



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

UNDP/GEF/YS/RWG-E.3/3
Date: 21 September 2006
English only

**Third Meeting of the Regional Working Group
for the Ecosystem Component**
Jeju, Republic of Korea, 18 – 21 September 2006

Meeting Report

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1 OPENING OF THE MEETING

1.1 Welcome addresses

- 1.1.1 On behalf of the UNDP/GEF Yellow Sea Project, Ms. Connie Chiang, Environment Officer, opened the meeting and welcomed the members of the Regional Working Group-Ecosystem (RWG-E) to Jeju, Republic of Korea.
- 1.1.2 Ms. Chiang gave a summary of the stages of the project (TDA, SAP, pilot implementation of SAP), and stated that this meeting would focus on finalising the data for the TDA and preparing for the SAP phase. The first phase of the project focused on data collection for TDA, and the consultant preparing the TDA will aim to complete the TDA by the end of October/early November 2006, in time for the RSTP and PSC to, respectively, review and approve the document. The meeting will also consider how to begin developing the SAP, such as the activities and actions that should be discussed and agreed at the meeting.
- 1.1.3 Ms. Chiang also informed participants that during the meeting, members will discuss how to improve the national reports and prepare them for publication. The causal chain analysis would be re-visited and finalised based on the collected data and information, and collective knowledge of the experts. The meeting would also consider the issues relevant to the preparation of the SAP. Finally, on behalf of the PMO, Ms. Chiang expressed her appreciation to Ms. Kang Young Shil for acting as Interim Chairperson on such short notice.
- 1.1.4 On behalf Mr. Yoo Sinjae, RWG-E Chairperson, Ms. Kang Young Shil, Interim Chairperson of the meeting for Agenda Items 1 to 5.1.1, welcomed the participants to Jeju, and expressed her appreciation to the members for their commitment to the Project, because despite the typhoon, members made every effort to arrive at the meeting as soon as possible.

1.2 Introduction of members

- 1.2.1 Members and other participants were invited to introduce themselves, and gave a brief introduction on their background and roles in the Project. The list of participants is attached to this report as [Annex I](#).

2 ORGANISATION OF THE MEETING

2.1 Documentation Available to the Meeting

- 2.1.1 Ms. Kang invited the Secretariat (Project Management Office) to introduce this agenda item. Mr. Pae Seonghwan introduced the meeting's working and information documents prepared by the PMO (Document UNDP/GEF/YS/RWG-E.3/inf.1). Ms. Chiang alerted participants to the addition of two documents related to the TDA, and stated that most documents were sent to participants or were available online for reviewing before the meeting. The list of documents is attached as [Annex II](#).

2.2 Organisation of Work

- 2.2.1 Mr. Pae presented the provisional working programme for the meeting (Document UNDP/GEF/YS/RWG-E.3/inf.3). Ms. Chiang informed the meeting that as not all

members had arrived due to the typhoon, the working programme would have to be flexible, and it would be up to the Chairperson to arrange the appropriate times for each agenda item.

2.2.2 Due to the nature of the agenda items to be discussed, the meeting was organised in plenary as far as possible. Sessional working groups were formed for particular issues requiring more in-depth discussion.

2.2.3 The meeting was conducted in English.

3 ADOPTION OF THE MEETING AGENDA

3.1 The Chairperson introduced the Provisional Agenda (Document UNDP/GEF/YS/RWG-E.3/1) and Provisional Annotated Agenda (Document UNDP/GEF/YS/RWG-E.3/2) prepared by the PMO.

3.2 There were no changes to the agenda, and the Meeting adopted the agenda which is attached as [Annex III](#) to this report.

4 EXPECTED OUTPUTS FROM THE 3RD RWG-E MEETING

4.1 The Chairperson invited the PMO to present the expected outputs of the meeting (Document UNDP/GEF/YS/RWG-E.3/4). Ms. Chiang presented the list of expected outputs to be achieved by the meeting, provided some details for each agenda item's objective, and alerted the participants to the focus on considering the actions needed for preparing the SAP.

4.2 Mr. John Michael Bowers added that the causal chain analysis would be an important output of this meeting. The casual chain analysis would need to be done by this group of experts, and not an individual.

4.3 The members noted the expected outputs presented.

5 REVIEW OF COMPLETED AND ON-GOING ECOSYSTEM COMPONENT ACTIVITIES

5.1 Data and Information Status, Trends and New Findings

5.1.1 National data and information collection

5.1.1.1 Mr. Heo Seung presented the final report of this activity for Korea. He explained the review results of the data and information on phytoplankton, zooplankton, benthos, and HABs. He reported the status and long-term trends, and highlighted the gaps in the existing data and information and the needs for future data and information collection.

5.1.1.2 Mr. Zhu Mingyuan presented the report for the data and information collection activity carried out by China. He mentioned the sources of the data and information, and then presented the additional collected data and information since the submission of the draft final report. He highlighted the major findings, explaining the data and information on phytoplankton, zooplankton, benthos, HABs, chlorophyll-a, and primary production, and presented the data in terms of species composition,

biomass, seasonal variation, horizontal distribution, and dominant species. He pointed out some trends based on the collected data and information, and reported on the gaps in the available data and information.

5.1.1.3 Mr. Zhu also gave a presentation prepared by Mr. Qiao Fangli on the physical oceanographic aspects of the Yellow Sea, showing observed and simulated horizontal and vertical circulation patterns, SST, sea surface salinity, and chlorophyll-a. He concluded three points: (i) circulation has a three-layer structure; (ii) the upwelling is front scale, not basin scale; and (iii) modelling can illustrate hydrodynamic characteristics of the Yellow Sea.

5.1.1.4 During the discussion, Mr. Bewers raised a question about the interpretation of data, and wished to clarify how significant some data were. He noted that Korea's report provided a lot of useful data, but to prepare a good TDA, he asked for more interpretation of some of Korea's data as follows:

- Referring to Figures 6 and 8 on zooplankton biomass and percent composition, he asked how statistically significant the presented data and trends were.
- Referring to Figure 11 showing benthic community variables, he pointed out that it would greatly assist the TDA if there were some interpretation of the link between sediment and grain size to benthic structure.
- Referring to Table 6 showing HAB data, Mr. Bewers asked if the species that are harmful to human health could be highlighted, i.e. those species that cause PSP, DSP, and ASP.

5.1.1.4 Mr. Hong said that studying the sediment structure is out of the scope of work of the study, but he agreed with the importance of adding more data analysis and interpretation. **Members of the Korea Data Collection Team agreed that that statistical analysis would be done on Figures 6 and 8 and shown in the final report, a summary interpretation from the literature would be given for Figure 11, and the species causing toxic effects would be duly noted in Table 6.**

5.1.1.5 Ms. Chiang also felt that the data collection reports from this and other project components should include more interpretation with statistical analysis, where possible, to clarify how significant the data are. It would also depend on the regional synthesis consultant's range of expertise whether he would require further interpretation of the national data, or whether he could interpret all the data himself. If needed, the regional synthesis consultant will discuss the data and information further with each group to finalise the synthesis report.

5.1.1.6 Mr. Bewers asked for further clarification on the physical oceanographic presentation which Mr. Zhu agreed to provide after consulting with Mr. Qiao, who was unable to attend the meeting. Mr. Bewers' comments are attached as [Annex IV](#).

5.1.2 Regional data and information synthesis

5.1.2.1 Mr. Kang Daeseok, who chaired the meeting for Agenda Item 5.1.2 and part of Agenda 6, gave a summary report on the regional synthesis of ecosystem data. He summarized some of the national data and information collected, describing the synthesis on phytoplankton (e.g., species composition, abundance, primary productivity), zooplankton (e.g., biomass variation), benthos (e.g., biomass), and HABs (e.g., dramatic increase in HAB events in recent decades).

5.1.2.2 Mr. Kang pointed out the information gaps such as:

- (i) a severe lack of basin-scale ecosystem information;
- (ii) regional data synthesis by season was not possible due to different times of data collection from the two countries; and
- (iii) different sampling methods and strategies used.

Mr. Kang suggested some recommendations to fill the gaps, including:

- (i) systematic data and information collection (more qualitative data are necessary and useful for comparison);
- (ii) establishment of a basin-scale joint survey programme (two research activities, scanning (general) survey and target (specific) survey, were suggested);
- (iii) utilisation of remote sensing technology to have a long-term picture of the ecosystem in the Yellow Sea (a workshop on remote sensing might be helpful); and
- (iv) collection of data and information on the coastal water of DPRK.

5.1.2.3 With the different temporal and spatial data provided, Mr. Kang admitted that it was difficult to provide a whole picture of the Yellow Sea ecosystem; however, he successfully provided enough information and substantive interpretation that can contribute to the TDA.

5.1.2.2 In the subsequent discussion, Mr. Bewers reiterated that the TDA would be produced based on the best available data, and there were sufficient data from this group for a meaningful document. Mr. Zhu commended Mr. Kang on producing a good synthesis report, and agreed that monitoring by remote sensing is needed in this region.

5.1.2.3 Referring to the diagram on Page 6 of the report (Document UNDP/GEF/YS/RWG-E.3/6), Mr. Bewers asked for clarification about the scope of the ecosystem component, as the diagram included lower and higher trophic level organisms. Mr. Kang stated that he would present the figure in his final report to show that only lower trophic levels were included in his study.

5.1.2.4 Mr. Bewers asked for clarification about the term, “ocean dumping,” mentioned in the report, and pointed out that “ocean dumping” according to the London Convention definition would not affect the Yellow Sea structure and function. Mr. Kang agreed to revise the wording so as to not mislead the reader.

5.1.2.5 Ms. Chiang noted that the national data presentation report from China would be provided to Mr. Kang for the final version of his synthesis report. **Mr. Kang agreed to provide an updated version of his report to the PMO and TDA Consultant in early October 2006.**

5.1.2.6 Ms. Chiang said the Project will publish both national reports and the regional synthesis report. She asked for comments on how the Project should publish these reports.

5.1.2.7 Mr. Kang agreed to include GIS maps in the final regional synthesis report.

5.1.2.8 Mr. Isao Endo mentioned the agreement made by the 3rd RWG-I Meeting about publishing the Governance Analysis reports. He informed the Meeting that the RWG-

I agreed to publish the reports and that the final reports should be edited by native English speakers and checked by the relevant government officials due to the sensitivity of the information in the governance analysis reports. While ecosystem data might not include the same level of sensitivity, editing of reports before publication would also need to be done.

5.1.2.9 Mr. Bewers explained that the reports should be written in easy-to-understand language. The national reports should be technical/scientific documents; the regional synthesis report should be understandable by people with some technical background; the TDA report should be straightforward and understandable by politicians as the target audience. He suggested that the physical oceanography data presented by China was very useful and should be published, if not yet done so. He also suggested that the PMO consider publishing the data with the national report.

5.1.2.10 The PMO agreed to include physical oceanography data when publishing the China national report, but contingent upon the agreement from the RSTP on this matter.

5.1.2.11 Some of the raw data tables were very large, and members asked how these might be published. The PMO explained that raw data was useful for the database being produced by the CKJORC, but for publication purposes, summaries of the raw data shown illustratively would be more useful. The PMO would bring up the matter of reports publication at the 3rd RSTP meeting to be held in November 2006, when this issue would be reviewed to finalise the details of the publication.

5.1.2.12 **Members informed the PMO that all data shown at the meeting were not classified, agreed to publish the national reports and the regional synthesis report, considering all the comments made by the participants,** and took note of the action to be taken by the RSTP to agree on finalising the publications.

5.2 Other Activities

5.2.1 Co-operative study cruises

5.2.1.1 Mr. Endo introduced Document UNDP/GEF/YS/RWG-E.3/7, and explained that no government approval for the spring/summer cruise was obtained, and that the PMO is facilitating the negotiation and approval for the winter cruise.

5.2.1.2 Members noted the result of the approval for the spring/summer joint co-operative study cruise, and will await further information from the PMO on the progress of approval for the winter cruise.

5.2.2 EAS Congress

5.2.2.1 Mr. Endo explained the upcoming EAS Congress 2006 in Haikou, China, December, and that the Project and Yellow Sea Partnership plan to organise one session to discuss the Partnership's future work. The session will showcase how a partnership can extend its public awareness activities to a wider range of stakeholders, and enhance co-operation and co-ordination among the relevant activities in the Yellow Sea.

5.2.6.1 In addition, the project will also organise an exhibition booth. Members suggested that the exhibition might include displays showing the following topics:

- the status and trends of the HAB events, using data from the national reports;
- the long-term change of zooplankton observed as one of the effects of climate change; and
- information about jellyfish bloom with photos of jellyfish to illustrate recent new environmental problems in the Yellow Sea.

5.2.3 Other activities (e.g. Sustainability of LMEs: Bridging the Governance and Socioeconomics Gap Workshop)

Workshop on Sustainability of LMEs

5.2.3.1 Mr. Yoo and Mr. Zhu gave a summary of the workshop both had attended in March 2006, in Rhode Island, USA. The workshop's objective was to improve the socio-economic and governance analysis ability of participants from LME projects in order to improve the governance aspects in implementing LME projects. Mr. Yoo presented the topics of the workshop, including the definition of governance, how to link governance to LME project modules, and sustainable financing mechanisms for SAP implementation.

5.2.3.2 Mr. Yoo highlighted compliance policies and noted that it was an important issue that should be considered in SAP development.

5.2.3.3 Sustainable financing was another issue highlighted by Mr. Yoo, and he showed various types of financing mechanisms available from industries, governments, and donors. He stressed that this should be part of the SAP, although not all mechanisms might be applicable to this region.

5.2.3.4 The PMO noted that the additional information from the workshop might be useful for the RWG-I when the group discusses the activities on regional governance analysis, environmental valuation, financial sustainability, and SAP development.

Ecosystem Monitoring Guidelines

5.2.3.5 The Meeting felt that the TOR for the activity should be more specific, and more clearly define what aspects of the ecosystem should be monitored. However, without knowing the targets for the region, it might be difficult at this stage, to clearly define the scope of the activity. **The Meeting agreed that the following steps should be taken:**

- (i) The 3rd RSTP Meeting should consider the strategic implementation of this activity, and make a decision on the scope of work.**
- (ii) If PSC approval is obtained for the RSTP's recommendation, the SAP Consultation Meeting to be held in early 2007 will discuss and refine the scope of work.**
- (iii) Following the SAP Consultation Meeting, the PMO will rewrite the TOR, and re-advertise this consultancy.**

Demonstration of New and Innovative Technologies for Monitoring Ecosystem

5.2.3.6 Mr. Zhu informed the meeting that the continuous plankton recorder had been delivered to FIO, but he was unsure about available Project funds for non-cruise activities using the CPR. The PMO explained that it had been discussed and agreed by the RWG-E in earlier meetings that the PMO would consider proposals from FIO describing activities where the CPR would be used.

5.2.3.7 **It was agreed that FIO would submit a proposal containing activities using the CPR, and the budget for the activities, including insurance costs. FIO agreed to submit a proposal to the PMO before 8th October 2006.**

5.2.3.8 Mr. Zhu alerted the Meeting to the POGO programme to train young Chinese scientists in using the CPR for 2 months in the USA. These scientists would be able to implement activities using the CPR in the future. The Meeting noted this information.

5.2.3.9 Mr. Yoo explained the current uncertainty and large variation in estimating primary productivity, and that without reliable data, one could not obtain good carrying capacity estimates of the Yellow Sea. He also explained that the current fisheries production values are much higher than expected from primary productivity values. This was substantial evidence that current primary productivity values are not reliable enough, and more work should be done in this field.

5.2.3.10 Mr. Yoo presented a draft proposal on purchasing an FRFF-2 (fast repetition rate fluorometer, version 2) and an underwater optic profiler which are recently improved and developed equipments used to provide better estimation of chlorophyll-a and photosynthesis rates in turbid waters. The former equipment is used to measure *in-situ* photosynthesis, while the latter equipment is used to measure downwelling and upwelling irradiance. The data from the latter can be used in part to develop and verify ocean colour algorithms, and interpreting *in-situ* photosynthesis rate.

5.2.3.11 Mr. Yoo further stated that, with respect to the Project, data obtained from the activities using the equipments would be used in a Remote Sensing Workshop to develop maps of primary production in the Yellow Sea, and ultimately used for assessing carrying capacity.

5.2.3.12 **Mr. Yoo agreed to submit a more detailed proposal to the PMO, by 25th October 2006, about this activity and the purchase of equipments, including price quotations from companies producing the equipments and ship time.**

5.2.3.13 Mr. Zhu noted that the proposed two new equipments to be purchased will upgrade the capacity in primary productivity measurement and development of better remote sensing algorithm for estimation of primary productivity. He suggested the working group submit a proposal to the next RSTP Meeting. He also mentioned that the optical property of sea water is different between the east and west sides of the Yellow Sea, and the equipment should be used basin-wide. He also suggested that estimation of Yellow Sea primary productivity by remote sensing should be carried out jointly.

Regional Remote Sensing Workshop

5.2.3.14 Mr. Yoo gave a proposal for the upcoming remote sensing workshop (Annex V), explaining the proposed topics, participating scientists, and possible collaborating partners. It was proposed that a 2-day workshop focusing one day on developing ocean colour algorithm for chlorophyll-a and the second day on HAB detection should be held.

5.2.3.15 **Mr. Yoo agreed that following the annual KJWOC Meeting this December, he would further develop this activity, and keep the PMO updated on the developments of when and where the workshop should be held. He also agreed to involve Chinese scientists in the workshop organisation.**

Regional Synthesis to Assess Carrying Capacity

5.2.3.16 Mr. Yoo presented a draft TOR for this activity, explaining that the activity aimed to provide basin-scale estimation of production, and that the results might be useful for higher trophic level productivity estimation and also identify areas that management could target to maintain acceptable productivity levels. He also explained that understanding carrying capacity could address the energy transfer efficiency of the ecosystem to predict productivity and annual production that can support higher trophic levels in the Yellow Sea.

5.2.3.17 The discussion touched upon the definition of carrying capacity and the focus of the activity for science or management. The Meeting was informed that the Fisheries Component had plans to implement a similar activity on carrying capacity, but the details would be decided at the 3rd RWG-F Meeting next month.

5.2.3.18 **The Meeting agreed that based on the decision from the 3rd RWG-F Meeting, the RSTP should decide how to co-ordinate the carrying capacity work by the Ecosystem and Fisheries Components.**

5.2.3.19 Mr. Yoo also requested that any participant who had alternative suggestions for the activity submit opinions to him before 15th October 2006 so that the PMO could compile the information to present to the RSTP.

6 PREPARATION OF THE TDA

6.1 Mr. Bewers explained the purpose of the TDA and the requirements from the GEF point of view, the environmental problems identified from the draft national reports and the regional syntheses, and the ways to improve the causal chain analysis for the Ecosystem Component (Annex VI). He presented two documents relevant to the region's environmental problems and an example of a causal chain analysis (Document UNDP/GEF/YS/TDA Draft1). He indicated that the causal chain analysis should be carried out by a group of experts collectively.

6.2 There was extensive discussion on identifying and/or expanding the list of problems stated in the preliminary causal chain analysis, and overlaps of problems with the Biodiversity and Fisheries Components. There was also discussion on whether to combine the original list of problems with those drawn from the national data reports ([Annex VII](#)).

- 6.3 The participants first discussed the scope of problems for the Ecosystem Component to address, and recalled that the 2nd RWG-E meeting agreed to focus on the lower trophic levels. Participants agreed to focus mainly on the lower trophic levels when identifying the problems, and would address higher trophic levels, if necessary. Participants also discussed how the problems should be stated and to what level of detail the problems should address, i.e. considering problems by phytoplankton, zooplankton, and benthos-related issues, or the entire ecosystem.
- 6.4 Two working groups were formed to list the problems, and impacts of the problems. **It was agreed that habitat changes would be the responsibility of the RWG-B, as there were no explicit problems unique to this group that would not be dealt with by RWG-B.**
- 6.5 The table of problems and impacts and the finalisation of the causal chain analysis were reviewed in plenary, and is attached to the report as Annex VIII.

7 ACTIVITIES TO BE IMPLEMENTED FROM 2007 ONWARDS

7.1 Ecosystem Regional Targets and Strategic Action Programme

7.1.1 Consideration of defining critical habitats/ecosystems for preparation of necessary action plans for protection and management of the critical habitats

7.1.2 Ecosystem monitoring guidelines

7.1.3 Regional synthesis and assessment of ecosystem carrying capacity

7.1.4 Regional investment strategies for ecosystem protection and management

- 7.1.1 There was extensive discussion on how to identify the regional “targets” for the Ecosystem Component, and associated activities necessary for developing the SAP (Document UNDP/GEF/YS/RWG-E.3/8).
- 7.1.2 It was suggested that “targets” should be something that can be monitored or measured, possibly predicted, and could be translated to management targets which has direct human implication. Members decided to focus on productivity and structure of ecosystem as the targets for this group.
- 7.1.3 Based on the definition by Olsen et al. 2006 for the Productivity Module described as:

“Focuses on oceanic variability and its effect on the production of phytoplankton and zoo-plankton that are at the base of the ocean food chain; it is concerned with the carrying capacity of ecosystems and their ability to sustain fishery and other living resources,”

members engaged in long deliberation on how to define the ecosystem targets to fit the definition and to be measurable.

7.1.4 Members agreed on three targets:

- (i) **Diagnosis of spatial and temporal change in lower trophic level productivity;**
- (ii) **Diagnosis of spatial and temporal change in lower trophic level community structure; and**
- (iii) **Diagnosis of spatial and temporal change in benthic community structure.**

7.1.5 Members also agreed that the required actions to achieve the targets should be addressed at the SAP Consultation Meeting next year.

7.1.6 Habitats, monitoring guidelines, and carrying capacity were already discussed in previous agenda items.

7.2 Other Activities

7.2.1 Winter co-operative study cruise

7.2.2 Suggestions for other activities

7.2.1 The PMO explained the winter co-operative study cruise in Agenda 5.2, and there were no further suggestions for additional activities to be implemented.

8 WORKPLAN FOR 2007

8.1 Based on the activities discussed during the course of the meeting, members created and agreed on a workplan for 2007. The activities listed in Annex IX will be incorporated into the entire Ecosystem Component's workplan (Document UNDP/GEF/YS/RWG-E.3/9) and submitted to the PSC for approval.

9 OTHER BUSINESS

9.1 The Chairperson invited members to raise any other issues that needed to be considered by this meeting.

10 DATE AND PLACE FOR 4TH RWG-ECOSYSTEM MEETING

10.1 The Chairperson invited members to consider the date and place for the 4th RWG-E Meeting.

10.2 Mr. Zhu suggested, and members agreed to have the Fourth RWG-E Meeting in Ningbo, China from 5th to 8th November 2007.

11 ADOPTION OF THE MEETING REPORT

11.1 The Chairperson led the discussion of the draft meeting report. The report was reviewed, amended, and adopted by the Meeting.

12 CLOSURE OF THE MEETING

12.1 In closing, Mr. Yoo thanked the members for their contribution to the meeting, and the PMO for arranging the meeting.

12.2 On behalf of the Chinese members, Mr. Zhu thanked all the chairpersons and PMO for their guidance to reach the outputs of the meeting.

- 12.3 On behalf of the PMO, Ms. Chiang thanked the three chairpersons for their leadership in guiding the meeting to reach the outputs. She expressed her appreciation to all participants for their input and hard work to achieve the results.
- 12.4 Following the closing statements, the Chairperson declared the meeting closed on 21st September 2006.

Annex I

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Annex II

List of Documents

Working Documents

UNDP/GEF/YS/RWG-E.3/1	Provisional Agenda
UNDP/GEF/YS/RWG-E.3/2	Annotated Provisional Agenda
UNDP/GEF/YS/RWG-E.3/3	Report of the Meeting (<i>to be prepared at the meeting</i>)
UNDP/GEF/YS/RWG-E.3/4	Expected Outputs From the 3 rd RWG-E Meeting
UNDP/GEF/YS/RWG-E.3/5	National Data and Information Collection Activity – Final Reports
UNDP/GEF/YS/RWG-E.3/6	Report of Ecosystem Regional Data Synthesis
UNDP/GEF/YS/RWG-E.3/7	2006 Completed and On-going Activities of the Ecosystem Component
UNDP/GEF/YS/TDA Draft1	First Draft of the Transboundary Diagnostic Analysis (TDA)
UNDP/GEF/YS/RWG-E.3/8	Proposed Regional Targets for Management of Marine Ecosystem in the Yellow Sea
UNDP/GEF/YS/RWG-E.3/9	Ecosystem Component Activities for 2007 and Onwards
UNDP/GEF/YS/RWG-E.3/10	Ecosystem Component's Workplan for 2007

Information Documents

UNDP/GEF/YS/RWG-E.3/inf.1	Provisional List of Documents
UNDP/GEF/YS/RWG-E.3/inf.2	Provisional List of Participants
UNDP/GEF/YS/RWG-E.3/inf.3	Provisional Working Programme for the Meeting
UNDP/GEF/YS/RWG-E.2/3	Report of "Second Meeting of the Regional Working Group for the Ecosystem Component"
UNDP/GEF/YS/RSP.2/3	Report of the "Second Meeting of the Regional Scientific and Technical Panel"
UNDP/GEF/YS/PSC.2/3	Report of the "Second Meeting of the Project Steering Committee"
UNDP/GEF/YS/JC.2/3	Report of "Second Technical Meeting for the Co-operative Study Cruises In the Yellow Sea Marine Basin for the UNDP/GEF Yellow Sea Project"
UNDP/GEF/YS/JC.3/3	Report of "Third Technical Meeting for the Co-operative Study Cruises In the Yellow Sea Marine Basin for the UNDP/GEF Yellow Sea Project"

Annex III

Agenda

- 1. OPENING OF THE MEETING**
 - 1.1 Welcome addresses**
 - 1.2 Introduction of members**
- 2. ORGANISATION OF THE MEETING**
 - 2.1 Documentation Available to the Meeting**
 - 2.2 Organisation of Work**
- 3. ADOPTION OF THE MEETING AGENDA**
- 4. EXPECTED OUTPUTS FROM THE 3RD RWG-E MEETING**
- 5. REVIEW OF COMPLETED AND ON-GOING ECOSYSTEM COMPONENT ACTIVITIES**
 - 5.1 Data and Information Status, Trends and New Findings**
 - 5.1.1 National data and information collection
 - 5.1.2 Regional data and information synthesis
 - 5.2 Other Activities**
 - 5.2.1 Co-operative study cruises
 - 5.2.2 EAS Congress
 - 5.2.3 Other activities (e.g. *Sustainability of LMEs: Bridging the Governance and Socioeconomics Gap Workshop*)
- 6. PREPARATION OF THE TDA**
- 7. ACTIVITIES TO BE IMPLEMENTED FROM 2007 ONWARDS**
 - 7.1 Ecosystem Regional Targets and Strategic Action Programme**
 - 7.1.1 Consideration of defining critical habitats/ecosystems for preparation of necessary action plans for protection and management of the critical habitats
 - 7.1.2 Ecosystem monitoring guidelines
 - 7.1.3 Regional synthesis and assessment of ecosystem carrying capacity
 - 7.1.4 Regional investment strategies for ecosystem protection and management
 - 7.2 Other Activities**
 - 7.2.1 Winter co-operative study cruise
 - 7.2.2 Suggestions for other activities
- 8. WORKPLAN FOR 2007**
- 9. OTHER BUSINESS**

- 10. DATE AND PLACE FOR 4TH RWG-ECOSYSTEM MEETING**
- 11. ADOPTION OF THE MEETING REPORT**
- 12. CLOSURE OF THE MEETING**

ANNEX IV

TDA CONSULTANT'S COMMENTS ON THE PHYSICAL OCEANOGRAPHIC PRESENTATION PREPARED BY QIAO FANGLI

First, it was good to have the presentation on the structure and circulation of the Yellow Sea. It is essential for understanding the transport of sediments and contaminants in this system. I would recommend that, if the work has not yet been published, it be incorporated into a paper for publication by the YSLME project. If the work has already been published, a reference would be very useful.

I asked the following questions:

1. Does the modelling include accounting for the freshwater input to the system from rivers? The oceanographic structure around the mouth of the Chiangjiang suggests that it is but I am puzzled by the lack of any temperature signal in the Bohai Sea in summer that might reflect freshwater discharge from the Yellow River.
2. I found it somewhat difficult to understand the vertical advection in the system on the basis of the figures presented. Reference is made to frontal upwelling but apart from some evidence of frontal upwelling near the southwest coast of Korea, I could see little other evidence of any frontal upwelling. Is this correct?
3. The modelling of the entire system in which wave and tidal influences are added to the basic model output suggests that, while wind-driven circulation does play a minor role in controlling the circulation, the tidal influence is extremely small. Is this correct?
4. The modelling results and the comparison with actual hydrographic information suggests that the model is doing a very reasonable job of representing the conditions and circulation in the Yellow Sea. Therefore, I asked whether it would be possible to estimate the water exchange rates between the YS and the Bohai Sea and between the YS and the East China Sea in a manner that might provide some estimate of transport and residence time for conservative constituents entering the YS from land discharges. This, in turn, might provide some basis for estimating the time available for non-conservative substances, like nitrogen, to be utilized by primary producers before it leaves the YS. Finally, is there any possibility of enhancing the model to include sediment transport to show both the transport of particles from the major rivers, especially the Yellow River and the Chiangjiang, and any physically-induced erosion (for example, sediment erosion of the old Yellow River deltaic sediments on the Chinese coast of the Yellow Sea)?

Annex V - Remote sensing workshop I

- Objectives
 - To decide on better working algorithms for chlorophyll retrieval in the Yellow Sea
 - HAB detection algorithms and strategy in turbid waters
- Implementation
 - Co-operative activities with KJWOC
- Time and venue
 - Possibly concurrent with other YSLME conferences in 2007
 - Venue will be decided accordingly

Remote sensing workshop II

- Partners
 - KJWOC
 - IOC/WESTPAC
- Participants groups
 - Korean and Chinese ocean color scientists
 - KJWOC members
 - European & US ocean color scientists

Remote sensing workshop III

- Topics
 - Day 1. Retrieval of chlorophyll-a in turbid waters
 - Overview of the problems
 - Validation of algorithms
 - Parameterization of neural network algorithms
 - Recommendations for implementation
 - Day 2. Detection of HAB
 - Overview
 - Comparison of existing algorithms
 - Co-ordination of future activities
 - Recommendations for implementation



Annex VI

Transboundary Diagnostic Analysis (TDA)

**Presentation to YSLME
Regional Working Groups
on
Transboundary Diagnostic Analysis**

**Mike Bewers
September 2006**



Transboundary Diagnostic Analysis (TDA)

Purpose of a TDA

Specify options for intervention to address transboundary problems in the Yellow Sea.

Options for intervention identified in the TDA are used as a basis for selection of interventions in the Strategic Action Plan (SAP).



Transboundary Diagnostic Analysis (TDA)

**CONDUCTING A TDA IS THE FIRST STEP IN
BUILDING STAKEHOLDER OWNERSHIP
AT THE NATIONAL LEVEL**

TDA provides a sound scientific basis for action that must be fully understood by all stakeholders



Transboundary Diagnostic Analysis (TDA)

Structure and Content of a TDA

1. Characterization of environmental problems;
2. Identification of priorities among problems;
3. Identification of the causes of problems; (causal chain analysis)
4. Ranking of causes;
5. Discriminating between domestic (national) and transboundary problems; and
6. Identification of options for management intervention to mitigate or resolve problems.



Transboundary Diagnostic Analysis (TDA)

TDA Preparation

1. Is conducted primarily from technical and scientific perspectives;
2. May need some socio-economic expertise but does *not* normally require policy-level involvement; and
3. All policy-level considerations are dealt within the Strategic Action Plan (SAP).



Transboundary Diagnostic Analysis (TDA)

Actions required by Working Groups

- The characterization of environmental problems;
- The completion of a causal chain analysis for each problem; and
- The identification of options for management intervention.



Transboundary Diagnostic Analysis (TDA)

Characterization of Environmental Problems

Each problem must be described and characterized in terms of its adverse effects.

Based on the data and information assembled, this should include the nature of the problem and, where possible, quantify its impact in socio-economic terms e.g. loss of jobs, loss of production, loss of tourism income.

Quantification of impact in monetary terms assists the priority ranking of problems.



Transboundary Diagnostic Analysis (TDA)

Domestic versus Transboundary

If the problem arises in the waters of a single country and is caused wholly by activities or sources within that country, the problem is a **domestic problem**.

If the problem lies in **international** waters or in the waters under the jurisdiction of a country other than that in which the causes arise, the problem is a **transboundary problem**.



Transboundary Diagnostic Analysis (TDA)

A Causal Chain Analysis is

Unidirectional and starts from the identified environmental issue and/or problem

Identifies the causes of each problem in a sequence from the most immediate to the more fundamental causes

Moves from the environmental (natural sciences) domain through the chain of cause and effect to the “root” cause that frequently lies in the social, cultural and economic domain



Transboundary Diagnostic Analysis (TDA)

Hypothetical Causal Chain

Environmental Problem	Adverse Effects	Causes				Root Cause
		1	2	3	4	



Transboundary Diagnostic Analysis (TDA)

Hypothetical Causal Chain

Environmental Problem						
Habitat Modification						



Transboundary Diagnostic Analysis (TDA)

Hypothetical Causal Chain

Environmental Problem	Adverse Effects	Immediate Cause (1 st level)
Habitat Modification	Loss of fisheries resources (What and where?)	
	Loss of spawning areas (Where and how much?)	
	Loss of coastal amenities for recreation and tourism (How much and where?)	
	Loss of transient bird habitat (Where and how much?)	



Transboundary Diagnostic Analysis (TDA)

Hypothetical Causal Chain

	Adverse Effects	Immediate Cause (1 st level)				
	Loss of coastal amenities for recreation and tourism (How much and where?)	Land reclamation				
		Sand extraction				
		Coastal/Beach erosion				



Transboundary Diagnostic Analysis (TDA)

Hypothetical Causal Chain

	Immediate Cause (1 st level)	Secondary Cause (2 nd level)			
	Land reclamation	Increased demand for coastal space (harbour/port development, housing, industry, etc.)			
	Coastal/Beach erosion	Sediment impoverishment			
		Sand and gravel extraction			



Transboundary Diagnostic Analysis (TDA)

Hypothetical Causal Chain

			Secondary Cause (2 nd level)	Tertiary Cause (3 rd level)		
			Increased demand for coastal space (harbour/port development, housing, industry, etc.)	Rapid economic development in the coastal zone		
			Sediment impoverishment	Reduced sediment input from rivers		
			Sand and gravel extraction	Inadequate pre-assessment of the consequences of sand and gravel extraction		



Transboundary Diagnostic Analysis (TDA)

Hypothetical Causal Chain

				Tertiary Cause (3 rd level)	Quaternary Cause (4 th level)	
				Rapid economic development in the coastal zone	Lack of consideration of effects on coastal amenities and resources associated with land reclamation	
				Reduced sediment input from rivers	Construction of dams/impoundments on major rivers	
				Inadequate pre-assessment of the consequences of sand and gravel extraction	Poor forward planning by central government and provincial authorities and municipalities	



Transboundary Diagnostic Analysis (TDA)

Hypothetical Causal Chain

				Quaternary Cause (4 th level)	Root Cause
				Lack of consideration of effects on coastal amenities and resources associated with land reclamation	Inadequate account taken of environmental consequences of development
				Construction of dams/impoundments on major rivers	Inadequate account taken of the consequences of dam construction on the coastal environment.
				Poor forward planning by central government and provincial authorities and municipalities	Inadequate legislative basis for integrated multi-sectoral development of the coastal zone that takes account of environmental protection considerations



Transboundary Diagnostic Analysis (TDA)

Environmental Problem	Adverse Effects	Immediate Cause (1 st level)	Secondary Cause (2 nd level)	Tertiary Cause (3 rd level)	Quaternary Cause (4 th level)	Root Cause
Habitat Modification	Loss of coastal amenities for recreation and tourism (How much and where?)	Land reclamation	Increased demand for coastal space (harbour/port development, housing, industry, etc.)	Rapid economic development in the coastal zone	Lack of consideration of effects on coastal amenities and resources associated with land reclamation	Inadequate account taken of environmental consequences of development
		Coastal/Beach erosion	Sand and gravel extraction	Inadequate pre-assessment of the consequences of sand and gravel extraction	Poor forward planning by central government and provincial authorities and municipalities	Inadequate legislative basis for integrated multi-sectoral development of the coastal zone that takes account of environmental protection considerations
			Sediment impoverishment	Reduced sediment input from rivers	Construction of dams/impoundments on major rivers	Inadequate account taken of the consequences of dam construction on the coastal environment.



Interventions can be applied at any level of cause

Reduce Environmental Stress in the Yellow Sea Large Marine Ecosystem



Transboundary Diagnostic Analysis (TDA)

Steps to be taken

1. Consider the list of environmental problems and revise the list as appropriate;
2. Summarize the nature of the problem, where it occurs and its severity;
3. Conduct a causal chain analysis for each problem;
4. Consider the options for intervention for each cause in the causal chain and
5. Summarize the advantages and disadvantages for each intervention.

ANNEX VII - Problems Relating to Ecosystem (RWG-E)

(Identified by TDA Consultant, and taken from YSLME Project documentation such as Regional Working Group Reports and Component Synthesis Reports)

Subject Areas: Coastal Habitat Change; Ecosystem Structure and Productivity	Regional Working Group			
	Biodiversity	Ecosystem	Fisheries	Pollution
Benthic habitat destruction caused by inappropriate fishing practices		X		
Coastal habitat change and destruction		X		
Loss of aesthetic and recreational areas		X		
Loss of cultural and scenic areas		X		
Loss of coastal wetlands and bird habitat		X		
Increased vulnerability to natural extreme phenomena		X		
Changes in biodiversity and ecosystem productivity		X		
Preservation of cold water habitat in central YS		X		

Shaded problem is suggestion by TDA Consultant.

ANNEX VIII - ECOSYSTEM COMPONENT CAUSAL CHAIN ANALYSIS

Problems		Impacts	Primary Cause	Secondary Cause	Tertiary Cause	Quarternary Cause	Root Cause
1) Change in biomass or abundance							
	Increase in Korea-greater than 330um zooplankton; water samples phytoplankton	Change in food chain and food web; Loss of living marine resources	Change of Phytoplankton abundance and composition	Change in physical condition	Regional climate change	Global climate change	This is a global issue and relates to the implementation of FCCC. Currently, both countries are parties of Kyoto Protocol.
			Decrease predator pressure and change in food item consumed	Change in fish community	Over fishing	Increasing demand for sea food	Weak enforcement on illegal fishing activities
	Decrease in China-greater than 505um zooplankton; greater than 77um phytoplankton*	Loss of capacity in CO2 fixation; Reduced dimethyl sulfide production - China P only	Change of nutrient concentration and ratio	Change in sewage discharge, reduced fresh water loading, increased use of fertilizer	Rapid development in coastal zone and interior without adequate environmental protection	Inappropriate balance between economic development and environmental protection	Weakness in legislation or inadequate application of legislation to coastal zone management and protection
	Shift in peak in seasonal pattern-Korea zooplankton biomass	Change in food chain and food web; Loss of living marine resources	Change of Phytoplankton abundance and composition	Change in physical condition	Regional climate change	Global climate change	This is a global issue and relates to the implementation of FCCC. Currently, both countries are parties of Kyoto Protocol.
			Decrease predator pressure and change in food item consumed	Change in fish community	Over fishing	Increasing demand for sea food	Weak enforcement on illegal fishing activities
2) Change in species composition							
	Change in dominant groups-Korea zooplankton	Change in food chain and food web	Change of Phytoplankton abundance and composition	Change in physical condition	Regional climate change	Global climate change	This is a global issue and relates to the implementation of FCCC. Currently, both countries are parties of Kyoto Protocol.
			Decrease predator pressure and change in food item consumed	Change in fish community	Over fishing	Increasing demand for sea food	Weak enforcement on illegal fishing activities
	Ratio of Diatom/dinoflagellates - China	Change in food chain and food web	Change of predator (top down control)	Over fishing	Rapid development in fishing efforts	Insufficient control on over fishing	Weak enforcement on illegal fishing activities

ANNEX VIII - ECOSYSTEM COMPONENT CAUSAL CHAIN ANALYSIS

Problems		Impacts	Primary Cause	Secondary Cause	Tertiary Cause	Quarternary Cause	Root Cause
		Change in composition of plankton for plankton eating species, i.e. zooplankton and higher organisms	Change in nutrient concentration and ratio	change in nutrient discharge	Increased sewage discharge, reduced fresh water loading	Rapid development of coastal zone	Weakness of the legislation or Inadequate application of legislation to coastal zone management and protection
	Jellyfish bloom	Change in foodweb, interference with fishing activities; clogging of sea water intakes; stinging of bathers	Change in physical environment, such as temperature, salinity, and mixing	Climate change	Increased CO2	Rapid global economic development	This is a global issue and relates to the implementation of FCCC. Currently, both countries are parties of Kyoto Protocol.
	Change in benthic species composition and dominant species	Reduction in benthic biodiversity and fisheries resources	Degradation of bottom water environment and sediment quality, change in sediment types	Stagnation of bottom water due to thermal stratification	Change in general YS circulation pattern	Climate change	This is a global issue and relates to the implementation of FCCC. Currently, both countries are parties of Kyoto Protocol.
			Change in predation pressure	Change in species composition and fish community (more pelagics than demersal)	Overfishing of demersal fish	See RWG-F	
3) Increase frequency of HABs							
	Increased HAB events by total number of events per year	Increased mortality of mariculture stocks, frequent kills of wild fish, thereby reducing fishery yields, and increased risks to seafood consumers	Eutrophication**	See RWG-P			
			Si depletion**	See RWG-P			
4) Loss of benthic habitat in coastal area	See RWG-B						
* The causal chain analysis is specific only to China phytoplankton greater than 77um.							
** From RWG-P's causal chain analysis							

ANNEX IX
ECOSYSTEM COMPONENT WORKPLAN FOR 2006 TO 2007

<u>ACTIVITY</u>	<u>Action</u>	<u>RESPONSIBLE PARTY</u>	<u>SCHEDULE/DEADLINE</u>
<u>National Reports, Regional Synthesis, TDA</u>	Finalisation of National Reports including comments from 3RWG-E Meeting	China, Korea National D & I Collection Teams	10 Oct. 2006
	Final Regional Synthesis Report	Kang Daeseok	15 Oct. 2006
	Publication of reports	RSTP / PMO	March 07
<u>Monitoring using CPR</u>	Proposal and budget on use of CPR on ship of opportunities submitted to PMO	Zhu Mingyuan	8 Oct. 2006
<u>Equipment purchase</u>	Proposal on use and purchase of equipment for chl-a and ocean color algorithm development submitted to PMO	Yoo Sinjae	25 Oct. 2006
<u>Remote sensing workshop</u>	see results from KJWOC annual meeting	Yoo Sinjae	end Dec 06
<u>Monitoring guidelines</u>	RSTP to review monitoring components & devise strategy for way forward; PSC approve	RSTP/PSC	Nov. 06
	provide details for implementation of the activity	SAP Consultation meeting	Mar. 07
	implementation of activity	Consultant and PMO	after SAP Consultation Mtg
<u>Carrying capacity</u>	Suggestions for TOR to Yoo Sinjae	members and PMO	15 Oct. 06
	Discussion with RWG-F	PMO and RWG-F	Oct. 06
	Based on RSTP's comments, implement activity	Consultant and PMO	March 07 to Feb. 08
<u>4th RWG-E Meeting</u>	PMO will arrange	PMO	4-8 Nov. 07

List of Acronyms

ASP	amnesic shellfish poisoning
CKJORC	China-Korea Joint Ocean Research Center
CPR	continuous plankton recorder
DPRK	Democratic People's Republic of Korea
DSP	diarrhetic shellfish poisoning
EAS	East Asian Seas
FIO	First Institute of Oceanography - China
FRFF-2	fast repetition rate fluorometer, version 2
GEF	Global Environment Facility
GIS	geographic information system
KJWOC	Korea-Japan Workshop on Ocean Color
HAB	harmful algal bloom
LME	large marine ecosystem
NFRDI	National Fisheries Research and Development Institute - Korea
PMO	Project Management Office
POGO	Partnership for Observation of the Global Oceans
PSC	Project Steering Committee Meeting
PSP	paralytic shellfish poisoning
RSTP	Regional Scientific and Technical Panel
RWG-B	Regional Working Group – Biodiversity
RWG-E	Regional Working Group – Ecosystem
RWG-F	Regional Working Group – Fisheries
RWG-I	Regional Working Group – Investment
RWG-P	Regional Working Group – Pollution
SAP	Strategic Action Programme
SST	sea surface temperature
TOR	terms of reference
TDA	Transboundary Diagnostic Analysis
UNDP	United Nations Development Programme
WG	working group
WSFRI	West Sea Fisheries Research and Development Institute