



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

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And Project Steering Committee
For the UNDP/GEF Yellow Sea Project
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Report of Project implementation Progress

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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.

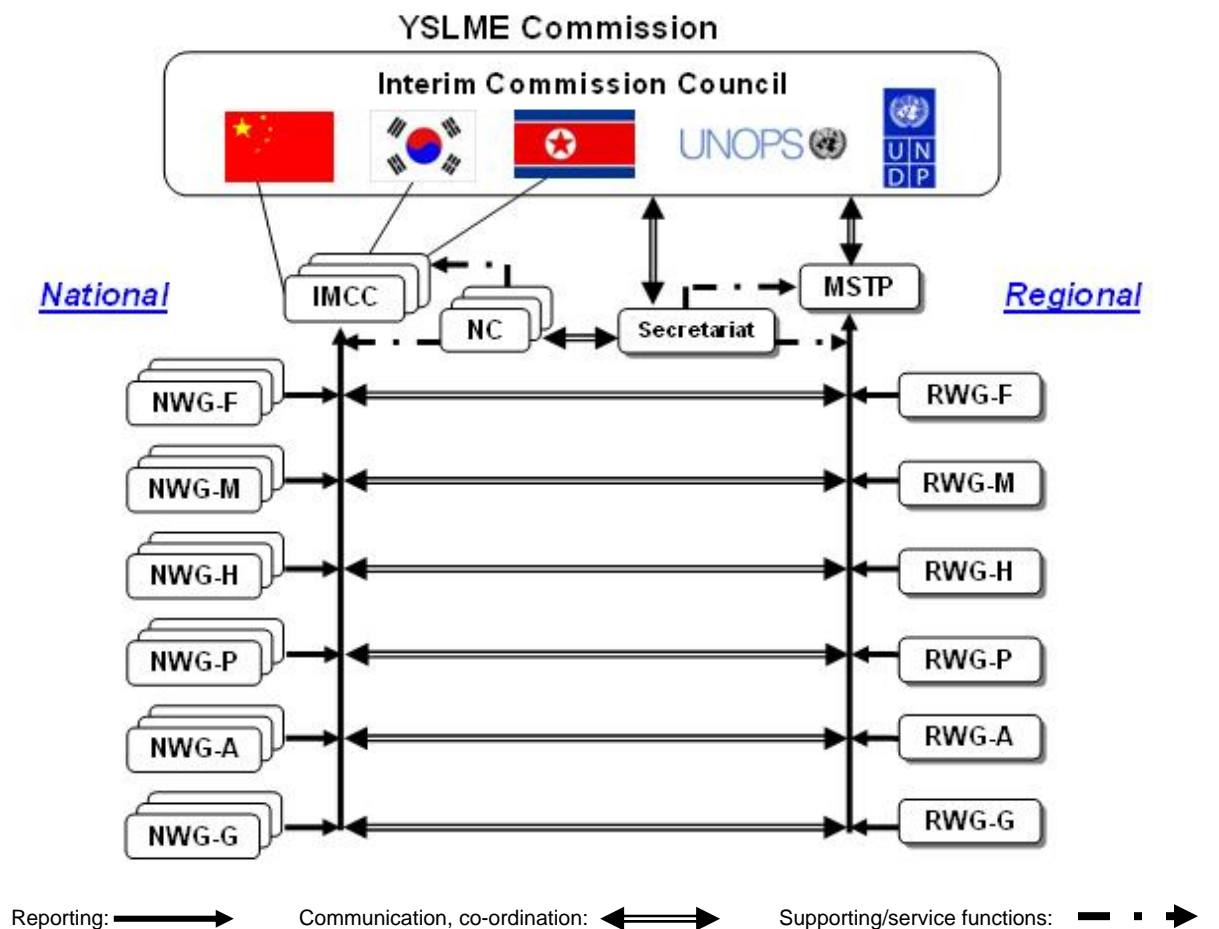


Fig. 1. Consultation meeting in Ansan, Republic of Korea (left) and at the China-Korea Joint Ocean Research Center, Qingdao, China (right).

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

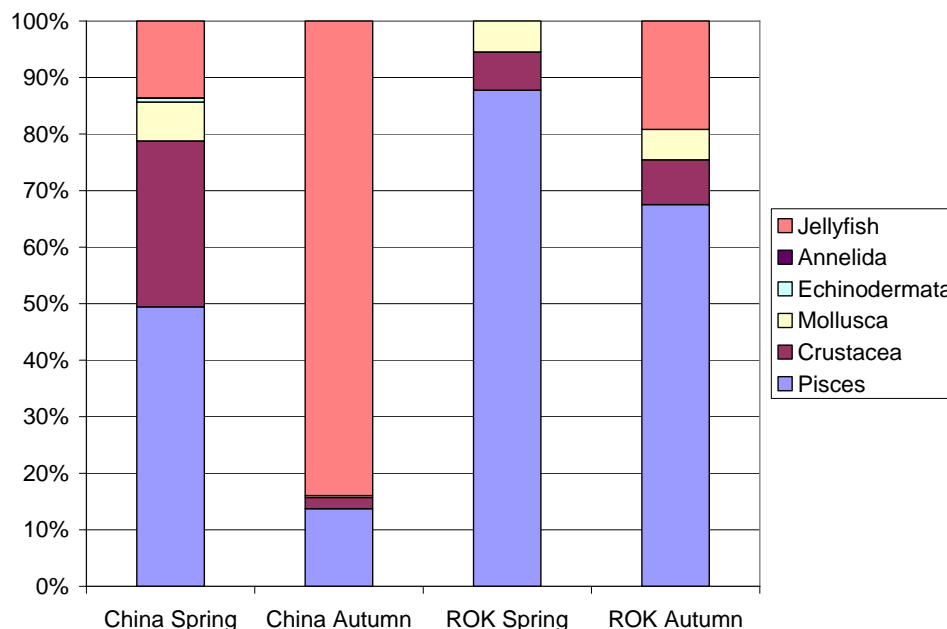
21. The 5 SAP demonstration activities initiated under the Fisheries Component, 3 directed towards capture fisheries and 2 at improving mariculture:
 - Assessment of the Effectiveness of Improved Fisheries Management;
 - Assessment of the effectiveness of the stock enhancement; and
 - Assessment of the 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.

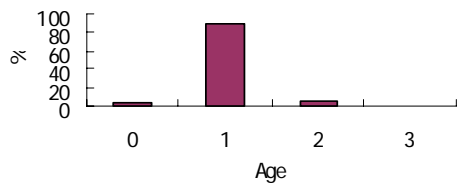
3.1.2 Stock Assessment

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.

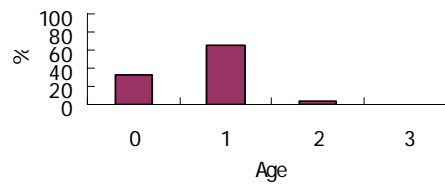
Fig. 3. Taxonomic composition of catches by weight in the spring and autumn surveys.



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.

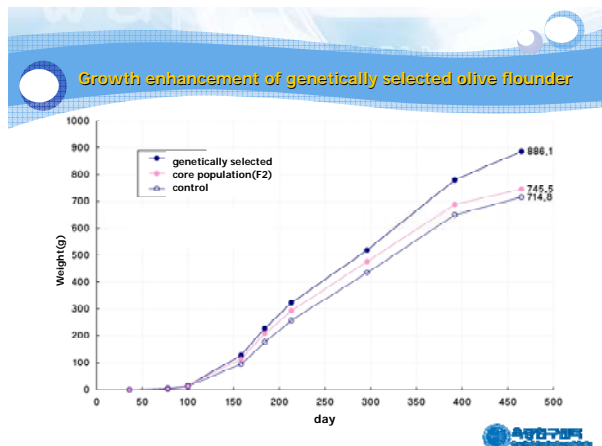


Fig.7. Olive flounder selected for faster growth.

Selective breeding goal of olive flounder in Korea

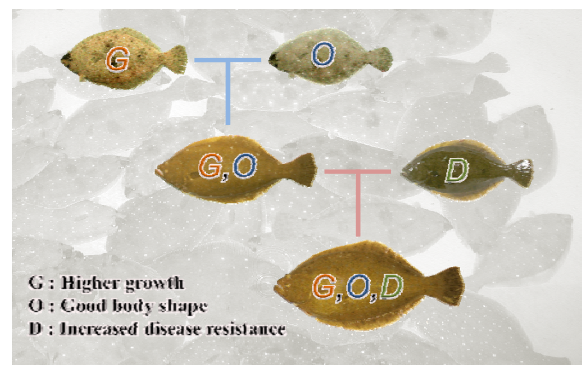


Fig. 8. Eventual goals of disease resistant, fast growing, well forming olive flounder.

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

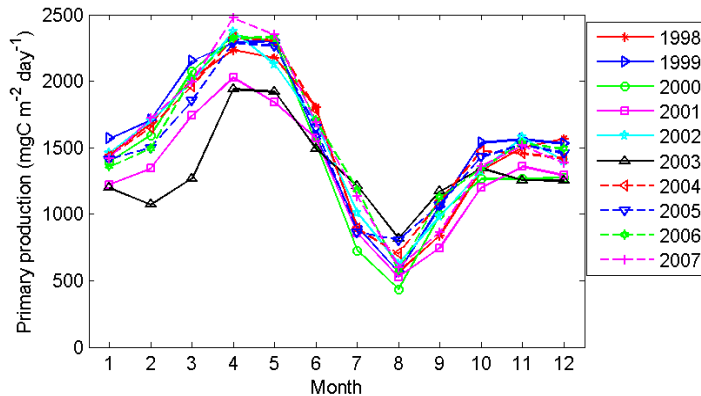


Fig. 9. Monthly averaged variations of primary production in the Yellow Sea from 1998 to 2007.

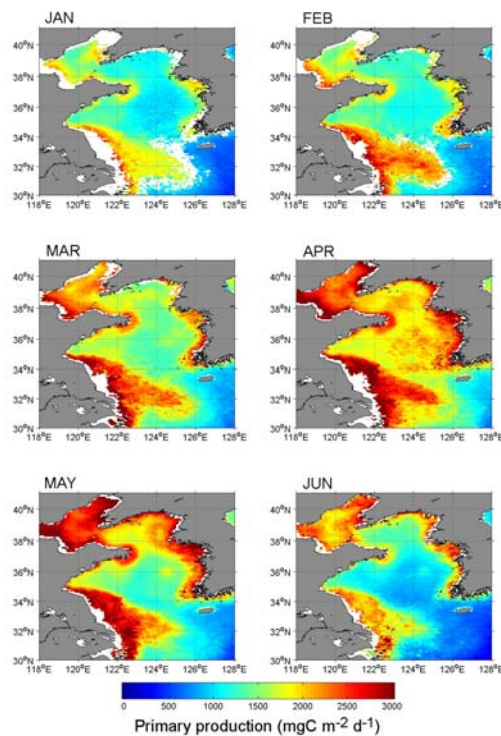


Fig. 10. Climatology of primary production in the Yellow Sea, Jan-Jun, from 1998 to 2007.

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.

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

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

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.

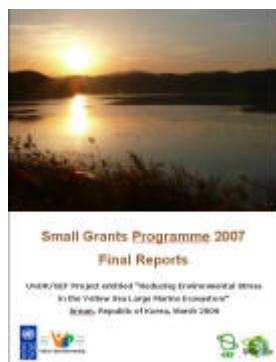


Figure 19(a): The cover of Small Grants Programme 2007 (publication).



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).

UNDP / GEF Yellow Sea Large Marine Ecosystem Project

Home | Introduction | Press | Publication | Document | Links

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	Kunming, China	Final meeting report	Logistic
	First Meeting of Regional Science and Technical Panel	4-6 July 2005	Dalian, 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	Kunming, 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	Taejeon, 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

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Publication

- Meeting Reports Publications
- Newsletter
- Brochure&Poster

Announcement

- Past announcement

Quick Link

- Meeting documents
- Yellow Sea Partnership
- PMO Discussion Forum
- YSLME 2006 Schedule
- PMO staff information
- Webmail

Yellow Sea News

UNDP/GEF Yellow Sea Project PMO, 1270 Sa2-dong Sangnok-gu, Ansan-si Gyeonggi-do, 426-744.

Analysis of environmental Status and Trends
Volume 4 : Governance Analysis
size: 9M, PDF

Analysis of Environmental Status and Trends
Volume 1 : National Reports - China 1
size: 65M, PDF

Analysis of Environmental Status and Trends
Volume 1 : National Reports - China 2
size: 74M, PDF

Analysis of Environmental Status and Trends
Volume 2 : National Reports - Korea Republic1
size: 66M, PDF

Analysis of Environmental Status and Trends
Volume 2 : National Reports - Korea Republic2
size: 64M, PDF

Analysis of Environmental Status and Trends
Volume 3 : Regional Synthesis
Size: 135M, PDF

4TH PSC
Report of the Fourth Meeting of the Project Steering Committee
UNDP/GEF Yellow Sea Project

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.

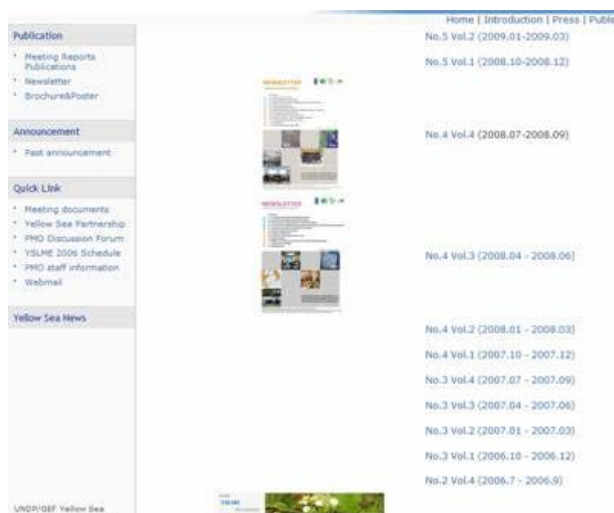


Fig. 25. Web links to the project newsletters.

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.

Annex 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

Annex II
Expenditure Report for 2009

Available from the PMO upon request.

Annex III

PMO's Inventory of Non-Expendable Property

Available from the PMO upon request.

Annex 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