a Annex IV), highlighting some of the major achievements over the past year. The Report included the following:

- Project implementation in 2009;
- Financial report;
- Report on PMO;
- Co-operation with other organisations and projects;
- Involvement of DPRK;
- Challenges to project implementation; and
- Recommendations.

22. Additional details were provided as follows.

Project implementation

- International recognition was received for the efforts of China, ROK and the YSLME project for the science-driven ecosystem-based management approach to achieving the goal of maintaining the ecosystem carrying capacity of the Yellow Sea and its ability to provide ecosystem services. Other project activities were highlighted, the details of which are available in the project's fact sheets as Document UNDP/GEF/YS/RSP-PSC.6/inf.4.
- Preparation for SAP implementation is well underway with the Project Identification Form (PIF), and the draft Second Phase Project Document already prepared by the consultant, Dr. John Pernetta. These documents were discussed in more detail in Agenda 7. Also in preparation for the second phase, the two documents, "Draft YSLME Commission Structure" and "Draft Rules of Procedure," were prepared.
- The final wrap-up workshop of the project's two Cooperative Cruises further illustrated the scientific benefits that come from international collaboration. This collaboration was further highlighted by the successful conclusion of the 4 surveys undertaken through the Joint Regional Fisheries Stock Assessment activity. All data and samples from both activities have been fully exchanged.
- More than twenty activities aimed at demonstrating the effectiveness of SAP management actions and how effective they are in achieving the regional ecosystem targets are coming to a conclusion and final reports are being submitted. Details of these demonstration projects are available in Document UNDP/GEF/YS/RSP-PSC.6/4b.

- In addition to the demonstration projects, activities under each Project Component were implemented as agreed by the PSC. Detailed information about each activity was provided in the report.
- The ROK government, Ministry of Land, Transport and Maritime Affairs (MLTM), and especially KORDI were thanked for their support of the YSLME project office. The websites of the project and that of the Yellow Sea Partnership were constantly updated and partners encouraged to update their news, a facility that NOWPAP has taken advantage of to facilitate cooperation.
- Regional partnership was strengthened with relevant organisations and projects, including the Northwest Pacific Action Plan (NOWPAP) of UNEP; IOC/WESTPAC; FAO Regional Office for Asia and Pacific; PEMSEA; PICES; NGOs; national organisations and KMI and GEF Seas of South China project through exchanging MoUs and implementing co-operative activities.
- Challenges to project implementation were mentioned, and recommendations to overcome the challenges were given as listed in the report.

Financial report

- The 2009 Expenditure Report with total expenditure of just over USD 2 million was reported. Planning for the project's bridging phase was not in the original budget, but approved by the PSC and is being implemented with savings from completed activities.
 - This amount was less than planned due to:
 - The extension of the SAP demonstration activities to ensure better implementation meant that some final payments would now be made in 2010.
 - The saving in salary incurred due to the IT staff member moving from permanent to part time employment.
 - In accordance with the instruction from the PSC the project has looked for ways of saving money for the bridging phase to the 2nd Phase.
23. Following the presentation by the PMO, participants expressed their high satisfaction with the project implementation and outcomes produced since the last PSC meeting. The meeting was reminded that without the support and efforts of the countries, organisations and individuals, the success of the project would not have been realised. The meeting exchanged their views and opinions, suggesting recommendations to improve Project implementation. Major suggestions included the following:
- Further collaboration of regional organisations was encouraged to prevent duplication of activities and build synergy. During the third EAS congress there is a session on improving collaboration between regional partners and the GEF is organising a meeting early next year to discuss this issue.
 - In response to problems raised regarding project implementation, institutional incentives were suggested as a method for addressing other challenges to the project's implementation. Review of contractor's reports by concerned government departments, from the beginning stage of the relevant project NPCs and a peer review panel were suggested as methods of improving the

quality of reports. PMO was also requested to increase efforts of addressing these challenges by co-ordinating relevant components regarding this.

- Although the ProDoc approved by GEF Council and endorsed by China and ROK, states the composition of PSC should include NGO and private sector, no agreement had been reached for their inclusion. However, the meeting recognised the importance of wider stakeholder participation and encouraged involvement of NGOs and private companies in various ways such as RSTP, working groups and relevant activities.
- Attention was drawn to the awarding of the maximum “*Highly Satisfactory*” rating in the Project Implementation Review by a panel that included the UNDP Regional Technical Advisor, the UNDP country office, and the Project Manager. This recognition is deemed important as it shows countries and project partners that the collective efforts have been recognised (The Project Implementation Review report is attached as Annex V).

24. After all questions raised by the participants were duly answered, the Meeting thanked the PMO for its work, and **adopted the Report of Project Implementation Progress.**

5. REPORTS OF THE NATIONAL PROJECT CO-ORDINATORS

25. The National Project Co-ordinator’s (NPC) reports from China and ROK were presented (Documents UNDP/GEF/YS/RSP-PSC.6/5a and b) and focused on implementation of project activities at national level covering:

- Activities implemented in 2009;
- Results and achievements;
- New developments;
- Difficulties/problems encountered in project implementation and proposed solutions; and
- Suggestions for future work.

26. The reports also mentioned:

- the completion of the co-operative cruises;
- co-ordinating the SAP and NSAP preparation and endorsement by various government agencies;
- preparing documents for project phase 2;
- assisting with organising activities held in their respective country;
- nominating participants for project activities; and
- co-operating with other national and international organisations.

27. Mr. Yafeng YANG informed the meeting of the many national meetings organised to facilitate SAP endorsement and compatibility of the SAP with China’s national laws and programmes. The NSAP would be finalised and approved following the endorsement of the SAP. He also mentioned that some modifications to the SAP had been proposed in order for the document to comply with the national policies.

28. Mr. Yang also highlighted some specific national co-ordination and assistance that had been provided for jellyfish cross-basin monitoring, finalisation of the SAP and NSAP, macro-algae workshop, and initiating the regional MPA network.

29. Mr. Yang suggested that public awareness of the SAP and the project had to be enhanced. If many activities would be held in China, then additional funding would be needed to enable all countries to participate.
30. Mr. Liang informed the meeting that the draft Phase 2 PIF had been reviewed by experts. After the endorsement of the SAP, the PIF will be reviewed by the relevant government agencies.
31. Mr. Sinjae YOO notified the meeting that the development of the ROK NSAP since 2008 required some more time before finalisation, as ROK would like to prepare a realistic and usable NSAP. IMCC meetings had been held where Phase 2 project documents had been reviewed by various ministries and experts, and discussion held on how to support the bridging phase and 2nd Yellow Sea Regional Science Conference. Discussions were also held with government agencies to co-ordinate the ship of opportunities jellyfish monitoring, and with international environmental programmes to explore opportunities for collaboration. MOFAT, the project focal point, has been updated regularly on project implementation progress.
32. The APEC-LME workshop and a national workshop on capacity building of stakeholders were held during the year, where 2 pilot projects were proposed to APEC, and education programmes, further networking of stakeholders, and thematic workshops were suggested as future activities. Mr. Hong provided additional information on a proposal to establish a regular APEC workshop series, and invited China to consider supporting workshop. Mr. Yang agreed to inform his colleague responsible for APEC activities, and in principle, China supported the proposal.
33. Mr. Yoo noted some challenges to national co-ordination:
 - Conflicts in national jurisdiction over marine ecosystem management.
 - Need for a comprehensive NSAP that is harmonised with national plans and involves all relevant national ministries.
 - Lack of motivation/incentives to participate, however this would be alleviated in Phase 2 with ROK's own funding.
 - Ecosystem-based management needs to be enhanced. Management and protection of the Yellow Sea should embrace a more holistic view.
 - Weak networking among stakeholders - needs to be improved.
34. Mr. Jiang expressed his appreciation to the Governments of China and ROK for their continued support to various project activities: the ROK NPC and MOFAT for supporting all activities implemented in ROK; MLTM for supporting capacity building activities; KMI for initiating the establishment of the MPA network; and the Dalian Association of Oceanography, an NGO in China, for assisting with implementing capacity building activities for DRPK.
35. Participants noted the information provided by the NPCs.

6. ENDORSEMENT OF THE STRATEGIC ACTION PROGRAMME (SAP)

36. Mr. Jiang introduced this agenda item by presenting briefly the process in preparing the SAP. He informed the meeting that there were drafting working group meetings to prepare the document. The final draft SAP was presented to the 5th meeting of the PSC, and PSC agreed the document to be submitted to the governments of China

and ROK for final endorsement. The PSC at its 5th meeting also felt it would be supportive for applying the 2nd phase of the project if a supporting letter could be received from DPRK.

37. The final endorsement was received from ROK on 28 November 2008, and an official letter in supporting project's TDA and SAP from DPRK on 8 December 2008. Before the PSC meeting, information was received from China on the final endorsement of SAP. In the meantime, there were some modifications proposed by China.
38. In order to reach agreement on the proposed modifications, two sessional consultative discussions were held between the participating countries on the modification of the final SAP, and the result of these consultations was reported to the meeting.
39. The governments of the People's Republic of China and the Republic of Korea fully recognised the importance of the SAP, and its critical role in the application process for the 2nd phase of the project. Therefore, both governments agreed that the prompt actions in endorsing the SAP are necessary. Regarding the changes proposed by China, it was clearly understood and agreed that the term of marine living resource used in the SAP includes fishes and all other marine animals and plants.
40. The governments suggested inserting the following in Section 5.1, Actions Primarily Addressing Provisioning Services, of the SAP:

“Regarding the Provisioning Services component including control on over-fishing and reduction of fishing efforts, the YSLME project will be in line with bilateral consultations and agreements between the competent authorities of the People’s Republic of China and the Republic of Korea.”
41. In addition, DPRK also reviewed the amendment of final SAP and expressed no objection.
42. The Members thanked significant efforts made by the governments of China and ROK and **agreed on the suggestions and to endorse the SAP. The endorsed SAP is attached to this report as Annex VI.**
43. The official signing ceremony for the SAP endorsement was organised to commemorate this important milestone for the Project.
44. Mr. Jiang opened the ceremony and thanked China and ROK for their efforts in protecting the environment in the Yellow Sea. He thanked the members of the SAP drafting group for contributing their knowledge and expertise. The final endorsement of the SAP paved solid base for implementing the SAP.
45. On behalf the Chinese delegation, Mr. Zhang expressed that he is pleased to take part in this historical moment, and he congratulated on this success. Mr. Zhang felt that the Project had made a great step today to move towards SAP implementation. He expressed thanks to the Project, especially Project Manager for his leadership, experts for their contributions, and ROK for their co-operation and dedication to the Project. Mr. Zhang thanked colleagues in China for their continued involvement and contribution. He was confident that the project would have bright future and continue to contribute to protecting the environment in the region and beyond.

46. On behalf the delegation of ROK, Mr. Suh felt that it is a great honour for him to sign the SAP. He thanked efforts of all partners that had allowed this ceremony to take place. As marine resources in the Yellow Sea were important to the region, He believed that this signing ceremony marked a new beginning for protecting the Yellow Sea, hoping that the promises would be moved into action so that the Yellow Sea could provide sustainable resources for the region. Mr. Suh thought that with successful implementation, the Project would provide experiences and lessons for other large marine ecosystems.
47. On behalf of UNDP/GEF, Ms. Tengberg expressed her great pleasure on the endorsement of the SAP. She believed that the implementation of the SAP would greatly contribute to secure ecosystem services that the Yellow Sea provided. UNDP was ready to support in the Project's next phase, and would like make efforts to mobilise resources. Ms. Tengberg wished success in SAP implement for the future.
48. **On behalf of the participating countries, Mr. Zhang and Mr. Suh signed the statement of mutual agreement to endorse the SAP. The representatives from DPRK and UNDP/GEF witnessed signing ceremony.**

7. PROGRESS OF SAP IMPLEMENTATION (PROJECT PHASE 2)

7.1 Preparation of the Project Identification Form (PIF) and the Draft Project Document

49. Project Manager reported on the progress in the preparation of the Project's second phase. Mr. Jiang informed the meeting that based on outcomes of the two workshops organised for preparing PIF, and the instruction from the 5th PSC meeting a consultant, Mr. John Pernetta, was hired to draft the Project Document and Project Identification Form (PIF) UNDP/GEF/YS/RSP-PSC.6/6 & 6/7
50. Mr. Pernetta presented the Draft PIF and Draft Project Document for SAP Implementation, and explained that the PIF is a précised summary of the Project Document. He stated that the current draft incorporated comments resulting from workshops in ROK and China. He informed the meeting that these documents had been sent to the two countries but comments were only received from ROK. The comments of ROK and those from DPRK resulting from the 2nd Phase capacity building workshop, held immediately prior to the 6th PSC, would be incorporated in an amended version, once China had also submitted their revisions.
51. The consultant outlined the structure of the two documents and introduced the contents of the Project Document: that included Situation Analysis, Strategy, Project Results Framework, Management Arrangements, Monitoring Frameworks and Evaluation, and Legal Context.
52. The meeting had a number of comments and suggestions for improving the documents, these included the strengthening of several sections, inconsistencies between the PIF and Project Document, revising the proposed YSLME Commission membership and operation.
53. With regard to the proposed YSLME Commission, Mr. Suh, while recognising the importance of establishing the Commission, pointed out that the timing of establishment of the Commission (including interim Commission) and its structure should be carefully considered.

54. Ms. Tengberg indicated to the meeting that in order to make the project eligible for GEF funding under the GEF 5 IW Strategy and to meet its objective 2 on SAP implementation in LMEs and expected outcome 2.2 on “Institutions for joint ecosystem based management for LMEs and local ICM frameworks demonstrate sustainability”, strengthened regional institutional arrangements for the management of the YSLME, such as an interim YSLME Commission, are required by GEF for application for a next phase of GEF funding.
55. **The chairperson requested the persons who made comments to provide their comments in writing to the PMO and the consultant.**
56. The consultant thanked the meeting participants for their suggestions and comments, and indicated that they would be incorporated in the revised document. He reminded the participating countries of the need for timely submission of suggestions as the process for finalisation would take several months. He further indicated that the inclusion of the YSLME commission was critical to secure further GEF funding as the commission represented commitment to sustainability of the project. Mr. Pernetta presented a timetable of activities that would enable a submission date to the GEFSEC in June to be met (Annex VII).
57. The Project Manager reiterated the urgent need to obtain information on co-financing resources from participating countries, and the list of project stakeholder which are the important parts of the two documents.
58. **The meeting discussed the timetable prepared by Mr. Pernetta, and amended and adopted it as it appears in Annex VII.**

7.2 Involvement of DPR Korea

59. Mr. Jang from DPRK informed the meeting that during the Capacity Building workshop organised prior to the PSC meeting, to aid implementation of the SAP in DPRK, areas for possible capacity building were discussed. Mr. Jang presented the list of capacity building requirements that would facilitate the SAP implementation within DPRK that included:
- Enhancing national co-ordination;
 - Preparing national analysis in accordance with the TDA;
 - Preparing NSAP;
 - Pollution monitoring;
 - Sustainable mariculture;
 - MPA establishment; and
 - Strengthen regional co-operation that includes:
 1. Establishing good communication between DPRK, PMO and partners.
 2. Improving partnership and involvement in the project, particularly in workshops and conferences.

Detailed information on these activities was included in the report of the “Capacity Building Workshop for Yellow Sea Strategic Action Programme Implementation.” Mr. Jang emphasised the importance of good communication as being a critical factor for the success of the project.

60. Mr. Suh reiterated ROK’s support for the involvement of DPRK in the 2nd Phase of the project.

61. The importance of DPRK's involvement in the project was highlighted by Ms. Tengberg who indicated that GEF IW funding was reliant on the participation of at least two eligible countries. She informed the meeting that the newly reopened UNDP office in DPRK would facilitate communication.
62. Project Manager thanked governments of China and ROK for their financial contribution for DPRK's involvement in the project activities to date and was encouraged by the support of ROK for the further participation of DPRK.

8. CONSIDERATION OF THE BRIDGING PHASE IN 2010

8.1 Relevant Information on Necessary Bridging Phase

63. Mr. Jiang presented the history of the discussions between the project and GEFSEC since 2008. At the time, GEF stated that should the project next phase be accepted by GEF, the funding would be earliest available in July 2010, and the 5th PSC agreed to a no-cost extension of the project until June 2010.
64. During the World Ocean Conference in Manado, Indonesia, this year, GEF updated the PMO that the next replenishment would be available during the 2nd half of 2010, and that the funds would be released to projects in March 2011 as a practical arrangement.
65. Mr. Jiang then presented 3 options for the transition period: 1) If sufficient funds are available to cover the costs of the bridging phase, then the project can continue with full transform. 2) If partial bridging resources are available, then the project will still continue, but with fewer staff and activities. 3) If no financial resources are available, then the project will end in June 2010, and restart when GEF funds are available.
66. The meeting was also informed that when considering which option to select, to also keep in mind that the UNDP Country Office in ROK will close in December 2009. Thus, if options 1 or 2 are chosen, the legal status of PMO from 2010 onwards needs to be resolved. Mr. Jiang also reminded the members that the costs for the bridging phase had been provided to the countries and are estimated at about US\$ 690,000 for 6 months, covering staff salary, office operations, and project activities.
67. Ms. Tengberg updated the meeting on the new GEF IW results framework and 5 objectives – a more structured and organised way for GEF to run its programmes. She highlighted Objective 2 and the outcomes relevant to SAP implementation, ecosystem-based management, solutions for pollution reduction, fish stock replenishment and climate variability. Replenishment scenarios were presented and will be finalised by GEF by next March with the funds expected to become available sometime between September 2010 and March 2011.
68. Questions were raised on GEF funds, required bridging phase costs, and PMO's legal identity. Answers were provided as follows:
 - Some GEF-4 funds are available, but not in the focal areas without a Resource Allocation Framework, such as IW. Therefore, the project may request funds only from GEF-5.
 - The recent GEF Meeting approved its focal area strategies, objectives and outcomes. Documents should be available from the GEF's website.

- GEF can support project operation costs and a higher level of co-financing from the countries to PMO costs would be viewed favourably by the GEF.
- The Legal Team at UNDP Headquarters has prepared a document on the Project's future identity for MOFAT's review. The delegate from ROK requested PMO to submit the document officially for consideration. ,
- As UNDP Country Office in ROK will be closed, UNDP/GEF in New York will have temporary oversight of the project during the bridging phase.

8.2 Update on Bridging Phase Support

69. Mr. Zhang informed the meeting that China will provide in-cash and in-kind support during the bridging phase and current negotiations are still going on internally. Final confirmation will be provided in due course.
70. Mr. Suh and Mr. Hong informed the meeting that MLTM is seeking funds of approximately US\$ 500,000 subject to the approval by the ROK National Assembly. If the funds are approved, they would be used during the bridging phase, including NPC operation, supporting the 2nd Regional Science Conference, and considered as co-financing for project phase 2. Furthermore, the funds would be available if China co-finances some portions of the bridging phase.
71. After all the information were provided, the following agreements were reached:
- **The members agreed that the project should continue under Option 1. However, given the uncertainties on bridging funds and when GEF funds would be available, the project might have to operate under Option 2 later in 2010, if required.**
 - **It was agreed that PMO would send official request to MOFAT related to the project's future legal identity.**
 - **It was also agreed that the PMO should send again the detailed breakdown of the required bridging costs to all countries.**
 - **The project will be extended to 31st March 2011 subject to the availability of financial resources.**
72. Mr. Jiang expressed appreciation to the governments of the participating countries for their positive outlook and support of the bridging phase. He reiterated the instruction from the 5th PSC Meeting to slow down spending and that some approved activities would be implemented in 2010.

8.3 Proposed Activities and Workplan for 2010

73. Following the instructions from the 5th PSC Meeting for the project to slow down spending, some approved activities scheduled for implementation in 2009 were re-scheduled for 2010. Ms. Chiang gave brief explanations on these already approved activities which were on-going (Document UNDP/GEF/YS/RSP-PSC.6/9):
- Second Yellow Sea Regional Science Conference;
 - Co-operative Cruise Regional Report;
 - NSAP English Versions;
 - Public Awareness and Stakeholder Involvement Activities;
 - Workshop on Financial Sustainability of Management Plans;
 - Documents for Project Phase 2; and
 - Terminal Evaluation.

74. Ms. Chiang also drew the meeting's attention to the list of new activities proposed for implementation in 2010 in order to transition the project to SAP implementation. She informed the meeting that the new activities proposed were done so given the fact that the project would end in 30 June 2010, and with savings and limited remaining budget. Brief information was given on the following activities:
- Maintaining the Network of Sustainable Mariculture Proponents;
 - Involving Local Government in Fisheries Management;
 - Supporting the Yellow Sea MPA Network;
 - Harmonising Basin-wide Ecosystem Monitoring;
 - Technical Co-operation for QA/QC (Monitoring Nutrient Loads);
 - Assessment and Estimation of Nutrient Loads (Modelling);
 - Improvement of CBA Procedures for SAP Management Actions;
 - Preparation for the Establishment of YSLME Commission; and
 - Exploring Co-operation with EU.
75. There was extensive discussion on the number of proposed activities, time frame for implementation, and availability of financial resources. Generally, members felt that there was neither the time nor resources to implement so many new activities in such a short time span.
76. Opinions from members included:
- It would be reasonable to add more activities given that the project would be extended to 2011;
 - It should not implement too many activities since there were limited funds and time;
 - It should prioritise activities and implement them as resources become available; and
 - It was suggested to organise a Special PSC meeting next year back to back with the 2nd Regional Science Conference, if necessary to discuss and approve the other activities.
77. Extensive explanations were provided by the PMO and UNDP/GEF. It was noted that the already approved activity, "Workshop for sustainable implementation of conservation plans" was not limited to SAP, but to provide information and experience to any management/conservation plan on fund raising the financial sustainability. It is recommended to modify the title of the workshop to be more understandable.
78. Mr. Jang reiterated that the UNDP Country Office in DPRK held an opening ceremony for the resumption of UNDP operation in DPRK. Given this fact, DPRK would require some support to participate in project activities, and requested the assistance of PSC members and the PMO. Mr. Suh suggested that some funds from ROK would be available to this effect.
79. **Finally, it was agreed:**
- **All proposed activities are approved for implementation during the first half of 2010, except the establishment of the YSLME Commission which was explained in Agenda 7 (Annex VIII).**
 - **Additional new activities during the second half of 2010 would be proposed by PMO in consultation with PSC members based on available financial resources.**

- **If necessary, a Special PSC Meeting will be held in conjunction with the 2nd RSC to discuss any remaining issues.**
- **PMO will prepare a list of activities relevant to and in consultation with DPRK, and would assist to seek funding for the activities.**

8.4 Proposed Budget for 2010

80. Mr. Jiang introduced this agenda item and presented the proposed budget for the first half of 2010.
81. Clarifications were provided on questions as follows:
- Staff salary is split across project components as it is GEF's policy to differentiate between human resources spent on technical issues and project management.
 - It was reiterated that as the 5th PSC Meeting instructed the project to slow down spending in preparation for possible further project no-cost extension. Given the possibility of this, and that the project will now be extended to March 2011, some funds will be re-allocated to cover part of the extension period.
 - It was explained that January - September 2009 expenditures as shown in the revised budget were the actual expenditures, while October - December figures were the estimated expenditures. It was also explained that some final payments of activities implemented in 2009 would be paid in 2010, hence the amount in 2010 might seem to be relatively large compared to other years. Also, staff separation costs of UN staff were also included in the 2010 budget.
82. **Following the explanations, the meeting approved the revised budget for 2010, which is attached as Annex IX**

9. CO-OPERATION WITH OTHER ORGANISATIONS

83. The meeting invited other organisations to give a statement on their activities and possible future co-operation with the YSLME Project.
84. Providing a brief history of the co-operation with the YSLME Project, Mr. Sadayosi TOBAI of WWF Japan stressed the importance of reciprocal participation between the Project and the WWF/Yellow Sea Ecoregion Support Programme (YSESP). He believed that the active co-operation had created significant synergy effects: (i) avoiding duplication and maximising available resources through enhanced co-ordination and implementation; (ii) sharing technical expertise and resources, e.g., a common ecosystem-scale planning framework; (iii) enhancing financial sustainability through the involvement of a private sector; and (iv) increasing the participation from various stakeholders, including NGOs and academia through the implementation of small grant programmes. He hoped that the WWF and Project would continue and strengthen its co-operative relationship so as to conserve the environment in the Yellow Sea more effectively and efficiently.
85. Mr. Alexander TKALIN thanked the PSC for inviting NOWPAP to the meeting. Mr. Tkalin expressed NOWPAP's strong willingness to strengthen the co-operation with the YSLME Project to maximise the use of limited resources and create synergy between the activities implemented by the two regional organisations individually. He

suggested facilitating some of the activities for future co-operation, including: (i) establish/operate an MPA network, (ii) conduct regional environmental monitoring and assessment, and (iii) establish a regional monitoring network. Mr. Tkalin also suggested the PSC to consider the possible participation of NOWPAP in the YSLME Commission.

86. Mr. Chris O'BRIEN congratulated the Project on its successful implementation of activities and provided the meeting with a brief introduction of the Bay of Bengal Large Marine Ecosystem (BOBLME) project. The BOBLME faced transboundary problems such as the overexploitation of fishstock, habitat degradation, and land-based pollution. The project consists of five components to be implemented under the project with FAO as the executing agency. Mr. O'Brien believed that the experiences and lessons learned from the YSLME Project would be useful to similar projects, including the BOBLME project. He hoped to strengthen the co-operative relationship between the two LME projects through sharing information and expertise .
87. On behalf of PICES, Mr. Yoo mentioned that PICES and YSLME Project could benefit from each other by expanding their co-operative relationship. PICES published the "North Pacific Ecosystem Report" with a chapter describing the Yellow Sea. The next issue of the Report is expected to be published in 2010, and the scientific findings from latest Project activities could be major inputs for the report. PICES has a working group on introduced/invasive species, and a database covering almost all oceans would be established next year, providing an easy access and a free service to any user.

10. OTHER BUSINESS

88. Ms. Naobi Okayasu provided information on the organisation of the CBD COP-10 Meeting which will provide communication opportunities to display the relevant outcomes of biodiversity conservation in the Yellow Sea. WWF-Japan will explore necessary possibilities, and inform PMO to consider possible co-operation during the COP-10 Meeting.

11. ADOPTION OF THE MEETING REPORT

89. The Chairperson invited the participants to review the draft meeting report prepared by the Secretariat. **The draft report was discussed, amended, and adopted by the Meeting.**

12. CLOSURE OF THE MEETING

90. The Chairperson summarised discussions, highlighting major outputs of the meeting.
91. Thanking the participants for showing open-mindedness and co-operative attitudes, Mr. Suh was pleased that as a result, the SAP was officially endorsed during this meeting. He believed that the SAP would be a guideline for future activities to protect the ecosystem in the Yellow Sea. Mr. Suh mentioned that the Project was at an important junction with a lot of challenges foreseen, and therefore, he thought, all the relevant countries should progress project implementation with more patience and co-operative spirits. With that, Mr. Suh was confident that the Project would produce even better results in the future.

92. Mr. Yang felt the meeting was successful with the SAP endorsement, considering it as one of the most important outputs of the Project. He was proud that all major objectives of the Project's current phase were achieved through the co-operation of the countries and relevant stakeholders. Mr. Yang thanked ROK for its understanding and support in modifying the SAP, and also the PMO for its work in organising the meeting smoothly. Mr. Yang mentioned that a new member would join the Project's second phase, hoped that all countries continue co-operation, and believed that the Project would have continued success.
93. Mr. Jang stated that the meeting had been very constructive, and expressed his appreciation to the PMO for the meeting arrangements.
94. Ms. Tengberg felt that the discussions were very constructive, enabling the meeting to produce a number of remarkable results. She thanked the participants for their hard work to achieve them. She stated that UNDP looked forward to collaboration in the second phase, believing that the Project would accomplish desired results to protect the Yellow Sea.
95. Mr. Jiang thanked the Chairperson for his leadership, patience, and guidance to lead the meeting to achieve its objectives.
96. Following the closing remarks, the Chairperson declared the meeting closed at 5:30P.M. on 19th November 2009.

Annex I

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Annex II

List of Documents

Working Documents

UNDP/GEF/YS/RSP-PSC.6/1	Provisional Agenda
UNDP/GEF/YS/RSP-PSC.6/2 rev.1	Provisional Annotated Agenda
UNDP/GEF/YS/RSP-PSC.6/3	Report of the Meeting (<i>to be prepared at the meeting</i>)
UNDP/GEF/YS/RSP-PSC.6/4a	Report of Project Implementation Progress
UNDP/GEF/YS/RSP-PSC.6/4b	Summary of SAP Demonstration Activities
UNDP/GEF/YS/RSP-PSC.6/4c	Progress of Preparations for 2 nd Regional Science Conference
UNDP/GEF/YS/RSP-PSC.6/5a-b	National Project Co-ordinators' Reports
UNDP/GEF/YS/RSP-PSC.6/6	Draft Project Document for SAP Implementation - "Implementing the Strategic Action Programme for the Yellow Sea Large Marine Ecosystem: Restoring Ecosystem Goods and Services and Consolidation of a Long-term Regional Environmental Governance Framework"
UNDP/GEF/YS/RSP-PSC.6/7	Draft PIF for SAP Implementation
UNDP/GEF/YS/RSP-PSC.6/8	2010 Bridging Phase
UNDP/GEF/YS/RSP-PSC.6/9	Proposed Activities and Workplan for 2010
UNDP/GEF/YS/RSP-PSC.6/10	Proposed Budget for 2010

Information Documents

UNDP/GEF/YS/RSP-PSC.6/inf.1 rev.1	Provisional List of Documents
UNDP/GEF/YS/RSP-PSC.6/inf.2	Provisional List of Participants
UNDP/GEF/YS/RSP-PSC.6/inf.3 rev.1	Provisional Working Programme for the Meeting
UNDP/GEF/YS/RSP-PSC.6/inf.4	Project Factsheets: <ul style="list-style-type: none">• Overfishing-mariculture-food supply• Ganghwa management• Liaoning SAP pollution activities• Enhancing stakeholder awareness and participation• Scientific collaboration: co-operative cruises and joint stock assessment

UNDP/GEF/YS/RSP.5/3

Report of the “Fifth Regional Scientific and Technical Panel Meeting”

UNDP/GEF/YS/PSC.5/3

Report of the “Fifth Project Steering Committee Meeting for the UNDP/GEF Yellow Sea Project”

Strategic Action Programme (SAP)

Annex III

Agenda

1. OPENING OF THE MEETING

- 1.1 Welcome addresses
- 1.2 Introduction of the members

2. ORGANISATION OF THE MEETING

- 2.1 Election of Officers
- 2.2 Meeting Documents
- 2.3 Organisation of Work

3. ADOPTION OF THE MEETING AGENDA

4. REPORT ON PROJECT IMPLEMENTATION PROGRESS

- 4.1 Implementation of Project Activities
- 4.2 SAP Demonstration Activities
- 4.3 Regional Co-operation
- 4.4 Report on the Project Management Office (PMO)
- 4.5 Financial Report
- 4.6 Introduction of Project Phase 2 Preparations (a detailed update will be given in Agenda 7)

5. REPORTS OF THE NATIONAL PROJECT CO-ORDINATORS

6. ENDORSEMENT OF THE STRATEGIC ACTION PROGRAMME (SAP)

7. PROGRESS OF SAP IMPLEMENTATION (PROJECT PHASE 2)

- 7.1 Preparation of the Project Identification Form (PIF) and the Draft Project Document
- 7.2 Involvement of DPR Korea

8. CONSIDERATION OF THE BRIDGING PHASE IN 2010

- 8.1 Relevant Information on Necessary Bridging Phase
- 8.2 Update on Bridging Phase Support
- 8.3 Proposed Activities and Workplan for 2010
- 8.4 Proposed Budget for 2010

9. CO-OPERATION WITH OTHER ORGANISATIONS

10. OTHER BUSINESS

11. ADOPTION OF THE MEETING REPORT

12. CLOSURE OF THE MEETING

Annex IV
Report of Project Implementation Progress

TABLE OF CONTENTS

1	INTRODUCTION	1
2	MAJOR ACHIEVEMENTS SINCE THE LAST MEETING	2
2.1	APPLICATION OF THE SCIENCE-DRIVEN ECOSYSTEM-BASED APPROACH IN MANAGEMENT OF THE YELLOW SEA	2
2.2	PREPARATIONS FOR SAP IMPLEMENTATION	2
2.3	DEVELOPMENT OF YSLME COMMISSION STRUCTURE	3
2.4	COMPLETION OF THE CO-OPERATIVE CRUISES	4
2.5	JOINT FISHERIES STOCK ASSESSMENT	5
2.6	INITIATION OF BIODIVERSITY SAP DEMONSTRATION ACTIVITIES	5
2.7	NATIONAL SAPS	6
3	PROJECT IMPLEMENTATION	6
3.1	FISHERIES COMPONENT	6
3.1.1	<i>SAP demonstration activities – Fisheries</i>	6
3.1.2	<i>Stock Assessment</i>	7
3.1.3	<i>2nd Regional Mariculture Conference</i>	8
3.2	BIODIVERSITY COMPONENT	9
3.2.1	<i>Assessment of Critical Habitats</i>	9
3.2.2	<i>SAP demonstration activities - Biodiversity</i>	11
3.2.3	<i>MPA network</i>	12
3.3	ECOSYSTEM COMPONENT	12
3.3.1	<i>Primary productivity estimation</i>	12
3.3.2	<i>Ocean colour algorithm peer-reviewed journal papers</i>	13
3.3.3	<i>Macroalgae Regional Project</i>	14
3.3.4	<i>SAP demonstration activities - ecosystem</i>	14
3.4	POLLUTION COMPONENT	15
3.4.1	<i>SAP demonstration activities - pollution</i>	15
3.5	INVESTMENT COMPONENT	16
3.5.1	<i>Yellow Sea Partnership</i>	16
3.5.2	<i>Associate Experts</i>	16
3.5.3	<i>Voluntary Internship Programme and Model UN</i>	17
3.5.4	<i>Small Grants Programme</i>	18
3.5.5	<i>Data and information management</i>	19
3.5.6	<i>Pilot Project on Economic Valuation of Management Actions</i>	19
	(i) <i>CBA of mariculture</i>	19
	(ii) <i>Ganghwa CBA study</i>	20
3.5.7	<i>Project video</i>	20
3.6	NATIONAL CO-ORDINATION AND IMPLEMENTATION	21
3.7	CROSS COMPONENT ISSUES	21
3.7.1	<i>SAP cross component demonstration activity</i>	21
3.7.2	<i>Cruise Summary and Wrap-up</i>	21
3.7.3	<i>Preparation of the Second Yellow Sea Regional Science Conference</i>	22
4	FINANCIAL REPORT 2009	22
5	REPORT ON THE PROJECT MANAGEMENT OFFICE	22
5.1	OFFICE & FACILITIES	23
5.2	OPERATION OF THE OFFICE	23
5.3	PROJECT WEBSITE, PARTNERSHIP WEBSITE, E-DISCUSSION GROUP AND NEWSLETTER	23
6	CO-OPERATION WITH OTHER ORGANISATIONS AND PROJECTS	26
6.1	EXCHANGE AND IMPLEMENTATION OF MEMORANDUM ON CO-OPERATION.....	26
6.2	EAS CONGRESS	27
6.3	SYNERGY WITH WWF ON SELECTION OF DEMONSTRATION PROJECTS AND SMALL GRANTS	27

7	INVOLVEMENT OF DPRK	28
8	CHALLENGES TO PROJECT IMPLEMENTATION	28
9	RECOMMENDATIONS FOR THE PROJECT	30

APPENDIXES

Appendix I	Activities and Workshops Participated by the Project in 2009
Appendix II	Expenditure Report for 2009
Appendix III	PMO's Inventory of Non-Expendable Property
Appendix IV	List of Acronyms

1 INTRODUCTION

1. This has been a very critical period for the YSLME project since the last Project Steering Committee (PSC) meeting. While the project engaged fully in developing the Project Document for the possible second phase to implement the Strategic Action Programme (SAP), the project has spent a lot of efforts and time to introduce the concept of ecosystem-based management. The purpose of the outreach activities has generated more support for the implementation of SAP in the Yellow Sea region, not only from the participating countries, but also from all relevant institutions, include GEF, UNDP/GEF, national and local governments in the participating countries.

2. It was a pleasure for all the persons who were involved in the project to receive a very positive evaluation on the project outcomes and outputs produced so far. As indicated in the IUCN book entitled, "Sustaining the World's Large Marine Ecosystem," Sherman et al. (2009)¹ gave the following evaluation:

Two chapters on the Yellow Sea LME project describe the world's largest effort underway to restore vital components of an LME, using the 5-module approach to ecosystem-based management. China and R. Korea, the two participating countries in the LME project, will be reducing fishing efforts by 30% and ramping up mariculture, using new systems for increasing water quality as one of the end products. The restoration effort is framed by the concept of "carrying capacity," using trophodynamic models based on gC/m² estimates of productivity.

3. Following the well-designed concept, the experts involved in the project have concentrated their efforts in the demonstration projects specially designed for testing the usefulness and effectiveness of the management actions listed in the SAP based on the ecosystem-based management. The initial results have shown valuable outcomes from the demonstration projects.

4. With the well-designed concept and procedure, valuable information comes from demonstration projects and good evaluation from the experts within and outside the project; confidence has been built for developing the project framework and activities for the next phase of the project: the implementation of the SAP. The draft Project Document and the Project Identification Form have been prepared to receive evaluation and approval from PSC, and GEF in a later stage.

5. Recognising that there are a lot of challenges in front of all involved in the project, it is well noted that the efforts and achievements generated from the project has paved a solid foundation for the project to go ahead to achieve the goals that have been agreed.

¹ Sherman, K., Aquarone, M.C. and Adams, S. (Editors) 2009. *Sustaining the World's Large Marine Ecosystems*. Gland, Switzerland: IUCN. vii+ 140p.

2 MAJOR ACHIEVEMENTS SINCE THE LAST MEETING

2.1 Application of the science-driven ecosystem-based approach in management of the Yellow Sea

6. In an effort to manage the linkages and trade offs between ecosystem services and the impacts of management actions, the YSLME project has adopted an ecosystem-based approach to environmental management. This is a more unified approach to management that is directed to maintenance of ecosystem services.
7. Based on scientific knowledge and understanding, the project has identified the linkages between the ecosystem services, and defined management actions according to the increased scientific understanding of these linkages and trade offs.
8. For example, overfishing has changed the fish catch composition with large valuable demersal fish being replaced by less valuable small sized pelagics, there has been a decrease in mean size at capture in many species, and a reduction in Yellow Sea fish biomass. These changes were supported by the results from the recent joint regional stock assessment organised by the YSLME project that found that majority of yellow croaker and anchovy were 1 year old or less suggesting that overfishing had simplified the age structure and that catches are now entirely dependent on recruitment. However, the overwhelming dominance of jellyfish by weight in the autumn survey in the western Yellow Sea suggests that ecosystem is also stressed. The stability of the ecosystem is being endangered by the reduction in biodiversity as a result of the degradation and loss of critical coastal habitats. Moreover, coastal eutrophication and decreasing freshwater inputs are changing nutrient ratios. Since 1980 there has been a significant decline in Si:N and it is now approaching the Redfield ratio, below which silicon may become limiting for diatom growth, and diatoms are the basis of all food chains supporting productive fisheries.
9. It is therefore unlikely that just reducing fishing effort will enable fish stocks to recover. We also need to address other important drivers, such as pollution, eutrophication and habitat degradation that impact the ecosystem and diminish its ability to supply ecosystem services.
10. More examples are detailed in the Fact Sheets provided in Document UNDP/GEF/YS/RSC-PSC.6/inf.4 which include the trade off between reducing fishing effort and maintenance of food security. At present fish stocks are being over exploited, to conserve them, a 25-30% percent reduction in fishing effort is proposed, however in the short term until fish stocks recover, this is likely to result in reduced fish harvests. To compensate, mariculture will have to increase production but unless this increase is sustainable there will be negative environmental impacts. To avoid these impacts the project is promoting the use of integrated multi-trophic aquaculture and heterotrophic shrimp culture. These two culture methods maximize production while minimizing environmental impacts and could play an important role in ensuring food security in the region.

2.2 Preparations for SAP Implementation

11. In order to obtain the GEF support for implementation of the YSLME SAP, the PSC decided to prepare the Project Identification Form (PIF), and the Project Document during this year. Consultant, Dr. John Pernetta, was hired to prepare documents for the project's next phase (Fig. 1). He visited ROK and China from 17 to 21 August 2009 to further the development of the documents. During his visit to Qingdao, China, and Ansan, ROK, Dr. Pernetta met with the National Project Co-ordinators,

national experts, government representatives, and Project Management Office staff to discuss the draft documents. Participants of the meetings gave their inputs on items to be included or deleted. Dr. Pernetta produced many versions of the project documents. One draft incorporating country comments after his meetings with them was distributed in September 2009. This final draft will be discussed at the project's Sixth Project Steering Committee Meeting in November 2009. The draft PIF has also been prepared.

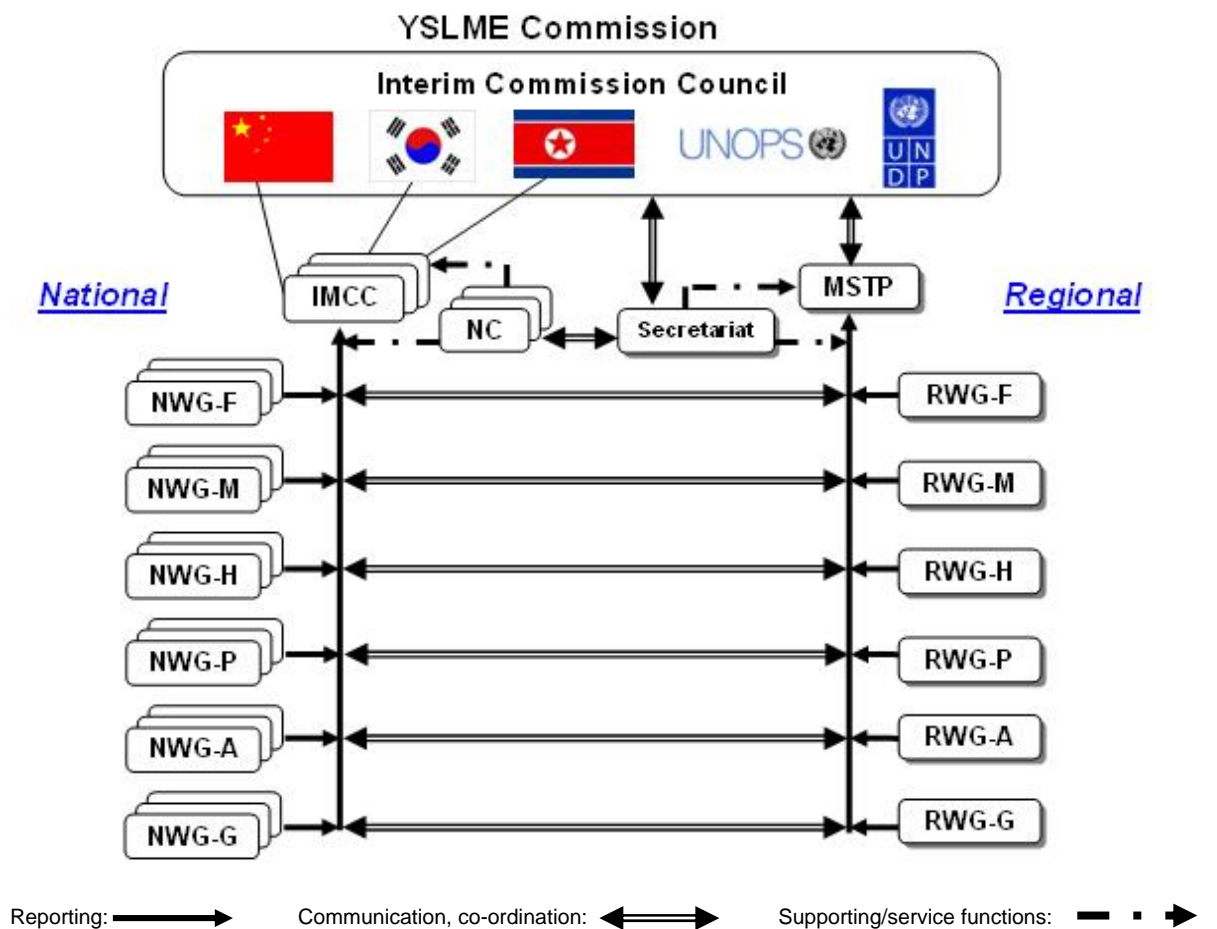


Fig. 1. Consultation meeting in Ansan, Republic of Korea (left) and at the China-Korea Joint Ocean Research Center, Qingdao, China (right).

2.3 Development of YSLME Commission Structure

One of the actions proposed by the SAP is to establish the YSLME Commission as an institutional framework to implement the SAP and to continue and expand current momentum and efforts made under the current phase of the Yellow Sea Project. Intensive consultations were sought with officials from governmental and other relevant experts from the participating countries to solicit comments and suggestions for designing an appropriate mechanism. As a result, two documents, "Draft YSLME Commission Structure" and "Draft Rules of Procedure," were prepared. The former summarised the organisational framework of the Commission, describing terms of reference for each commission body. The latter provided basic guidelines on how to operate the Interim Commission Council, a supreme decision-making authority with respect to the implementation of SAP-related activities.

The Commission will be a soft, non-legally binding, and co-operation based institution that co-ordinates and enhances regional and national co-operation and co-ordination to implement science-driven and ecosystem-based management. With the participation of the Yellow Sea countries, the proposed structure of the Commission is proposed as shown in Figure 2.



NWG = National Working Groups; RWG = Regional Working Groups; IMCC = Inter-Ministry Co-ordination Committee; NC = National Co-ordinator; MSTP = Management Science and Technology Panel. National and Regional Working Groups include Fisheries = F; Mariculture = M; Habitats = H; Pollution = P; Assessment = A; and Governance = G.

Fig. 2. Proposed organisational framework of the YSLME Commission.

2.4 Completion of the Co-operative Cruises

12. After more than 2 years of negotiation undertaken by member countries, and 2 more years of hard work, the YSLME Project's two co-operative cruises (Winter and Summer 2008) were completed at last, with all samples fully shared by the participating countries, and data analysed, with updated information about the Yellow Sea available. A Cruise Summary Workshop was held from 17-18 June 2009 in Seokcho, Republic of Korea, to wrap-up the activity. From the outcomes of the co-operative cruises, it was clear that this kind of co-operation is very useful, and moreover, absolutely necessary if we wish to understand the Yellow Sea as a whole.

13. Some results are listed below:

- Nano- and micro- zooplankton were relatively high in the southwestern areas.
- Biomass and production of heterotrophic bacteria were significantly high in the surface near the mouth of the Yangtze River.
- The highest phytoplankton diversity indices were observed near the mouth of the Yangtze River due to the high occurrence of diverse diatoms and dinoflagellates there.

- Two major communities of macrobenthic organisms were identified, with a larger community in the north and a smaller community in the south.
- Strong stratification of nutrient concentrations was observed in summer, with higher concentration in the bottom layers.
- Unusually high concentrations of mercury were detected at several sampling stations.

14. Please also see Section 3.7.

2.5 Joint Fisheries Stock Assessment

15. Originally conceived during the 4th RWG-Fisheries meeting this activity was designed to provide additional useful ways to understand fishery stock as the agreement was not reached to include fishery in the Co-operative Cruises. The need for a joint stock assessment in the Yellow Sea was argued for by the Stock Assessment consultant due to the straddling nature of the Yellow Sea's migratory fish stocks, and the differences in growth rates and size at maturity of certain fish species that emphasised the need for a mechanism to harmonise the stock assessment techniques in the region.
16. Scientists from the Yellow Sea Fisheries Research Institute (YSFRI) and the West Sea Fisheries Research Institute (WSFRI) agreed to concentrate on assessing the status of 5 commercial species, using for the first time a harmonised methodology, with standardised data formats for exchange and comparable trawling gears deployed behind national research vessels.
17. Some interesting results are listed below:
- a. Significant differences in catch composition on both sides of the Yellow Sea with fish dominating in the eastern portion.
 - b. Jellyfish showed a significant increase in both countries autumn surveys, and occupied 86% of the catches by weight in the western Yellow sea
 - c. Yellow croaker and anchovy showed a very simplified age structure, with most fishes 1 year old or less, suggesting that catches are entirely dependent on recent recruitment.
 - d. The large increases in biomass of anchovy, goosefish (anglerfish) and yellow croaker in the autumn survey is due to recruitment from the spring spawning.
18. The stock assessment activity has been a resounding success that has increased scientific understanding, enabled comparison of fisheries data from both countries and demonstrated how scientists can find ways of cooperating on sensitive fisheries issues so as to provide a stronger scientific justification for the ecosystem based management of fisheries resources. Please see section 3.1 for further discussion.

2.6 Initiation of Biodiversity SAP demonstration activities

19. After completion of the assessment of critical habitats in the Yellow Sea region by our two consultants from R. Korea and China, and WWF YSESP's assessment of management effectiveness of these critical habitats, two demonstration sites were selected: the Rongcheng Seagrass beds and the tidal mudflats south of Ganghwa Island. At these sites a series of demonstration activities are currently being conducted to improve management, involve local stakeholders in the conservation and raise environmental awareness of visitors to these sites. Management plans are being devised and the Management Plan for Ganghwa Tidal flat was presented to stakeholders for review at the MLTM offices on 2 November 2009 and is being

revised according to comments. The Management Plan for the Rongcheng seagrass beds is scheduled for a similar review. Please see section 3.2 for further details.

2.7 National SAPs

20. The preparation of two National Strategic Action Plans (NSAPs), one for China and one for ROK, is ongoing. To conserve marine environment in the Yellow Sea and facilitate sustainable use of its resources at national level, the two national project teams led by respective National Co-ordinators have been creating the NSAPs individually. The project teams have reviewed current ecosystem situation and trend, analysed and prioritised environmental problems, and devised management actions to mitigate the problems. Throughout the entire NSAP development process, extensive consultations with relevant stakeholders, including government agencies, NGOs, academia, and local community have been sought iteratively. As a result, draft NSAPs are prepared with a set of policies based on the latest scientific data and information. NSAPs will address the regional priorities identified in the SAP at the national level, and in the meantime, provided information on the national structure and strategies in implementing the regional and national SAPs.

3 PROJECT IMPLEMENTATION

3.1 Fisheries Component

3.1.1 SAP demonstration activities – Fisheries

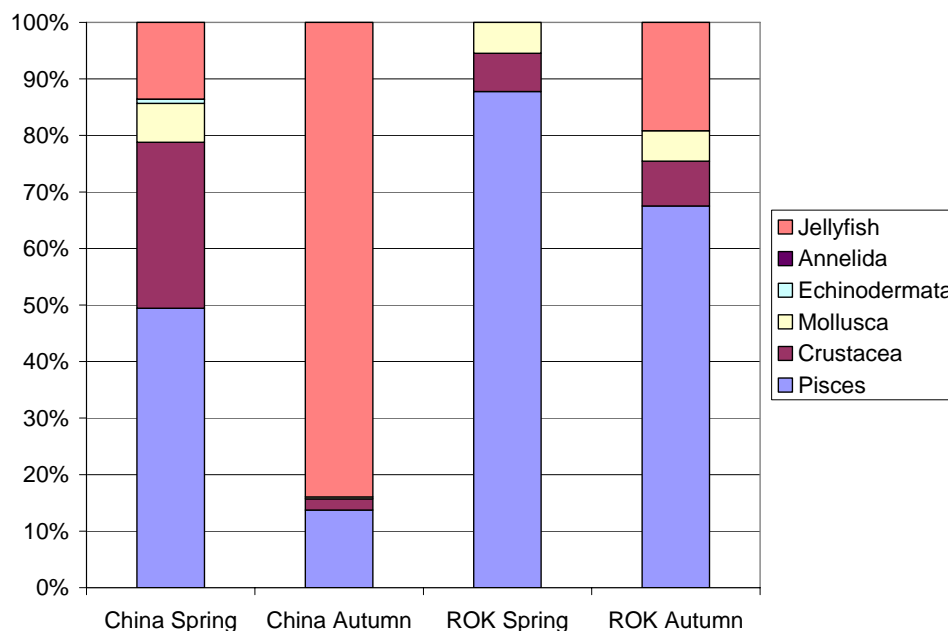
21. The 5 SAP demonstration activities initiated under the Fisheries Component, 3 directed towards capture fisheries and 2 at improving mariculture:
 - Assessment of the Effectiveness of Improved Fisheries Management;
 - Assessment of the effectiveness of the stock enhancement; and
 - Assessment of the effectiveness of closed fishing areas or seasons.
 - Environmentally friendly mariculture: Integrated Multi-Trophic Aquaculture
 - Environmentally friendly mariculture: Limited water exchange shrimp culture
22. The activities have progressed well and final reports have been received.
23. Assessment of the effectiveness of improved fisheries management examined the impacts of boat buy-back and self-management by fisheries cooperatives on fish stocks. Researchers at Pukyong University assessed status of selected fish stocks and fisheries to examine over-capacity and over-exploitation and used questionnaires to survey the impacts on fishermen.
24. Assessment of the stock status suggested that while some species are recovering, it is difficult to credit the fisheries structural adjustment policy of boat buyback and self management with their recovery. However interviews with offshore Yellow Sea fishermen indicated that 70% of the respondents thought that these programmes have had significant effect on resource recovery with bottom fish being most affected by these policies.
25. Assessment of the effectiveness of the stock enhancement of olive flounder in Taozi Bay, Shandong Province, China was performed by YSFRI. Researchers released more than 12,000 tagged flounder, however only 46 were recaptured despite widespread publicity announcing the reward for tagged fish, two fisheries independent research surveys and the monthly purchase of catches from a trawler operating at the release site.

26. The effectiveness of the closure of the Yellow Sea for fishing between June and September to help rebuild fish stocks was assessed by YSFRI. Catches were found to increase dramatically following the re-opening of the closed area, however this did not last and in the following months catches declined. Moreover catch composition changed markedly in the months following the reopening of the closed area.

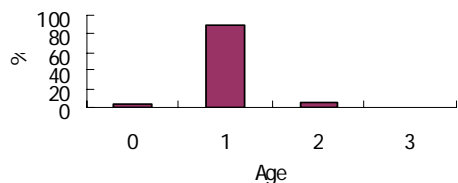
3.1.2 Stock Assessment

27. Two initial stock assessment workshops were hosted by the YSFRI and WSFRI to set out the aims of the cruises and agree a common methodology, using standardised equipment and data recording techniques. Following the second stock assessment workshop there was an exchange of scientists, researchers from YSFRI visited the WSFRI to harmonise methodology on the ageing of fish while other researchers from WSFRI travelled to YSFRI to compare methods for identifying the stomach contents of selected fish species. Two stock assessment surveys were held in the spring and two in the autumn of 2008. A final stock assessment workshop was held in Yantai in 2009.
28. Some interesting findings came from the final reports. Catch composition differed on both sides, with fish dominating the catch by weight in the ROK survey while fish and crustaceans dominated the Chinese catches. The autumn surveys were dominated by again by fish in ROK catches, but jellyfish now occupied most of the Chinese catch. However, jellyfish were relatively unimportant by number in the autumn surveys and only 2 species were significant *Nemopilema nomurai* and *Cyanea nozakii* (Fig. 3). Catch density was also higher in the eastern part of the Yellow Sea in both surveys.

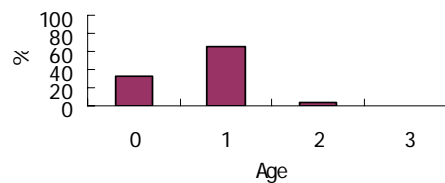
Fig. 3. Taxonomic composition of catches by weight in the spring and autumn surveys.



29. The fish ageing harmonization exercise involving the exchange of scientists, confirmed the decrease in the mean age at capture of fish species. Currently, most yellow croaker were caught at only one year old and no individuals were caught greater than 3 years old, the same is true of anchovy (Fig. 4 below).



Small yellow croaker age structure caught in the spring survey



Small yellow croaker age structure caught in the autumn survey

30. This exercise has been important in increasing understanding between scientists of both countries. The differences on the size at age of various species are now no longer thought to be due to variations in ageing techniques, as a result of the harmonisation of the otolith ageing. Experts agreed that there is still a need for further joint research on:
- Diet composition of commercially important fish species through stomach contents analysis combined with zooplankton studies to understand prey selection.
 - Studies that will improve understanding of the size at age of more species.
 - Further calibration of fisheries gear on different research vessels to enable better comparison of fisheries data.
 - Other biological studies of commercially important species, such as stock identification.
31. These point the way towards further cooperation that should be investigated in the 2nd Phase.

3.1.3 2nd Regional Mariculture Conference

32. With the theme “Driving sustainability in Yellow Sea mariculture” the second Regional Mariculture Conference was held 16-18 June in Jeju Island, R. Korea. The first session “Advances in Mariculture Rearing: Techniques to reduce environmental impacts” resulted in talks ranging from developments in offshore cage design and performance, the use of sea cucumbers in integrated multi-trophic aquaculture (IMTA), advances in artificial diet, habitat improvement through the use of artificial reefs, IMTA design, bioremediation using seaweeds, recirculation technologies and the use of micro-bubbles, and heterotrophic shrimp culture using biofloc technology. The IMTA system in Sanggou Bay (Fig. 5) and the heterotrophic shrimp culture project (Fig. 6) are two mariculture projects that are currently being supported by the YSLME to demonstrate how productivity can be enhanced at the same time that impacts on the environment can be significantly reduced.
33. In session two “Genetic advances for improved productivity” many talks focused on the use of genetic markers that could be used to assist in the selection of various desirable traits such as improved growth, increased tolerance to high water temperatures and low salinity and enhanced disease resistance (Figs. 7-8). Commercially cultured species were the focus of these studies. Genetic selection offers a much more rapid way of improving, for example growth rates, compared with traditional phenotype selection (eg. using large animals for production of the next generation). These advances could have significant impacts in reducing the use of prophylactic disease treatments and the use of antibiotics and as well reducing the environmental impact of aquaculture through improved food conversion ratios and faster growth rates.



Fig. 5. Example of IMTA in Sanggou Bay.

Commercial Farm in Korea

- Commercial Farm
 - Located in Goseong
 - Limited water exchange system have been in use since 2004
- Tank Size : 190, 160, 300m² (6 raceways)
- Productivity
 - 6.7kg/m²/crop in 2007
 - 6.9kg/m²/crop in 2008

Fig. 6. Commercial use of Heterotrophic shrimp culture in ROK.

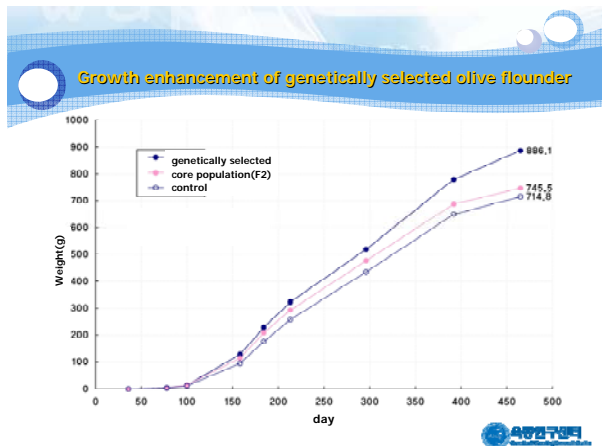


Fig.7. Olive flounder selected for faster growth.

Selective breeding goal of olive flounder in Korea

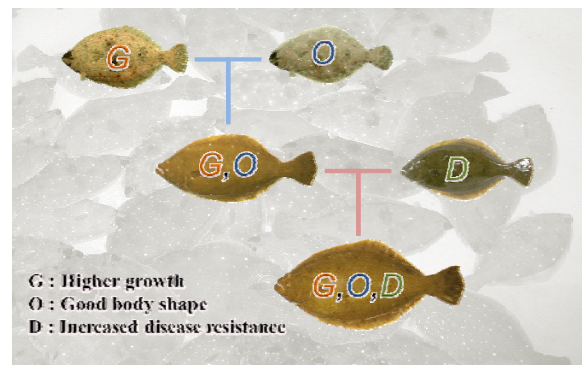


Fig. 8. Eventual goals of disease resistant, fast growing, well forming olive flounder.

34. In addition to the presentations on selection for disease resistance in organisms, session three “Advances in disease diagnosis, prevention and control” highlighted the work that was been done on the development of fish vaccines and their application, new methods for detecting and identifying diseases quickly so that early treatment can applied, and the role of traditional monitoring programmes to identify disease outbreaks and possible solutions.
35. The conference highlighted the excellent work being carried out in the region to improve the sustainability and productivity of marine aquaculture that will play a major part in the years to come to ensure food security. Prof. Wang suggested that as a result of the growth in population in China, mariculture production will have to almost double by the year 2020 to reach and annual production of 25 million tonnes.

3.2 Biodiversity Component

3.2.1 Assessment of Critical Habitats

36. Last year experts identified critical habitats for biodiversity conservation through the section of the best examples of the 10 Ramsar habitat types in the Yellow Sea, and

the selection of 5 potential demonstration sites (2 in China, 3 in Korea). In 2009 these potential demonstration sites were surveyed to provide baseline biodiversity information. Management assessment of these potential demonstration sites was completed by members of the WWF YSESP project. Reports of the management and biodiversity assessments were presented to a panel of WWF and RWG-Biodiversity members to enable them to make an informed decision on which of the habitats was most suitable for demonstration activities.

ROK

37. In the Han River Estuary fish assemblages showed distinctive distribution patterns along the salinity gradient, with the highest biodiversity at the mesohaline waters and lower diversity at both of the ends of the salinity gradient. A total of 62 species were recorded in this survey, with the most species found in the families of Sciaenidae, Engraulidae, and Gobiidae. Prawns are predominant in abundance, consistent with the long-term trend in the Yellow Sea of declining populations of large predatory fishes which have been replaced largely by smaller fishes and shrimp.
38. The Ganghwa tidal mudflat was also subject to a large variation of salinity ranging from 10 to 27 ppt. A total of 133 species of benthic macrofauna were found, in which annelids were the major faunal group comprising 40% of total number of species. Biodiversity was positively and significantly related to salinity and the proportion of sand, but negatively to organic content in the sediment. The same physical variables were also important in structuring spatial distribution of macrofauna community examined in non-metric multidimensional scaling. Compared with the results from a previous survey conducted in 2003, the observed number of species has decreased by nearly half, and total density and biomass have also decreased, resulting in lower diversity. Some of the major species observed in 2003 either vanished or declined sharply in the 2008 survey, suggesting that the benthic biotic system may have become less stable in the Ganghwa tidal flat.
39. In Garolim Bay, a total of 5 halophytes were recorded in the intertidal zone, with a clear zonal distribution, but with a large spatial variation. A total of 80 species were recorded in the macrofauna community in the intertidal zone. Annelids were the most species-abundant group, followed by molluscs, arthropods, and echinoderms, with a large spatial variation in species composition among sampling stations. Ecological indices of the macrofauna community in the intertidal zone widely varied among stations, but the macrofaunal community tended to be more diverse at mudflat sites and least diverse at the transition zone between rocky shore and saltmarsh. In the subtidal area, physical diversity (e.g., salinity) was low due to limited freshwater input into the bay. Macrofauna diversity was generally higher at inshore stations than at offshore stations.
40. The tidal mudflats south of Ganghwa Island were selected as the demonstration site for Korea and the results from the survey were used to develop a management plan that was presented to stakeholders at the Ministry of Land Transport and Maritime Affairs.

China

41. The Yalu Nature reserve in part of the second largest coastal marsh in Asia, and seasonally hosts numerous migratory seabirds. The surveys of the subtidal area of the Yalu Nature reserve indicated there was no difference in the biodiversity inside or outside the reserve. Differences in the zooplankton, phytoplankton and nutrient levels appeared to be correlated to salinity gradients as a result of the Dayanghe

River that flows in the sea on the eastern boundary of the reserve. The limited impact of the reserve on biodiversity was attributed to the lack of control that the reserve authority had on the offshore area as it did not possess a "Sea Use" licence for the estuarine/marine part of the reserve. Furthermore, lack of proper conservation planning had rendered the western core area a heavily human-modified habitat. This habitat has been selected by WWF YSESP to demonstrate YLSME SAP management actions.

42. The Rongcheng seagrass beds are thought to be one of the last remaining seagrass beds that used to be the dominant feature of the Shandong Coast only a few decades ago. Seagrass biomass was 1.15 - 1.85 kg/m² along Shandong Peninsular during the 1950s-1970s (Yang and Wu 1981), but declined to 0.2 - 0.5 kg/m² off Rongcheng in the 1980s (Xia et al. 1991). The present study reveals that current seagrass biomass is ca. 0.30 kg/m² in the subtidal zone and 2.1 kg/m² in the low tidal zone off Chudao, Rongcheng. This indicates a slight (subtidal) to moderate (low tidal zone) recovery of seagrass. Nutrients levels inside the seagrass bed were slightly lower in summer (active growth) and higher in winter (inert season) than outside indicates that seagrass growth may further help maintain the nutrient levels. The lack of significant differences in most parameters (nutrients, chl_a, and zooplankton) measured inside and outside the seagrass was thought to reflect the tidal flushing of the seagrass beds that would result in mixing of both sampled waters. The presence of eggs and larvae inside the sea grass suggests that this habitat may act as spawning ground and nursery for some species in common with numerous other studies. The high chl_a concentrations and the high biomass of fisheries resources found in the seagrass beds, suggests this is a highly productive habitat, and this productivity may spill over in to surrounding areas as suggested by the higher catches just outside the seagrass compared with those reported by local fishermen further away.
43. The high productivity of these seagrass beds, their nursery function and nutrient absorption capability hints at the important ecosystem services they provide. In order to preserve these services, the Rongcheng seagrass beds were selected as a demonstration site for the YSLME project.

3.2.2 SAP demonstration activities - Biodiversity

44. At both countries' demonstration sites 3 Biodiversity SAP demonstration activities are currently taking place:
- Effectiveness of improving management of critical habitats
 - Effectiveness of training stakeholder around critical habitats
 - Effectiveness of increasing the environmental awareness of visitor to critical habitats
45. Firstly, improved management of critical habitats addresses the problems of integration and enforcement of existing legislation or management plans in conserving the selected demonstration sites. This activity has identified shortfalls and proposed environmental targets and management to meet them. Currently in Ganghwa a management plan has been devised to regulate the pollution that is thought be the cause of the biodiversity decline and the plan was introduced to local and provincial government and other stakeholders at a hearing in the offices of the Ministry of Land, Transport and Maritime Affairs.
46. Secondly, in order to build support for these improvements in management, local stakeholders are also targeted to increase their environmental awareness. In

Ganghwa this involved running eco-guide courses for fishermen and local pension owners, in Rongcheng a variety programmes have been run by the "Yellow Sea Guard" a voluntary organisation set up Shandong University, Yantai, targeting various sections of the population: fishermen, local government, fishery bureau officers, and local communities surrounding the seagrass beds.

47. Thirdly, visitors to the demonstration site areas are also to be educated. In Ganghwa this will concentrate on the production of public awareness materials, such an eco-guidebook to the island and ecomaps of the area, information pamphlets on the flagship species such as blackfaced spoonbill and other publicity material. In Rongcheng this involves using the local tourist board, local TV, radio and newspapers to broadcast more environmental information, putting up information bulletin boards in the nearby villages, as well as hosting seminars.
48. These activities will be assessed at the end of the year through questionnaire surveys. Further information can found in UNDP/GEF/YS/RSP-PSC.6/4b.

3.2.3 MPA network

49. One of the proposed management actions in the YSLME SAP is the development of a MPA network. To this end the project has been cooperating with Korea Maritime Institute (KMI) to develop a pilot MPA network that can be used to demonstrate the advantages to a wider audience.
50. To facilitate implementation the network is initially comprised of 2-3 of these critical areas from each country to ensure a more closely knit network. The network will initially function as a social and learning network, where managers and other MPA practitioners are linked with different institutions to improve capacity and understanding of the importance of biodiversity and its management. We hope that using this pilot scale network we can build linkages and develop activities more easily so that the advantages of the network can be easily demonstrated to encourage other managed areas to join. The first meeting to identify the needs of the network, how it is going to function, workplan and responsibilities of partners was held at the Yakim Hotel in Gimpo City 20-21 October 2009.

3.3 Ecosystem Component

3.3.1 Primary productivity estimation

51. There remains uncertainty in estimating the primary production of the Yellow Sea, as some of the difficulties lie in the rather large seasonal ranges due to environmental factors. The high variability in environmental characteristics calls for using satellite data for better estimation of the primary production of the Yellow Sea, and to resolve problems such as retrieval of chlorophyll and diffuse attenuation coefficient of PAR, estimation of physiological parameters, and vertical structure of chlorophyll in the water column.
52. This activity developed a new primary production algorithm to estimate the primary production of the Yellow Sea. To develop a new algorithm, 66 vertical profiles of chlorophyll-a obtained during March-August in 1994-2008 period were analysed. The scientists also compared the estimates with those from VGPM (vertically generalized production model). VGPM gave much higher estimates than simulated in-situ depth-integrated primary production. The reason of the discrepancy seems to be that P_{opt}^B from VGPM formulation were higher than estimated in-situ P_{opt}^B . Using the new algorithm, primary production of the Yellow Sea for the period 1998 to 2007

was calculated (see Fig. 9 for example). The scientists also produced monthly and annual climatology maps (see Fig. 10 for example) of the primary production of the Yellow Sea and analysed the inter-annual variations.²

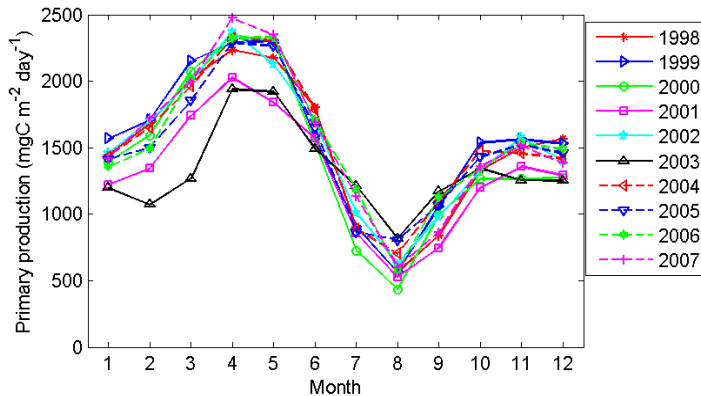


Fig. 9. Monthly averaged variations of primary production in the Yellow Sea from 1998 to 2007.

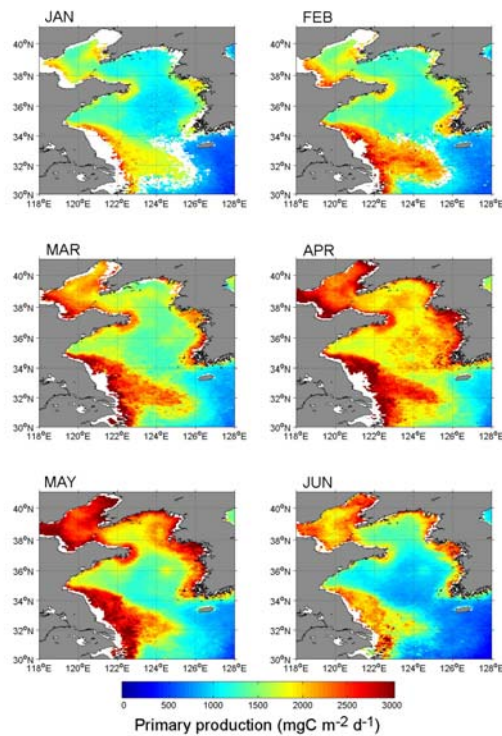


Fig. 10. Climatology of primary production in the Yellow Sea, Jan-Jun, from 1998 to 2007.

3.3.2 Ocean colour algorithm peer-reviewed journal papers

53. Following the sharing of data by scientists from Japan, ROK, and China, this activity has developed some in-water algorithms for estimating chl-a, TSM, and CDOM ag440 recommended for use in the region. Some of the constant coefficients tested and refined are shown below.

$$\text{Chl - a} = 10^{(0.182 - 2.863R + 4.498R^2 - 5.011R^3 + 1.380R^4)}$$

² Results of the study and graphics were provided by Sinjae Yoo.

$$\text{CDOM } a_{g_{440}} = 1.5 \times 10^{(-1.138 - 0.769R_{15} - 1.082R_{15}^2 - 0.368R_{25} + 0.727R_{25}^2)}$$

$$\text{TSM} = 10^{(0.850 - 1.123R - 37.096R^2 + 88.035R^3 - 30.594R^4 - 48.004R^5)}$$

54. Two peer-reviewed papers on developing ocean colour algorithms for the Yellow Sea were drafted and are under review by all co-authors. One paper was presented at the Japan Oceanographic Society Meeting this year.

3.3.3 Macroalgae Regional Project

55. In co-operation with the governments of China and R. Korea, and YSLME Project, the CKJORC organised a regional workshop on macro-algae (25-26 March 2009). Following the large scale bloom of macro-algae in Qingdao prior to the 2008 Olympic Games, this event received wide attention from scientific communities, and some governments. The workshop aimed at exchanging knowledge and information on occurrence, transport, environmental impacts, and utilisation of the macro-algae.
56. During the workshop, scientists and experts from the region provided information and understanding on this event, covering taxonomy, possible sources of the algae, transport and development of blooms, environmental and socio-economic impacts of the blooms, and potential ways of using the algae. The presentations summarised major findings of the algal bloom, including sources of the algae, transport mechanism, impacts, and potential areas for utilisation. The workshop identified the gaps in current knowledge on algal blooms. The workshop called for co-operation among scientists in the region, particularly on the issues of: (i) biological and ecological features of the macro-algae, and possible mechanisms for blooms; (ii) early warning system; and (iii) potential utilisation of the algae. However, there is still a need to reach agreement between the countries to carry out a regional level project.

3.3.4 SAP demonstration activities - ecosystem

57. The 3 SAP demonstration activities initiated under the Ecosystem Component:
- Monitoring Jellyfish Bloom in the Yellow Sea;
 - Assessing impacts of N:P:Si change on the Yellow Sea ecosystem; and
 - Assessing and Monitoring the Impacts of Climate Change on the Yellow Sea's Ecosystem

have progressed well throughout the year. A monitoring and assessment of the activities on N:P:Si change and climate change impacts took place in Qingdao, China, from 14-15 September. A seminar was held for the contractors to update project staff and Qingdao Ocean and Fisheries Bureau on each activity. A Monitoring Team, consisting of project staff and government officers visited project sites in Qingdao to view the mesocosm activities first-hand (Figs. 11-12). Government officers were informed of the problems the Yellow Sea faces, i.e. changes in nutrient ratios, and the potential impacts on ecosystem structure and function.

58. Details of the Ecosystem Component SAP Demonstration Activities can be found in Document UNDP/GEF/YS/RSP-PSC.6/4b.



Fig. 11. White coloured buoys denoting the location of the mesocosms in Maidaos, for the activity on impact of climate change.



Fig. 12. Mr. Zhu Mingyuan giving further details about the experiments in Maidaos.

3.4 Pollution Component

3.4.1 SAP demonstration activities - pollution

59. The 4 SAP demonstration activities initiated under the Pollution Component:

- Management of recreational waters;
- Monitoring and assessing atmospheric deposition of pollutants;
- Calculation of nutrient loads in hot spot areas; and
- Monitoring and assessing sea-based sources of nutrients

have shown tremendous progress throughout the year. Monitoring & assessing the progress of the activity on improving management of recreational waters, Qingdao bathing beaches was carried out from 14-15 September (Figs. 13-14). This was jointly held with the assessment of Ecosystem Component SAP demonstrations (see above). PMO staff visited the wastewater discharge outlets at each recreational site, and also joined the Qingdao beach cleanup organised by the contractor on 13 September, as part of the SAP demonstration activity.

60. Monitoring and assessing SAP demonstration activities implemented in Liaoning, China (activities 2-4 bullet point above), was undertaken from 30 June - 3 July. A seminar was held for the contractors to update project staff and local and provincial government officers on each activity. A Monitoring Team, consisting of project staff, govt officers, and environmental chemistry experts, visited project sites in Dalian, Zhuanghe and Yalu River Estuary to view the activities first-hand. Recommendations were given to the contractors for efficient completion of the activities. Government officers were informed of the problems, current state of pollution in the northern Yellow Sea, and provided with management actions to reduce nutrient loads from various sources. The activity obtained political willingness and buy-in from policy makers to implement the pollution-related management actions in the SAP.

61. Details of the Pollution Component SAP Demonstration Activities can be found in Documents UNDP/GEF/YS/RSP-PSC.6/4b and inf.4 - Fact Sheets.



Fig. 13. Activity sites for management of recreational waters.



Fig. 14. Field sampling in No. 1 Beach.

3.5 Investment Component

3.5.1 Yellow Sea Partnership

62. Since the successful organisation of the third Yellow Sea Partnership (YSP) workshop in 2007, the Project has expanded co-operative activities with YSP members. Those activities included: (i) organising a session at the East Asian Seas Congress 2009, where representatives from some YSP member organisations with relevant expertise and experience gave presentations on biodiversity and habitat conservation; and (ii) sharing information and expertise with WWF to co-ordinate demonstration activities implemented individually by the Project and the WWF to generate a synergy effect. For details of those activities, see Section 6 in this report.
63. The fourth YSP workshop is expected to be held in 2010. A specific date and venue of the workshop will be decided in consultation with all the members. The workshop secretariat will also be decided based on the agreements made by the previous workshops, that the workshop should be hosted by the members by rotation.

3.5.2 Associate Experts

64. Two young professionals (Figs. 15-16) nominated by NPCs have participated in this year's "Associate Expert Programme." Mr. Shouqiang Wang, a Chinese Associate Expert, is trained as a marine biologist. Prior to joining the Programme, Mr. Wang worked at State Oceanic Administration, having been seconded from First Institute of Oceanography. Ms. Sunyoung Chae, the ROK Associate Expert, has expertise in international relations. She assisted in conducting the Political and Social Acceptance Analysis. Ms. Chae also serves as Assistant to the NPC-ROK, while she receives training under the Programme.
65. Throughout the entire six-month period of the Programme, the Associate Experts had received an intensive on-the-job training from PMO staff, assisting PMO in organising international meetings, contracting consulting services, reviewing outputs, and preparing for the Project's second phase. Ms. Chae and Mr. Wang obtained practical skills and experiences to manage international projects by actively participating in regional meetings such as the APEC-LME Workshop, visiting SAP demonstration sites, and collaborating with government officials and experts in preparing NSAPs.



Figure 15. Ms. Sunyoung Chae (centre) taking notes while Dr. Ken Sherman gives his presentation at the APEC-LME Workshop.



Fig. 16. Mr. Shouqiang Wang (second from right) at the APEC-LME Workshop.

66. The Associate Experts greatly contributed to the smooth implementation of various Project activities, liaising closely with NPCs and government agencies. The communication between the participating countries and the PMO were improved significantly thanks to the assistance from Ms. Chae and Mr. Wang.

3.5.3 Voluntary Internship Programme and Model UN

67. The Project co-hosted the second annual Korea Model United Nations (KMUN) in February 2009 with the Division of International Studies, Korea University and with the Representation in ROK for the United Nations High Commissioner for Refugees. Approximately 400 college and high-school students attended the meeting. Under the supervision of Dr. Suh-Yong Chung, a professor at the University and a member of the Project's RWG for Investment Component, the student organisation held the meeting, instructing participants, facilitating discussions, and providing administrative services (Figures 17-18).
68. Through those activities, the students benefited from not only exchanging their views on the global issues, but also developing skills that would be useful throughout their lives: research, writing, public speaking, problem solving, consensus building, and co-operation.



Figure 17. College and high school students discussing at the Korea Model United Nations.



Fig. 18. Mr. Yihang Jiang, Project Manager, giving his opening ceremony remarks.

3.5.4 Small Grants Programme

69. Five projects, funded by the Small Grants Programme 2007, were completed successfully, and the Programme Report summarising those projects was published (available online at <http://www.yslme.org/publication.htm>) (Figure 19(a)).
70. Five projects funded by the Programme 2008 were implemented as scheduled. Four grant recipients completed their projects with the activities and outcomes as summarised below.
- Birds Korea established guidelines, processes, and basic designs for the enhancement, restoration, and “Wise Use” of the “Mokpo Urban Wetland,” the largest remaining area of inter-tidal and adjacent modified wetland in the Yeongsan Estuary, located in Mokpo, ROK (Figure 19(b)).
 - Nanjing University evaluated the impact of industrial pollution on some economically-important macrobenthos species in the northern coast of Jiangsu Province, China, and provided scientific information to enhance ecosystem management (Figure 19(c)).
 - PGA Wetlands Ecology Institute (PGAI) carried out activities in Ganghwa, ROK, to conserve Black-Faced Spoonbills through developing and executing CEPA (Communication, Education, and Public Awareness) activities (Figure 19(d)).
 - Rongcheng Fisheries Association raised local fisherfolk’s understanding of the status and ecological services of seagrass beds—one of the representative habitats in the Yellow Sea—in Rongcheng, China, introducing practices to avoid damaging those unique habitats (Figure 19(e)).
71. The successful implementation of the Programme during the past years invited more participation from various stakeholders and enhanced their ownership and capacity in environmental conservation. A strong commitment of the stakeholders will strengthen the performance and sustainability of the Project activities.



Figure 19(a): The cover of Small Grants Programme 2007 (publication).



Figure 19(b): Mokpo Urban Wetland.



Figure 19(c): Local people collecting seafood at the tidal flat in Yancheng.



Figure 19(d): Survey on benthos in rice fields, the habitats of Black-Faced Spoonbills, in Gangwha.



Figure 19(e): Workshop for seagrass bed conservation.

3.5.5 Data and information management

72. In co-operation with the China-Korea Joint Research Center (CKJORC), the Project has been improving the function and accessibility of the Regional GIS and Meta Databases. The data and information services provided by the Databases are expected to be greatly enhanced such that (i) numerical data are provided online in the form of widely-used spreadsheet software, (ii) geographic information/maps are offered online with data and information as map products, and (iii) “help desk” services are initiated to answer queries from users about data acquisition, data analysis, and resource persons and organisations through email, phone, and in-person consultation. To promote the use of the Databases, campaigns are being organised to reach out to potential users, distributing brochures and demonstrating the Databases. In co-ordinating with on-going national efforts in R. Korea to establish the Yellow Sea data and information system, the project worked together with relevant organisations’ efforts to introduce the mirror site sits of the YSLME GIS database into the large databases. As this is on-going efforts, more information would be available later.

3.5.6 Pilot Project on Economic Valuation of Management Actions

(i) CBA of mariculture

73. To assess the cost-benefit performances of SAP demonstration activities and illustrate how economic analyses can be used as a tool for better ecosystem

management, the Project conducted cost-benefit analyses (CBA) of the following two projects: (i) integrated multi-trophic aquaculture (IMTA) and (ii) improved management of critical habitats. This and following sections describe those CBA studies, summarising their activities and results/progress. For details of the demonstration projects, see Sections 3.1 and 3.2 in this report.

74. A consulting team led by the First Institute of Oceanography analysed the IMTA demonstration project in the Sanggou Bay, China, that the Yellow Sea Fisheries Research Institute implemented. Questionnaire surveys were conducted with two large-scale mariculture farms implementing the demonstration project and with other small-scale farmers around the Bay. Commercial and environmental benefits in the following three different modes of mariculture were calculated and compared: the monoculture of kelp, the monoculture of scallop, and the IMTA of those two species. Additionally, the sustainability of different modes was measured with the “emergy” approach taken as an evaluation method. The study found that the IMTA was more profitable and sustainable than the monoculture. Specifics and guidelines on how to conduct the analysis were summarised as a reference for future similar analyses with the detailed description of the step-by-step process of data collection, analysis, and interpretation.

(ii) Ganghwa CBA study

75. In conjunction with the SAP demonstration activity implemented in Ganghwa, ROK, the Project has been conducting an economic analysis to estimate benefits of preserving biodiversity in the tidal flat. The analysis assesses the effectiveness of implementing the management plan as suggested by the demonstration activity, studying the behaviour of tourists who visit Ganghwa Island. An on-site and face-to-face questionnaire survey was conducted in the summer of 2009, in which trained enumerators interviewed 300 visitors to Dongmak Beach and the Ganghwa Tidal Flat Center (Figure 20). The second survey will be conducted in the fall with the expectation of interviewing an additional 100 visitors. Early results indicated that improving the tidal flat management with the introduction of the proposed plan would generate economic benefits.



Figure 20. Interviewers conducting a survey with visitors to Ganghwa.

3.5.7 Project video

76. In co-operation with China Ocean News and regional scientists, the Project is creating a promotional video that provides a summary of the Project’s activities to help the general public understand the importance of the Yellow Sea to their lives, the environmental problems threatening the ecosystem, and the actions taken by the participating countries under the Project. Reviewing the Project history briefly, the video highlights major activities of scientific research, policy development, and public

awareness campaigns. The video describes the SAP as one of the major outputs, explaining its innovative ecosystem-based approach compared to the traditional sector approach. With simple words used, the video will allow even those who may not know much about marine science and the ecosystem to obtain a clear understanding of the environmental issues in the Yellow Sea. It is expected that the video will motivate a broad audience of people to think and act for conservation and will solicit public support for the Project activities.

3.6 National co-ordination and implementation

77. Thanks to NPCs and their assistants, the national co-ordination in participating countries was further strengthened during the reporting period. The communication and co-operation among relevant government agencies were improved as the consultations with the agencies and Inter-Ministry Co-ordinating Committee were sought intensively. The co-operation with NGOs and local communities was also improved through stakeholder meetings. An extensive technical and administrative support was provided by the national co-ordination units to facilitate Project implementation. As a result, a wide variety of Project activities were successfully implemented, including the preparation for the Project's second phase, the implementation and monitoring of SAP demonstration activities, and the preparation of NSAPs as described in relevant sections of this report. Regional meetings such as the Second Regional Mariculture Conference and the Co-operative Cruises Summary Workshop were organised successfully. A number of important agreements and outputs such as Project Document for the Project's second phase were produced through the activities. For details of national co-ordination and implementation in the countries, see NPC reports (Document, UNDP/GEF/YS/RSP-PSC.6/5a-b).

3.7 Cross Component Issues

3.7.1 SAP cross component demonstration activity

78. The biodiversity-pollution SAP demonstration activity in Ganghwa tidal flats, ROK, is showing how regular monitoring and assessment of the ecosystem and exchange of information across different responsible agencies can help improve critical marine habitats around Han River estuary and Ganghwa southern tidal flats, through controlling marine pollution in the Yellow Sea. A management plan has been developed and will be presented to stakeholders in early November. At the time of writing this document, the stakeholder meeting had not taken place. Outcomes from the event will be presented at the 6th RSTP/PSC Meeting.

79. More details of this Demonstration Activity can be found in Document UNDP/GEF/YS/RSP-PSC.6/4b.

3.7.2 Cruise Summary and Wrap-up

80. A workshop to report on the co-operative cruise summer results and next steps to take was convened from 17-18 June 2009 in Seokcho, Republic of Korea, with the following objectives:

- Report and exchange Summer Co-operative Cruise data;
- Examine results of inter-comparison samples;
- Solve remaining data differences; and
- Provide inputs to the Chief Scientists in preparing the Regional Cruise Report, and agree on the format of the Regional Report.

81. Seventeen participants from China and Republic of Korea took part in the workshop. The participants closely examined data from the Summer Cruise and any outstanding issues from the Winter Cruise. Suggestions were given and agreements reached, more or less, on solving all data differences and which results should be included in the Regional Report (Figs. 21-22). Some data differences on phytoplankton remain, and seem not solvable, but will be used as material for further studies on how to harmonise data from different kinds of sampling methods and taxonomic classification.
82. Again, special thanks go to the scientists, government agencies, donors, and supporters for their contribution to this very important activity, which saw the launch of a pioneer co-operative survey in the Yellow Sea.



Fig. 21. Scientists discussing the data for benthic and pelagic resources.



Fig. 22. Discussion to harmonise data on organic compounds.

3.7.3 Preparation of the Second Yellow Sea Regional Science Conference

83. Following the approval of this activity, as listed in the approved "Project Implementation Plan," and again approved at the 5th PSC Meeting by all its members, the PMO has begun organising this event with consultation of NPCs and the Conference Organising Committee. The event is scheduled to take place in Xiamen, China, from 24-26 February 2010. In June, a flyer announcing the conference was e-mailed and posted to all major partners of the project. The conference was also announced on the Project website. Tentative talk titles of some interested participants have been received. All interested participants will need to submit an abstract before 15th December for evaluation before receiving confirmation on whether their talk can be accommodated in the conference.
84. Further details on the conference can be found in Document UNDP/GEF/YS/RSP-PSC.6/4c.

4 FINANCIAL REPORT 2009

85. The financial report showing the expenditures of 2009 until Month 2009 is attached as [Annex II](#).

5 REPORT ON THE PROJECT MANAGEMENT OFFICE

5.1 Office & Facilities

86. With generous support from KORDI, the PMO has operated without any difficulties during the year.
87. Since the UNDP Country Office had planned to close its office at the end of this year, the PMO International staffs' UN Laissez-Passer extension were handled by UNOPS Headquarters.
88. The PSC should consider the PMO legal identity due to closure of UNDP Country Office.
89. The Inventory list of the project's assets is attached as [Annex III](#).

5.2 Operation of the Office

90. Since October, the PMO began operating the flexible working option based on UNOPS' new policies on Work-Life Harmonization and Flexible Working Arrangements. Thus far, this has been implemented successfully without any negative effects to the working environment or outputs produced. The core working time is between 10AM to 5PM and staff may choose his/her starting time and finishing time within 8 hours a day.
91. Ms. Euidea YUN, IT Administrator, has changed her contract from full-time to part-time and has been working 2 days a week since May this year.
92. The PMO continues to operate within UNOPS' rules and regulations.

5.3 Project Website, Partnership Website, E-Discussion Group and Newsletter

Project Website

93. The project website continues to disseminate information about the project, the staff and partners, the latest news on implementation, and stories about the Yellow Sea. It also keeps a record of every meeting, conference, and publication produced by the project. With 5 year's successful operation of the YSLME website, www.yslme.org, anyone can download the meeting materials from 2005's first event to the latest news. The Document menu keeps all the lists on event title, venue, including handout materials for each event. Additionally, the Publication menu contains the soft copy of publications from the project (Figure 23).

The screenshot shows the project website with a navigation menu and a sidebar. The main content is a table titled "Meeting List (Click the meeting name)". The table has columns for Meeting List, Date, Venue, Final full documentation, and Logistic Info. It lists various meetings for the RSTP and PSC committees, including dates, venues in China, Korea, and Jeju Island, and links to final meeting reports.

Meeting List (Click the meeting name)	Date	Venue	Final full documentation	Logistic Info	
RSTP	Fifth Meeting of Regional Science and Technical Panel	25-26 November 2008	Shanghai, China	Final meeting report	Logistic
	Fourth Meeting of Regional Science and Technical Panel	26-28 November 2007	Guangzhou, China	Final Meeting Report	Logistic
	Third Meeting of Regional Science and Technical Panel	20-22 November 2006	Jeju Island, Republic of Korea	Final meeting report	Logistic
	Second Meeting of Regional Science and Technical Panel	15-17 December 2005	Kumming, China	Final meeting report	Logistic
	First Meeting of Regional Science and Technical Panel	4-6 July 2005	Dakan, China	Final meeting report	Logistic
PSC	Fifth Meeting of Project Steering Committee	27-28 November 2008	Shanghai, China	Final meeting report	Logistic
	Second Special Meeting of the Project Steering Committee	8 May 2008	Hangzhou, China	Final meeting report	Logistic
	Fourth Meeting of Project Steering Committee	29-30 November 2007	Guangzhou, China	Final Meeting Report	Logistic
	Third Meeting of Project Steering Committee	23-24 November 2006	Jeju Island, Republic of Korea	Final Meeting Report	Logistic
	Second Meeting of Project Steering Committee	19-20 December 2005	Kumming, China	Final meeting report	Logistic
	First Meeting of Project Steering Committee	7-8 March 2005	Seoul, Korea	Final meeting report	Logistic
Fifth Meeting of Regional Working Group	Pollution	8-10 October 2008	Xiamen, China	Final meeting report	Logistic
	Fisheries	23-25 September 2008	Shanghai, China	Final meeting report	Logistic
	Biodiversity	2 - 4 September 2008	Weihai, China	Final meeting report	Logistic
	Ecosystem	23 - 25 September 2008	Taeam, Republic of Korea	Final meeting report	Logistic
	Investment	14 - 16 October 2008	Shanghai, China	Final meeting report	Logistic
	Pollution	11 - 13 October 2007	Jeju, Republic of Korea	Final Meeting Report	Logistic
	Fisheries	7-9 November 2007	Soekcho, Republic of Korea	Final Meeting Report	Logistic

The screenshot shows a grid of publications. The top row features "Analysis of environmental Status and Trends Volume 4 : Governance Analysis" (9M, PDF). Below it are five reports: "Volume 1 : National Reports - China 1" (65M, PDF), "Volume 1 : National Reports - China 2" (74M, PDF), "Volume 2 : National Reports - Korea Republic1" (66M, PDF), "Volume 2 : National Reports - Korea Republic2" (64M, PDF), and "Volume 3 : Regional Synthesis" (135M, PDF). At the bottom, there is a report titled "4TH PSC Report of the Fourth Meeting of the Project Steering Committee UNDP/GEF Yellow Sea Project" and "4TH RSTP".

Fig. 23. Project website showing publications.

Partnership Website

94. The website (Fig. 24) helps to promote environmentally-sustainable management and use of the marine and coastal resources in the Yellow Sea for the Yellow Sea Partners. The platform takes advantage of the free tools and services offered and

supported by UNEP/GEF IW:LEARN website toolkit. With the toolkit, each partner may update its news by itself, directly to the website. For a while, the site was under re-construction for upgrade by UNEP, but it is now fully operational again, and one can see the improved site design and layout.



Fig. 24. The YSP webpage.

Newsletter

95. The newsletters describe all past events, workshops, and activities implemented by the project. The full set of newsletters from 2005 to 2009 is accessible from the project website under Publication-Newsletter menu as shown in Figure 25 below.

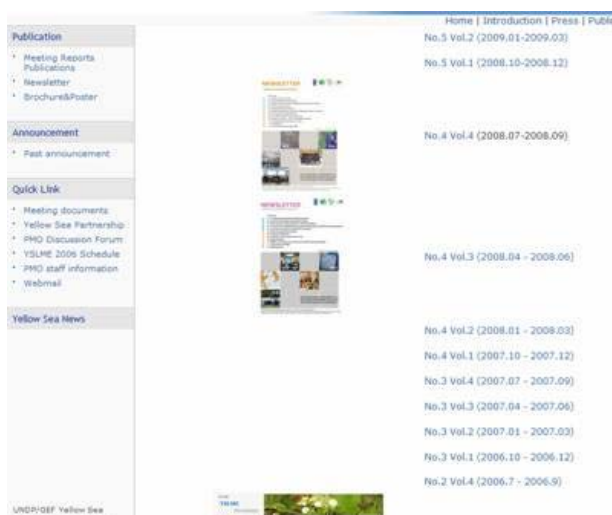


Fig. 25. Web links to the project newsletters.

96. This year the PMO issued 4 newsletters which are available online and offline. Figure 26 show a sample newsletter.



Fig. 26. One of the project newsletters.

6 CO-OPERATION WITH OTHER ORGANISATIONS AND PROJECTS

6.1 Exchange and implementation of Memorandum on Co-operation

97. The Project continued to seek and strengthen the co-operation with other relevant organisations and projects. This and following sections highlight the results of some of those major co-operative activities.
98. The memorandum of understanding (MOU) was exchanged between the Project and the Korea Maritime Institute (KMI) on co-operation in promoting conservation and sustainable use of marine and coastal environment in the Yellow Sea (Figures 27-28). The MOU described the scope, formats, and conditions of the co-operation between the two organisations, specifying possible areas of joint activities. The initial co-operative activities, suggested and agreed in the MOU, were to establish the regional network of marine protected areas and to explore the possibility of organising a training workshop on the conservation of marine biological diversity and the protection of coastal habitat. For more information about those activities, see Section 3.2 in this report.
99. To enhance the capacity of all stakeholders in the Yellow Sea region, the Project facilitated the co-operation between the participating countries and DPRK. Following the agreement made by the Dalian Society of Oceanography (DSO) and the State Hydrometeorological Administration (SHMA) of DPRK, instruments for marine environmental monitoring and water quality analysis were transferred to DPRK to upgrade the country's capacity in these areas, , and furthermore to strengthen regional co-operation in marine environment protection. A ceremony was organised in April 2009, where the representatives of DSO and SHMA signed an equipment donation certificate (Figure 29).



Fig. 27. Mr. Yihang Jiang, Project Manager (right) and Mr. Jong-Hee Ghang, President, KMI (left) signing the MOU.



Fig. 28. The MOU signing ceremony.



Fig. 29. SHMA and DSO representatives signing the equipment donation certificate.

6.2 EAS Congress

100. As part of the co-operative activities with PEMSEA, the Project organised a special session at the 2009 EAS congress held in Manila. The session titled "Innovation in biodiversity conservation in the Yellow Sea Large Marine Ecosystem" highlighted the efforts that have been made by partners in the region to conserve habitats and biodiversity. Presentations from the biodiversity demonstration projects and recipients of the YSLME small grants programmes formed the backbone of the session. However, the WWF/KORDI Yellow Sea Ecoregion Support Project (YSESP) demonstration activities in China and R. Korea also featured.

6.3 Synergy with WWF on Selection of Demonstration Projects and Small Grants

101. WWF has been important to biodiversity conservation efforts for the YSLME project in the past, and made significant contributions during the drafting of the biodiversity component of the SAP agreeing to help demonstrate the effectiveness of the SAP biodiversity management actions at their own YSESP demonstration sites. Using the YSLME project's assessment of critical habitats, and their own assessment of management effectiveness in these critical habitats, two potential YSESP

demonstrations sites were selected: The Yalu Nature reserve in Liaoning Province and the Rongcheng Seagrass beds in Shandong province.

102. In April 2009 PMO and WWF visited and jointly assessed the two sites using jointly developed criteria. After a series of meetings with provincial and local government set up by PMO the Yalu Nature reserve was selected in a transparent process as the YSESP demonstration site.

7 INVOLVEMENT OF DPRK

103. Since the last meeting of the PSC, there were a number of activities implemented in order to ensure the potential involvement of DPR Korea in the project.
104. With financial support provided by the participating countries of the project, capacity building activities were carried out. Following the successful organisation of the training course of TDA and SAP processes, the experts from DPR Korea upgraded their knowledge and experiences in the development of the two important documents of the project. They also further strengthened their understanding of ecosystem-based approach applied in the design of SAP.
105. With close consultation with relevant institution and experts from DPR Korea, a capacity building project has been fully implemented with the assistances provided by a participating country, and implemented by a NGO, the Dalian Association of Marine Environment.
106. Regarding the request of the PSC at its last meeting on the issue of ensuring convenient communication between all the participating countries and the secretariat of the YSLME Commission, the relevant negotiation was not able to be initiated due to the United Nations Security Council's Resolution 1874. It is anticipated that the relevant negotiation would start when the situation allows.

8 CHALLENGES TO PROJECT IMPLEMENTATION

107. Although the project has been under implementation for nearly five years with mostly the same partners, challenges to implementation still remain, as these challenges are notified each year, but few people seem to take any notice of them or the recommendations to overcome such challenges. To ensure successful project implementation in the remaining half year, some might think it is probably too late to bother; however, for a successful completion of the project, and in the event that project extends to a second phase, the PMO hopes to have fewer challenges in the remaining project life span and next phase to more effectively and efficiently implement the SAP.
108. Once again, the PSC is requested to pay attention to these challenges, to take action to eliminate them, or at least lessen their negative impacts. The challenges to project implementation are listed in Table 1.

Issue	Situation
Blatant disregard for agreed deadlines and attention to reminders	There continues to be delays in meeting milestones stated in legally signed contracts for activities. Throughout the lifetime of the project, nearly all contractors did not adhere to the work plan

Issue	Situation
	<p>stated in the contract. Some examples: one institution gave the final draft report 9 months late. Another contractor gave the final draft report 7 months late. All this despite constant reminders from the PMO. Contracted parties simply have refused to accept that contracts entered into with UNOPS are legal binding agreements. In theory (and should be implemented in practice), all contractors who have been in breach of contract should not be re-contracted.</p> <p>Precious time is spent during every meeting to prepare agreed workplans. However, nearly no one adheres to the agreed tasks and deadlines, while numerous reminders from the PMO go unanswered.</p>
National co-ordination in some areas need further improvement	Overall, national level co-ordination has improved somewhat in some areas, but there remain quite a few incidences of lack of national assistance and co-ordination which is the responsibility of the NPCs and IMCCs, certified by and agreed through the NPC contracts.
Quality of outputs from some contractors need to be improved	This was a problem in the first year of the project which was understandable, as many partners were not familiar with the operational procedures of UNOPS. The project then organised a proposal and report writing workshop where the participants sent to the workshop were not really people who write proposals and reports. As the outcomes of the workshop were not properly applied in the reporting work of some activities, the quality of the products need to be further improved.
Enhance the participation and roles of the IMCC	The IMCCs have been established in both countries with some regular meetings. However, participation from a wide range of government agencies needs to be strengthened, especially since there is a possibility of SAP implementation.
Lack of a wide range of stakeholder, such as NGO, participation in decision making processes	Since project inception, the membership of only NWGs and RWGs has included slightly more institutions. However, new member involvement in the overall project continues to be limited in scope and number and only on a short-term basis (Small Grants Programme). Considering the future of the project and the GEF's requirements, it would be more effective and beneficial to the region if additional institutions, especially NGOs, have long-term involvement in the project that is not limited to technical issues. Recognising that inclusion of any new members should be properly assessed before acceptance, it should also be noted that allowing long-term participation in more institutions from relevant stakeholders would bring more expertise and human resources to the project, and also help raise attention on the environmental problems faced by the Yellow Sea.
Lack of institutional incentives	This issue has not been solved, and is related to the above. While recognition of the issue has been heightened, there is no resolution to the situation. Considering that co-financing from all

Issue	Situation
	countries is required for the project's future, this issue warrants urgent discussion and solution.

Table 1. Challenges to project implementation.

109. As the project moves towards implementation of the SAP, all challenges serve as a reminder that there remains a need for a continued sense of co-operation and commitment by all parties to the project and a faithful and optimistic outlook that the project, with an SAP in place, will provide the expected benefits to the region's marine environment and any future benefits the project may bring.

110. Recommendations to overcome the challenges are described in Section 9.

9 RECOMMENDATIONS FOR THE PROJECT

Recommendation 1. Keeping the Workplan and Contract Deadlines for Completion

During the intersessional period, the project has continued suffering in delay of completing relevant work according to the workplan. The late completion of defined work in various contracts has largely affected overall implementation of the project activities. It has been a serious issue for the project to receive outputs according to the workplan as agreed by the project groups, and the contract deadlines signed in the contacts.

Therefore, it is recommend that the National Project Co-ordinator and the Chairpersons of the National Working Groups take this issue seriously, and instruct all relevant persons to provide outcomes according to the workplan and contract deadlines.

Recommendation 2. Wider participation of more stakeholders should be encouraged in both decision-making and implementation processes

As the project will enter into the stage for implementation of SAP, wider participation of more stakeholders in project activities should be encouraged, in both decision-making and implementation. During the intersessional period, efforts have been made to involve local governments, NGOs and youth groups into the project activities, but there is still a large room for improvement in this regard. As define by the Project Document, endorsed by the governments of the participating countries, and approved by the GEF Council, the representatives from NGOs and private sectors should be the members of the PSC. At this moment, the agreement has not been reached.

It is recommended that all project stakeholders consider this issue again, and make necessary improvement in involving more stakeholders, in particular the local governments, NGOs and private sectors. This will be critically important when the project gets into the implementation phase of the SAP.

Recommendation 3. NPCs should pay special attention to the quality of the project outcomes

The quality of the project outcomes has been improved in many reports and outcomes, but this still remains as a challenge of the project. In many cases, the presentation of the project outcomes in oral presentations were quite good, but when the written reports were received, the qualities dropped dramatically. While understanding the report writing is a time

consuming process, it is important to present the project outcomes to the governments of the participating countries, and the audience from outside the project.

It is recommended that the NPCs should pay special attention to the quality of the project outcome. It would be appropriate if some quality assurance procedure is established in the participating countries to ensure the quality of the outcomes meet the required standards.

Recommendation 4. Institutional incentives

As mentioned in the last PSC meeting, the lack of institutional incentives still remains a problem. In most cases, the project activity funding levels are much smaller than those from the national sources. It is hard to raise the institutional incentives in most institutions for the project activities within the framework of the project. However, as recognised by most people involved in the project that without co-operation and co-ordination between the participating countries, it would be impossible to understand the Yellow Sea as a whole, and it would be impossible to carry out management actions to address transboundary problems in the Yellow Sea. The project is providing a unique way in marine environment protection and sustainable use of coastal and marine resources.

It is recommended that the focal ministries responsible for the project in the participating countries positively consider necessary means to increase institutional incentives by various ways deemed necessary and appropriate.

Appendix I

Activities and Workshops Participated by the Project in 2009

10-13 Feb	Model UN with Korea University, Seoul, ROK
25-26 Mar	Macroalgae Discussions, Qingdao, China
7-11 Apr	YSESP-YSLME Biodiversity Demonstration Site Identification, Shandong and Liaoning Provinces, China
12 Apr	Monitoring and assessment of Mariculture Demonstration activities in Sanggou Bay
14-16 Apr	Final Joint Stock Assessment Workshop, Yantai, China
19-20 May	Assessment of Ganghwa Cross Component SAP demonstration activity, and seminar on UN for Anyang University students, Ganghwa, ROK
11-15 May	World Ocean Conference, Manado, Indonesia
16-18 June	2 nd Regional Mariculture Conference, Jeju, ROK
17-18 June	Cruise Summary Workshop, Seokcho, ROK
30 Jun-2 Jul	Monitoring and Assessing Pollution SAP demonstration activities in Liaoning Province, Liaoning, China
3 Jul	Groundwork for Ganghwa Tidal Flat Economic Valuation, Ganghwa, ROK
9-10 Jul	Presentation of overfishing-sustainable mariculture-food supply link at IOC-IUCN-NOAA LME 11 th Consultative Committee Meeting, Paris, France
18 Aug	Phase 2 Preparation Consultative Meeting with ROK, Ansan, ROK
21 Aug	Phase 2 Preparation Consultative Meeting with China, Qingdao, China
8-9 Sep	APEC-LME Workshop, Seoul, ROK
14-15 Sep	Monitoring and Assessing SAP demonstration activities in Qingdao, Qingdao, China
16-17 Sep	NOWPAP Biodiversity Workshop and Brainstorming Session, Toyama, Japan
20-21 Oct	Establishment of MPA Network in the Yellow Sea, Ganghwa, ROK
24-30 Oct	GEF IW Workshop and IW Conference, Cairns, Australia
16 Nov	Phase 2 Preparation Consultative Meeting with DPRK, Xian, China
17-19 Nov	6 th RSTP/PSC Meeting, Xian, China
23-27 Nov	EAS Congress 2009, Manila, Philippines
11 Dec (TBD)	Ocean Colour Algorithm Wrap-up and drafting peer-reviewed papers articles, Ansan, ROK

Appendix II

Expenditure Report for 2009 (As of 9th Nov 2009)

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances	
0.PMO	0A	Salary	1101	Programme Manager	92,880	-61,667	-20,556	-82,223	10,656	
			1102	Environ Officer	0	0	0	0	0	
			1103	Fisheries Officer	0	0	0	0	0	
			1104	Economist	0	0	0	0	0	
			1301	Secretary	16,273	-8,986	-2,995	-11,981	4,292	
			1302	Driver	13,572	-7,462	-2,487	-9,949	3,623	
			1303	Adm. Asst.	16,273	-8,986	-2,995	-11,981	4,292	
			1304	Finance & Adm. Officer	28,316	-14,817	-4,939	-19,756	8,560	
			1305	IT specialist	16,273	-4,660	-1,553	-6,214	10,059	
	Sub Total					183,588	-106,578	-35,526	-142,105	41,483
	0D	Premises	4101	Office supplies	7,716	-1,471	-2,000	-3,471	4,245	
			4102	Library acquisitions	259	-206	0	-206	53	
			4104	Computer Software	500	0	0	0	500	
			4201	Computers	2,000	-1,329	0	-1,329	671	
			4203	Printers	0	0	0	0	0	
			4204	Copy machine (small size)	0	0	0	0	0	
			4205	PowerPoint OHP	0	0	0	0	0	
			4206	Automobile	0	0	0	0	0	
			4301	Office rent	0	0	0	0	0	
4302			Furniture	0	0	0	0	0		
4303	Premises costs	5,000	0	-2,000	-2,000	3,000				
5101	Rental & maint. of computer equip.	3,000	0	0	0	3,000				

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances
			5102	Rental & maint. of copiers	500	0	0	0	500
			5103	Repair & maint. of vehicles & insurance	8,752	-2,594	-1,500	-4,094	4,658
			5104	Rental & maint. of other office equip	2,500	0	0	0	2,500
			5105	Rental of meeting rooms & equip.	0	0	0	0	0
			5220	Publication (other than reports)	12,216	0	-1,500	-1,500	10,716
			5221	Webpage design and updating	931	-107	0	-107	824
			5301	Communication	1,500	-504	-300	-804	696
			5302	Postage/freight	8,267	-851	-1,500	-2,351	5,916
			5303	Operation cost	19,269	-5,243	-5,000	-10,243	9,026
			1306	Staff Charges	23,397	-13,583	-4,528	-18,111	5,287
			5607	Reimbursement Costs	0	-7,497	0	-7,497	-7,497
			5701	Provision & Contribution-Staff charges	107,246	0	0	0	107,246
			5801	PO Accrual & Reversal	0	25,067	0	25,067	25,067
			5600	UNOPS Project Supporting Cost (6%)	17,815	-6,894	-3,231	-10,125	7,690
Sub Total					220,868	-15,210	-21,559	-36,769	184,100
0.PMO Total					404,456	-121,788	-57,085	-178,873	225,583
6.Cross Component	6A	Travel	1501	Project Staff Travel	77,840	-28,585	-25,000	-53,585	24,255
			1601	Annual Tri Part Review (IVB)	16,000	0	0	0	16,000
			1602	Interviews/Travel (CTA Prospects) (IVB)	0	0	0	0	0
	6B	Meeting	3301	Project Steering Committee meetings	18,000	0	-20,000	-20,000	-2,000
			3302	RSTP meetings	25,000	0	-23,000	-23,000	2,000

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances
			3303	Regional scientific conferences	90,000	0	0	0	90,000
	6C	Premises	4208	Sea-going equipment	11,971	0	0	0	11,971
			4210	Equipment unspecified	23,039	0	0	0	23,039
	6D	Contingencies	1223	Other consultant contracts	20,000	0	0	0	20,000
			1228	Phase 2 preparation - consultant	25,000	-8,750	-11,450	-20,200	4,800
			2135	Other institutional contracts	49,000	0	0	0	49,000
			2166	2 Regional cruise reports	15,000	0	0	0	15,000
			2177	Bridging phase	0	0	0	0	0
			2178	Cross Component Demo	53,000	-17,500	-35,500	-53,000	0
			3102	Short term fellowship for training	20,000	0	0	0	20,000
			3217	Additional training activities	20,000	0	0	0	20,000
			3335	Additional meetings required	30,000	0	0	0	30,000
			3349	2 WGs for Phase 2	0	-4,498	0	-4,498	-4,498
			3350	Cruise Summary W/S	20,000	-9,351	0	-9,351	10,649
			5219	Printing cost for the additional reports	36,000	0	-1,500	-1,500	34,500
			5401	Exigency costs	116,617	-4,661	-5,000	-9,661	106,956
			5501	Evaluation (consultants fees/travel/DSA)	48,000	0	0	0	48,000
			1307	Staff Charges	261,072	-168,884	-56,295	-225,178	35,894
			5606	UNOPS Project Supporting Cost(6%)	60,681	-14,534	-10,665	-25,198	35,483
			Sub Total		1,036,220	-256,763	-188,409	-445,172	591,048
			6.Cross Component Total		1,036,220	-256,763	-188,409	-445,172	591,048
1.Fisheries	1A	Stock assessment	1201	Development of Joint Stock Assessment Guidelines-Consultant	0	0	0	0	0

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances
			1225	Expert exchange programme	0	0	0	0	0
			2101	Institution Contracts for Data & Information collection	0	0	0	0	0
			2102	Institution Contracts to Revise National Stock Assessment Data	0	0	0	0	0
			2103	Institution Contract to Perform Regional Stock Assessment (Cooperative Cruise)	0	0	0	0	0
			2150	Regional Stock Assessment (4cruises +3 expert consultations)	120,000	0	-120,000	-120,000	0
			1226	Young Scientist exchange	0	0	0	0	0
			2147	Demo - Effectiveness of closed season / area	20,930	-9,000	-11,930	-20,930	0
			2149	Demo – Improvement in fisheries management system	15,325	0	-15,325	-15,325	0
			2148	Demo - Effectiveness of stock enhancement	35,000	-15,000	-19,985	-34,985	15
			2168	Other Contracts-Fisheries	20,000	0	0	0	20,000
			5201	Stock assessment report	0	0	0	0	0
	1B	Carrying capacity	1202	Developing Guidelines for Carrying Capacity Analysis-Consultant	0	0	0	0	0
			2104	Institution Contracts for Annual carrying capacity determination	0	0	0	0	0
			5202	Carrying capacity report	0	0	0	0	0
			2146	Carrying capacity technical guide line (mariculture)	0	0	0	0	0

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances
			3338	Regional training for carrying capacity (mariculture)	0	0	0	0	0
	1C	Mariculture Production	1203	Development of Sustainable Mariculture-Consultant	0	0	0	0	0
			1701	Mariculture Advisor	0	0	0	0	0
			3344	Regional Mariculture Conference	30,307	-24,045	0	-24,045	6,262
			3345	World Aquaculture Society meeting	0	0	0	0	0
			2105	Institution Contracts to Implement mariculture techniques (Demonstration Projects).	132,020	-37,500	-64,520	-102,020	30,000
			3202	Reg. training on mariculture techniques	0	0	0	0	0
			3203	Reg training on disease diagnosis, prevention and control	0	0	0	0	0
1.Fisheries			1D	Fisheries Management - Regional Agreements, National Laws & Management Plan for Fisheries	1204	Feasibility study on the regional agreement,i.e. FAO code of conduct	0	0	0
	1205	Prepare regional Agreement on Legislation-Consultant			7,000	0	0	0	7,000
	1206	SAP-fisheries-Consultant			0	0	0	0	0
	2106	Institution Contracts to Implement Reg Fisheries and ecosystem Management / Implementation Plans			0	0	0	0	0
	5203	Publication of regional fisheries agreement			0	0	0	0	0
	1E	Meetings	3304	RWG-F Meeting 1	0	0	0	0	0
			3305	RWG-F Meeting 2	0	0	0	0	0
			3306	RWG-F Meeting 3	0	0	0	0	0

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances	
			3307	RWG-F Meeting 4	0	0	0	0	0	
			3308	RWG-F Meeting 5	0	0	0	0	0	
			3309	RWG-F Meeting 6	0	0	0	0	0	
	Sub Total					380,582	-85,545	-231,760	-317,305	63,277
	1A	Stock assessment	2107	Ship rental	0	0	0	0	0	
			4207	Equipment for regional survey (f)	0	0	0	0	0	
			3336	2nd & 3rd Technical Meeting for the Cooperative Cruise	0	0	0	0	0	
	1F	UNOPS Project Supporting Cost	5304	Operation cost	0	0	0	0	0	
			1308	Staff Charges	120,694	-74,920	-24,973	-99,894	20,800	
			5608	Reimbursement Costs	0	-518	0	-518	-518	
			5802	PO Accrual & Reversal	0	2,896	0	2,896	2,896	
	5601	UNOPS Project Supporting Cost(6%)	30,628	-9,485	-15,404	-24,889	5,739			
	Sub Total					151,322	-82,027	-40,377	-122,404	28,917
	1.Fisheries Total					531,904	-167,572	-272,137	-439,709	92,194
	2.Biodiversity	2A	Habitat Conservation (Activity 1 to 3) & Vulnerable Species (Activity 2 to 5)	1208	Review of National Practice of Coastal Habitats and Vulnerable Species-Consultant	0	0	0	0	0
2108				Institution Contracts to review existing national practices of coastal habitat use, conservation & restoration	0	0	0	0	0	
2109				Institution Contracts to Implement Regional Strategy for Conservation Areas	0	-29,995	0	-29,995	-29,995	

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances
			2151	Management effectiveness of reserves (two country reports)	0	-9,800	0	-9,800	-9,800
			2152	Regionsal training for Reserve managers (2 meetings in local language)	45,000	-20,255		-20,255	24,745
			2169	Management improvement in demo site	100,000	-85,000	0	-85,000	15,000
			2170	Other Contracts-Biodiversity	20,000	0	0	0	20,000
			2171	Public awareness in demo site	30,000	-20,000	0	-20,000	10,000
			5204	Review national practices of coastal habitat use, conservation, and restoration-Printing costs	0	0	0	0	0
			5205	Review of status of vulnerable species and vulnerable trophic linkages-Printing costs	0	0	0	0	0
	2B	Genetic Diversity	1702	Biodiversity Advisor	0	0	0	0	0
			2144	Genetic diversity	0	0	0	0	0
			2153	Review of Genetic diversity in fleshy shrimp	0	-6,770	0	-6,770	-6,770
			5222	Printing cost for habitat status and Genetic review	10,000	0	0	0	10,000
	2C	Meetings	3310	RWG-B Meeting 1	0	0	0	0	0
			3311	RWG-B Meeting 2	0	0	0	0	0
			3312	RWG-B Meeting 3	0	0	0	0	0
			3313	RWG-B Meeting 4	0	0	0	0	0
			3314	RWG-B Meeting 5	0	0	0	0	0
			3315	RWG-B Meeting 6	0	0	0	0	0
Sub Total					205,000	-171,820	0	-171,820	33,180

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances
	2C	Meetings	3337	Cross Component Conference (RSTP3)	0	0	0	0	0
	2D	UNOPS Project Supporting Cost	5305	Operation cost	0	0	0	0	0
			1309	Staff Charges	37,436	-23,238	-7,746	-30,984	6,452
			5609	Reimbursement Costs	0	-729	0	-729	-729
			5803	PO Accrual & Reversal	0	3,145	0	3,145	3,145
			5602	UNOPS Project Supporting Cost(6%)	14,724	-11,559	-465	-12,023	2,701
	Sub Total				52,160	-32,380	-8,211	-40,591	11,569
2.Biodiversity Total					257,160	-204,200	-8,211	-212,411	44,749
3.Ecosystem	3A	Status of Ecosystem	1216	Regional data synthesis - Institution Contracts	0	0	0	0	0
			1703	Ecosystem Advisor	0	0	0	0	0
			2118	Institution Contracts - Nat'l data & Info collection	0	0	0	0	0
			2119	Institution Contracts for Demonstration of new and innovative technologies for monitoring (FRRF)	8,450	-8,450	0	-8,450	0
			3208	Reg training (estimation) on carrying capacity of ecosystem (CPR)	0	0	0	0	0
			2121	Institution Contracts for cooperative study cruise - ecosystem	118,689	-82,226	0	-82,226	36,463
			3334	Regional workshop on remote sensing for monitoring ecosystem	0	0	0	0	0
			2136	Spring cruise benthos and sediment core	0	0	0	0	0
			2137	Intercalibration	8,194	-14,361	0	-14,361	-6,167

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances	
3.Ecosystem	3B	Carrying Capacity of Ecosystem	1217	Prepare guidelines for ecosystem carrying capacity-Consultant	0	0	0	0	0	
			5211	Publish report on carrying capacity-Printing costs	0	0	0	0	0	
	3C	Stressors to Ecosystem	1218	ID and rank stresses to ecosystem-Consultant (regional monitoring)	0	0	0	0	0	
			2120	Institution Contracts to develop long-term sustainable investments & lessen stress to ecosystem	0	0	0	0	0	
			2155	Demo - Institution contract for jellyfish monitoring	60,000	-39,978	-20,000	-59,978	22	
			2154	Demo - Institution contract for effects of climate change	73,274	-24,400	0	-24,400	48,874	
			2167	demo-NPSi ratio	59,235	-19,700	0	-19,700	39,535	
			2172	Macroalgae bloom	15,000	0	0	0	15,000	
			2173	Other Contracts-Ecosystem	20,000	-2,880	-5,000	-7,880	12,120	
			5212	Publish reports-Stresses to ecosystem-Printing costs	4,000	0	0	0	4,000	
			3D	Meetings	3322	RWG-E Meeting 1	0	0	0	0
	3323	RWG-E Meeting 2			0	0	0	0	0	
	3324	RWG-E Meeting 3			0	0	0	0	0	
	3325	RWG-E Meeting 4			0	0	0	0	0	
	3326	RWG-E Meeting 5			0	0	0	0	0	
	3327	RWG-E Meeting 6			0	0	0	0	0	
	Sub Total					366,842	-191,995	-25,000	-216,995	149,847
	3E	UNOPS Project Supporting Cost	5306	Operation cost	0	0	0	0	0	
			1310	Staff Charges	63,680	-40,995	-13,665	-54,659	9,021	
			5610	Reimbursement Costs	0	-1,129	0	-1,129	-1,129	

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances
			5804	PO Accrual & Reversal	0	86,018	0	86,018	86,018
			5603	UNOPS Project Supporting Cost(6%)	26,341	-8,886	-2,320	-11,206	15,135
			Sub Total		90,021	35,008	-15,985	19,024	109,045
3.Ecosystem Total					456,863	-156,987	-40,985	-197,971	258,892
4.Pollution	4A	Contaminant Inputs (Critical Spots)	1211	Regional data synthesis - consultant	0	0	0	0	0
			1224	Visiting Scientist Programme	0	0	0	0	0
			2111	Institution Contracts - nat'l data & info collection	22,982	0	0	0	22,982
			5206	Publish report-reg'l data synthesis-Printing costs	0	0	0	0	0
	4B	Contaminant Levels	1212	Reg'l monitoring guidelines; indicators to assess convention implementation-consultant (IAEA)	0	0	0	0	0
			2112	Institution Contracts for cooperative study cruise	53,967	-53,967	0	-53,967	0
			2113	Institution Contracts for Intercalibration exercise (QHSS+IAEA)	0	0	0	0	0
			2157	Institution contract for IC nutrients Rd 3	0	0	0	0	0
			2156	Institution contract for IC metals org Rd2	23,900	-23,900	0	-23,900	0
			3206	Training on contaminant monitoring (phytotoxin)	0	0	0	0	0
			3218	Training Course assessing marine environment quality	3,662	0	0	0	3,662
			3219	Level 2 Training Courses (Joint with AMETEC)	0	-5,567	0	-5,567	-5,567
			3339	Intercalibration Summary Workshop	0	0	0	0	0

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances
	4C	Analysis of the Fate and Transport of Contaminants to Facilitate SAP Analysis	2115	Institution Contracts for Practice & Intercalibration - fate & transport of contaminants	0	0	0	0	0
2116			Institution Contracts for ICM actions for controlling discharge of contaminants and nutrients	0	0	0	0	0	
5210			Publish report-Fate and transport of contaminants-Printing costs	0	0	0	0	0	
4.Pollution	4D	Regional Strategy Pollution Control	1213	Reg'l synthesis contaminant fate and transport-Consultant(IC)	0	0	0	0	0
			1215	Reg'l investment strategy & imp. plan pollution control - Consultant (IAEA)	0	0	0	0	0
			2114	Institution Contracts to implement regional pollution control strategies	0	0	0	0	0
			2117	Institution Contracts to implement contaminant remediation/prevention	0	0	0	0	0
			2158	Demo - Institution contract for atmosphere deposition	74,480	-24,800	-49,680	-74,480	0
			2159	Demo - Institution contract for HS nutrient load	88,956	-32,000	-56,956	-88,956	0
			2160	Demo - Institution contract for Public awareness	0	0	0	0	0
			2161	Demo - Institution contract for recreational waters management	37,543	-12,510	-25,033	-37,543	0
			2162	Demo - Institution contract for sea-based nutrient source	51,916	-17,000	-31,716	-48,716	3,200

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances	
			2174	Other Contracts-Pollution	20,000	-7,629	0	-7,629	12,371	
			3346	Experience exchange for LME visit	0	0	0	0	0	
			5207	Publish regional invest. strategy-Printing costs	3,000	0	0	0	3,000	
			5209	Publish reg'l strategy activity results-Printing costs	3,000	0	0	0	3,000	
	4E	Meetings	3316	RWG-P Meeting 1	0	0	0	0	0	
			3317	RWG-P Meeting 2	0	0	0	0	0	
			3318	RWG-P Meeting 3	0	0	0	0	0	
			3319	RWG-P Meeting 4	0	0	0	0	0	
			3320	RWG-P Meeting 5	0	0	0	0	0	
			3321	RWG-P Meeting 6	0	0	0	0	0	
	Sub Total					383,406	-177,374	-163,385	-340,759	42,648
				1311	Staff Charges	61,799	-39,783	-13,261	-53,044	8,754
				5307	Operation cost	0	0	0	0	0
				5611	Reimbursement Costs	0	-1,224	0	-1,224	-1,224
				5805	PO Accrual & Reversal	0	52,843	0	52,843	52,843
				5604	UNOPS Project Supporting Cost(6%)	27,399	-9,932	-10,599	-20,531	6,868
Sub Total					89,198	1,903	-23,860	-21,957	67,241	
4.Pollution Total					472,604	-175,470	-187,245	-362,715	109,889	
5.Investment	5A	Stakeholders & Public Awareness	1227	Public awareness assistant	0	0	0	0	0	
			2123	Institution Contracts for Governance analysis	0	0	0	0	0	
			2124	Institution Contracts for The Yellow Sea and Youth	8,000	0	0	0	8,000	

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances
			2125	Institution Contracts to Organize regular stakeholders conference (1/yr)	4,000	0	0	0	4,000
			2130	Institution Contracts to Organize public awareness conferences	3,500	0	0	0	3,500
			2131	Institution Contracts to Prepare public awareness materials	0	-1,200	-2,400	-3,600	-3,600
			2132	Institution Contracts to Produce multi-media, e.g., project pins, mouse pads, posters, etc.	0	0	0	0	0
			2138	Partnership Workshop	1,000	0	0	0	1,000
			2139	EAS Congress Workshop and Joint Session	10,000	0	-10,000	-10,000	0
			2140	Parliamentary Workshop	0	0	0	0	0
			2145	Regional governance analysis	0	0	0	0	0
			2175	Other Contracts-Investment	20,000	0	-20,000	-20,000	0
			2176	Preparation of commision document	5,000	0	0	0	5,000
			3101	Associate expert	25,300	-3,201	-6,200	-9,401	15,899
			3210	Training for decision makers	0	0	0	0	0
			3211	Training for community trainers	0	0	0	0	0
			3212	Training for local governmental officers	0	0	0	0	0
			3216	Public awareness training	0	0	0	0	0
			3340	2nd Training for local governmental officers	0	0	0	0	0
			3341	2nd Partnership Workshop	0	0	0	0	0

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances
			3342	2nd Parliamentary Workshop	0	0	0	0	0
			5214	Print newsletters	2,000	-1,452	-500	-1,952	48
			5223	Print the CBA of demonstration	2,000	0	0	0	2,000
5.Investment			1219	Prepare TDA-Consultant	0	0	0	0	0
			1220	Prepare regional SAP-Consultant	0	0	0	0	0
			1706	TDA NPPP	0	0	0	0	0
			2126	Institution Contracts to Prepare NYSAP	22,000	-28,000	-38,660	-66,660	-44,660
			2141	Regional valuation guideline	0	0	0	0	0
			2163	Case study	0	0	0	0	0
			2165	Political social acceptance analysis	0	-8,400	0	-8,400	-8,400
			2164	CBA of demonstration	117,600	-9,837	-10,620	-20,457	97,143
			3343	SAP consultation	0	0	0	0	0
			3347	SAP drafting group	0	0	0	0	0
			3348	Special PSC for SAP	0	0	0	0	0
			5215	Print the final TDA	0	0	0	0	0
			5216	Print NYSAP	6,000	0	0	0	6,000
			5217	Print regional SAP	5,000	0	0	0	5,000
	5B	TDA & SAP (Regional Coordination)							
	5C	National Coordination (Institutions)	1704	NCU Coordinator (K)	60,000	-35,200	0	-35,200	24,800
			1705	NCU Coordinator (C)	35,000	0	-26,765	-26,765	8,235
			2127	Institution Contracts to analyse institutional arrangements	0	0	0	0	0
			2133	National co-ordinating mechanism (C)	51,540	-40,000	-3,815	-43,815	7,725
			2134	National co-ordinating mechanism (K)	10,420	0	0	0	10,420

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances	
			3213	Training on Project document preparation	0	0	0	0	0	
			3214	Training on Fund raising	20,000	0	0	0	20,000	
	5D	Data and Information Management	1222	Develop regional data & info systems-Consultant	0	0	0	0	0	
			1707	DIM Consultants	0	0	0	0	0	
			2143	Maintenance of Meta and GIS Databases	17,500	-7,500	-5,000	-12,500	5,000	
			3215	Training on DIM	0	0	0	0	0	
			4103	GIS Software	0	0	0	0	0	
			4202	GIS workstation	0	0	0	0	0	
			4209	Equipment for DIM	0	0	0	0	0	
	5E	Meetings	3328	RWG-I Meeting 1	0	0	0	0	0	
			3329	RWG-I Meeting 2	0	0	0	0	0	
			3330	RWG-I Meeting 3	0	0	0	0	0	
			3331	RWG-I Meeting 4	0	0	0	0	0	
			3332	RWG-I Meeting 5	0	0	0	0	0	
			3333	RWG-I Meeting 6	0	0	0	0	0	
	Sub Total					425,860	-134,790	-123,960	-258,750	167,110
	5. Investment	5F	Financial Sustainability (Instruments)	2129	Demonstration projects on sustainable investment	0	0	0	0	0
2142				Small Grants Projects	26,326	-36,239	-2,990	-39,229	-12,903	
5G		UNOPS Project Supporting Cost	1312	Staff Charges	114,579	-70,127	-23,376	-93,502	21,077	
			5308	Operation cost	0	0	0	0	0	
			5612	Reimbursement Costs	0	-505	0	-505	-505	
			5806	PO Accrual & Reversal	0	52,522	0	52,522	52,522	
			5605	UNOPS Project Supporting	35,314	-11,348	-9,020	-20,368	14,946	

Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Yr2009	Actual Exp (JAN-SEP)	Est Exp (OCT-DEC)	Total Expenditure	Balances
				Cost(6%)					
				Sub Total	176,219	-65,697	-35,385	-101,082	75,137
				5.Investment Total	602,079	-200,487	-159,345	-359,832	242,247
				Grand Total	3,761,286	-1,283,267	-913,417	-2,196,684	1,564,601

Appendix III

PMO's Inventory of Non-Expendable Property

Period	PROJECT EXPENDITURE						EXPENDITURE AMOUNT		Autho- rization	Ref
	BUDGET LINES	ACCOUNT	ACCOUNT DESCRIPTION				LC	US\$ equiv		
Dec.04	4205	72800	Office Equipment	LCD Projector	O-04-001	PLC-XT15KA(SANYO)	KRW 3,540,000	3,361.82	34	
Dec.04	4205	72800	Office Equipment	Scanner	O-04-002	EPSON Perfection 1270	KRW 102,000	96.87	34	
Dec.04	4201	72800	IT Equipment	Lap-top Computer	I-04-001	Toshiba	KRW 1,960,000	1,861.35	34	Including OS Software(130,000)
Dec.04	4201	72800	IT Equipment	Lap-top Computer	I-04-002	Toshiba	KRW 1,960,000	1,861.35	34	Including OS Software(130,000)
Dec.04	4302	72200	Furniture	Partition	F-04-001	KF124 * 2	KRW 354,400	336.56	34	
Jul.05	4302	72200	Furniture	Partition	F-04-001	(KF124 * 2)	-KRW 91,314	(89.17)		Disposal on 2005
Dec.04	4302	72200	Furniture	Partition	F-04-001	KF104W * 5	KRW 775,500	736.47	34	
Jul.05	4302	72200	Furniture	Partition	F-04-001	(KF104W * 5)	-KRW 28,904	(28.23)		Disposal on 2005
Dec.04	4302	72200	Furniture	Partition	F-04-001	KF084W *2	KRW 266,000	252.61	34	
Dec.04	4302	72200	Furniture	Connector	F-04-001	KF5214 T * 2	KRW 35,800	34.00	34	
Dec.04	4302	72200	Furniture	Connector	F-04-001	KF5114 L * 1	KRW 15,200	14.43	34	
Dec.04	4302	72200	Furniture	Connector	F-04-001	KF6014 * 6	KRW 49,800	47.29	34	
Dec.04	4302	72200	Furniture	Partition	F-04-001	KF126 * 5	KRW 1,055,000	1,001.90	34	
Jul.05	4302	72200	Furniture	Partition	F-04-001	(KF126 * 5)	-KRW 42,527	(41.53)		Disposal on 2005
Dec.04	4302	72200	Furniture	Partition	F-04-001	KF106 * 2	KRW 357,200	339.22	34	
Jul.05	4302	72200	Furniture	Partition	F-04-001	(KF106 * 2)	-KRW 15,649	(15.28)		Disposal on 2005
Dec.04	4302	72200	Furniture	Connector	F-04-001	KF5216 T * 1	KRW 21,400	20.32	34	
Dec.04	4302	72200	Furniture	Connector	F-04-001	KF5116 L * 1	KRW 20,000	18.99	34	
Dec.04	4302	72200	Furniture	Connector	F-04-001	KF6016 * 5	KRW 48,500	46.06	34	
Jul.05	4302	72200	Furniture	Partition	F-04-001	(KF6016 * 4)	-KRW 5,706	(5.57)		Disposal on 2005
Dec.04	4302	72200	Furniture	Multi-Bar	F-04-001	KA0012 * 6	KRW 103,200	98.01	34	
Dec.04	4302	72200	Furniture	Multi-Bar	F-04-001	KA0008 * 1	KRW 12,400	11.78	34	

Period	PROJECT EXPENDITURE						EXPENDITURE AMOUNT		Author-ization	Ref
	BUDGET LINES	ACCOUNT	ACCOUNT DESCRIPTION				LC	US\$ equiv		
Dec.04	4302	72200	Furniture	Horizontal Shelf	F-04-001	KA0101 * 7	KRW 28,700	27.26	34	
Dec.04	4302	72200	Furniture	Supplies Shelf	F-04-001	KA0104 * 7	KRW 24,500	23.27	34	
Dec.04	4302	72200	Furniture	Pencil Case	F-04-001	KA0106 * 7	KRW 14,700	13.96	34	
Dec.04	4302	72200	Furniture	Shelve	F-04-001	KT3312 * 3	KRW 429,000	407.41	34	
Dec.04	4302	72200	Furniture	Chair	F-04-002	CH2301	KRW 112,500	106.84	34	
Dec.04	4302	72200	Furniture	Shelve	F-04-001	KT3010 * 3	KRW 130,200	123.65	34	
Dec.04	4302	72200	Furniture	Cabinet	F-04-003	SC0085W5 * 2	KRW 252,400	239.70	34	
Dec.04	4302	72200	Furniture	Cabinet	F-04-004	SB0082W2 * 2	KRW 95,400	90.60	34	
Dec.04	4302	72200	Furniture	Cabinet	F-04-005	SC0085W5 * 4	KRW 505,200	479.77	34	
Dec.04	4302	72200	Furniture	Cabinet	F-04-006	SC0082W2 * 1	KRW 86,900	82.53	34	
Dec.04	4302	72200	Furniture	Cabinet Door	F-04-004	SB0082W2 * 5	KRW 238,500	226.50	34	
Dec.04	4302	72200	Furniture	Conference Table	F-04-007	SR118	KRW 214,500	203.70	34	
Dec.04	4302	72200	Furniture	Chair	F-04-008	CH0011AF * 6	KRW 605,400	574.93	34	
Dec.04	4302	72200	Furniture	Folding Table	F-04-009	CR9006 * 1	KRW 116,800	110.92	34	
Dec.04	4302	72200	Furniture	Cabinet	F-04-0010	SC982F 800	KRW 111,000	105.41	34	
Dec.04	4302	72200	Furniture	Cabinet	F-04-0011	SC982C 800	KRW 367,600	349.10	34	
Dec.04	4302	72200	Vehicle	Motor Vehicle	V-04-001	Hyundai Trajet 2.0 A/T	KRW 24,094,000	22,881.29	30	
Jul.05	4104/4201	72800	IT Equipment	Office Software	I-05-001	Windows XP Pro (Kor)	355,000	354.65	PO%19 281- 44,45	krw 355,000 * 1ea
Jul.05	4104/4201	72800	IT Equipment	Office Software	I-05-002	MS windows XP Pro (Eng)	1,155,000	1,153.85	PO%19 281- 44,45	krw 385,000 * 3ea
Jul.05	4104/4201	72800	IT Equipment	Office Software	I-05-003	MS windows XP Pro - OLP NL (Eng)	3,390,000	3,386.61	PO%19 281- 44,45	krw 565,000 * 6ea
Jul.05	4104/4201	72800	IT Equipment	Office Software	I-05-004	H Office 2003 Pro - OLP NL (Kor)	456,000	455.54	PO%19 281- 44,45	krw 456,000 * 1ea
Jul.05	4104/4201	72800	IT Equipment	Office Software	I-05-005	Acrobat 7.0 Std (Eng)	900,000	899.10	PO%19 281- 44,45	krw 300,000 * 3ea

Period	PROJECT EXPENDITURE						EXPENDITURE AMOUNT		Author-ization	Ref
	BUDGET LINES	ACCOUNT	ACCOUNT DESCRIPTION				LC	US\$ equiv		
Nov.05	4104	72800	IT Equipment	Office Software	I-05-006	MS Project 2003 Std - OLP NL (Eng)	650,000	623.20	PO#293 86-14	1ea
Nov.05	4201	72800	IT Equipment	Lap-top Computer	I-05-007	Fujitsu S6240-SDM16	1,700,000	1,629.91	PO#293 86-13	
Apr.05	4201	72800	IT Equipment	Portable Hard Disk	I-05-008		CNY 640	77.91	PO#192 81-44	
May.05	4201	72800	IT Equipment	Lap-top Computer	I-05-009	Fujitsu S7011SF16	KRW 1,760,000	1,777.60	PO#192 81-44	
Jun.05	4201	72800	IT Equipment	DVD Read/Writer	I-05-0010			198.98	PO#192 81-44	
Mar.05	4204	72200	Office Equipment	Copy machine	O-05-001	Cannon IC-D380H	KRW 550,000	550.00	PO#178 11-01	
Apr.05	4210	72200	Office Equipment	Digital Camera	O-05-002	Nikon Coolpix3700	KRW 279,000	281.36	PO#192 81-38	
Apr.05	4210	72200	Office Equipment	Type Writer	O-05-003	ET-3800 Kyungbang Co.	KRW 200,000	201.69	PO#178 11-07	
May.05	4210	72200	Office Equipment	Safety Box	O-05-004	Bum Il ESD-104A(Digital Double Locking)	KRW 299,000	301.99	PO#192 81-38	
May.05	4210	72200	Office Equipment	Conference Call Machine	O-05-005	SoundPointPro225	KRW 370,000	372.38	PO#192 81-38	
Jul.05	4302	72200	Furniture	Task Chair	F-05-002	CH0011AF * 8 (615*530*785)	KRW 896,000	883.72	PO#192 81-39	KRW 112,000
Jul.05	4302	72200	Furniture	Famillia Chair	F-05-003	CH2301 * 1 (620*595*870~970)	KRW 125,000	123.29	PO#192 81-39	KRW 125,000
Jul.05	4302	72200	Furniture	Desk	F-05-004	TD016 * 2 (1600*800*720)	KRW 426,000	420.16	PO#192 81-39	KRW 213,000
Jul.05	4302	72200	Furniture	Extension desk	F-05-005	SD912F * 1 (600*1200*720)	KRW 139,000	137.09	PO#192 81-39	KRW 139,000
Jul.05	4302	72200	Furniture	Endless cabinet	F-05-006	SC982C * 2 (800*290*1920)	KRW 204,000	201.20	PO#192 81-39	KRW 102,000
Jul.05	4302	72200	Furniture	Square table	F-05-007	SR024S * 1 (2400*900*720)	KRW 312,000	307.72	PO#192 81-39	KRW 312,000
Jul.05	4302	72200	Furniture	Folding Table	F-05-008	CR9006 * 1 (590~610*480~520*720)	KRW 113,000	111.45	PO#192 81-39	KRW 113,000
Jul.05	4302	72200	Furniture	Partition	F-05-001	KF104W * 9 (1000*66*1370)	KRW 1,557,000	1,535.65	PO#192 81-39	KRW 173,000
Jul.05	4302	72200	Furniture	Partition Frame	F-05-001	KF0104 * 2 (1000*34*1370)	KRW 96,000	94.68	PO#192 81-39	KRW 48,000

Period	PROJECT EXPENDITURE						EXPENDITURE AMOUNT		Author-ization	Ref
	BUDGET LINES	ACCOUNT	ACCOUNT DESCRIPTION				LC	US\$ equiv		
Jul.05	4302	72200	Furniture	Partition Frame	F-05-001	KF0124 * 5 (1200*34*1370)	KRW 265,000	261.37	PO#192 81-39	KRW 53,000
Jul.05	4302	72200	Furniture	Partition tile	F-05-001	KF1106 * 4 (1000*14*600)	KRW 104,000	102.57	PO#192 81-39	KRW 26,000
Jul.05	4302	72200	Furniture	Partition tile	F-05-001	KF1126 * 10 (1200*14*600)	KRW 300,000	295.89	PO#192 81-39	KRW 30,000
Jul.05	4302	72200	Furniture	L Shape connector	F-05-001	KF5114 L * 6 (H: 1370)	KRW 96,000	94.68	PO#192 81-39	KRW 16,000
Jul.05	4302	72200	Furniture	Endong	F-05-001	KF6014 * 10 (H: 1370)	KRW 90,000	88.77	PO#192 81-39	KRW 9,000
Jul.05	4302	72200	Furniture	Leg	F-05-001	KF8001 * 2	KRW 44,000	43.40	PO#192 81-39	KRW 22,000
Jul.05	4302	72200	Furniture	Shelf	F-05-001	KT3010 * 2 (1000*360*200)	KRW 96,000	94.68	PO#192 81-39	KRW 48,000
Mar.06	4210	72200	Office Equipment	SONY Camcoder	O-06-001	System Case_Portavrace DSR with Matte Box	NZD 419.61	309.84	PO%35 736-10	
Mar.06	4210	72200	Office Equipment	SONY Camcoder	O-06-001	Headphone_Sennheiser HD202 Closed back monitor	NZD 56.00	41.35	PO%35 736-10	
Mar.06	4210	72200	Office Equipment	SONY Camcoder	O-06-001	Video Camcoder	NZD 4,747.50	3,505.55	PO%35 736-10	
Mar.06	4210	72200	Office Equipment	SONY Camcoder	O-06-001	Video Light HVL20DW2	NZD 112.50	83.07	PO%35 736-10	
Mar.06	4210	72200	Office Equipment	SONY Camcoder	O-06-001	Battery Pack - NPF970	NZD 483.76	357.21	PO%35 736-10	
Mar.06	4210	72200	Office Equipment	SONY Camcoder	O-06-001	AC Adaptor and Power Charger ACVQ1050D	NZD 237.96	175.71	PO%35 736-10	
Mar.06	4210	72200	Office Equipment	SONY Camcoder	O-06-001	Wireless Lavalier Mike Kit UWPC1	NZD 686.25	506.73	PO%35 736-10	
Mar.06	4210	72200	Office Equipment	SONY Camcoder	O-06-001	Tripod/Stand	NZD 151.88	112.15	PO%35 736-10	
Mar.06	4210	72200	Office Equipment	SONY Camcoder	O-06-001	DVCAM Tapes VF58CPKS	NZD 239.00	176.48	PO%35 736-10	
Mar.06	4210	72200	Office Equipment	SONY Camcoder	O-06-001	IEEE DV Cable	SGD 145.00	89.51	PO%35 736-10	
Mar.06	4210	72200	Office Equipment	SONY Camcoder	O-06-001	Headphone port adaptor	SGD 12.00	7.41	PO%35 736-10	

Period	PROJECT EXPENDITURE						EXPENDITURE AMOUNT		Author-ization	Ref
	BUDGET LINES	ACCOUNT	ACCOUNT DESCRIPTION				LC	US\$ equiv		
Mar.06	4210	72200	Office Equipment	SONY Camcoder	O-06-001	Memory Stick	SGD 95.00	58.64	PO%35 736-10	
Mar.06	4210	72200	Office Equipment	SONY Camcoder	O-06-001	Rain Cofer + Shipping		99.90	PO%35 736-10	
Feb.06	4201	72800	IT Equipment	Lap-top Computer	I-06-001	Toshiba M50-03601S	KRW 1,400,000	1,452.28	PO%35 736-15	
Jun.06	4201	72800	IT Equipment	Office Server	I-06-002	AS-PE1800 - Dell TM Power Edge TM 1800 Server	KRW 3,968,000	4,252.95	PO%41 557-12, PO%35 736-15	
Dec.06	4104	72800	IT Equipment	Office Software	I-06-003	Expert Choice Software	KRW 3,900,000	4,190.98	PO%53 903-03	
Nov.06	4205	72200	Office Equipment	LCD Projector	O-06-002	Sony CX20		1,560.00	PO%46 928-08	
Nov.06	4203	72200	Office Equipment	Printer	O-06-003	Cannon I90 Printer		250.00	PO%46 928-08	
Nov.06	4210	72200	Office Equipment	Scanner	O-06-004	Scanner HP Scanjet7650	KRW 653,600	688.00	PO%46 928-08	
Jun.07	4302	72200	Furniture	Shelves	F-07-001	Shelving units for container	KRW 170,000	184.78	PO%61 923-16	
Jun.07	4302	72200	Furniture	Container	F-07-002	Container	KRW 1,200,000	1,304.34	PO%61 923-16	
Jun.07	4302	72200	Furniture	Double drawer	F-07-003	TP0312W (420*560*570)	KRW 264,000	286.96	PO%61 923-16	2EA
Jun.07	4302	72200	Furniture	Farmilar Chair	F-07-004	CH2301 (620*595*870~970)	KRW 126,000	136.96	PO%61 923-16	1EA
Jun.07	4302	72200	Furniture	Topline Desk	F-07-005	TD016 (1600*800*720)	KRW 213,000	231.52	PO%61 923-16	1EA
Jun.07	4302	72200	Furniture	L-shape Connector	F-07-003	KF5514 (H:1370)	KRW 19,000	20.65	PO%61 923-16	1EA
Jun.07	4302	72200	Furniture	Partition	F-07-003	KF068W (600*66*1770)	KRW 154,000	167.39	PO%61 923-16	1EA
Jun.07	4302	72200	Furniture	Partition	F-07-003	KF108W (1000*66*1770)	KRW 220,000	239.13	PO%61 923-16	1EA
Jun.07	4302	72200	Furniture	Partition	F-07-003	KF128W (1200*66*1770)	KRW 256,000	278.26	PO%61 923-16	1EA
Jun.07	4302	72200	Furniture	L-shape Connector	F-07-003	KF5118 (H:1770)	KRW 24,000	26.09	PO%61 923-16	1EA

Period	PROJECT EXPENDITURE						EXPENDITURE AMOUNT		Author-ization	Ref
	BUDGET LINES	ACCOUNT	ACCOUNT DESCRIPTION				LC	US\$ equiv		
Jun.07	4302	72200	Furniture	Ending Connector	F-07-003	KF6018 (H:1770)	KRW 24,000	26.09	PO%61 923-16	2EA
Jun.07	4302	72200	Furniture	Folding Table	F-07-006	CR9006 (630*525*720)	KRW 260,000	282.61	PO%61 923-16	2EA
Aug.08	4201	72800	IT Equipment	Lap-top Computer	I-08-001	Lenovo Thinkpad	KRW 1,145,400	1,150.00	PO#101 563-03	
Aug.08	4201	72800	IT Equipment	Lap-top Computer	I-08-002	Lenovo Thinkpad	KRW 1,145,400	1,150.00	PO#101 563-03	
Jul.09	4201	72800	IT Equipment	Lap-top Computer	I-09-001	Toshiba Portege A600 PPA60K-01C00R	KRW 1,690,000	1,328.62	PO#147 291-01	
Total Amount as of Oct 2009									\$77,798.31	
								IT Equipment	\$27,804.88	
								Furniture	\$13,924.50	
								Vehicle	\$22,881.29	
								Office Equipment	\$13,187.65	
									TRUE	

Appendix IV

List of Acronyms

APEC-LME	Asia-Pacific Economic Co-operation - Large Marine Ecosystem
CBA	cost-benefit analysis
CDOM	coloured dissolved organic matter
CKJORC	China-Korea Joint Ocean Research Center
DPRK	Democratic People's Republic of Korea
DSO	Dalian Society of Oceanography
GEF	Global Environment Facility
GIS	geographic information system
IMCC	Inter-ministerial Co-ordinating Committee
IMTA	integrated multi-trophic aquaculture
IOC`	Intergovernmental Oceanographic Commission
IUCN	International Union for Conservation of Nature
IW:LEARN	International Waters:Learning Exchange and Resource Network
KMI	Korea Maritime Institute - ROK
KORDI	Korea Ocean Research and Development Institute
LME	large marine ecosystem
MoU	Memorandum of Understanding
MPA	marine protected area
NGO	Non-Governmental Organisation
NOAA	National Oceanic and Atmospheric Administration
NOWPAP	Northwest Pacific Action Plan
NPC	National Project Co-ordinator
NWG	National Working Group
NSAP	National Yellow Sea Action Plan
PAR	photosynthetically active radiation
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PIF	Project Identification Form
PMO	Project Management Office
PSC	Project Steering Committee
ROK	Republic of Korea
RSTP	Regional Scientific and Technical Panel
RWG	Regional Working Group
SAP	Strategic Action Programme
SHMA	State Hydrometeorological Administration - DPRK
TDA	Transboundary Diagnostic Analysis
TSM	total suspended matter
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNOPS	United Nations Office for Project Services
WSFRI	West Sea Fisheries and Research Institute - ROK
WWF	World Wide Fund for Nature
YSESP	Yellow Sea Ecoregion Support Project
YSFRI	Yellow Sea Fisheries Research Institute - China
YSLME	Yellow Sea Large Marine Ecosystem
YSP	Yellow Sea Partnership

Annex V
Project Implementation Review



Selected Project: 994 - Yellow Sea

Rating of Project Progress towards Meeting Objective

	Overall 2008 Rating (from 08 PIR)	2009 Rating	Comments[6]
National Project Manager/Coordinator:	HS	HS - Highly Satisfactory	Since the implementation of the project, many of the expected outputs have been altered to read more easily, make more sense, and have more relevance to regional needs. Implementations of the project activities have involved wider participation, from parliamentary members to youth group. Preparation of TDA was completed in 2006; final draft SAP was completed in spring 2008 and is being reviewed by the governments. The table above maintains the original outputs as stated in the ProDoc LogFrame. Project implementation suffered some minor delays in keeping with some deadlines. However, additional activities were implemented to meet the stated outputs and more. It should be noted that the 2 co-operative cruises were successfully implemented for the first time ever in the Yellow Sea. That proved the co-operative spirit of the littoral countries, contributing greatly to not only sound environment in the Yellow Sea, but also regional peace and stability.
Government GEF OFFP[7] (optional):	HS		
Executing Agency (optional):	HS		
UNDP Country Office:	HS	HS - Highly Satisfactory	During the reporting period, most of the planned activities were implemented in line with the workplan. Especially SAP was finalized and officially submitted to the ROK and PRC. This would be major achievements in this project however, during the reporting period, ROK only approved SAP whereas pending approval in PRC.
UNDP Regional Technical Advisor:	HS	HS - Highly Satisfactory	The project is on track to achieve its objective and is exceeding expectations under some of its components, especially in terms of enhancing the scientific understanding of the YSLME and the threats to it in terms of overfishing, macroalgal bloom, pollution, impacts of climate change, reclamation activities, etc. including impressive scientific results on food-chain analysis, stock assessment and fish genetic diversity, carrying capacity of mariculture, and modification of marine and coastal habitats. The project has also successfully initiated national and regional priority actions, including moratorium on fisheries during certain seasons in certain areas, protection of seagrass beds, establishment of marine protected area networks, etc. The regional and national institutional frameworks for sustainable management of the YSLME have also been strengthened - a TDA has been finalised and approved by the countries and the SAP has been technically cleared and is awaiting political endorsement. The project has contributed to a shift to ecosystem-based management of the YSLME instead of traditional sectoral approaches and the SAP includes the establishment of an YSI

[6] Comment on the rating for 2009 and also on any observable trends from 2006 – 2009

[7] In the case of a project involving more than 1 country, it is suggested that for simplicity only the OFFP (optional) and Country Office Programme Manager from the lead country sign-off. If representatives from more than 1 country sign off, please add additional rows as necessary indicating the country name for each signature.



Selected Project: 994 - Yellow Sea

Rating of Project Progress towards Meeting Objective

	Rating of Project Implementation	2009 Rating	Comments[6]
National Project Manager/Coordinator:	S	HS - Highly Satisfactory	Overall project implementation is satisfactory, and according to schedule, with good quality results for the most part. It should be noted that the few activities previously delayed are now back on track. Additional activities have also been carried out through collaboration with regional partners.
Government GEF OFP[7] (optional):	S		
Executing Agency (optional):	S		
UNDP Country Office:	S	HS - Highly Satisfactory	The project implementation was smoothly carried out during the reporting period, focusing on the project objectives. The major planned activities were implemented in line with the workplan, namely, finalization of SAP, NSAP draft, demonstration activities and partnership building etc. As mentioned by the project above, there were some delayed activities, which required closer monitoring.
UNDP Regional Technical Advisor:	S	HS - Highly Satisfactory	Implementation of project activities is on track and has involved groundbreaking activities, such as the first joint ecosystem assessment cruises in the YSLME ever undertaken, implementation of a large number of demonstration activities on fisheries and mariculture, biodiversity conservation, pollution control, etc. Key outputs include a high-quality TDA and SAP which are introducing the ecosystem-based approach to management of the YSLME, a biodiversity assessment of critical habitats, a new ocean-colour algorithm for the YSLME, regional monitoring of jellyfish bloom and impact of climate change and changed nutrient ratios. With the approval of the SAP and agreement on the establishment of a YSLME Commission at the Regional Project Steering Committee meeting in November 2009, coupled with completion of initiated demonstration activities, the project will have completed all its expected activities as well as additional ones.

[6] Comment on the rating for 2009 and also on any observable trends from 2006 – 2009

[7] In the case of a project involving more than 1 country, it is suggested that for simplicity only the OFP (optional) and Country Office Programme Manager from the lead country sign-off. If representatives from more than 1 country sign off, please add additional rows as necessary indicating the country name for each signature.

Annex VI
Endorsed SAP

**Endorsement of the Regional Strategic Action Programme for
the Yellow Sea Large Marine Ecosystem**

The People's Republic of China and the Republic of Korea,

Recognising the need to reduce environmental stresses in the Yellow Sea due to the causes identified in the Transboundary Diagnostic Analysis (TDA) of the UNDP/GEF Project entitled "Reducing Environmental Stresses in the Yellow Sea Large Marine Ecosystem (YSLME);

Recognising also the regional co-operating mechanism established by the YSLME project provided an effective means for addressing the environmental problems of the Yellow Sea;

Appreciating the support and assistance provided by the Global Environment Facility (GEF), the United Nations Development Programme (UNDP) and the United Nations Office for Project Services (UNOPS) in preparing the regional Strategic Action Programme (SAP) and other project activities;

Noting the ecosystem-based approach applied in the SAP for the Yellow Sea provides a co-ordinated management structure to address the environmental problems, with clearly identified tangible targets and appropriate management actions;

Following the consultation with relevant governmental agencies, **Endorse** the regional Strategic Action Programme for the Yellow Sea as attached in the Annex.

Signature: _____

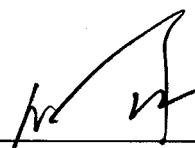


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19. 11. 2009

Signature: _____



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Date: _____

19 Nov 2009



**UNDP/GEF PROJECT ENTITLED “REDUCING ENVIRONMENTAL STRESS IN THE
YELLOW SEA LARGE MARINE ECOSYSTEM”**

**STRATEGIC ACTION PROGRAMME (SAP)
FOR
THE YELLOW SEA LARGE MARINE ECOSYSTEM**

**UNDP/GEF Project entitled “Reducing Environmental Stress in
The Yellow Sea Large Marine Ecosystem”**

November 2009

Table of Contents

EXECUTIVE SUMMARY.....	V
LIST OF ABBREVIATIONS.....	XI
ACKNOWLEDGEMENTS.....	XIII
1. ENVIRONMENTAL CHALLENGES IN THE YELLOW SEA: ENVIRONMENT STATUS...	1
2. ENVIRONMENTAL PROBLEMS AND CAUSES	3
2.1 POLLUTION AND CONTAMINANTS	3
2.2 EUTROPHICATION.....	4
2.3 HARMFUL ALGAL BLOOMS (HABs)	4
2.4 FISHING EFFORT EXCEEDING ECOSYSTEM CARRYING CAPACITY.....	4
2.5 MARICULTURE FACING UNSUSTAINABLE PROBLEMS	5
2.6 HABITAT LOSS AND DEGRADATION	5
2.7 CHANGE IN ECOSYSTEM STRUCTURE	5
2.8 JELLYFISH BLOOMS.....	6
2.9 CLIMATE CHANGE-RELATED ISSUES.....	6
3. INSTITUTIONAL AND LEGAL FRAMEWORK IN PROTECTION OF MARINE ENVIRONMENT AND SUSTAINABLE USE OF MARINE AND COASTAL RESOURCES: CURRENT STATUS AND LIMITATIONS.	7
3.1 INSTITUTIONAL ARRANGEMENTS.....	7
3.2 LEGAL STANDARDS.....	7
3.3 STAKEHOLDERS' INVOLVEMENT.....	8
4. ENVIRONMENTAL AND SCIENTIFIC BASIS FOR THE MANAGEMENT STRATEGIES: ECOSYSTEM CARRYING CAPACITY AND REGIONAL MANAGEMENT TARGETS	9
4.1 ECOSYSTEM SERVICES.....	9
4.2 ECOSYSTEM CARRYING CAPACITY	9
4.3 FUTURE OF ECC IN THE YELLOW SEA.....	11
4.4 REGIONAL MANAGEMENT TARGETS	11
5. MANAGEMENT STRATEGIES: INTERVENTIONS AND ACTIONS TOWARDS 2020....	13
5.1 ACTIONS PRIMARILY ADDRESSING PROVISIONING SERVICES	14
5.1.1 <i>Technical actions</i>	15
5.1.2 <i>Governance Actions</i>	17
5.1.3 <i>Indicators of management actions</i>	17
5.2 ACTIONS PRIMARILY ADDRESSING REGULATING SERVICES	18
5.2.1 <i>Technical actions</i>	18
5.2.2 <i>Governance actions</i>	20
5.2.3 <i>Indicators of management actions</i>	20
5.3 ACTIONS PRIMARILY ADDRESSING CULTURAL SERVICES	20
5.3.1 <i>Technical actions</i>	21
5.3.2 <i>Governance actions</i>	22
5.3.3 <i>Indicators of management actions</i>	22
5.4 ACTIONS PRIMARILY ADDRESSING SUPPORTING SERVICES	22
5.4.1 <i>Technical actions</i>	23
5.4.2 <i>Governance Action</i>	25
5.4.3 <i>Indicators of management actions</i>	26
6. ECONOMIC JUSTIFICATION AND ASSESSMENT.....	27
6.1 ECONOMY OF MANAGEMENT ACTIONS	27
6.2 A CASE STUDY: WOULD MANAGEMENT ACTIONS BE EFFICIENT?.....	28

6.3	INTEGRATION OF ECONOMIC ANALYSIS INTO ECOSYSTEM MANAGEMENT	31
7.	INSTITUTIONAL & LEGISLATIVE ACTIONS AND FINANCIAL MECHANISM FOR IMPLEMENTATION OF SAP	32
7.1	GOVERNANCE	32
7.1.1	<i>Institutional actions: creation of the YSLME Commission</i>	32
7.1.2	<i>Actions to improve effectiveness of legal instruments</i>	32
7.1.3	<i>Stakeholders' wide participation</i>	33
7.1.4	<i>Guidelines for the improvement of national governance</i>	34
7.2	UPGRADING NATIONAL CAPACITY	34
7.3	FINANCIAL MECHANISM FOR THE IMPLEMENTATION OF YSLME SAP.....	34
8.	MONITORING AND EVALUATION	35
8.1	INDICATORS OF MONITORING AND EVALUATION	35
8.1.1	<i>Process Indicators</i>	35
8.1.2	<i>Stress Reduction Indicators</i>	36
8.1.3	<i>Environmental Status Indicators</i>	37
8.2	MECHANISM OF MONITORING AND EVALUATION	38
8.2.1	<i>Project Implementation Review (PIR)</i>	38
8.2.2	<i>Mid-Term Evaluation</i>	38
8.2.3	<i>Final Evaluation</i>	38
9.	CONCLUSIONS	38
10.	REFERENCES.....	39
	ANNEX.....	43

Executive Summary

Project objectives and activities

The objective of the UNDP/GEF Yellow Sea Large Marine Ecosystem (YSLME) Project is to facilitate the ecosystem-based management and environmentally-sustainable use of the Yellow Sea and its watershed by reducing development pressure and promoting sustainable development of this densely populated, heavily urbanised, and industrialised semi-enclosed shelf sea ecosystem. To achieve this objective, the YSLME Project prepared a Transboundary Diagnostic Analysis (TDA) and regional Strategic Action Programme (SAP). National Yellow Sea Action Plans (NSAPs) and demonstration activities of the SAP management actions were also prepared.

Transboundary environmental problems in the Yellow Sea

According to the TDA (2007) as well as to the new information reported since then, nine major transboundary environmental concerns have been identified:

- Pollution and Contaminants;
- Eutrophication;
- Harmful Algal Blooms (HABs);
- Fishing Effort Exceeding Ecosystem Carrying Capacity;
- Mariculture Facing Unsustainable Problems;
- Habitat Loss and Degradation;
- Change in Ecosystem Structure;
- Jellyfish Blooms; and
- Climate Change-related issues.

Purpose of SAP for the Yellow Sea

To address these environmental issues, the YSLME SAP sets regional management targets for environmental quality of the Yellow Sea, and the required management actions to achieve these targets by 2020. Based on the concept of the “ecosystem carrying capacity” (ECC), the SAP proposes the targets and actions according to the services that the Yellow Sea ecosystem provides. The actions consists of both technical and institutional/legislative (governance) interventions. For more information about the contents of the SAP, see Section 2 in this document.

Brief history of SAP development

To ensure the concerns of all stakeholders were addressed in the SAP, seven meetings with regional scientists, government officials, and other relevant stakeholders such as NGOs were organised in 2007 and 2008. Initially, a consultation meeting prepared a concept paper describing the objectives and central theme of the SAP. Next, two ad-hoc working group meetings identified the regional management targets and the management actions. The final two drafting group meetings prepared the draft SAP for the special Project Steering Committee (PSC) meeting, organised immediately after the third ad-hoc working group meeting. The PSC reviewed and approved the SAP as the final draft to be submitted to the participating governments for their consideration and endorsement.

This document was drafted by Mr. CHUNG Suh-Yong, Mr. ENDO Isao, Mr. JIANG Yihang, Mr. JIN Xianshi, Mr. WALTON Mark, Mr. WEN Quan, and Mr. YOO Sinjae with additional contributions from Ms. CHIANG Connie, Mr. CHO Dong-Oh, Mr. FANG Jianguang, Mr. HUH Hyung-Tack, Mr. JANG In Kwon, Ms. KANG Young Shil, Mr. KWON Sukjae, Mr. LEE Jang-Uk, Mr. LEE Sang-Go, Mr. LEE Youn Ho, Mr. LI Haiqing, Ms. LI Jingmei, Mr. LIANG Fengkui, Mr. LIU Hongbin, Mr. PARK Gyung Soo, Mr. TOBAI Sadayosi, Mr. WANG Songlin, Mr. WANG Zongling, Mr. XU Xiangmin, Mr. YANG Dong Beom, Mr. YANG Yafeng, Ms. YU Ming, Mr. ZHANG Xuelei, Ms. ZHENG Wei, and Mr. ZHU Mingyuan.

Ecosystem-based approach

The YSLME SAP uses an innovative “ecosystem-based approach” to manage the complicated relationships between the environmental stresses and the resulting problems. The ecosystem-based approach uses scientific knowledge to guide appropriate management actions that preserve the ecosystem function of the YSLME. The goal of the YSLME SAP is to preserve the ECC which is defined as the capacity of the ecosystem to provide its ecosystem services. These services are vital for the welfare of communities surrounding the Yellow Sea. They include provisioning services (e.g. fisheries & mariculture), regulating services (e.g. regulation of climate change and water quality), cultural services (e.g. tourism), and supporting services (e.g. nutrient cycling & primary production). Traditionally, the management actions targeted problems by sector. However, this approach is of limited effectiveness as environmental problems are not normally the result of a single cause. The sector approach cannot address all the underlying causes. Based on this past experience, the ecosystem-based approach, advocated by the YSLME SAP, targets multiple ecosystem services holistically to sustain the ECC of the Yellow Sea.

Regional management targets and actions

The YSLME SAP proposes eleven regional management targets to sustain the ECC (Box 1). These targets primarily address a particular ecosystem service, with the understanding that achievement of a target will also benefit other ecosystem services. These targets are set using current scientific understanding and most are quantitatively measurable. Under ecosystem-based management, scientific monitoring is essential to assess the impact of the management actions and management must be adaptive to respond to new knowledge.

Technical actions

To achieve these regional targets, the SAP proposes associated technical management actions.

Box 1: Regional targets and technical actions proposed by the YSLME SAP

Provisioning Services

Target 1: 25-30% reduction in fishing effort

- Action 1-1: Control fishing boat numbers
- Action 1-2: Stop fishing in certain areas/seasons
- Action 1-3: Monitor and assess stock fluctuations

Target 2: Rebuilding of over-exploited marine living resource

- Action 2-1: Increase mesh size
- Action 2-2: Enhance stocks
- Action 2-3: Improve fisheries management

Target 3: Improvement of mariculture techniques to reduce environmental stress

- Action 3-1: Develop environment-friendly mariculture methods and technology
- Action 3-2: Reduce nutrient discharge
- Action 3-3: Control diseases effectively

Regulating Services

Target 4: Meeting international requirements on contaminants

- Action 4-1: Conduct intensive monitoring and assessment
- Action 4-2: Control contaminants discharge with reference to Codex alimentarius and Stockholm Convention
- Action 4-3: Implementing MARPOL 1973/78 effectively

Target 5: Reduction of total loading of nutrients from 2006 levels

- Action 5-1: Control total loading from point sources
- Action 5-2: Control total loading from non-point sources and sea-based sources
- Action 5-3: Apply new approaches for nutrient treatment

Cultural Services

Target 6: Reduced standing stock of marine litter from current level

- Action 6-1: Control source of litters and solid wastes
- Action 6-2: Improve removal of marine litter
- Action 6-3: Increase public awareness of marine litter

Target 7: Reduce contaminants, particularly in bathing beaches and other marine recreational waters, to nationally acceptable levels

- Action 7-1: Conduct regular monitoring, assessment and information dissemination particularly in bathing beaches and other recreational waters
- Action 7-2: Control pollution in bathing beaches and other marine recreational waters

Supporting Services

Target 8: Better understanding and prediction of ecosystem changes for adaptive management

- Action 8-1: Assess and monitor the impacts of N/P/Si ratio change
- Action 8-2: Assess and monitor the impacts of climate change
- Action 8-3: Forecast ecosystem changes in the long-term scale
- Action 8-4: Monitor the transboundary impact of jellyfish blooms
- Action 8-5: Monitor HAB occurrences

Target 9: Maintenance and improvement of current populations/distributions and genetic diversity of the living organisms including endangered and endemic species

- Action 9-1: Establish and implement regional conservation plan to preserve biodiversity

Target 10: Maintenance of habitats according to standards and regulations of 2007

- Action 10-1: Develop regional guidelines for coastal habitat management

- Action 10-2: Establish network of MPAs
- Action 10-3: Control new coastal reclamation
- Action 10-4: Promote public awareness of the benefits of biodiversity conservation

Target 11: Reduction of the risk of introduced species

- Action 11-1: Control and monitor ballast water discharge
- Action 11-2: Introduce precautionary approach and strict control of introduction of non-native species

Governance actions

The proposed management actions include not only technical actions as mentioned above, but also governance actions. Specifically, the SAP suggests the following actions as an implementation mechanism to enhance the environmental governance of the Yellow Sea: to improve the effectiveness of legal instruments; to promote participation of a wide range of stakeholders; and to create the YSLME Commission (Box 2).

Box 2: Outline of the YSLME Commission

Objectives

- To co-ordinate national efforts better
- To enhance the effectiveness of regional efforts

Nature

- Soft, non-legally binding and co-operation based institution

Institutional framework

- Steering Committee: serves as a supreme decision making body
- Secretariat: secures appropriate expertise to address the policy and research interests of the Steering Committee
- Sub-Commissions: mainly consist of experts, responsible for technical issues

Having devised the management actions, the SAP provides the means to secure economic justification of the actions and to monitor and evaluate their status and performance. Firstly, the SAP suggests the actions to integrate economic analyses into the ecosystem management of the Yellow Sea, providing the basic framework and a case study of the cost-benefit analyses of the management actions. Secondly, the SAP lists performance indicators (i.e. process, stress reduction, and environmental status) as well as the mechanism of monitoring and evaluation to determine the effectiveness of each action.

Future of ECC in the Yellow Sea

The current level of exploitation or stress placed on the Yellow Sea will result in a loss of economically important services; most noticeable will be the loss of provisioning services. Decision-makers are faced with a choice, whether or not to introduce the SAP management actions that will sustain the ecosystem services and preserve the Yellow Sea as a productive, useful commodity for future generations.

Conclusions

To address the transboundary environmental problems in the Yellow Sea, the YSLME SAP develops an ecosystem-based approach to sustain the ECC holistically. The SAP not only sets regional management targets, but also devises the management actions to achieve the targets. The actions consist of both the technical and governance actions. With the implementation of these actions, the ECC of the Yellow Sea will improve and thereby continue to provide the ecosystem services.

Several characteristics make the YSLME SAP unique compared to other SAPs. Firstly, the YSLME SAP employs the ecosystem-based approach rather than the traditional sector approach. Secondly, the SAP provides the concrete and measurable targets and the comprehensive management actions to achieve them. Lastly, the SAP proposes mechanisms for regional co-ordination and co-operation, including the YSLME Commission.

The Yellow Sea ecosystem and its ECC will change in the future, for better or worse. If all the pressures exerted on the ecosystem continue, the Yellow Sea will degrade and its ECC will decline. However, if all the management actions proposed in this SAP are implemented and regional management targets met, the Yellow Sea will improve its capacity to supply its provisioning, regulating, cultural and supporting services and the Yellow Sea would remain a living, vital, productive, and healthy sea.

List of Abbreviations

CBA	Cost-Benefit Analysis
CBD	Convention on Biological Diversity
DPRK	Democratic People's Republic of Korea
ECC	ecosystem carrying capacity
EBFM	Ecosystem-based fisheries management
GEF	Global Environment Facility
FAO	Food and Agriculture Organization of the United Nations
GAP	Good Aquaculture Practice
HABs	harmful algal blooms
IMO	International Maritime Organisation (of United Nations)
IMTA	Integrated Multi-trophic Aquaculture
IOC	Intergovernmental Oceanographic Commission of UNESCO
ITQ	Individual Transfer Quota
LME	Large Marine Ecosystem
MARPOL	International Convention for the Prevention of Pollution from Ships
MPA	Marine Protected Area
MOU	Memorandum of Understanding
NGO	Non-governmental organisation
NOWPAP	UNEP Northwest Pacific Action Plan
NSAP	National Strategic Action Plan
PAHs	polycyclic aromatic hydrocarbons
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PIR	Project Implementation Review
POPs	persistent organic pollutants
ROK	Republic of Korea
PSC	Project Steering Committee
RWG	Regional Working Group
SAP	Strategic Action Programme
TAC	Total Allowable Catch
TDA	Transboundary Diagnostic Analysis
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNDP	United Nations Development Programme
WESTPAC	IOC Sub-Commission for the Western Pacific
YSLME	Yellow Sea Large Marine Ecosystem
YSLME CSC	YSLME Commission Steering Committee

Acknowledgements

The UNDP/GEF YSLME Project wishes to thank all those who contributed to the production of this Document.

STRATEGIC ACTION PROGRAMME (SAP) FOR THE YELLOW SEA LARGE MARINE ECOSYSTEM

1. Environmental Challenges in the Yellow Sea: Environment status

The geographic area of Yellow Sea Large Marine Ecosystem (YSLME) for use in the project was defined in the UNDP/GEF Project document ^[1] as the body of water bounded as follows: to the west by the Chinese coastline south of Penglai; to the north by a line from Penglai to Dalian; to the east by the Korean Peninsula and Jeju Island and a line drawn from Jindo Island off the south coast of the Korean mainland to the north coast of Jeju Island; and to the south by a line running from the north bank of the mouth of the Yangtze River (Chang Jiang) to the south-western coast of Jeju Island (Figure 1).

This shallow sea has an average depth of 44m ^[2]. The seafloor slopes gently from China and more steeply from Korea to a trough in the eastern portion that runs south to the Okinawa Trench ^[2]. It was carved by the ancient Yellow River (Huang He) when Yellow Sea was dry during the last glacial period ^[3]. The Yellow Sea region is under the influence of the Asian monsoon system, where seasonal winds prevail. The region is also located between the Siberian High and the subtropical Pacific Low, which results in cold-dry winters and warm-wet summers ^[4]. The bio-geochemistry of the sea is strongly influenced by fresh water and airborne (aeolian) material. Rivers discharge approximately 1.6 billion tonnes of sediment and 1,500 billion tonnes of freshwater into the Yellow Sea annually ^[5] with a further 460 billion tonnes of water from rainfall ^[3]. The huge freshwater inputs result in temperature and salinity differences that limit the water exchange between the Yellow Sea and the East China Sea ^[6], so that water is only exchanged every 7 years ^[7] making this sea vulnerable to pollution. There are two seasonal water circulation patterns (Fig 1) but water circulation is weak ^[7] meaning that coastal areas are susceptible to localised pollution discharges. Nevertheless, the Yellow Sea is very productive and supports substantial populations of fish, birds, mammals, invertebrates and a huge human coastal population. This population relies on the Yellow Sea LME for many services such as: provision of fisheries (2.3 million tonnes per year) & mariculture (6.2 million tonnes per year); the support of wildlife, provision of bathing beaches & tourism, and its capacity to absorb nutrients and other pollutants. The ability of the Yellow Sea to provide these services is defined here as “ecosystem carrying capacity”.

Catches of the ten most important species landed in the Yellow Sea area¹ have increased rapidly since 1986 from 400,000 tonnes to 2.3 million tonnes in 2004 ^[5]. However, this level of exploitation is not sustainable. In common with many other seas, over-exploitation of marine living resources mean that catches in the Yellow Sea once mostly consisting of large, long-lived, valuable demersal fish such as hairtail and small yellow croaker are now dominated by short-lived, smaller, lower trophic level and less valuable species such as anchovy and sandlance ^[9].

¹ Yellow Sea catches may include catch from adjacent areas, likewise catch from the Yellow Sea may be landed in elsewhere

The combination of the loss of wetlands, deterioration in coastal water quality and over-exploitation of resources has reduced the ecosystem carrying capacity of the Yellow Sea. The loss of the capacity of the Yellow Sea to provide services such as nutrient regulation combined with increased pollution is driving changes in the food chain that may not support the current productive ecosystem and are encouraging the red tides and harmful algal blooms (HABs) currently experienced in the Yellow Sea ^[11, 12].



Figure 1: (a) Winter and (b) summer circulation features for the Yellow Sea, extracted from Su (1998) ^[10]. The identified currents include Yellow Sea Coastal Current (YSCC), Changjiang River Plume (CRP), Yellow Sea Warm Current (YSWC), Korean Coastal Current (KCC), and Kuroshio Current. The red line marks Yellow Sea LME boundary.

The loss of biodiversity reduces the ecosystem's ability to respond to change ^[13]. Thus the loss of key fish species through over-fishing is thought to allow the blooms of flagellates and jellyfish ^[12] currently reported in the region ^[14-16]. These changes may signal the beginning of a shift towards an ecosystem dominated by worthless jellyfish, as has happened in various other areas including the Benguela Current Region ^[17, 18] and the Black Sea ^[19].

In order to ensure the future capacity of the Yellow Sea ecosystem to provide services such as the production of fish & shellfish, climate regulation, carbon sequestration and nutrient cycling, improved science-based management is required.

This document, the Strategic Action Programme of the YSLME, provides a roadmap for improving the ecosystem carrying capacity by the year 2020, through a combination of improvements in environmental legislation and enforcement, improved regional co-ordination and national co-operation between government agencies, elimination of environmentally damaging subsidies, enhanced public awareness and capacity building, and the use of regional monitoring networks. Once in place, these actions will

help limit the loss of habitat, reduce environmental degradation and improve the state of over-exploited marine living resources stocks. Using the principles of ecosystem-based management and sustainable use can ensure these ecosystem services for future generations.

Environmental impacts from an adjacent area, the Bohai Sea, are addressed by similar management actions identified in this document. China's "National Action Plan for the Blue Bohai Sea" has documented reductions of fishing efforts and pollution discharge. The GEF-funded PEMSEA Project developed the "Bohai Sea Declaration", and Environment Management Strategy in the Bohai Sea, with participation of the provinces and cities around the Bohai Sea. These efforts are going on in the region. Relevant information and impact assessment of management actions will be provided by the PEMSEA Project and the appropriate governmental agencies in China.

2. Environmental Problems and Causes

The Transboundary Diagnostic Analysis (TDA) is part of the mechanism that the GEF recommends to ensure that nations sharing a large marine ecosystem (LME) begin to address coastal and marine issues by jointly analysing factual, scientific information on transboundary concerns ^[20]. The root causes and priorities for management actions to address those concerns are examined in the Causal Chain Analysis. The TDA process provides a useful mechanism to foster participation at all levels.

This section sets out the primary environmental concerns as expressed in TDA and new information reported since the TDA was published.

2.1 Pollution and Contaminants

Pollution is the introduction of contaminants into the environment that causes harm to organisms or damage to the environment ^[21]. These cover a range of compounds resulting from human activities due to discharges of industrial and domestic waste. These enter the marine environment through rivers, groundwater and through the atmosphere as wet or dry deposition. Some of these contaminants occur naturally and are essential for supporting life, while others have only been found since industrialisation occurred. Most of these compounds have no detrimental effect until a certain critical concentration is reached either in food or in the environment. The Regional Working Group (RWG) - Pollution identified inorganic nitrogen and phosphate, faecal substances, heavy metals, persistent organic pollutants (POPs), polycyclic aromatic hydrocarbons (PAHs) and marine litter as the major contaminants in the Yellow Sea ^[1].

Inorganic nitrogen and phosphate are important nutrients that sustain phytoplankton (single celled algae) communities, which form the basis of the marine food chain. However, high concentrations stimulate excessive phytoplankton growth that cannot be consumed by zooplankton leading to eutrophication (see 2.2) and HABs (2.3). Faecal compounds from domestic waste disposal can result in contaminated water supplies or seafood, like mussels, oysters and scallops. The resulting illnesses vary from stomach ailments to dysentery or typhoid. Heavy metals, although possibly important locally around industrial areas, are not considered a transboundary problem. PAHs are also likely to be a more localised issue associated with certain industrial processes although

this class of compound can be mutagenic or carcinogenic ^[1]. Incorporation of POPs in to the food chain is, however, part of a global problem and can lead to increased health risks in humans ^[1].

2.2 Eutrophication

The extensive and frequent over-use of chemical fertilizers and the increased discharges of partially treated industrial and domestic waste have raised the concentration of dissolved inorganic nitrogen in coastal waters. This nutrient enrichment acts as a fertilizer stimulating the growth of phytoplankton often to a problematic degree as evidenced by algal blooms and red tides. Few species are able to grow in this environment and feed on this productivity and therefore biodiversity is decreased. Normal food chains that support fish and shellfish are highly impacted, and production suffers^[1]. The Yellow Sea is very vulnerable to eutrophication as it is isolated from the East China Sea by a strong thermohaline front ^[6] and internally, water circulation is weak ^[7]. This results in a flushing time of 7 years ^[7] meaning that contaminants like nitrogen can accumulate in the system.

2.3 Harmful Algal Blooms (HABs)

Frequently, the eutrophication promotes phytoplankton growth to such an extent that the bloom collapses, and the resulting bacterial decomposition causes oxygen depletion in the surrounding water causing fish kills and mass mortality of other less mobile organisms, especially in mariculture establishments ^[1].

Silicate (Si^{2-}) is the result of the erosion and weathering of rocks and is carried to the sea by rivers, ground water and by the wind as dust. As a result of changing freshwater flows due to irrigation and hydroelectric projects, much of the silicate is trapped before entering the sea. The decreased silicate inputs in combination with increased nitrogen (N) concentrations have changed the ratio. This Si:N ratio is vital in sustaining the growth of diatoms. Diatoms are the most important group of phytoplankton in economically productive systems, accounting for approximately 60% of primary production by biomass in the worlds oceans ^[22] However, when the ratio of Si:N falls beneath a ratio of 1:1 (Redfield ratio), the lack of silicate prevents diatoms from forming their silica body walls and consequently flagellate species are favoured ^[23-25]. Since 1980, the Si concentration in the Yellow Sea has been close to the ecological threshold required for diatom growth ^[26]. The result is that organisms that are not dependent on this nutrient benefit most, such as flagellates. Some of these flagellates produce blooms (red tides and HABs) that are either toxic to higher organisms, such as human shellfish poisoning, or reduce palatability of seafood. Intense blooms can also reduce survival of fish and shellfish through gill clogging and reduced oxygen levels ^[1].

2.4 Fishing Effort Exceeding Ecosystem Carrying Capacity

There is rapid increase in catches² in the Yellow Sea from 400,000 tonnes in 1986 to almost 2.5 million tonnes in 2004, which indicate that fishing effort has exceeded Ecosystem Carrying Capacity ^[27, 28]. The over-exploitation is evidenced by the decrease in mean size at catch of some species over the same time period ^[29]. In addition the composition of catches have dramatically changed in the last decades: in

² Yellow Sea catches may include catch from adjacent areas, likewise catch from the Yellow Sea may be landed elsewhere.

the 1950's and '60's the catch was dominated by small yellow croaker, large hairtail and shrimp; in the '70's herring dominated the catch briefly and in the late 80's to the present day anchovy has been the dominant species, although recently even catches of anchovy have declined and a new fishery for sandlance has developed. In general large commercially valuable species have been replaced by smaller, lower trophic level, less valuable pelagic species ^[1, 9, 30, 31]. Furthermore, the mean trophic level of the main commercial species in the Yellow Sea has decreased due to dietary changes as a result of ontogenetic shifts in diet, climate change induced changes in availability of dietary items and over-fishing of the prey items of carnivorous fish e.g. anchovy ^[32].

2.5 Mariculture Facing Unsustainable Problems

The production from mariculture and freshwater aquaculture from China and Republic of Korea (ROK) has grown spectacularly and in 2005 these countries accounted for 44 million metric tonnes^[33] or 70% of the world's total production, with China accounting for the bulk of the growth ^[1]. Mariculture accounted for approximately 14 million tonnes in 2004 of which the greatest increases were from mollusc culture. However there are signs that these increases are facing some problems, and recently the productivity per unit area has begun to fall as the area under cultivation grows ^[1, 5]. This fall in productivity maybe due to the fact that only unsuitable cultivation areas now remain, or that increased proximity of farms has resulted in: increased disease transmission between farms; raised concentrations of organic wastes; and competition for food resources amongst cultivated organisms ^[1]. These factors all increase stress and lower the growth and survival rates of the culture organisms, thus reducing productivity.

2.6 Habitat Loss and Degradation

Habitat has been lost at a staggering rate with almost 40% of coastal wetlands being converted to other uses ^[8] and both countries have further development plans. Coastal construction has altered coastal habitats, and industrial, agricultural and domestic effluent, aggregate mining and dumping have further degraded the marine coastal environment. These coastal wetlands are important habitat for shellfish fisheries and culture, and many of the commercially important fish species use these areas as nursery or feeding grounds at some stage in their life cycle. Additionally many endangered bird species depend on these wetlands as feeding and breeding grounds on their migration routes ^[6]. Moreover these wetlands perform important biogeochemical functions such as sediment retention, carbon sequestration, nutrient cycling, prevention of saltwater intrusion and coastline stabilisation.

2.7 Change in Ecosystem Structure

Changes in the biomass and composition of phytoplankton and zooplankton communities could have serious consequences for fisheries productivity as these groups form the basis of the food chain. The national reports by the YSLME project indicated increases in the biomass of phytoplankton fraction > 77 µm, but decreases in the zooplankton > 500 µm on the Chinese side, while on the Korean side of the Yellow Sea increased biomass of zooplankton > 330 µm were recorded ^[1, 5, 27, 28]. The ratio of diatoms to dinoflagellates was reported to have decreased in recently years, possibly in response to the increasing eutrophication and decreased ratio of Si:N ^[1] as mentioned previously. Benthic biomass also appears to have decreased and the proportion of polychaetes seems to have increased ^[5], these changes are frequently associated with

increasing eutrophication of the sediments. The reduced benthic community could have significant consequences as it is an important food source for many commercially important fish species. As mentioned previously, there have also been changes in the composition of catches suggesting that community structure has altered as a result of overfishing and other anthropogenic impacts.

2.8 Jellyfish Blooms

The TDA reported that the abundance of jellyfish has increased in recent years leading to clogging of fishing nets and increased likelihood of bathers being stung ^[1]. Recently it was reported that the increase in marine litter and construction of concrete structures (e.g. jetties and wharfs) has expanded the habitat available for the asexual reproductive stage of jellyfish ^[34]. In addition, the reduction of plankton-eating fish stocks, brought about by over-fishing, has increased the food available to support the growth of jellyfish blooms ^[18, 35]. There appears to be a growing consensus that pollution, acidification of the sea and changing phytoplankton communities is leading to increased jellyfish densities ^[12, 17, 35-38]. Not only do these higher jellyfish densities impact the tourists and fishermen in the Yellow Sea, they also directly impact fish stocks through feeding on the fish larvae and reducing the availability of zooplankton which is an important food source for larval fish ^[37, 39-43].

2.9 Climate Change-related Issues

Air temperatures over the Korean Peninsula have increased at a rate of 0.23°C/decade since the 1960's ^[44]. Although annual variation in sea temperatures appears to be connected with other major climate systems (e.g. El Nino/Southern Oscillation and the Aleutian Low) ^[44], mean sea temperatures have increased 0.38 – 0.94°C/decade in the Yellow Sea ^[26]. The warming trend has been accelerating in recent decades and there has been a northward movement of isothermals during the period ^[45].

Climate change will affect marine ecosystems in many ways ^[46]. Changes in global precipitation and temperature patterns could alter large-scale oceanic circulation patterns ^[47]. As a result, circulation in marginal seas such as the Yellow Sea will be affected as well. This will affect migration and dispersal of marine organisms. Intensified stratification can reduce the productivity in the upper layer as reported from offshore waters of California ^[48]. Diseases are more likely in the warming environment. Already the incidence of disease in many marine species is increasing around the world ^[49].

Most of the major commercial fish species over-winter in the bottom cold water mass located in the central southern portion of the Yellow Sea ^[28]. Shrinkage of cold water mass due to climate change could have serious consequences for these stocks. Already some cold-water species, such as Pacific cod and herring, are no longer found in commercial numbers due to over-fishing and/or warming of the water mass ^[44].

Climate change can cause the mistiming of the arrival of migratory birds and breeding season with food availability as evidenced in other seas ^[50, 51]. In addition, climate driven changes in sea level could have significant impacts of the food availability to wading birds ^[52].

The increase in carbon dioxide emissions due to anthropogenic activities that is driving climate change is also causing acidification of seawater. A decrease 0.7 pH units is expected by the time fossil fuels are depleted. Already the pH of the world's oceans has decreased 0.1 pH units, representing a 30% increase in the H⁺ ion concentration^[53]. The speed of change is causing concern, as oceans are unlikely to be able to adapt so quickly^[53]. Already links between jellyfish density and acidification have been reported^[54].

3. Institutional and Legal Framework in Protection of Marine Environment and Sustainable Use of Marine and Coastal Resources: Current Status and Limitations.

3.1 Institutional Arrangements

Status: Regional Co-operative institutions (e.g., YSLME, NOWPAP) exist, but the co-ordination among institutions could be improved to address environmental stresses in the region.

Several international institutions exist in the region. While the YSLME Project is directly related to the regional governance in the Yellow Sea, other institutions such as Northwest Pacific Action Plan (NOWPAP), Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), and IOC/WESTPAC also have some relevance to the Yellow Sea region^[55]. There are also bilateral co-operative institutions including those between China and ROK based on two bilateral treaties on the environment and fisheries, i.e. the Joint Committee on the Environmental Co-operation and the Joint Fisheries Commission^[55].

However, the level of co-ordination among the institutions to bring synergic effects and the efforts to avoid the duplication problem is low. For example, considering the serious impacts of the recent oil spill accident in 2007 along the west coast of ROK, better co-ordination between the YSLME Project and NOWPAP could have increased the effectiveness of regional efforts to deal with the problems.

Gaps: There is a need to improve regional co-ordination.

Improved regional co-ordination will enhance overall effectiveness using limited resources in the Yellow Sea region. This can be achieved by a creation of a regional co-ordinating mechanism such as the YSLME Commission.

3.2 Legal standards

Status: There are several treaties and guidelines related to the environment of the Yellow Sea region, but the level of strictness and scope of coverage of these legal instruments varies.

The United Nations Convention on the Law of the Sea, the London Convention and its 1996 Protocol, MARPOL, the Convention on Biological Diversity, the Ramsar Convention and the FAO Code of Conduct for Responsible Fisheries are examples of multilateral treaties and guidelines^[55]. Bilateral treaties such as those between China

and ROK on the environment and fisheries are also relevant to the environment in the Yellow Sea ^[55].

However, not all of the coastal countries in the Yellow Sea region are the members of the treaties including the 1996 Protocol to the London Convention and Annex VI of the MARPOL ^[55]. Furthermore some treaties such as the United Nations Convention on the Law of the Sea, and the Convention on Biological Diversity do not provide detailed legally binding standards to address the problems in the Yellow Sea to the coastal countries. The FAO Code of Conduct for the Responsible Fisheries, on the other hand, may not be effective due to its non-legally binding nature.

At the national level, national laws and regulations of coastal countries in the region have not been sufficiently developed to implement regional standards ^[55]. There exist inconsistencies of existing laws and regulations. Limited enforcement of laws and regulations contribute to the problem of implementation of legal instruments.

Gaps: There is a need to improve the strictness, scope of coverage and enforcement mechanism of legal instruments.

Improvement of the strictness and scope of coverage of legal instruments at the regional level will help enhance overall effectiveness of the legal instruments. Development of a regional mechanism to harmonise national legal institutions is also necessary in order to achieve equally effective implementation of legal instruments in each participating country.

3.3 Stakeholders' Involvement

Status: Several stakeholders are involved in the regional governance in the Yellow Sea region. However, the level of importance and participation varies.

The government is the most important stakeholder. The role of the central governments of the participating countries has been critical. However, among the coastal countries in the Yellow Sea region, the Democratic People's Republic of Korea (DPRK) has not fully participated in the regional efforts.

Several international organisations have participated in the regional governance. UNDP has actively participated in the regional governance while the UNEP and IMO are also related to the regional governance in the Yellow Sea.

Other stakeholders such as NGOs and private sectors have participated in the regional governance less actively compared with other realms ^[55].

Gaps: Securing participation of all the coastal countries and relevant stakeholders in the regional governance is necessary. Capacity building of some stakeholders is also important before their full participation in the regional governance.

Despite some progress in securing the participation of DPRK in regional efforts, full participation of the DPRK, which is important in terms of geographical completeness and effectiveness of regional governance in the Yellow Sea region, has not been achieved yet ^[55]. Enhanced co-ordination among the participating governments is also necessary to enhance the effectiveness. Further constructive participation of relevant

international organisations needs to be sought. Capacity building of local governments and NGOs is necessary to encourage their full participation in regional governance. Finally a constructive participation of private sectors is also important to enhance overall effectiveness of regional governance in the Yellow Sea region.

4. Environmental and Scientific Basis for the Management Strategies: Ecosystem Carrying Capacity and Regional Management Targets

4.1 Ecosystem Services

The Yellow Sea provides many benefits that are crucial for the lives and wellbeing of people in the surrounding countries. The coastal population especially, relies on the Yellow Sea ecosystem for a large portion of their basic and economic requirements. These benefits obtained from ecosystems are called ecosystem services ^[56] and are generally classified into four categories: provisioning, regulating, cultural and supporting services ^[57]. Provisioning services provide ecosystem goods such as seafood (cultured as well as natural), fuels, bio-products, genetic resources and raw materials (e.g. sand & salt). Regulating services play a crucial role in the maintenance of environmental quality. These include water quality regulation, sewage treatment, waste disposal, and disease regulation. Cultural services provide non-material benefits such as spiritual, aesthetical, and recreational amenities. While some cultural services, like tourism, have market values ^[58], others, such as spiritual services might be difficult to be valued. Whether or not cultural services have market values, they have direct implications for human well-being. Therefore, provisioning, regulating, and cultural services provide benefits directly usable by people.

There are other kinds of ecosystem services that human society needs, although they are not as visible as the above three service categories. For the three directly-usable services to be maintained, basic ecosystem functions and processes have to work. Physico-chemical and biological processes are involved in such basic ecosystem functions. For example, people eat fish and fish eat plankton, and therefore in order to sustain fish production, production of plankton communities should be maintained. Production of plankton is furthermore controlled by many physico-chemical factors. These functions that support the basic processes of ecosystems are called supporting services. Supporting services include primary production, nutrient cycling, and maintenance of biodiversity. Without supporting services, the other directly-usable services cannot be sustained.

4.2 Ecosystem Carrying Capacity

Not every ecosystem provides the same quantity and quality of ecosystem services. This is because ecosystem services are the result of many physico-chemical and biological processes within the ecosystem, and different ecosystems have different structures and processes. Therefore, it is obvious that there is a limit to the ecosystem services that an ecosystem can provide. Also, as an ecosystem changes, the ecosystem services that they provide will change. For example, if the environmental conditions deteriorate, marine living resources decline and we get less seafood. The factors that change the structure and productivity of ecosystems are called drivers of the ecosystem changes ^[56]. Most physico-chemical factors are called direct drivers as they immediately influence ecosystems. But it is the indirect drivers that are ultimately

responsible for direct drivers. Urbanisation and population growth are good examples. These indirect drivers will increase the nutrient loads (a direct driver) which will lead to eutrophication. Figure 2 describes the relationship of ecosystem, ecosystem services, direct and indirect drivers, human societies, and climate system. These form a cycle which is driven by human societies and climate system.

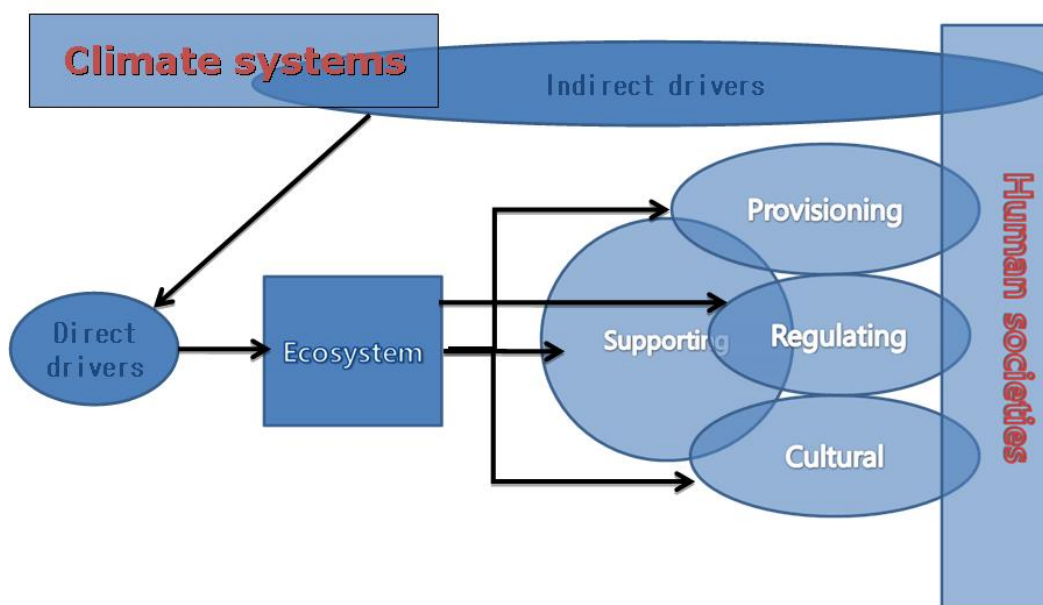


Figure 2: Relationship of ecosystem, ecosystem services, direct and indirect drivers, human societies, and climate system.

Thus, in the face of a changing world, the goal of ecosystem management will be to maximise and sustain ecosystem services. However, managing ecosystem services is a complicated issue as there are linkages and tradeoffs among services ^[57]. For instance, if provisioning service (aquaculture production) is unsustainably maximised, other services, such as regulating, cultural, and supporting, will be diminished in addition to reduction of wild fish catch. Because of linkages and trade-offs, we cannot manage each ecosystem service separately. This is why sectorial approaches have not been very successful. Another problem is that, not all the drivers of ecosystem changes are controllable (e.g., climate change). Climate change will further complicate the management issue as its effects will interact with anthropogenic drivers.

Therefore, there is a need for a comprehensive and holistic quantity that describes this fundamental capacity of ecosystem to provide its services. We define “ecosystem carrying capacity³ (ECC)” as the capacity of an ecosystem to provide its services or the

³ “Carrying capacity” concept was originally proposed by Verhulst (1845)^[59] to describe logistic growth of human population. The concept has been widely used in population ecology, e.g. Begon et al (2006) ^[60]. Recently, Olsen et al. (2006)^[61] used the term as “ability of ecosystems to sustain fishery and other living resources”

sum of all the ecosystem services it can provide. ECC will be determined by various ecological processes that are inter-dependent, which in turn are determined by ecosystem configuration and state. As such, ECC will change under different environmental conditions as the ecosystem structure and processes will change. The environmental conditions will change as societal requirements increase and climate change accelerates.

4.3 Future of ECC in the Yellow Sea

During the past decades, we have witnessed many signs of the deterioration of the Yellow Sea's ECC, such as the decline of commercially important fish landings, increase of algal blooms, and novel jellyfish blooms ^[1]. We have identified the major environmental threats to the health of the Yellow Sea ecosystem in section 1 and 2. The problems can be summarised into five broad categories: pollution, habitat modification, mariculture facing unsustainable problems, fishing effort exceeding Ecosystem Carrying Capacity, and climate change. These problems have impacted fundamental ecosystem properties, which in turn have been changing ECC of the Yellow Sea.

How will the Yellow Sea ecosystem and its ECC change in the future? If the trends identified in the TDA continue, we will experience further degradation of the Yellow Sea ecosystem and reduction of ECC. Moreover, global climate change will exacerbate the situation. Disturbances in the hydrological cycle, sea-level rise, ocean acidification, spread of diseases, rising temperature, and strengthened stratification among others will amplify the on-going problems ^[46, 62-68]. The impacts of climate change will be experienced throughout the whole basin. Such ecosystem changes are difficult to predict with certainty because of complicated interactions and un-controllable forcing. The future management of the Yellow Sea ecosystem therefore should be designed and executed as an adaptive, learning-based process that applies the principles of the scientific methods to the processes of management. The ultimate target of ecosystem-based management should be to sustain ECC of the Yellow Sea ecosystem. This requires that the management actions should be based on long-term scientific research and adaptive strategies.

4.4 Regional Management Targets ⁴

In this document, the Regional Management Targets are the regional management objectives to be achieved by 2020 through implementation of management actions. Each of the five major environmental problems mentioned above as major stresses changes ECC and affects multiple ecosystem services (Figure 3). The regional management targets should aim to the reduction of those stresses and the improvement of ECC as a whole through ecosystem-based approach. Improving ECC means improving all of its components: provisioning, regulating, cultural, and supporting services.

⁴ Regional Management Targets are equivalent to the Regional Ecosystem Quality Objectives from GEF document

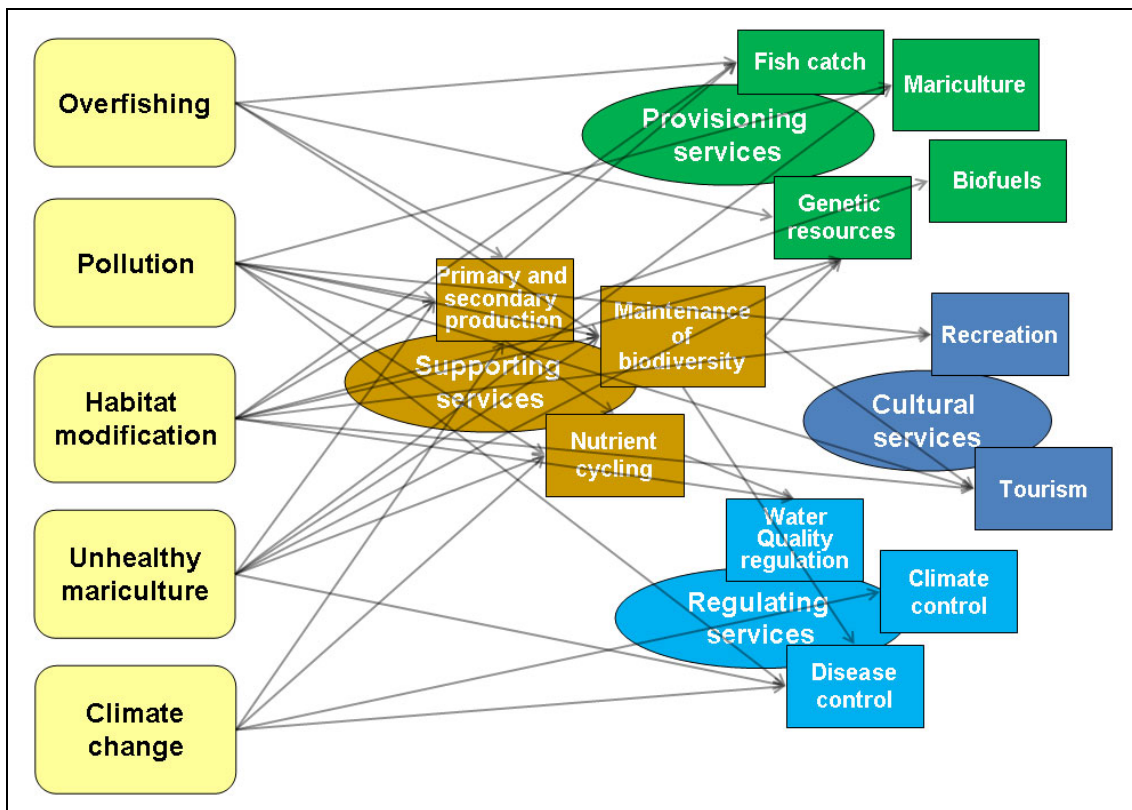


Figure 3: Relationship between major environmental problems and ecosystem services.

The Regional Management Targets for 2020 are:

A. The ECC should be improved for sustaining the provisioning services from YSLME to provide foods, genetic resources, new materials and bio-fuels, etc., to meet the requirements of human welfare. In this regard, the regional management targets should be to reduce the fishing effort, to rebuild the over-exploited marine living resources, to improve the sustainable mariculture techniques, and to keep the stock levels adequately high for reproduction to ensure the healthy condition of marine living resources.

B. The ECC should be improved for maintaining the regulating services of YSLME for sewage treatment (water quality regulation), disease control and climate regulation, etc. to meet the requirements of environmental and human safety. In this regard, the regional management targets should be to keep the quality of seafood at safe levels, and to improve the seawater quality with reduction of pollutant discharge.

C. The ECC should be improved for increasing the cultural services of YSLME for its, aesthetic values and cultural diversity and attractiveness for recreation and ecotourism as well as spiritual/religious values. In this regard, the regional management targets should be to conserve the landscape and/or seascape, and to reduce the standing stock of marine litter and contaminants particularly around bathing beaches and other marine recreational waters, to nationally acceptable levels.

D. The ECC should be improved for maintaining the supporting services of YSLME for nutrient cycling, primary and secondary production and their transfer, and maintenance

of biodiversity, habitat preservation, etc. In this regard, the regional management targets should be to reduce the human impacts in order to maintain and improve current populations/distributions and genetic diversity of organisms including endangered and endemic species, to maintain the habitats according to standards and regulations of 2007, and to reduce the risks from introduced species and red tides. Also required is better understanding and prediction of ecosystem changes to ensure effective adaptive management.

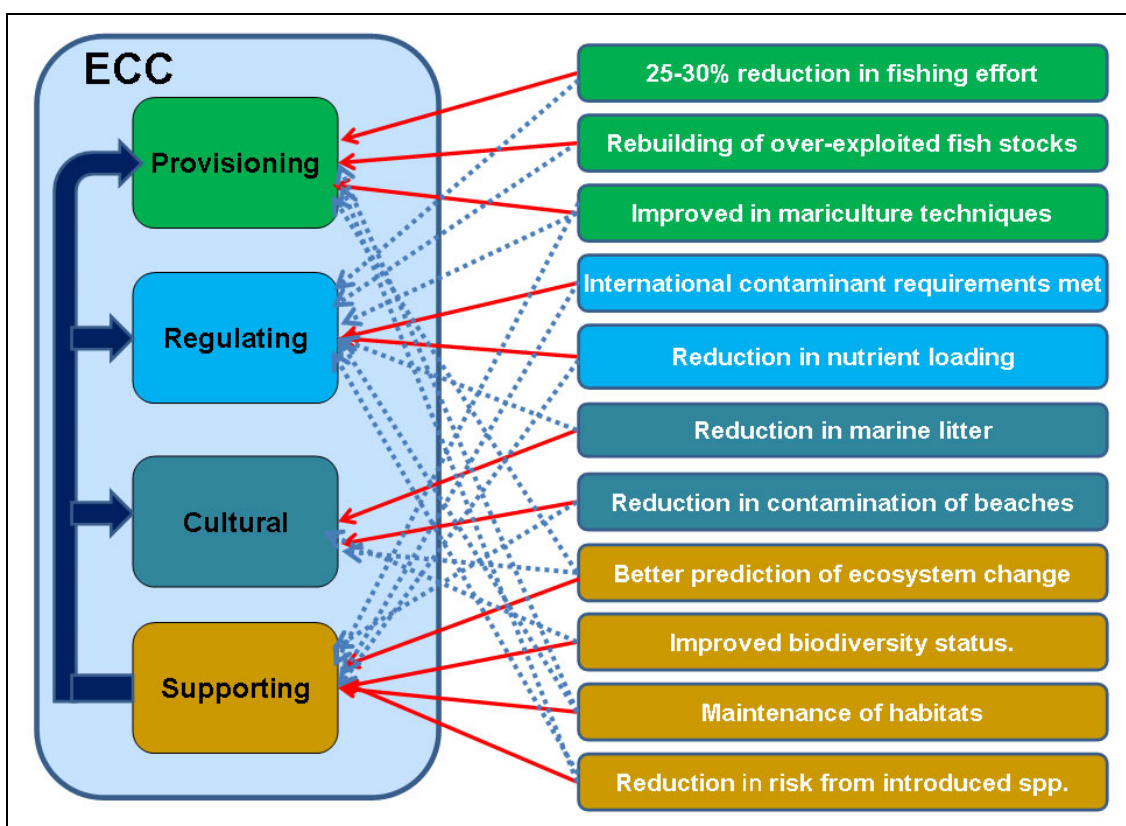


Figure 4: The relationship between Ecosystem Carrying Capacity (ECC), ecosystem services (left) and the regional targets (right) that seek to maintain these services.

5. Management Strategies: Interventions and Actions towards 2020

To improve ECC, or the ecosystem services as a whole, eleven regional targets have been selected (Figure 4). Appropriate managements for these targets will improve physical, chemical, biological processes that sustain ecosystem services, and thereby will improve ECC eventually. In Figure 4, how these targets are related to ecosystem services are indicated by red arrows. These solid arrows indicate the major links but achieving these targets will improve more than one service. Such additional effects are indicated by dotted arrows in blue. While the eleven targets are classified by the major linkages, their effects will be multiple and holistic. Also note that the targets mainly related to supporting services will promote other services. Although supporting services are not directly usable by humans, they support other directly usable services. To sustain or maximise ECC, not only the directly-usable services, i.e., provisioning, regulating, and cultural services, but also supporting services should be maintained.

That is why targets seemingly having indirect relevance are included, such as monitoring and assessment of ecosystem structure and productivity. For example reducing fishing effort may not have the desired effect of rebuilding marine living resources, without a reduction in the pollutant discharge (Figure 5). This is because pollution is affecting the supporting services, degrades the environment, changing the composition of the phytoplankton (micro-algae) which in turn affects the zooplankton composition which affects the fish production. Figure 5 represents choices faced by decision makers, whether to introduce management actions to sustain ecosystem services and the resulting maintenance of fisheries catches. Or take no action with the result that by 2020 if trends continue, marine living resources will be significantly reduced and consist of smaller less valuable fish.

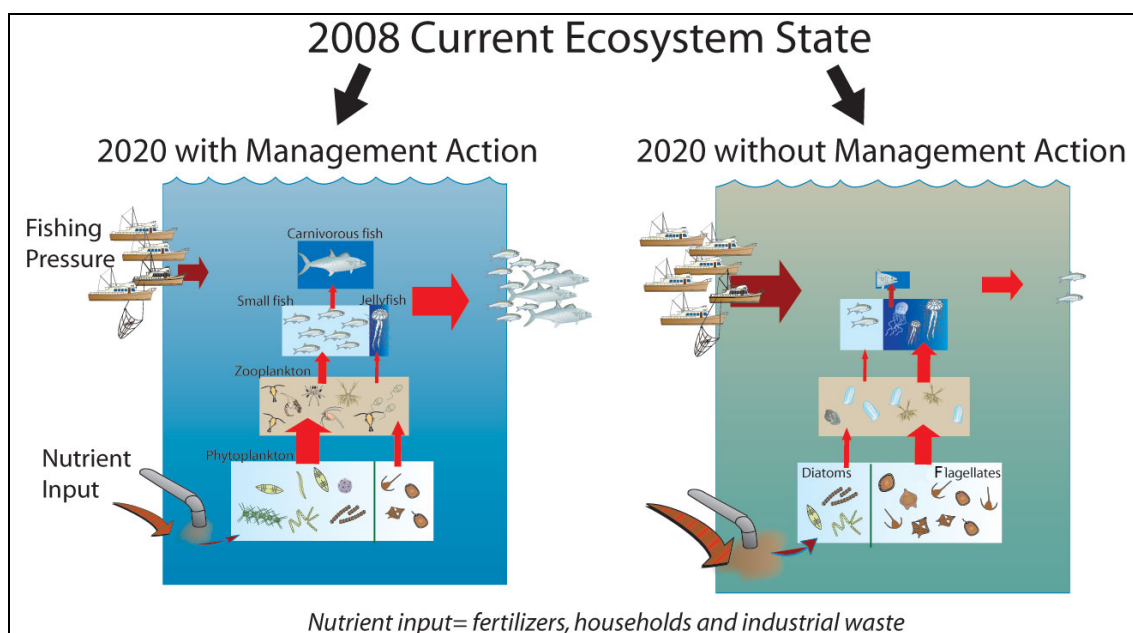


Figure 5: A simplified overview of the state of the ecosystem in 2020 with and without management actions.

Planning and implementation of comprehensive regional ecosystem quality objectives that address problems faced by all ecosystem services are fundamental for adaptive, scientific, ecosystem-based management.

5.1 Actions Primarily Addressing Provisioning Services

Due to limitation of ECC, decline in landings of many commercially important fish species and unsustainable mariculture practices have been identified as the major factors affecting the provisioning services of the Yellow Sea ecosystem. The following actions principally aim to make provisioning services of the Yellow Sea ecosystem sustainable. The first goal is to increase fisheries resources by reducing fishing pressure and rebuilding marine living resources. The second goal is to increase the sustainability of mariculture by reducing its impacts on the environment and controlling diseases effectively. Although these actions will primarily improve provisioning services, they will also have pervasive effects on regulating, cultural, and supporting services as well.

Regarding the Provisioning Services component including control on over-fishing and reduction of fishing efforts, the YSLME project will be in line with bilateral consultations and agreements between the competent authorities of the People's Republic of China and the Republic of Korea.

5.1.1 Technical actions

Target 1: 25-30% reduction in fishing effort⁵

Management Actions 1-1: Control fishing boat numbers

Reduction in fishing effort already has been implemented in the region for several years. Optional buy-back of fishing boats from fishermen will continue, a reduction of 25-30% of total marine fishing boats is recommended during 2004-2020 based on the current stock level. In addition, new boat building should be strictly controlled.

Management Action 1-2: Stop fishing in certain areas/seasons

Closed season and areas for fishing have been used for many years. Limitation of fishing is implemented in certain areas, such as spawning and nursery grounds in the coastal waters, and is a useful measure to conserve marine living resource. Closed seasons and areas for fishing need to be continued based on improved scientific knowledge. In China, after 12 years in practice, the summer fishing ban has been demonstrated to efficiently conserve juvenile fish stock, and should be continued. Marine protected areas for fishery resources need to be established for conservation of the spawners and genetic resources of living resources.

Management Action 1-3: Monitor and assess stock fluctuations

There is a need to improve quality of data and of stock and/or individual-level biological parameters. Stock assessment is the basis of fisheries management, and should be based on scientifically monitored data and independent information. Joint monitoring and analysis of major stocks, compatible data and assessment methodology need to be undertaken co-operatively as a demonstration of the benefits to the individual country. Establishment of a regional database is recommended.

Target 2: Rebuilding of over-exploited marine living resources

Management Action 2-1: Increase mesh size

Yellow Sea is exploited by many different types of fisheries all using different gears. The main fishing method used in the YSLME is the bottom trawl which is fairly unselective in what it catches. Increasing mesh-size can reduce the percentage of

⁵ Estimation of reduction required to avoid over-exploitation explained and presented at the First Yellow Sea Regional Science Conference^[69], the specification of management actions will be adjusted according to new regional knowledge, including the regional stock assessment organised under the project.

juveniles caught. More selective fishing gears and optimum mesh-size based on the studies of gear performance and fish behaviour are recommended to reduce by-catch.

Management Action 2-2: Enhance stocks

To rebuild over-exploited stocks, degraded habitats for fishery resources will be improved by transplanting sea-grass and by controlling pollution and construction. Healthy, genetically diverse fry of high value fish and shellfish species will continue to be released into the sea in order to increase recruitment and help rebuild stocks. Designation of protected areas and building of artificial reefs in appropriate areas of the sea with suitable monitoring is encouraged to conserve and increase marine living resources and improve their environment. Impact of the release of hatchery-raised juveniles and construction of artificial reefs on the ecosystem should be monitored and assessed.

Management Action 2-3: Improve fisheries management

Ecosystem-based fisheries management (EBFM) has been widely discussed worldwide due to the failure of single species management. Introduction of EBFM is suggested based on improved knowledge. Establishment of a self-regulation system by fishermen and community-based management in the coastal areas are recommended. Use of Total Allowable Catch (TAC) and Individual Transfer Quota (ITQ) based on survey and assessment should be encouraged in fisheries management. Fish landings should be substantially reduced to optimal levels to keep biomass at biologically safe levels. Each participating country should implement the reduction in fishing efforts to nationally acceptable level, making efforts to ensure effectiveness in securing the sustainability of provisioning services.

Target 3: Improvement of mariculture techniques to reduce environmental stress

Management Action 3-1: Develop environment-friendly mariculture methods and technology

Yellow Sea region is one of the most productive areas in mariculture, many methods have been used. As an environment-friendly mariculture method, Integrated Multi-trophic Aquaculture (IMTA) is recommended as it will also increase economic benefit. Standard offshore technologies to different conditions should be developed. Good Aquaculture Practice (GAP) should be demonstrated at commercial scales.

Management Action 3-2: Reduce nutrient discharge

The development of mariculture in the region is the fastest in the world, in order to reduce its negative impacts on the ecosystem, limited water exchange aquaculture systems, recirculating systems are recommended to be established, and artificial diet improvement should be practiced on a commercial scale.

Management Action 3-3: Control diseases effectively

Mariculture diseases seriously affect the production. Diagnosis and control techniques for major diseases need to be developed and established. The network for an early

warning and diagnosis system of diseases is suggested. New techniques and management measure to control disease should be introduced to the farmers.

5.1.2 Governance Actions

- Public awareness of the future benefits that a reduction of fishing boats, closed seasons/areas and improved regulations will bring, should be increased, especially among fishermen. A mechanism should be created to increase the public awareness of the benefits of IMTA, offshore aquaculture and limited-water exchange systems and artificial feeds.
- Alternative livelihoods should be provided until all ex-fishermen have new job opportunities, preferential taxation should be given to the fishermen who are engaged in non-fishing work, and subsidies for impoverished ex-fishermen are recommended ^[70].
- Training programmes should be encouraged to provide ex-fishermen with new techniques, information and skills.
- Incorporation of stakeholders into the various decision-making systems related to marine resource management, coastal zone management, pollution management etc. is encouraged. Co-ordination is also desirable between scientists, managers, fishermen, farmers, government departments and countries.
- Various management measures have already been implemented. However, with the development of fisheries industries and international ocean environment, the current laws and regulations for fisheries management need to be improved to meet today's requirements.
- Illegal fishing and mariculture should be strictly controlled. Capacity building for enforcement of relevant regulations should be increased.
- Licenses that control both farm area and species are recommended. Standards and regulations for offshore mariculture are needed to as this industry develops. Improved regulations to control nutrient discharge and diseases in mariculture are needed, and policies to discourage use of trash fish should be encouraged.
- Establishment of regional marine living resources scientific committee, as a subsidiary body of the YSLME Commission is recommended, to conduct joint monitoring and assessment for trans-boundary marine living resources stocks and ecosystem to evaluate trans-boundary resource and to provide advice for fishery management.

5.1.3 Indicators of management actions

The following indicators are considered for management actions that address the provisioning service function of YSLME:

- A 1/4 - 1/3 reduction in the number of motorized fishing boats by 2020 from 2004, and a harvesting level will meet the "surplus yield", implying that the stocks are kept at biologically safe levels to ensure sufficient reproductive capacity to maintain

marine living resources in a healthy condition. Recovery of some over-exploited commercial fish stocks.

- The release of billions of fry into the sea for stock enhancement after necessary evaluation in accordance with ecosystem stability.
- The establishment of at least ten protected areas for fishery resources in the Yellow Sea.
- Reduced environmental stress as a result of the widespread adoption of environment-friendly mariculture and sustainable mariculture techniques.
- Efficient operation of a network of an early warning and diagnosis system of mariculture diseases.

5.2 Actions Primarily Addressing Regulating Services

Problems affecting nutrient cycling, such as pollutant discharge, eutrophication, abnormal nutrient ratios and solid waste disposal were identified as major factors affecting regulating services of the Yellow Sea ecosystem. The following actions principally aim to improve regulating services of the Yellow Sea ecosystem. The first goal is to control contaminant discharge according to the international standards. The second goal is to reduce eutrophication by diminishing nutrient loading. Although these actions will primarily improve regulating services, they will also have pervasive effects on provisioning, cultural, and supporting services as well.

5.2.1 Technical actions

Target 4: Meeting international requirements on contaminants

Management Action 4-1: Conduct intensive monitoring and assessment

Monitoring and assessment in the Yellow Sea have been implemented independently for many years by each of the coastal countries. A new mechanism for regional monitoring and assessment should be established. It is recommended that intensive and regional routine monitoring and assessment on marine environmental pollution in the Yellow Sea should be conducted, and a regional workshop held every 5 years focused on monitoring technology and assessment methodology. It is also recommended that a diagnostic strategy for identifying sources and sinks of pollutants should be established. Regional methodologies for monitoring and assessment of status & trends of environment should be developed and the environmental status and trends report on the Yellow Sea be prepared and issued.

Management Action 4-2: Control contaminants discharge with reference to Codex alimentarius and Stockholm Convention

The coastal countries have taken measures to control the discharge of contaminants for many years. It is encouraged that a basin-wide strategy be developed to address the pollution in YSLME, and to update facilities/equipment to control or reduce discharge from industrial and municipal sources with the reference to the seafood safety and reducing health risks. Regional monitoring and assessment of contaminant

sources and fates should be continued. The economic instruments to encourage reduced pollution loads should be introduced and a protocol to control dumping at sea be developed.

Management Action 4-3: Implementing MARPOL 1973/78 effectively

For control of oil pollution in Yellow Sea, effective implementation of MARPOL 1973/78 is encouraged with improvements in national and regional contingency strategies and plans for oil spills in YSLME, covering both vessels and offshore installations. The capacity for early warning and response to extreme pollution events on the sea should be strengthened. The necessary steps to fully exercise the enforcement powers should be taken. The co-operative research on measures to avoid any introductions of exotic species into the YSLME should be conducted.

Target 5: Reduction of total loading of nutrients from 2006 levels

Management Action 5-1: Control total loading from point sources

The total loading from point sources has been controlled in recent decades. The continuation of the strict control of pollution loading from point sources is encouraged. The routine monitoring of major input sources and loads should be enhanced with the exchange of data and information at a regional level. The total-quantity-control methodologies of pollutant discharge in combination with best available techniques should be adopted. The hot spot control should be conducted with the calculation of loads in hot spot areas. The recommendations for waste treatment capacity, including reviewing the current waste treatment facilities and for facility's future development every 5 years should be given. Clean production techniques, recycling, improvements in waste treatment systems and capacity and policies for the construction of new treatment plants should be promoted. The continuation of strict control of total nutrient loading control programme is encouraged through reduction of point and non-point pollution sources discharge, or increasing the portion of sewerage treatment. With those actions China planned to reduce total nutrient loading from point sources 10% from 2006-2010, and the reduction policy will be continued in the future.

Management Action 5-2: Control total loading from non-point sources and sea-based sources

The atmospheric deposition and inputs from the watershed are considered important sources of Yellow Sea pollution ^[71, 72]. Therefore the research on atmospheric deposition, especially of nitrogen and toxic substances (heavy metals and POPs, etc.) should be expanded. Improved management of fertiliser use is needed, including the monitoring and assessment of fertiliser use, and technical recommendations on better fertiliser use. The management on sea-based sources should also be encouraged, including monitoring and assessment of sea based sources, practice of sustainable mariculture, and dredging to remove contaminated sediments. The development of storm water treatment systems is also recommended.

Management Action 5-3: Apply new approaches for nutrient treatment

The new approaches for treatment of pollutants have been developed rapidly and should be applied during the period of implementing SAP. Existing or construction of additional wetlands could be further utilised as nutrient sinks. Bio-technology for treatment of nutrients in wastewater and sewage could be applied. The cost-effective means of treating municipal wastewater should be investigated and the regional recommendations be produced.

5.2.2 Governance actions

- A mechanism for agreements and the methodology to share monitoring results, ecotoxicological data and relevant information should be established.
- An operational mechanism for a regional forum for integrated review of hot spots and to improve understanding of environmental capacity should be established.
- A mechanism to promote best available techniques and best environmental practices for related land and sea-based industries should be established
- A mechanism to encourage use of organic fertilisers, eco-agriculture and organic fertiliser use and sustainable utilisation of wetlands should be implemented.
- A mandatory review of environmental quality standards every 5 years should be conducted.
- Existing regulations, with international requirements, on clean production, recycling use, etc. should be improved.
- Participating countries are recommended to establish a total nutrient loading control programme in the context of their relevant development plans.

5.2.3 Indicators of management actions

The following indicators are considered for management actions that address the regulating service function of YSLME:

- Well-operated regional monitoring network;
- Provision of access to reliable monitoring information on environmental quality for state governance bodies and the public;
- Significant reduction of total loading of the pollutants;
- Significant improvement of seawater quality with reduction of human health risk.

5.3 Actions Primarily Addressing Cultural Services

Marine litter and the contamination of recreational waters have been identified as major problems threatening the cultural services of the Yellow Sea ecosystem. The following actions principally aim to improve cultural services of the Yellow Sea ecosystem. The goal is to reduce contaminants and litter around bathing beaches and other recreational marine areas. To achieve this, control and monitoring of contaminants as

well as public participation is important. Although these actions will primarily improve cultural services, they will also have pervasive effects on provisioning, regulating, and supporting services as well.

5.3.1 Technical actions

Target 6: Reduced standing stock of marine litter from current level

Management Action 6-1: Control source of litters and solid wastes

Marine litter has become a global challenge ^[73]. Litter and solid waste has become a major issue in coastal areas. Management of waste from coastal cities, counties and watershed should be encouraged. The technologies for waste reduction, re-use, recovery, and disposal should be implemented and the clean production and development of re-cycling economy be promoted.

Management Action 6-2: Improve removal of marine litter

Litter on beaches and in coastal waters has impacted not only the aesthetics but also the lives of animals. Development and implementation of a monitoring programme for marine litter is encouraged, in conjunction with the assessment and dissemination of information, and exchange of data and information in the region. It is also recommended that the local governments and NGOs develop and implement programmes for cleaning marine litter in YSLME coastal waters.

Management Action 6-3: Increase public awareness of marine litter

Public awareness of the benefits of environmental protection for young generations is the key for ensuring sustainable development of YSLME. The development and implementation of environmental awareness and education programmes, especially for primary, middle and high schools are recommended. The opportunities for NGOs participation should be created and/or provided. Educational information packages should be produced for use in schools.

Target 7: Reduce contaminants, particularly in bathing beaches and other marine recreational waters, to nationally acceptable levels

Management Action 7-1: Conduct regular monitoring, assessment and information dissemination particularly in bathing beaches and other recreational waters

Water quality in recreational waters will directly impact human health. To minimise health risks, agreed measurement techniques for bathing water quality should be developed with a common quality assurance support mechanism. The intensive monitoring, early-warning, assessment in the seasons and the information dissemination for bathing waters and other marine recreational waters should be conducted. The national acceptable criteria or guidelines on water quality for those areas should be developed and/or improved.

Management Action 7-2: Control pollution in bathing beaches and other marine recreational waters

Enhanced control of pollution discharge and mediation of the impacts of accidents especially on bathing and other marine recreational waters is encouraged. The emergency response system for human health in these areas should be improved and/or developed.

5.3.2 Governance actions

- More funding opportunities for recycling enterprises should be provided.
- The operational approach or system for litter removal should be developed.
- The environmental awareness and education programmes should be mainstreamed into national plans.
- Network for government-issued public announcements on beach closures should be established. The reporting network, especially the public participation and reporting system should be established.
- More regular and stricter enforcement of marine litter laws should be carried out, and compliance with waste management laws and regulations be improved.
- Clear national & regional guidelines on marine litter monitoring and assessment should be established.
- Legislation of sub-standard recreational waters should be promoted.

5.3.3 Indicators of management actions

The following indicators are considered for the management actions that address the cultural services function of YSLME:

- Regional guidelines for marine litter monitoring and assessment;
- Establishment of operational mechanism for beach cleaning;
- Published educational information package ;
- Improved legislation on waste and litter management.

5.4 Actions Primarily Addressing Supporting Services

Improving provisioning, regulating, and cultural services is impossible without improving supporting services as well. This is because ecosystem functions rely on complex physical, chemical, and biological processes. Also climate change could alter overall ecosystem structure and productivity in the long run. Therefore, adaptive ecosystem managements are crucial to improve ECC of the Yellow Sea ecosystem. The following actions primarily aim to improve supporting services of the Yellow Sea ecosystem. These include maintaining habitats and biodiversity, and providing relevant

information of current status and forecasts on the Yellow Sea ecosystem for adaptive, scientific, ecosystem-based management.

5.4.1 Technical actions

Target 8: Better understanding and prediction of ecosystem changes for adaptive management

Management action 8-1: Assess and monitor the impacts of N/P/Si ratio change

The basin-scale change of nutrient ratio has been observed in the Yellow Sea in the past decades ^[26]. Although such change could potentially impact the ecosystem structure and productivity, and ECC, these potential changes are not being systematically assessed. The long-term trend in the nutrient ratio and its impacts on the ecosystem structure should be monitored and assessed. For this, existing national monitoring and assessment methodologies need to be reviewed and harmonised.

Management action 8-2: Assess and monitor the impacts of climate change

There are many signs of global climate changes on regional scales. Certainly these changes will continue in the coming decades and exacerbate anthropogenic problems. The Yellow Sea ecosystem is anticipated to undergo fundamental changes in the future and its ECC shall change. For better management of the Yellow Sea ecosystem, basin-scale monitoring and assessment of the ecosystem status is necessary. For this, existing national monitoring and assessment methodologies need to be reviewed and harmonised. If necessary, sampling and assessment schemes should be improved.

Management action 8-3: Forecast ecosystem changes in the long-term scale

Climate-induced long-term changes in ecosystems, despite its devastating nature, cannot be managed by human. In such circumstances, forecasting the future changes and developing adaptive management scheme are the best strategy. Basic science and technologies exist for forecasting future changes of ecosystems, e.g., climate-ocean circulation models and ecosystem models. Regional efforts should be focused on integrating models and developing scenario-based projections for the future ecosystem changes.

Management action 8-4: Monitor the transboundary impact of jellyfish blooms

Recent outbreaks of jellyfish in the North-western Pacific are truly a transboundary problem in that reproduction occurs in the Yellow Sea or East China Sea and medusae spread out to the East Sea/Sea of Japan. These novel outbreaks not only cause damages to the fisheries but also indicate fundamental ecosystem changes. An international co-operation is required for proper monitoring and mitigation of jellyfish blooms on regional scale. This includes developing national and regional monitoring methodologies of jellyfish blooms

Management action 8-5: Monitor HAB occurrences

Continued eutrophication in the coasts of the Yellow Sea for the past decades resulted in increases in algal blooms since late 1980's. Although the frequency of algal blooms

has not increased in recent years, monitoring these nuisance blooms should be continued for potential impacts to aquaculture, fisheries and public health. In addition the regional capability for HAB monitoring and mitigation needs to be improved.

Target 9: Maintenance and improvement of current populations/distributions and genetic diversity of the living organisms including endangered and endemic species

Management Action 9-1: Establish and implement regional conservation plan to preserve biodiversity

As signatories to the Convention on Biological Diversity (CBD)^[73], both countries already have national conservation strategies. The next logical step is to establish a regional conservation plan that would include: the establishment of new regional nature reserves/MPAs needed to maintain the population structure, distribution and genetic diversity of the living organisms and endangered and endemic species; regular regional biodiversity monitoring to assess the effectiveness of the conservation plan; and the promotion of the concept of sustainable use.

Target 10: Maintenance of habitats according to standards and regulations of 2007

Management Action 10-1: Develop regional guidelines for coastal habitat management

Under the CBD, signatories are obliged to identify areas that are important for biological diversity in combination with management plans for protecting these critical habitats through promotion of the sustainable use and creation of protected areas.

Management Action 10-2: Establish network of MPAs

Inter-linkage of MPAs is important to ensure that migration routes and genetic exchange are maintained. As required by CBD operational objective 3.1, a national and regional system of representative nature reserves/MPAs should be established. Moreover in order to improve effectiveness of these reserves/MPAs, enforcement should be strengthened and management improved through annual assessments.

Management Action 10-3: Control new coastal reclamation

Intertidal wetlands play a vital role in the provision of supporting services such as nutrient absorption, carbon sequestration, sediment deposition, shore line stability, and as habitat for many commercially important fish and shell fish species as well as birds and other animals. Therefore, governments should enforce strict limits on new coastal reclamation according to current government plans.

Management Action 10-4: Promote public awareness of the benefits of biodiversity conservation

The benefits of biodiversity preservation in terms of increased productivity from fisheries and mariculture and the ability of the ecosystem to adapt to change and continue providing the vital ecosystem services is not generally appreciated by the

general public. To raise support for conservation measures increased public awareness of both the benefits of biodiversity preservation and the conservation regulations are required.

Target 11: Reduction of the risk of introduced species

Management Action 11-1: Control and monitor ballast water discharge

The introduction of non-native species through exchange of ballast water is a growing international problem that can reduce the productivity of native species in the existing ecosystem, such as the introduction of zebra mussel to the American Great Lakes and transfer of toxic dinoflagellates that cause human shellfish poisoning, from Asia to Australia^[74]. Improved control and monitoring of ballast water discharge is needed following the International Convention for the Control and Management of Ships Ballast Water & Sediments.

Management Action 11-2: Introduce precautionary approach and strict control of introduction of non-native species

Aquaculture farmers frequently select non-native species for their growth performance, but these introductions can have serious consequences for native species. The precautionary principle should be employed when assessing the risk of introducing a non-native species^[75], and once introduced strict monitoring of the organism should continue until the risk of ecosystem modification is negligible.

5.4.2 Governance Action

- For monitoring the impacts of nutrient ratio change and climate change, establishing cross-basin monitoring network and implementing monitoring activities are crucial. For this, the following activities are necessary; to create regional committee to co-ordinate monitoring and assessment; to conduct routine monitoring; to hold annual meetings to conduct joint assessment.
- For ecosystem modelling activities and HAB assessment, the establishment of two regional science committees is necessary to co-ordinate these activities. These regional science committees will oversee further activities; to establish national science committees for integrative modelling activity; to hold regular regional science committee meetings; to co-ordinate HAB assessment activities.
- For monitoring jellyfish blooms, following actions are required; to establish international monitoring network; to develop regional monitoring strategy; to implement regional monitoring.
- Development of a regional framework is needed to incorporate the assessment into management policies for climate change impacts, HAB, and jellyfish blooms. Activities to achieve this goal include; the review of monitoring strategies in national management policy; the review of the existing policy making framework; and incorporation of assessment activities in management policy.
- Development of a framework to incorporate the forecasts of ecosystem change into management policy is recommended. Activities to achieve this goal include; a

review of national management policy regarding climate changes and a revision of the national framework to incorporate forecasts of ecosystem change.

- Creation of a regional mechanism for co-operation (such as the YSLME Commission) is recommended and strengthened national mechanisms for inter-agency co-ordination and between government agencies and stakeholders to share information on biodiversity and biodiversity management are needed.
- Improved legislation and enforcement to ensure that vulnerable and endemic species and critical habitats are protected are required as recommended in the Convention on Biological Diversity;
- Regional and national mechanisms for raising awareness of environmental issues and legislation should be improved and public involvement through educational programmes and the promotion of eco-tourism and ecotourism livelihoods should be encouraged.
- A regional conservation plan and strengthened national legislation on coastal habitat management (including MPAs) as agreed under the Convention of Biological Diversity in addition to the creation of appropriate enforcement bodies should be established.
- Clear national and regional guidelines on biodiversity monitoring and assessments of the benefit of biodiversity to the local economy and the effectiveness of management should be identified.
- Improved enforcement of international regulations on the introduction of non-native species in combination with a strengthening of national legislation on species introductions and the use of risk assessment procedures is recommended.

5.4.3 Indicators of management actions

- Continuation of cross-basin monitoring of N/P/Si change, climate impacts, and HAB trends
- Working international monitoring network for jellyfish blooms,
- Regular status reports of N/P/Si change, climate impacts, jellyfish blooms, HAB trends
- Scenario-based long-term projection of ecosystem changes
- Development of adaptive management strategies using ecosystem status assessment and forecasting
- Policy making based on adaptive management strategies
- Species composition, species diversity indexes, and the density of vulnerable and endemic species at selected sites is maintained and improved compared to the 2007 situation.

- Area of current habitats is maintained according to standards and regulations of 2007.
- The incidence of disease/parasites and impacts endemic/vulnerable species caused by introduction of non-native species is reduced.

6. Economic Justification and Assessment

6.1 Economy of Management Actions

It may be difficult to gain public support for actions which are less likely to produce economic benefits even though the actions greatly contribute to maintaining and/or improving the ecosystem services. Therefore, the management actions, described in Section 5 in this document, should be economically beneficial. To examine the economy or efficiency of a management action(s), economic analysis, specifically Cost-Benefit Analysis (CBA), is used.⁶

CBA compares the net benefits (i.e., the difference between “gross” benefits and costs) of management actions under two scenarios: with or without the actions. A research question that CBA addresses is: “What would happen if conservation measures [management actions] were implemented [compared] to what would have happened if they were not”^[76]. The analysis then uses simple yet effective decision criteria: Comparing the gains (benefits) with the losses (costs) of an action, if the former exceeds the latter, support the action; otherwise, oppose it^[77] i.e. the proposed actions are accepted if the net benefits are positive, or declined if the net benefits are negative.

Figure 6 illustrates the concept of the CBA under with or without scenarios. Properly measured, the economic value of goods today may be illustrated as the leftmost column in the figure. Suppose that these benefits will decrease in the future because of environmental degradation; then, the benefits would be as shown in the next column to the right. The difference in the amount of the economic value between today and the future is the scale of predicted degradation. With management actions implemented, however, this degradation might be less (third column from the left). Comparing the results of the two scenarios, with or without management actions, would reveal the benefit of the actions.⁷ In the subsequent cost-benefit analysis (the rightmost column), the benefit of implementing the management actions is compared with the cost of implementing them. The cost might consist of both direct costs and opportunity costs. If the benefits exceed the costs, it is reasonable to support the management actions.

⁶ CBA is regarded as the most appropriate way to assess the economy of environmental management actions, although other methods such as the cost-effectiveness analysis and the economic impact analysis can be used alternatively, if necessary.

⁷ The benefit, described in this document, is the “benefit of implementing management actions,” that can be defined as the prevented future loss measured in economic value. The benefit of management actions is different from the “benefit of consuming ecosystem services.” The former can be described as the difference in the amount of economic value between with- and without scenarios, while the latter can be described as the amount of the value itself. The benefit of ecosystem services can be gross or net depending on whether the cost of producing the services is included or not.

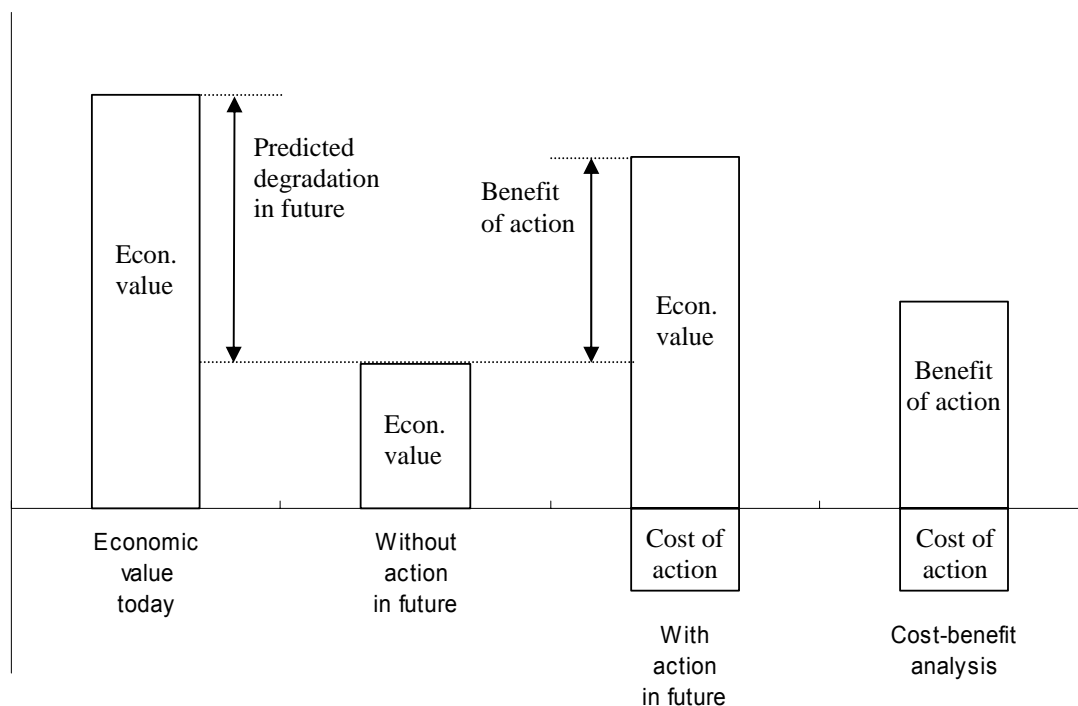


Figure 6: Cost-benefit analysis of environmental management actions (adapted from Pagiola et al., 2004^[76])

To measure the value of ecosystem services, a number of economic techniques are used, including empirical technique, travel cost method, and contingent valuation method. The selection of techniques depends on the characteristics of services to be evaluated and on the availability of data to be collected and analysed under the constraints of limited research funds and time. If the services are traded in the market, one can use their market prices and trading volumes to estimate the value. The empirical technique takes this approach. If the services are not traded in the market, however, one should use either the market information of relevant services or the information collected by surveys about consumer preference for the services concerned. A typical example of the former approach is the travel cost method; meanwhile, that of the latter is the contingent valuation method. For more information about valuation techniques, see UNDP/GEF (2008)^[78].

6.2 A Case Study: Would Management Actions be Efficient?

Take management actions to reduce fishing efforts as an example to illustrate how CBA examines the efficiency of the actions. According to the study, the total catch of ten commercially-important species in China in 2004 is approximately 2 million tons^[28]. The economic value of those species is estimated as approximately USD 2.8 billion with available market price data used (Annex 1)^[79-84]⁸. Note that this estimation

⁸ The economic value of the species is approximately 21.8 billion Chinese Yuan. It is assumed that USD 1 is equal to 7.85 Chinese Yuan (i.e. the average official exchange rate from July 2005 to December 2007^[59]).

represents the value of eight species, not all species, in the Yellow Sea ⁹. One of the major problems in fisheries in the Yellow Sea is the decline in landings of commercially-important species ^[1]. To address this problem, the SAP proposes management actions, including boat buy-back programme, seasonal/area fishing ban, and alternative livelihood provision, to reduce fishing efforts by 25-30% by 2020: Would those actions be efficient?

Suppose that reducing fishing effort would increase fish stock; as a result, fish catch would remain constant *with* the management actions taken; in contrast, the catch would decrease *without* the actions taken. Figure 7 shows expected fish catch by 2020 under those two scenarios.¹⁰ Note that fish catch under the with-scenario remains constant from 2010 through 2020, while that under the without-scenario decreases by 30% by 2020 in this figure.

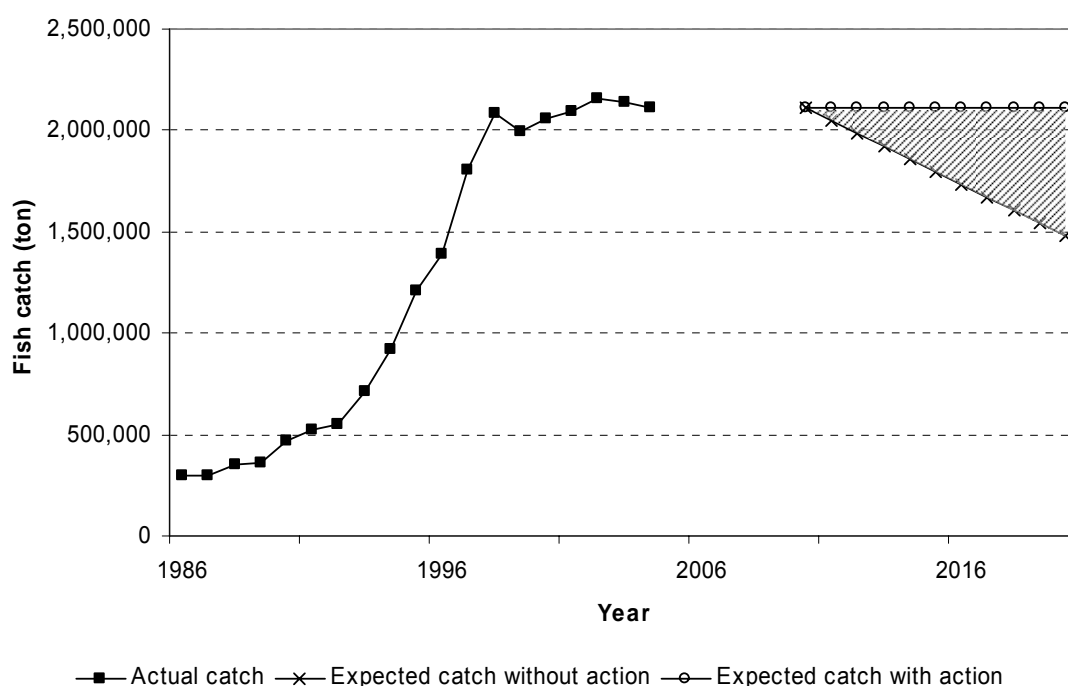


Figure 7: Expected fish catch by 2020 under with-and-without scenarios

The benefits of the management actions, shown as a shaded area in Figure 7, are the difference between the fish catch under the with-scenario and that under the without-scenario. The benefits of the actions in terms of the monetary value are approximately USD 0.8 – 4.2 billion (Table 1: Row, “Benefit”). In order to compare future monetary benefits with cost of management actions put into effect at the current time, this example uses a social discount rate of between 0 - 7%. This rate equates future benefits to the present day value.¹¹ For detailed calculation, see Annex 1.

⁹ This case study deals with the following eight species: Acetes, Anchovy, Chub Mackerel, Fleishy Prawn, Largehead Hairtail, Small Yellow Croaker, Spanish Mackerel, and Squid.

¹⁰ It is assumed that (i) fish catch in 2010 would be the same amount as the average of fish catch from 2000 to 2004; (ii) without the management actions, fish catch would decrease by 10-30% by 2020 due to the depletion of fish stock; (iii) with the actions, fish catch would remain constant at the same level as the average of fish catch from 2000 to 2004; and (iv) fish prices would remain constant at the level in 2007.

¹¹ Literature suggests using 2 to 4 percent as a social discount rate, although higher rates might have been applied to the analysis of fisheries conventionally with the high risk the industry faces considered. It is

Table 1: Cost-benefit performance of management actions

	Decrease in fish catch	Social discount rate		
		0%	3.5%	7%
Benefit (1)	30%	4,232	3,226	2,498
	10%	1,411	1,075	833
Cost (2)		126	103	86
Net benefit (1) – (2)	30%	4,106	3,122	2,412
	10%	1,285	972	747

Unit: Million USD

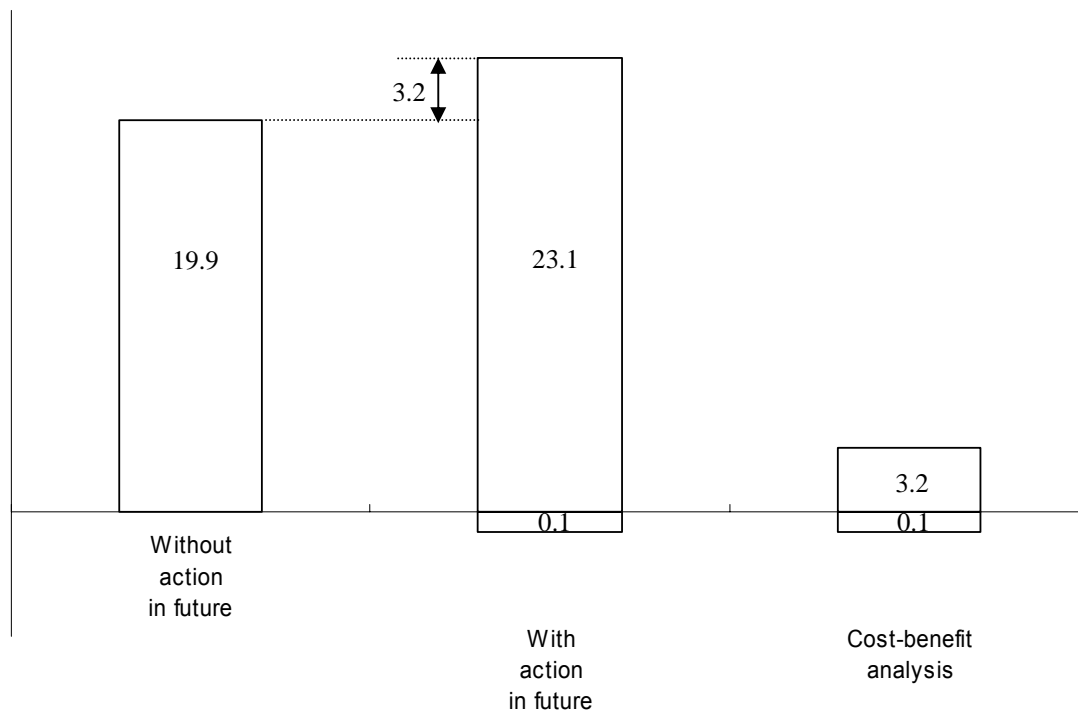
The costs of actions in this case study include the direct cost of implementing boat buy-back programme and creating alternative livelihood. It is estimated that the proposed actions would cost approximately USD 86 – 126 million (Table 1: Row, “Cost”). (For detailed calculation, see Annex 1.)

The proposed actions would make sense economically as long as the costs of those actions are less than the benefits. In this case study, the benefits of the actions exceed their costs; the net benefits are approximately USD 0.7 – 4.1 billion (Table 1: Row, “Net benefit”). Therefore, one can conclude that implementing the actions is justified economically.

Figure 8 illustrates the result of the case study, employing the similar diagram used in Figure 6.¹² Note at the far right column that the benefit of the actions is greater than the cost of them: The net benefits are positive.

recommended to conduct sensitivity analysis to check the robustness of analytical results. Using different rates, one can be confident about supporting the proposed management actions if net benefits still remain positive ^[78].

¹² Note that it is assumed in Figure 8 that (i) the fish catch under the without-scenario decreases by 30% by 2020 and (ii) the social discount rate is 3.5%. For illustrative purposes, the cost of the actions shown in this figure is bigger than the actual amount. (The actual cost is so small that it cannot be shown in the figure on the same scale as the benefit.)



Unit: Billion USD

Figure 8: Cost-benefit analysis of reducing fishing efforts

6.3 Integration of Economic Analysis into Ecosystem Management

In general, there is a lack of the economic considerations of ecosystem management in the region. Few analyses have been conducted on conservation activities from the perspective of cost-benefit performance. The CBA of major management actions should be conducted to provide more information. To integrate economic aspects into ecosystem management, it is recommended to take the following preparatory actions by 2020:

- Improve the regional guideline for economic analyses of environmental management actions;
- Conduct pilot CBA studies on selected demonstration activities of the actions;
- Organise technical trainings on CBA to build and/or strengthen the capacity of the participating countries;
- Integrate economic analyses into the workplan of relevant authorities to design and implement better conservation activities; and
- Review the results of all the above preparatory work to not only improve the regional guidelines, but also strengthen the national capacity.

7. Institutional & Legislative Actions and Financial Mechanism for Implementation of SAP

7.1 Governance

7.1.1 Institutional actions: creation of the YSLME Commission

It is desirable to establish the YSLME Commission as an institutional vehicle to continue and expand current efforts through the YSLME Project. The YSLME Commission will contribute not only to better co-ordination of national efforts but also to enhancing effectiveness of regional efforts.

Nature of the YSLME Commission

The YSLME Commission is to be a soft, non-legally binding and co-operation based institution. Considering complex geopolitical situation in the Yellow Sea region, it is not appropriate to have a legally binding treaty-based institution though it could be sought in the future. However, sufficient political wills among participating governments should be secured in the form of a joint declaration or an MOU ^[55].

Institutional framework

- YSLME Commission Steering Committee (YSLME CSC): YSLME Commission Steering Committee will serve as a supreme decision making body. YSLME CSC will include representatives of each participating government and the Secretariat.
- Secretariat: The establishment of a permanent secretariat will provide secretariat functions to the YSLME CSC. The secretariat should be small but secure appropriate expertise to address policy and research interests of the YSLME CSC.
- Sub-Commissions: Several Sub-Commissions will be created and responsible for technical issues in its own. Sub-Commissions will be mainly composed of experts.

Ensuring DPRK's full participation

DPRK's full participation is important in terms of geographical completeness and effectiveness of the work of the YSLME Commission. More efforts need to be made to ensure DPRK's full participation in the YSLME Commission.

7.1.2 Actions to improve effectiveness of legal instruments

Improving the implementation of international & regional treaties and guidelines

In order to improve the strictness, scope of coverage and enforcement of the legal instruments, actions need to be made including, but not limited to the following:

- Ensuring full ratification of the treaties;
- Strengthening co-ordination between the bilateral Fisheries Agreement between China and ROK in the YSLME Commission Context;

- Developing regional guidelines in order to incorporate suggested guidelines of the FAO Code of Conduct for Responsible Fisheries into the YSLME Commission's Context; and
- Developing guidelines on matters not covered in detail by the United Nations Convention on the Law of the Sea, Convention on Biological Diversity and Ramsar Convention.

Developing guidelines for periodic review of the implementation of treaties by each of the participating countries

Exchange of information on relevant domestic legislation

Developing projects to harmonise domestic legislation according to the regional standards and guidelines to be developed through YSLME Commission

7.1.3 Stakeholders' wide participation

Strengthening partnerships with existing regional co-operative institutions

In order to enhance overall effectiveness, strengthening partnership with existing regional co-operative institutions, strengthening partnership with these regional institutions is necessary including, but not limited to the followings:

- Strengthening co-ordination with bilateral co-operation mechanisms such as the Joint Committee on Environmental Co-operation, the Joint Fisheries Commission, China-Korea Joint Ocean Research Center, between the coastal countries
- Strengthening partnership with other regional co-operative mechanisms, especially with NOWPAP
- Further strengthening current Yellow Sea Partnership among related stakeholders
- Developing strong partnerships with relevant regional and international institutions to address the oil spill problems

Private sector's involvement

As private sector is an important stakeholder in the environmental and sustainable development in the Yellow Sea region, it is necessary to ensure private sector's involvement in the YSLME Commission process. Relevant private sectors include the related industries and research and education institutions.

Capacity building for NGOs and Local Governments

Capacity building for NGOs and local governments is important to help these stakeholders engaging in regional governance in the Yellow Sea region in constructive ways. Capacity building for NGOs and local governments include, but not limited to the following:

- Increasing understanding of international/regional institutions
- Learning advanced management measures
- Developing co-operation abilities with related stakeholders in the regional governance

7.1.4 Guidelines for the improvement of national governance

Ultimate implementation of regional policies in the Yellow Sea region is made at the national level. Therefore it is important that the actions for the national governance in each participating country are appropriately taken at national level to implement regional measures effectively. Actions for the national governance in each participating country include, but not limited to the following:

- Enactment and modification of legislation in order to fully incorporate regional guidelines and standards into the national legislation
- Improvement of the enforcement mechanism of the policy measures
- Institutional reforms to ensure effective co-ordination among the relevant governmental bodies and other stakeholders
- Wider stakeholders' participation in the national governance
- Increasing public awareness

7.2 Upgrading National Capacity

Upgrading capacities of national institutions play an important role in the implementation of SAP. Based on the root cause(s) from the TDA, the weak capacities of national institutions were identified, such as the inadequate balance between development and environmental protection policy, the limited compliance assurance infrastructures, lack of co-ordination between public health sector and private sector. The actions should be taken to update the capacities of national institutions, which involve the effective management programmes, capacity-building programmes, formulation of projects eligible to be financed by international financial donors, the involvement of all identified stakeholders into the implementation of SAP. The relevant actions should be detailed in the National Strategic Action Plan (NSAP).

7.3 Financial Mechanism for the Implementation of YSLME SAP

In order to establish a sustainable financial mechanism to support implementation of YSLME SAP, there is a need to identify the financial requirements; to identify relevant financial resources and establish effective financial mechanism for raising necessary funds from possible sources, managing financial resources, and reporting financial status.

- Financial requirements for implementation of SAP will be identified following the identification of actions and activities of SAP implementation.

- It is necessary to identify sources to meet the financial requirements for implementation of SAP, including GEF financial support, contribution from the governments of the participating countries, and potential donors. It should be noted that the financial commitments from the governments of the participating countries will be critical source of funding to show political willingness of the countries.
- Financial Mechanism will be established following the establishment of the YSLME Commission as implementing mechanism for the SAP. A staged arrangements will be prepared:
 - For the first 5 years (2010-2014), GEF funding will be the major financial resource to cover the incremental costs of the project activities. In the meantime, the national co-financial resources will be used as substantive support to the project implementation.
 - For the second 6 years (2015-2020), the participating countries will establish a sustained financial mechanism to cover the costs of the implementation of project activities.

Fund-raising campaign will be established within the YSLME Commission to generate financial support from private sectors and other donors. The YSLME Commission will provide overall policy on the fund raising campaign. The Head of the secretariat of the YSLME Commission has principal responsibility for identifying the financial sources, and fund raising campaigns. If necessary, special consideration should be given to this important element, including establishing a special post within the secretariat dedicated to fund raising.

8. Monitoring and Evaluation

8.1 Indicators of Monitoring and Evaluation

Monitoring is a continuous or periodic function that uses systematic collection of data, qualitative and quantitative, for the purposes of keeping activities on track. It is first and foremost a management instrument ^[85].

This document is focused on the Project Indicator Monitoring as defined by the GEF.

8.1.1 Process Indicators

The establishment of process indicators is essential to characterize the completion of institutional processes on the multi-country level or the single-country national level that will result in joint action on needed policy, legal, and institutional reforms and investments that aim to reduce environmental stress on transboundary water bodies ^[86].

- Regional Agreement on establishing the Yellow Sea Commission for implementing the Regional SAP;

Based on the results and recommendations made by the Regional Governance Analysis of the Project, it is recommended that a Yellow Sea Commission should be established in charge of the implementation of the SAP. As one of the most important indicators, the establishment and effective operation of the Yellow Sea Commission will be a good “process indicator”. This indicator presents the regional mechanism for the implementation of the SAP. It is hoped that the DPRK would join the Commission in an appropriate stage.

- Established national mechanism for implementing the National SAPs;

The Inter-Ministerial Co-ordinating Committee established within the project should be strengthened to take more responsibilities in implementing activities identified in SAP, in particular those activities have transboundary nature. The well-established and well-functioned national mechanism provides national institutional arrangement to protect marine environment in the Yellow Sea.

- Establishment of cross-basin monitoring network & implementation of regional monitoring activities, (including scientific research);

As the project objective is to establish ecosystem-based management of the marine environment in the Yellow Sea, a basin-wide monitoring programme should be established to provide scientific knowledge and environment information on the status of marine environment. The regional monitoring network should cover all the elements relevant to marine environment, and should have regular and effective monitoring activities and reports.

- Improved regulation and legislation and strengthened enforcement in the participating countries will cover following aspects:
 - To promote sustainable exploitation of fish stocks.
 - To control total loading of pollutants.
 - To establish regional conservation plan to protect endemic and vulnerable species.
 - To establish national and regional systems of representative nature reserves/MPAs and to integrate into a global network and as a contribution to globally agreed goals.
 - To establish environment-target-control mariculture practice.
- Established sustainable financial mechanism for implementation of SAP.

8.1.2 Stress Reduction Indicators

Stress reduction indicators relate to the specific on-the-ground measures implemented by the collaborating countries. Often a combination of stress reduction indicators in several nations may be needed to produce detectable changes in transboundary waters.

- Reduced and controlled fishing efforts, to reduce stress in over-fishing;

- Reduced number of fishing boat.
 - Improved selectivity of fishing gear.
 - Scientific assessment of summer fishing-ban.
- Enhanced sustainable mariculture
 - Established carrying capacity guidelines for planning mariculture.
 - Enhanced integrated multi-trophic mariculture techniques to reduce introduction of pollutants to the marine environment.
- Established new MPAs and improved management effectiveness of existing nature reserves/MPAs to reduce stress in loss and modification of marine habitats
 - Improved effectiveness of management for MPAs including the quality of prepared management plans.
 - Restriction on new reclamation.
 - Increase public involvement in MPAs management.
- Controlled and/or reduced pollution discharge to reduce stress of marine environment pollution
 - Updated knowledge of current waste treatment facilities.
 - Improved treatment system and capacities, including established new treatment facilities.
 - Established regional regular monitoring system to better understand status and trends of pollutants in marine environment.

8.1.3 Environmental Status Indicators

For projects in damaged transboundary systems, years may go by before a sufficient number of countries have implemented sufficient stress reduction measures to enable a change to be detected in the transboundary water environment.

- Established cross-basin monitoring network and implementing monitoring activities to better understand the environment status in the Yellow Sea
 - Harmonised monitoring methodologies and assessment of impacts ecosystem.
 - Developed comprehensive models to predict change and its impact on fisheries.
- Better understanding of environment status in the Yellow Sea through established regional monitoring system;
 - Marine living resources stock improvement after reduction of fishing efforts.
 - Reduced pollution load and concentration.
- Protected marine habitats, in particular coastal wetlands
 - Reduced rate of habitat loss.
 - Maintained ecological characters of critical habitats including species compositions, species diversity indexes.

- Reduced number of endangered species.

8.2 Mechanism of Monitoring and Evaluation

The YSLME Commission is the overall responsible body for monitoring and evaluation of the implementation of the SAP.

8.2.1 Project Implementation Review (PIR)

The YSLME secretariat is responsible for preparation of annual Project Implementation Review (PIR) to be submitted to the Commission for review and decision-making whenever deemed necessary. The PIR will also be submitted to UNDP and GEF.

The YSLME secretariat should prepare management responses to the comments and decisions made by the Commission.

8.2.2 Mid-Term Evaluation

Mid-term evaluation should be organised at the midpoint of the first phase of the SAP implementation (first 5 years), and at the midpoint of the second phase of SAP implementation. The mid-term evaluation should be carried out by the external/independent experts selected by the Commission, in consultation with UNDP and GEF, based on the indicators established for the monitoring and evaluation.

8.2.3 Final Evaluation

Final evaluation should be organised in the end of first phase of the SAP implementation (first 5 years), and in the end of the second phase of SAP implementation. The final evaluation should be carried out by the external/independent experts selected by the Commission, in consultation with UNDP and GEF (for the first phase of implementation), based on the indicators established for the monitoring and evaluation.

9. Conclusions

The Yellow Sea ecosystem and its ECC will change in the future, for worse or for better. If all threats and the problems to the ecosystem continue, following the trends identified in the TDA, the Yellow Sea will undergo further degradation of its ecosystem and reduction in its ECC, which means the Yellow Sea will have reduced capacity to provide its services that support human welfare. If all the management actions listed in this SAP are implemented to meet regional targets, the Yellow Sea would improve its capacity to provide provisioning, regulating, cultural and supporting services. By 2020, it is expected that if all the management actions have been taken, the Yellow Sea will be a living sea, which is vital, productive and healthy. Moreover, by 2020, if all the management targets have been achieved by coastal countries, the Yellow Sea would be a sea of co-operation, a sea of friendship, a sea of peace and a sea of safety.

10. References

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Annex

Annex 1. Summary of economic analysis of fisheries management actions

Economic value of commercially-important species

Table A1: Economic Value of commercially-important species in 2004

Year	Small Yellow Croaker	Spanish Mackerel	Anchovy	Chub Mackerel	Largehead Hairtail	Acetes	Fleshy Prawn	Squids	Total
Fish catch in 2004 (ton)	187,309	273,699	878,512	136,159	303,321	293,820	7,651	29,982	2,110,453
Price in 2007 (Yuan per ton)	13,905	14,000	1,740	7,000	12,180	26,000	160,000	12,000	
Value in 2004 (in 2007 million Yuan)	2,605	3,832	1,529	953	3,694	7,639	1,224	360	21,836
Value in 2004 (in 2007 million USD)	332	488	195	121	471	973	156	46	2,782

Note: It is assumed that USD 1 is equal to 7.85 Chinese Yuan^[59].

Estimation of fish catch

Fish catch from 2010 to 2020 is expected based on the following assumptions:

- Fish catch in 2010 would be the same amount as the average of fish catch from 2000 to 2004 [4];
- Without the management actions, fish catch would decrease by 10-30% by 2020 due to the depletion of fish stock (Table A2 [a]);
- With the actions, fish catch would remain constant at the same level as the average of fish catch from 2000 to 2004 (Table A2 [b]);

**Table A2: Estimated fish catch from 2010 to 2020
(a) Without action**

Year	Small Yellow Croaker	Spanish Mackerel	Anchovy	Chub Mackerel	Largehead Hairtail	Acetes	Fleshy Prawn	Squids	Total
2010	164,920	254,029	988,960	145,058	242,477	266,197	7,260	42,743	2,111,644
2011	159,973	246,408	959,291	140,706	235,202	258,211	7,042	41,461	2,048,295
2012	155,025	238,787	929,622	136,355	227,928	250,226	6,824	40,178	1,984,946
2013	150,078	231,166	899,953	132,003	220,654	242,240	6,607	38,896	1,921,596
2014	145,130	223,546	870,285	127,651	213,380	234,254	6,389	37,614	1,858,247
2015	140,182	215,925	840,616	123,299	206,105	226,268	6,171	36,332	1,794,898
2016	135,235	208,304	810,947	118,948	198,831	218,282	5,953	35,049	1,731,548
2017	130,287	200,683	781,278	114,596	191,557	210,296	5,735	33,767	1,668,199
2018	125,340	193,062	751,609	110,244	184,282	202,310	5,518	32,485	1,604,850
2019	120,392	185,441	721,941	105,892	177,008	194,324	5,300	31,202	1,541,500
2020	115,444	177,820	692,272	101,541	169,734	186,338	5,082	29,920	1,478,151

Unit: Ton

Note: It is assumed that fish catch would decrease by 30% by 2020 in this table.

(b) With action

Year	Small Yellow Croaker	Spanish Mackerel	Anchovy	Chub Mackerel	Largehead Hairtail	Acetes	Fleshy Prawn	Squids	Total
2010	164,920	254,029	988,960	145,058	242,477	266,197	7,260	42,743	2,111,644
2011	164,920	254,029	988,960	145,058	242,477	266,197	7,260	42,743	2,111,644
2012	164,920	254,029	988,960	145,058	242,477	266,197	7,260	42,743	2,111,644
...
2020	164,920	254,029	988,960	145,058	242,477	266,197	7,260	42,743	2,111,644

Unit: Ton

Note: It is assumed that fish catch would remain constant from 2010 through 2020.

Price of commercially-important species

Suppose that fish prices would remain constant at the level in 2007 (Table A3).

Table A3: Price of commercial fish in 2007

Small Yellow Croaker	Spanish Mackerel	Anchovy	Chub Mackerel	Largehead Hairtail	Acetes	Fleshy Prawn	Squids
13,905	14,000	1,740	7,000	12,180	26,000	160,000	12,000

Unit: Chinese Yuan per ton

Source: Retrieved in December 2007 and January 2008 on <http://www.shuichan.com>, <http://www.21food.com>, <http://fish.gov.cn>, <http://www.cappma.com>, <http://00968.com>, and <http://feed.aweb.com.cn>.

Benefits of management actions

The value of fish catch under the with- and without-scenarios is calculated based on the information of Table A2 and A3. That is, the value of fish catch in any given year is the sum of the amount of each species in that year multiplied by the corresponding price in 2007. See Column 1 and 2 in Table A4.

The benefits of the actions are then calculated by taking the difference between the value of fish catch under the with-scenario and that under the without-scenario. See the far-right column in Table A4.

Table A4: Value of fish catch under with- and without-scenarios

Year	Value of catch without action (1)	Value of catch with action (2)	Benefit of action (2) – (1)
2010	20,134,836,038	20,134,836,038	-
2011	19,530,790,957	20,134,836,038	604,045,081
2012	18,926,745,876	20,134,836,038	1,208,090,162
2013	18,322,700,795	20,134,836,038	1,812,135,243
2014	17,718,655,713	20,134,836,038	2,416,180,325
2015	17,114,610,632	20,134,836,038	3,020,225,406
2016	16,510,565,551	20,134,836,038	3,624,270,487
2017	15,906,520,470	20,134,836,038	4,228,315,568
2018	15,302,475,389	20,134,836,038	4,832,360,649
2019	14,698,430,308	20,134,836,038	5,436,405,730
2020	14,094,385,227	20,134,836,038	6,040,450,811
		PV (r = 0.0%)	33,222,479,463
		PV (r = 3.5%)	25,320,675,561
		PV (r = 7.0%)	19,611,217,348

Unit: Chinese Yuan per ton

Note: It is assumed that fish catch would decrease by 30% by 2020 in this table.

The total (gross) benefits of management actions, measured in terms of present value (PV), depend on the expected decrease in fish catch as well as on the social discount rates (r). Table A5 summarises expected benefits ranging from approximately 6.5 to 33.2 billion Chinese yuan (USD 0.8 – 4.2 billion).

Table A5: Expected benefits of management actions

		Social discount rate (r)		
		0%	3.5%	7%
Decrease in fish catch (%)	30%	33,222,479,463 (4,232,162,989)	25,320,675,561 (3,225,563,766)	19,611,217,348 (2,498,244,248)
	10%	11,074,159,821 (1,410,720,996)	8,440,225,187 (1,075,187,922)	6,537,072,449 (832,748,083)

Unit: Chinese Yuan

Note: The unit of the numbers in parentheses is U. S. dollars.

The total costs of the actions, in this example, are the sum of the direct cost of implementing the following activities: boat buy-back programme, alternative livelihood provision, and law enforcement. The annual national budget for the first two activities is

270 million Chinese Yuan; that for the last activity is 90 million Chinese Yuan. The national budget covers the four seas: the Bohai Sea, the East China Sea, the South Sea, and the Yellow Sea. The annual budget for the Yellow Sea is roughly 90 million Chinese Yuan, taking the total budget divided by four: $(270 \text{ million} + 90 \text{ million}) / 4 = 90$ million. Table A6 shows the expected budget or the costs of the actions that will accrue from 2010 to 2020.

Table A6: Expected costs of management actions

Year	Cost of action
2010	90,000,000
2011	90,000,000
2012	90,000,000
...	...
2020	90,000,000
PV (r = 0.0%)	990,000,000 (126,114,650)
PV (r = 3.5%)	810,139,593 (103,202,496)
PV (r = 7.0%)	674,880,690 (85,972,062)

Unit: Chinese Yuan

Note: The unit of the numbers in parentheses is U. S. dollars.

The total net benefits of the actions are the difference between the benefits and costs of implementing the actions. The difference can be calculated based on the information provided in Table A5 and A6. Table A7 summarises the cost-benefit information of the actions with the estimated net benefits.

Table A7: Cost-benefit performance of management actions

		Social discount rate		
		0%	3.5%	7%
Decrease in fish catch				
Benefit (1)	30%	33,222,479,463 (4,232,162,989)	25,320,675,561 (3,225,563,766)	19,611,217,348 (2,498,244,248)
	10%	11,074,159,821 (1,410,720,996)	8,440,225,187 (1,075,187,922)	6,537,072,449 (832,748,083)
Cost (2)		990,000,000 (126,114,650)	810,139,593 (103,202,496)	674,880,690 (85,972,062)
Net benefit (1) – (2)	30%	32,232,479,463 (4,106,048,339)	24,510,535,967 (3,122,361,270)	18,936,336,658 (2,412,272,186)
	10%	10,084,159,821 (1,284,606,347)	7,630,085,594 (971,985,426)	5,862,191,759 (746,776,020)

Unit: Chinese Yuan

Note: The unit of the numbers in parentheses is U. S. dollars.

Annex VII

Timetable for PIF and Project Document Submission

Annex VIII

Approved Workplan for 2010

<u>Activity</u>	<u>Action</u>	<u>Deadline / Activity Date</u>
Co-operative Cruises Regional Report	PMO and Chief Scientists	15 Dec 2009 (may be presented at 2nd RSC)
NSAP - final English versions	NPCs and national members	31 Dec 2009
Project Phase 2 final documents	Consultant, NPC, countries, experts	31 Jan 2010
2nd Regional Science Conference	PMO & Conference Organising Committee	24-26 Feb 2010
Terminal Evaluation	Evaluator(s), UNDP, UNDP/GEF, PMO, UNOPS	15 Mar 2010
CBA of SAP Demonstration Activities	Contractors	1 May 2010
Public Awareness and Stakeholder Involvement	PMO / Contractor	1 May 2010
Financial Sustainability Workshop	PMO	1 May 2010
Maintaining the network of sustainable mariculture proponents	PMO, scientists, SAP demonstration activity contractors	1 Jan - 1 Jun 2010
Involving local government in fisheries management	PMO, local government, scientists	1 Jan - 1 Jun 2010
Supporting the Yellow Sea MPA network	PMO, local government, MPA managers, NGOs, scientists, SAP demonstration activity contractors	1 Jan - 1 Jun 2010
Harmonising basin-wide ecosystem monitoring	PMO, Scientists, policy makers dealing with monitoring	1 Jan - 1 Jun 2010
Technical co-operation for QA/QC and monitoring N loads	PMO, scientists, international institute known for QA/QC	1 Jan - 1 Jun 2010
Modelling nutrient loads	PMO, scientists, SAP demonstration activity contractors	1 Jan - 1 Jun 2010

<u>Activity</u>	<u>Action</u>	<u>Deadline / Activity Date</u>
Improvement of CBA procedures	PMO, economists, experts on environmental valuation	1 Jan - 1 Jun 2010
Co-operation with the EU	PMO, EU, NPCs	1 Jan - 1 Jun 2010

Annex IX
Approved Budget for 2010

Revised Budget for 2009 and Onwards

As of 9th Nov 2009

		5th RSTP/PSC		2009.11.09		FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010			
Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Original Budget Total	Revised Budget Total	Yr 2004	Yr 2005	Yr 2006	Yr 2007	Yr 2008	Total Expenditure	Yr 2010 (Jan Jun)		
0.PMO	0A	Salary	1101	Programme Manager	536,019	533,801	-13,333	-98,810	-79,746	-81,143	-83,550	-82,223	94,995		
			1102	Environ Officer	0	0	0	0	0	0	0	0	0	0	
			1103	Fisheries Officer	0	0	0	0	0	0	0	0	0	0	
			1104	Economist	0	0	0	0	0	0	0	0	0	0	
			1301	Secretary	81,005	72,865	0	-11,706	-12,730	-16,254	-13,548	-11,981	6,647	6,647	
			1302	Driver	69,506	62,601	0	-10,637	-11,688	-13,558	-11,250	-9,949	5,519	5,519	
			1303	Adm. Asst.	87,394	79,255	0	-12,665	-12,730	-21,685	-13,548	-11,981	6,647	6,647	
			1304	Finance & Adm. Officer	140,545	123,450	0	-1,606	-21,330	-20,443	-27,015	-22,339	-19,756	10,960	10,960
			1305	IT specialist	86,141	67,893	0	-12,199	-12,730	-16,254	-17,966	-6,214	2,532	2,532	
	Sub Total					1,000,610	939,865	-14,940	-167,346	-150,067	-175,908	-162,199	-142,105	127,300	
	0D	Premises	4101	Office supplies	37,548	33,475	-913	-6,148	-4,320	-8,240	-5,883	-3,471	4,500		
			4102	Library acquisitions	655	602	0	0	-316	-80	0	-206	0		
			4104	Computer Software	10,982	10,791	-640	-5,618	0	-4,533	0	0	0		
			4201	Computers	21,127	20,456	-5,399	-5,097	-5,705	-582	-2,345	-1,329	0		
			4203	Printers	250	250	0	0	-250	0	0	0	0		
			4204	Copy machine (small size)	550	550	0	-550	0	0	0	0	0		
			4205	PowerPoint OHP	5,019	5,019	-3,459	0	-1,560	0	0	0	0		
			4206	Automobile	22,881	22,881	-22,881	0	0	0	0	0	0		
			4301	Office rent	0	0	0	0	0	0	0	0	0		
			4302	Furniture	14,283	14,283	-6,123	-4,617	0	-3,543	0	0	0		
			4303	Premises costs	7,500	4,500	0	0	0	0	0	-2,000	2,500		
			5101	Rental & maint. of computer equip.	4,500	1,500	0	0	0	0	0	0	1,500		
			5102	Rental & maint. of copiers	1,000	500	0	0	0	0	0	0	500		
5103			Repair & maint. of vehicles & insurance	30,629	24,536	0	-4,088	-2,755	-4,561	-4,661	-4,094	4,376			
5104			Rental & maint. of other office equip	3,500	1,000	0	0	0	0	0	0	1,000			
5105			Rental of meeting rooms & equip.	0	0	0	0	0	0	0	0	0			
5220			Publication (other than reports)	38,358	28,055	0	-5,026	-6,519	-9,955	-4,555	-1,500	500			
5221			Webpage design and updating	3,583	2,758	0	-356	-445	-782	-569	-107	500			
5301			Communication	28,552	15,029	-161	-8,911	-1,773	-1,522	-858	-804	1,000			
5302			Postage/freight	27,989	21,390	0	-1,456	-3,424	-5,610	-4,549	-2,351	4,000			
5303			Operation cost	106,168	135,010	-67	-11,768	-26,145	-31,578	-38,209	-10,243	17,000			
1306			Staff Charges	99,628	119,782	-1,904	-21,328	-19,125	-22,419	-20,672	-18,111	16,224			
5607			Reimbursement Costs	0	19,868	0	0	-5,578	-10,126	-4,164	-7,497	-7,497			
5701	Provision & Contribution-Staff charges	0	259,128	0	-94,342	36,678	-114,031	19,813	0	107,246					
5801	PO Accrual & Reversal	0	25,291	-40,137	-195,982	86,487	93,162	31,179	25,067	25,067					
5600	UNOPS Project Supporting Cost (6%)	87,919	153,725	0	0	0	-67,177	-58,080	-10,125	18,343					
Sub Total					552,620	920,378	-81,682	-365,286	45,250	-191,577	-93,555	-36,769	196,760		
0.PMO Total					1,553,230	1,860,243	-96,622	-532,632	-104,817	-367,485	-255,754	-178,873	324,060		
6A	Travel	1501	Project Staff Travel	479,765	460,872	1,014	-116,364	-50,096	-108,346	-98,495	-53,585	35,000			
		1601	Annual Tri Part Review (IVB)	16,000	0	0	0	0	0	0	0	0			
		1602	Interviews/Travel (CTA Prospects) (IVB)	10,879	10,879	-10,879	0	0	0	0	0	0			
	6B	Meeting	3301	Project Steering Committee meetings	116,800	133,942	0	-46,052	-28,659	-19,039	-20,192	-20,000	0		
			3302	RSTP meetings	148,228	130,412	-9,751	-45,582	-24,215	-17,491	-10,371	-23,000	0		
			3303	Regional scientific conferences	155,721	153,984	0	0	0	-63,984	0	0	90,000		
	6C	Premises	4208	Sea-going equipment	382,870	365,310	0	0	-234,380	-130,930	0	0	0		
			4210	Equipment unspecified	61,503	38,406	0	-1,157	-6,212	0	-31,037	0	0		
				1223	Other consultant contracts	29,682	99,682	0	-2,072	0	-7,610	0	0	90,000	

Revised Budget for 2009 and Onwards

As of 9th Nov 2009

		5th RSTP/PSC		2009.11.09	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010		
Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Original Budget Total	Revised Budget Total	Yr 2004	Yr 2005	Yr 2006	Yr 2007	Yr 2008	Total Expenditure	Yr 2010 (Jan Jun)
6.Cross Component	6D	Contingencies	1228	Phase 2 preparation - consultant	88,219	40,200	0	0	0	0	0	-20,200	20,000
			2135	Other institutional contracts	104,500	145,500	0	0	-1,500	0	-54,000	0	90,000
			2166	2 Regional cruise reports	15,000	15,000	0	0	0	0	0	0	15,000
			2177	Bridging phase	80,000	80,000	0	0	0	0	0	0	80,000
			2178	Cross Component Demo	70,000	70,000	0	0	0	0	-17,000	-53,000	0
			3102	Short term fellowship for training	20,000	0	0	0	0	0	0	0	0
			3217	Additional training activities	27,521	57,521	0	-1,438	0	-6,082	0	0	50,000
			3335	Additional meetings required	107,419	77,419	0	-5,224	0	-11,644	-15,550	0	45,000
			3349	2 WGs for Phase 2	20,872	25,370	0	0	0	0	-20,872	-4,498	0
			3350	Cruise Summary W/S	20,000	9,351	0	0	0	0	0	-9,351	0
			5219	Printing cost for the additional reports	36,816	2,316	0	-604	0	-213	0	-1,500	0
			5401	Exigency costs	155,481	48,525	0	-301	-2,849	-3,319	-2,396	-9,661	30,000
			5501	Evaluation (consultants fees/travel/DSA)	96,978	96,978	0	0	0	-48,978	0	0	48,000
			1307	Staff Charges	1,320,677	1,251,722	-4,963	-189,461	-183,084	-229,595	-234,570	-225,178	184,872
5606	UNOPS Project Supporting Cost(6%)	213,896	209,297	-8,205	-69,266	-59,956	0	0	-25,198	46,672			
Sub Total					3,778,827	3,522,687	-32,785	-477,521	-590,951	-647,231	-504,483	-445,172	824,544
6.Cross Component Total					3,778,827	3,522,687	-32,785	-477,521	-590,951	-647,231	-504,483	-445,172	824,544
1.Fisheries	1A	Stock assessment	1201	Development of Joint Stock Assessment Guidelines-Consultant	13,980	13,980	0	0	-4,200	-9,780	0	0	0
			1225	Expert exchange programme	0	0	0	0	0	0	0	0	0
			2101	Institution Contracts for Data & Information collection	89,242	89,242	0	-36,000	-53,242	0	0	0	0
			2102	Institution Contracts to Revise National Stock Assessment Data	0	0	0	0	0	0	0	0	0
			2103	Institution Contract to Perform Regional Stock Assessment (Cooperative Cruise)	0	0	0	0	0	0	0	0	0
			2150	Regional Stock Assessment (4cruises +3 expert consultations)	489,233	489,233	0	0	0	0	-369,233	-120,000	0
			1226	Young Scientist exchange	5,306	5,306	0	0	0	0	-5,306	0	0
			2147	Demo - Effectiveness of closed season / area	29,930	29,930	0	0	0	0	-9,000	-20,930	0
			2149	Demo – Improvement in fisheries management system	35,325	35,325	0	0	0	0	-20,000	-15,325	0
			2148	Demo - Effectiveness of stock enhancement	50,000	49,985	0	0	0	0	-15,000	-34,985	0
			2168	Other Contracts-Fisheries	20,000	54,570	0	0	0	0	0	0	54,570
			5201	Stock assessment report	3,852	3,852	0	0	0	-3,852	0	0	0
						1202	Developing Guidelines for Carrying Capacity Analysis-Consultant	9,477	9,477	0	0	-9,477	0

Revised Budget for 2009 and Onwards

As of 9th Nov 2009

		5th RSTP/PSC		2009.11.09		FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	
Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Original Budget Total	Revised Budget Total	Yr 2004	Yr 2005	Yr 2006	Yr 2007	Yr 2008	Total Expenditure	Yr 2010 (Jan Jun)
1B	Carrying capacity	2104	Institution Contracts for Annual carrying capacity determination	0	0	0	0	0	0	0	0	0	0
		5202	Carrying capacity report	3,774	3,774	0	0	0	-3,774	0	0	0	0
		2146	Carrying capacity technical guide line (mariculture)	10,500	10,500	0	0	0	-10,500	0	0	0	0
		3338	Regional training for carrying capacity (mariculture)	15,936	15,936	0	0	0	-10,249	-5,687	0	0	0
1C	Mariculture Production	1203	Development of Sustainable Mariculture-Consultant	10,500	10,500	0	0	-4,200	-6,300	0	0	0	0
		1701	Mariculture Advisor	25,000	25,000	0	0	-25,000	0	0	0	0	0
		3344	Regional Mariculture Conference	53,542	46,294	0	0	0	0	-22,249	-24,045	0	0
		3345	World Aquaculture Society meeting	10,458	10,458	0	0	0	0	0	-10,458	0	0
		2105	Institution Contracts to Implement mariculture techniques (Demonstration Projects).	292,020	292,020	0	0	0	0	0	-160,000	-102,020	30,000
		New Act	Network for sustainable mariculture proponent	0	10,000	0	0	0	0	0	0	0	10,000
		New Act	Involving local government in Fisheries Management	0	15,000	0	0	0	0	0	0	0	15,000
		3202	Reg. training on mariculture techniques	17,741	17,741	0	0	0	0	-17,741	0	0	0
3203	Reg training on disease diagnosis, prevention and control	18,900	18,900	0	0	0	0	0	-18,900	0	0		
1D	Fisheries Management - Regional Agreements, National Laws & Management Plan for Fisheries	1204	Feasibility study on the regional agreement, i.e. FAO code of conduct	5,600	5,600	0	0	-5,600	0	0	0	0	0
		1205	Prepare regional Agreement on Legislation-Consultant	0	0	0	0	0	0	0	0	0	0
		1206	SAP-fisheries-Consultant	0	0	0	0	0	0	0	0	0	0
		2106	Institution Contracts to Implement Reg Fisheries and ecosystem Management / Implementation Plans	0	0	0	0	0	0	0	0	0	0
		5203	Publication of regional fisheries agreement	7,000	0	0	0	0	0	0	0	0	0
1E	Meetings	3304	RWG-F Meeting 1	4,164	4,320	0	-4,320	0	0	0	0	0	0
		3305	RWG-F Meeting 2	10,975	10,975	0	-10,975	0	0	0	0	0	0
		3306	RWG-F Meeting 3	9,343	9,343	0	0	-9,343	0	0	0	0	0
		3307	RWG-F Meeting 4	11,217	11,217	0	0	0	-11,217	0	0	0	0
		3308	RWG-F Meeting 5	13,605	13,605	0	0	0	0	0	-13,605	0	0
		3309	RWG-F Meeting 6	0	0	0	0	0	0	0	0	0	0
Sub Total					1,266,621	1,312,084	0	-51,295	-111,062	-92,313	-630,539	-317,305	109,570
1A	Stock assessment	2107	Ship rental	747,905	747,905	0	-45,000	0	0	0	-702,905	0	0
		4207	Equipment for regional survey (f)	0	0	0	0	0	0	0	0	0	0
		3336	2nd & 3rd Technical Meeting for the Cooperative Cruise	10,524	10,315	0	0	-2,606	-7,709	0	0	0	0
1F	UNOPS Project	5304	Operation cost	2,481	1,960	0	0	-1,475	-380	-105	0	0	0
		1308	Staff Charges	596,909	557,980	-4,874	-105,254	-64,152	-107,136	-105,031	-99,894	71,638	
		5608	Reimbursement Costs	0	7,229	0	0	0	-719	-1,541	-4,451	-518	0

Revised Budget for 2009 and Onwards

As of 9th Nov 2009

					5th RSTP/PSC	2009.11.09	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010
Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Original Budget Total	Revised Budget Total	Yr 2004	Yr 2005	Yr 2006	Yr 2007	Yr 2008	Total Expenditure	Yr 2010 (Jan Jun)
		Supporting Cost	5802	PO Accrual & Reversal	0	0	0	-22,000	-57,382	-133,910	210,396	2,896	0
			5601	UNOPS Project Supporting Cost(6%)	157,466	137,055	0	-6,811	-10,095	-21,702	-62,686	-24,889	10,872
				Sub Total	1,515,285	1,462,443	-4,874	-179,065	-136,429	-272,378	-664,782	-122,404	82,511
				1.Fisheries Total	2,781,906	2,774,527	-4,874	-230,360	-247,491	-364,691	-1,295,321	-439,709	192,081
2.Biodiversity			1208	Review of National Practice of Coastal Habitats and Vulnerable Species-Consultant	9,300	9,316	0	0	-2,500	-6,816	0	0	0
			2108	Institution Contracts to review existing national practices of coastal habitat use, conservation & restoration	59,741	59,741	0	-20,918	-12,000	-26,823	0	0	0
			2109	Institution Contracts to Implement Regional Strategy for Conservation Areas	199,985	199,985	0	0	0	0	-169,990	-29,995	0
			2151	Management effectiveness of reserves (two country reports)	25,422	25,883	0	0	0	0	-16,083	-9,800	0
	2A	Habitat Conservation (Activity 1 to 3) & Vulnerable Species (Activity 2 to 5)	2152	Regionsal training for Reserve managers (2 meetings in local language)	45,000	30,255	0	0	0	0	0	-20,255	10,000
			2169	Management improvement in demo site	100,000	130,558	0	0	0	0	0	-85,000	45,558
			2170	Other Contracts-Biodiversity	20,000	54,573	0	0	0	0	0	0	54,573
			2171	Public awareness in demo site	30,000	29,405	0	0	0	0	0	-20,000	9,405
			New Act	MPA Network	0	10,000	0	0	0	0	0	0	10,000
			5204	Review national practices of coastal habitat use, conservation, and restoration-Printing costs	4,292	4,292	0	0	0	-4,292	0	0	0
			5205	Review of status of vulnerable species and vulnerable trophic linkages-Printing costs	3,535	3,535	0	0	0	-3,535	0	0	0
			1702	Biodiversity Advisor	0	0	0	0	0	0	0	0	0
			2144	Genetic diversity	16,059	11,559	0	0	0	-11,559	0	0	0
	2B	Genetic Diversity	2153	Review of Genetic diversity in fleshy shrimp	20,000	24,270	0	0	0	0	-17,500	-6,770	0
			5222	Printing cost for habitat status and Genetic review	10,000	10,000	0	0	0	0	0	0	10,000
			3310	RWG-B Meeting 1	3,436	3,436	0	-3,436	0	0	0	0	0
			3311	RWG-B Meeting 2	13,055	13,055	0	-13,055	0	0	0	0	0
			3312	RWG-B Meeting 3	8,485	8,485	0	0	-8,485	0	0	0	0
			3313	RWG-B Meeting 4	11,380	11,380	0	0	0	-11,380	0	0	0
			3314	RWG-B Meeting 5	11,438	11,438	0	0	0	0	-11,438	0	0
			3315	RWG-B Meeting 6	0	0	0	0	0	0	0	0	0
				Sub Total	591,126	651,164	0	-37,408	-22,985	-64,405	-215,011	-171,820	139,536
	2C	Meetings	3337	Cross Component Conference (RSTP3)	0	0	0	0	0	0	0	0	0
			5305	Operation cost	1,217	1	0	0	-1	0	0	0	0
			1309	Staff Charges	185,679	173,070	-1,512	-32,647	-19,898	-33,231	-32,578	-30,984	22,220
	2D	UNOPS Project	5609	Reimbursement Costs	0	3,126	0	0	-233	-983	-1,181	-729	0

Revised Budget for 2009 and Onwards

As of 9th Nov 2009

		5th RSTP/PSC		2009.11.09		FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010		
Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Original Budget Total	Revised Budget Total	Yr 2004	Yr 2005	Yr 2006	Yr 2007	Yr 2008	Total Expenditure	Yr 2010 (Jan Jun)	
4D	Regional Strategy Pollution Control		1213	Reg'l synthesis contaminant fate and transport-Consultant(IC)	11,477	11,477	0	0	0	-11,477	0	0	0	
			1215	Reg'l investment strategy & imp. plan pollution control -Consultant (IAEA)	0	0	0	0	0	0	0	0	0	0
			2114	Institution Contracts to implement regional pollution control strategies	0	0	0	0	0	0	0	0	0	0
			2117	Institution Contracts to implement contaminant remediation/prevention	0	0	0	0	0	0	0	0	0	0
			2158	Demo - Institution contract for atmosphere deposition	99,280	99,280	0	0	0	0	0	-24,800	-74,480	0
			2159	Demo - Institution contract for HS nutrient load	126,956	126,956	0	0	0	0	0	-38,000	-88,956	0
			2160	Demo - Institution contract for Public awareness	0	0	0	0	0	0	0	0	0	0
			2161	Demo - Institution contract for recreational waters management	50,043	50,043	0	0	0	0	0	-12,500	-37,543	0
			2162	Demo - Institution contract for sea-based nutrient source	67,916	64,716	0	0	0	0	0	-16,000	-48,716	0
			2174	Other Contracts-Pollution	20,000	62,199	0	0	0	0	0	0	-7,629	54,570
			3346	Experience exchange for LME visit	0	0	0	0	0	0	0	0	0	0
			5207	Publish regional invest. strategy-Printing costs	10,765	10,765	0	0	0	0	0	-7,765	0	3,000
	5209	Publish reg'l strategy activity results-Printing costs	3,000	3,000	0	0	0	0	0	0	0	3,000		
	4E	Meetings		3316	RWG-P Meeting 1	8,017	8,017	0	-8,017	0	0	0	0	0
				3317	RWG-P Meeting 2	9,475	9,475	0	-9,475	0	0	0	0	0
				3318	RWG-P Meeting 3	9,316	9,316	0	0	-9,316	0	0	0	0
				3319	RWG-P Meeting 4	9,741	9,741	0	0	0	-9,741	0	0	0
				3320	RWG-P Meeting 5	13,599	13,599	0	0	0	0	-13,599	0	0
				3321	RWG-P Meeting 6	0	0	0	0	0	0	0	0	0
	Sub Total					975,756	996,325	0	-36,492	-76,469	-121,382	-340,654	-340,759	80,570
				1311	Staff Charges	349,766	332,321	-2,326	-56,624	-51,733	-56,599	-56,278	-53,044	55,718
				5307	Operation cost	1,026	-10,604	0	0	7,327	3,277	0	0	0
5611				Reimbursement Costs	0	3,939	0	0	-548	-413	-1,753	-1,224	0	
5805				PO Accrual & Reversal	0	0	0	-22,000	-41,536	17,536	-6,843	52,843	0	
5604				UNOPS Project Supporting Cost(6%)	79,593	69,859	0	-4,951	-7,709	-6,039	-22,452	-20,531	8,177	
Sub Total					430,385	395,515	-2,326	-83,574	-94,199	-42,238	-87,325	-21,957	63,895	
4.Pollution Total					1,406,142	1,391,839	-2,326	-120,066	-170,668	-163,619	-427,979	-362,715	144,465	
5.Investment	5A	Stakeholders & Public Awareness	1227	Public awareness assistant	15,000	15,000	0	0	0	0	-15,000	0	0	
			2123	Institution Contracts for Governance analysis	42,124	42,124	0	0	-25,100	-17,024	0	0	0	
			2124	Institution Contracts for The Yellow Sea and Youth	43,816	40,863	0	0	-3,188	-13,012	-16,663	0	8,000	

Revised Budget for 2009 and Onwards

As of 9th Nov 2009

					5th RSTP/PSC	2009.11.09	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010
Activity	Sub Act	Sub Act Des	IMIS	IMIS Code Description	Original Budget Total	Revised Budget Total	Yr 2004	Yr 2005	Yr 2006	Yr 2007	Yr 2008	Total Expenditure	Yr 2010 (Jan Jun)
			New Act	Preparation for the establishment of YSLME Commission	0	15,000	0	0	0	0	0	0	15,000
			5215	Print the final TDA	9,805	9,805	0	0	0	-4,875	-4,931	0	0
			5216	Print NYSAP	6,000	6,000	0	0	0	0	0	0	6,000
			5217	Print regional SAP	5,000	3,000	0	0	0	0	0	0	3,000
			1704	NCU Coordinator (K)	284,999	284,935	0	0	-90,340	-70,922	-63,674	-35,200	24,800
			1705	NCU Coordinator (C)	175,500	175,510	0	0	-53,185	-34,800	-60,760	-26,765	0
			2127	Institution Contracts to analyse institutional arrangements	0	0	0	0	0	0	0	0	0
	5C	National Coordination (Institutions)	2133	National co-ordinating mechanism (C)	158,720	158,720	0	0	-29,325	-45,580	-40,000	-43,815	0
			2134	National co-ordinating mechanism (K)	59,497	51,449	0	0	0	-38,649	-2,400	0	10,400
			3213	Training on Project document preparation	20,278	20,278	0	0	0	-20,278	0	0	0
			3214	Training on Fund raising	20,000	20,000	0	0	0	0	0	0	20,000
			1222	Develop regional data & info systems-Consultant	0	0	0	0	0	0	0	0	0
			1707	DIM Consultants	0	0	0	0	0	0	0	0	0
	5D	Data and Information Management	2143	Maintenance of Meta and GIS Databases	54,560	54,560	0	0	0	-15,000	-22,060	-12,500	5,000
			3215	Training on DIM	14,966	14,966	0	0	0	0	-14,966	0	0
			4103	GIS Software	8,451	8,500	0	0	0	-8,500	0	0	0
			4202	GIS workstation	0	0	0	0	0	0	0	0	0
			4209	Equipment for DIM	20,320	20,320	0	0	-12,000	-8,320	0	0	0
			3328	RWG-I Meeting 1	5,634	5,634	0	-5,634	0	0	0	0	0
			3329	RWG-I Meeting 2	11,834	11,834	0	-11,834	0	0	0	0	0
			3330	RWG-I Meeting 3	16,933	16,933	0	0	-16,933	0	0	0	0
			3331	RWG-I Meeting 4	19,292	19,292	0	0	0	-19,292	0	0	0
			3332	RWG-I Meeting 5	11,256	11,256	0	0	0	0	-11,256	0	0
			3333	RWG-I Meeting 6	0	0	0	0	0	0	0	0	0
				Sub Total	1,741,687	1,730,342	0	-17,469	-358,019	-446,695	-408,713	-258,750	240,696
	5F	Financial Sustainability (Instruments)	2129	Demonstration projects on sustainable investment	0	0	0	0	0	0	0	0	0
			2142	Small Grants Projects	157,512	158,435	0	0	-20,600	-46,888	-51,718	-39,229	0
			1312	Staff Charges	600,296	534,903	-4,434	-64,877	-95,641	-104,148	-102,983	-93,502	69,316
			5308	Operation cost	5,766	3,310	0	0	1,776	223	-5,309	0	0
			5612	Reimbursement Costs	0	7,237	0	0	-2,683	-1,632	-2,418	-505	0
			5806	PO Accrual & Reversal	0	-0	0	-52,500	-247,667	269,182	-21,537	52,522	0
			5605	UNOPS Project Supporting Cost(6%)	150,316	115,492	0	-5,598	-37,749	-8,135	-25,042	-20,368	18,601
				Sub Total	913,889	819,376	-4,434	-122,975	-402,564	108,601	-209,006	-101,082	87,917
				5.Investment Total	2,655,576	2,549,718	-4,434	-140,444	-760,583	-338,094	-617,719	-359,832	328,613
				Grand Total	14,394,089	14,394,089	-144,949	-1,717,861	-2,112,843	-2,103,549	-3,894,061	-2,196,684	2,224,142

Annex X

List of Acronyms

APEC	Asia-Pacific Economic Cooperation Conference
BOBLME	Bay of Bengal Large Marine Ecosystem
CBA	Cost-Benefit Analysis
CBD	Convention of Biological Diversity
COP	Conference of Parties
DPRK	Democratic People's Republic of Korea
EAS Congress	East Asian Seas Congress
EU	European Union
FAO	United Nations Food and Agriculture Organisation
GEF	Global Environment Facility
GEFSEC	GEF Secretary
IOC/WESTPAC	Intergovernmental Oceanographic Commission / Sub-commission for the Western Pacific
IW	International Waters
KMI	Korea Maritime Institute
KORDI	Korea Ocean Research and Development Institute
LME	Large Marine Ecosystem
MLTM	Ministry of Land, Transport and Maritime Affairs
MOFAT	Ministry of Foreign Affairs and Trade
MoU	Memorandum of Understanding
MPA	Marine Protected Area
NOWPAP	Northwest Pacific Action Plan
NPC	National Project Co-ordinator
NSAP	National Strategic Action Plans
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PICES	North Pacific Marine Science Organization
PIF	Project Identification Form
PMO	Project Management Office
ProDoc	Project Document
PSC	Project Steering Committee
ROK	Republic of Korea
RSTP	Regional Scientific and Technical Panel
SAP	Strategic Action Programme
SHMA	State Hydrometeorological Administration
TDA	Transboundary Diagnostic Analysis
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNOPS	United Nations Office for Project Services
YSESP	Yellow Sea Eco-region Support Project
YSLME	Yellow Sea Large Marine Ecosystem