Regional Working Group Report

POLLUTION

UNDP/GEF Project Entitled “Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem”

Report of First Meeting

Qingdao, China, 6~9 April 2005

About this publication:

This publication contains the report of the First Meeting of the Regional Working Group for the Pollution Component, under the UNDP/GEF Project, “Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem.” The report includes a summary of the discussions and agreements from the Meeting. Data and information to be collected for the Yellow Sea Transboundary Diagnostic Analysis are listed in the Annex to the report.

For reference purposes, this report may be cited as:

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Photo credits: Fishing boats on the Yellow Sea near Jeju Island in the southern part of Republic of Korea, March 2005. Courtesy of Mr. Yihang JIANG.

REDUCING ENVIRONMENTAL STRESS IN THE YELLOW SEA LARGE MARINE ECOSYSTEM

Report of the First Meeting of the
Regional Working Group for the Pollution Component
UNDP/GEF Yellow Sea Project

Qingdao, China, 6th to 9th April 2005

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

UNDP/GEF/YS/RWG-P.1/3
Date: 9 April 2005
English only

First Meeting of the Regional Working Group for the Pollution Component
Qingdao, China, 6-9 April 2005

Meeting Report

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1 OPENING OF THE MEETING

1.1 Welcome addresses

1.1.1 On behalf of the United Nations Development Programme (UNDP) and United Nations Office for Project Services (UNOPS), Mr. Yihang Jiang, Project Manager, opened the meeting and welcomed the members of the Regional Working Group-Pollution (RWG-P) to Qingdao. He briefly mentioned the progress of the Project, highlighting the Project Steering Committee's approval of the Project Implementation Plan.

1.1.2 Mr. Jiang explained the goals of the Project, namely, the development of the Transboundary Diagnostic Analysis (TDA), Strategic Action Programme (SAP), and National Strategic Action Plans. In the final year of the Project, there will be implementation of demonstration and/or pilot activities identified in the SAP. This Meeting will focus on the process for TDA preparation, but also keep in mind the SAP development.

1.1.3 Mr. Jiang noted that the preliminary TDA information was a bit out of date. The preliminary TDA was prepared for the Global Environment Facility (GEF) Council to understand the project document before approving the Project. The final TDA, to be produced, needs updated data and information. Therefore, this Regional Working Group meeting will discuss and agree on identifying pollution-related problems of the Yellow Sea, agree on the types of information to support the identified problems, agree on the format of the collected information, and propose activities to gather additional required data.

1.2 Introduction of members

1.2.1 RWG-P members were invited to introduce themselves and give 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 Designation of Officers

2.1.1 Mr. Jae Ryoung Oh nominated Mr. Quan Wen as Chairperson. Members agreed and Mr. Wen was duly elected as Chairperson. The PMO was responsible for secretariat functions of the meeting.

2.2 Documentation Available to the Meeting

2.2.1 Mr. Wen invited the Secretariat to introduce this agenda item. Ms. Connie Chiang of the Project Management Office (PMO) introduced the Meeting's working and information documents prepared by the PMO, with a brief emphasis on the Terms of Reference (TOR) for the RWG-P which was further discussed during the relevant agenda item.

2.2.2 Mr. Jiang drew the member's attention to Document UNDP/GEF/YS/RWG-P.1/6, on a regional criteria to calculate activity costs. He asked all members to carefully

review this document, as it was an important element related to activity implementation.

2.3 Organisation of Work

2.3.1 The PMO presented the provisional working programme for the Meeting (Document UNDP/GEF/YS/RWG-P.1/inf.3).

2.3.2 The Chairperson informed the Meeting about the organisation of work. It was agreed that, due to the nature of the agenda items to be discussed, the Meeting would be organised in plenary as far as possible. Sessional working groups would be formed if deemed necessary.

2.3.3 Mr. Jiang thanked the National Marine Environment Monitoring Centre, China, for their generous support and hospitality provided during the Meeting.

2.3.4 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-P.1/1) and Annotated Provisional Agenda (Document UNDP/GEF/YS/RWG-P.1/2), prepared by the Project Management Office.

3.2 Mr. Wenxi Zhu asked for clarification on Agenda Item 5.2, “Reporting Responsibilities of the RWG-P.” Ms. Chiang clarified that this was actually reporting requirements of contractors. However, as the RWG-P would be working closely with the contractors and assisting in ensuring deadlines were met, the RWG-P should be aware of the United Nation’s reporting requirements.

3.3 Mr. Hak Bong Chang asked about selection of institutions when issuing contracts. Mr. Jiang explained the general bidding process of the United Nations when issuing contracts, in order to show that a transparent selection process was used. Mr. Jiang also explained that such a procedure is used to obtain the best value for money to fulfil the tasks.

3.4 Following the above clarifications, the meeting adopted the agenda that is attached as Annex II to this report.

4 DRAFT TERMS OF REFERENCE FOR THE REGIONAL WORKING GROUP FOR POLLUTION (RWG-P)

4.1 Ms. Chiang presented the TOR for the RWG-P, as listed in the Project Document. She explained that from the time of writing the TOR to the present, conditions of project implementation had changed. Members were asked to review the TOR, and make suggestions to revise the TOR to better reflect the current status of the RWG-P.

4.2 Mr. Zhu stated that that Chair of the RWG should be consistent to more efficiently co-ordinate work in between RWG meetings. Members agreed that China would take the lead role for the pollution component. However, some members suggested that each RWG meeting chairperson may not necessarily be the Chairperson of the Group.

4.3 The pros and cons of rotating the RWG meeting chairperson was discussed, and members agreed that the Chair of the RWG should also serve as the Chair of the RWG meetings.

4.4 The PMO was asked to prepare a revision of the TOR for the RWG-P. With the revision provided by the secretariat, members discussed the major responsibilities of the RWG-P. There was extensive discussion on a "network" for pollution monitoring. In order to have effective implementation of the project activities and to create a sustainable effect of the Project, "networks" do need to be established to ensure that the results of the Project benefit the region long after the SAP is implemented.

4.5 Ms. Hyun Shin Lee explained that the establishment of "networks" was approved in the original TORs, which was agreed by the countries. Therefore, there should not be any problems to create these "networks."

4.6 The next topic of discussion was the identification of "hot spots." The RWG members felt that this was an important task, but required clearer definition on the term, "hot spot." Members agreed that the hot spots in this project should include sources and impacts of pollutants.

4.7 Regarding the regional procedures for remediation and prevention of pollution, and testing the implementation, the Meeting realised the necessities and agreed to include the relevant responsibilities into the TOR of the RWG-P.

4.8 Members also recognised the importance to have regional guidelines for marine pollution monitoring and assessment, and decided to add this responsibility to the TOR.

4.9 Following the discussions and clarifications, members agreed to the revised TOR to be submitted to the Project Steering Committee (PSC) for approval. The revised TOR is attached to this report as Annex III.

5 OVERALL PROJECT AND COMPONENT OBJECTIVES

5.1 General description of activities contained in the Project Implementation Plan

5.1.1 Due to the member's differences in familiarity of the Project, Ms. Chiang gave an overview of the Project, including the goals of producing the TDA and SAP, and highlighted the pollution component's activities. She also gave a brief introduction on the work to be accomplished by the 1st RWG-P Meeting.

5.1.2 The meeting noted the information provided, in particular the relevant parts in preparing the TDA and SAP.

5.2 Reporting responsibilities of the RWG-P

5.2.1 The Secretariat introduced Document UNDP/GEF/YS/RWG-P.1/inf.5, and gave an overview on contracting procedures and reporting responsibilities of the contractors. Members noted that as the Project operates within the framework of United Nations, relevant UN rules and procedures should be followed. It was explained that one purpose of reporting was to keep abreast of the progress of each activity, and to provide assistance, should the activity face difficulties.

5.2.2 Members asked about the procedure to select contractors to implement activities. Referring to the document presented to the meeting, the Project Manager clarified that the normal bidding procedure should be applied. If there is a case where a wavier of bidding is requested, justification needs to be provided. Mr. Jiang informed the Meeting that a similar clarification was provided during the 1st Meeting of the Project Steering Committee.

5.2.3 Mr. Chang asked about the differences in the various types of contracts. The Secretariat explained that the type of contract issued by the UN would depend on the amount and institution to be contracted. There are not many differences between the types of contracts, and all do require clearly defined TORs and progress and financial reporting, which will be spelled out in the terms of reference for each contract.

5.2.4 Mr. Jiang emphasised that a wider participation of stakeholders would be more beneficial to the Project. He encouraged all members to work together to involve more stakeholders in different levels of implementation, including in the regional working groups.

5.2.5 Ms. Lee reiterated that the Project should produce high quality outputs; therefore, the open bidding process is used to get the best quality products. She encouraged the RWG members to help find the best entities to carry out the tasks, from a wider range of available resources.

5.2.6 Ms. Lee asked who is responsible for keeping to the reporting schedule. Mr. Jiang replied that the contractor is responsible for keeping to the agreed reporting schedule and workplan. The PMO and National Project Co-ordinator (NPC) will monitor implementation progress, and remind contractors of deadlines. The RWG would be responsible for the technical quality of tasks. Mr. Jiang emphasised that on-time delivery of outputs is very important, and does affect the contractor's possibility of receiving future contracts.

5.2.7 Mr. Oh asked about fixed rules for spending money, such as overhead costs. The PMO replied that, in principle, the overhead charges for the management costs of the project should be covered by national co-financing resources. Ms. Chiang further stated that each contract will state the TOR and budget breakdown, and money is to be spent according to the agreed budget and workplan attached to each contract.

5.2.8 The Meeting took note of the reporting requirements that will be applied during implementation of project activities.

5.3 Required outputs and outcomes from the 1st RWG-P Meeting

5.3.1 Ms. Chiang introduced this agenda item, explaining the required outputs and outcomes of this Meeting, and how the outputs would contribute to the later stages of the Project, particularly the TDA/SAP development. Mr. Jiang explained that the TDA will be a scientific-based document requiring references for all statements. Therefore, the importance and purpose of collecting data is to have concrete proof for the statements made in the TDA.

5.3.2 Members were invited to consider whether these outputs and outcomes are realistic for the Meeting to achieve in four days. Members discussed the TDA timelines, in the context of whether the proposed outputs would meet the TDA milestones. The PMO explained that the main milestone was that the TDA should be produced by the

end of 2006. All RWGs should begin as early as possible to collect the data for TDA inputs. Therefore, this Meeting will need to agree on the problems, required types of natural and socio-economic data, required actions, ways to calculate cost of actions, and timeline and costs of actions to work towards TDA development.

5.4 Co-operation with other project components and relevant activities in the region

5.4.1 Ms. Chiang introduced this agenda item by explaining that the PMO had requested brief information of relevant projects in the participating countries, in order to assist the PMO in examining the possible co-operative areas for the Yellow Sea Project. Members were invited to present national and regional projects that had the potential to co-operate with this Project.

5.4.2 Mr. Oh presented his two training programmes carried out by APEC Marine Environmental Training and Education Center in conjunction with Korea International Cooperation Agency in 2003: 1) oil pollution in the marine environment; and 2) protecting marine environment from sewage. Mr. Oh mentioned the number and types of trainees, and available facilities of the training centre, and showed pictorial examples of on-hands training in the field and lab.

5.4.3 Mr. Oh then presented the national programmes of his institute, The South Sea Institute of the Korea Ocean Research and Development Institute (KORDI) that included persistent organic pollutants, endocrine disrupting chemicals, and bio-accumulative and toxic chemicals. He explained the types of chemicals his lab can analyse, and showed samples of past and current work in monitoring pollutants in Korean bays, fate studies, ultra-trace level analyses, and molecular markers.

5.4.4 Mr. Oh extended his invitation to China for future training programmes.

5.4.5 Mr. Jiang expressed his wish that training needs will be identified, as the Project has resources for training workshops.

5.4.6 Ms. Juying Wang presented China's monitoring system in the Yellow Sea, showing the national monitoring network and existing programmes that include monitoring of: red tide, coastal ecological conditions, pollution status, river inputs, discharge outlets, and dumping sites.

5.4.7 Ms. Wang mentioned the three surveys in China:

1) survey of main pollutants, main ecological environmental issues, transport of pollutants, toxic effects, tissue residual analysis, ecological effects of pollutants in Bohai and Yellow Sea;

2) Joint survey with Korea; and

3) Coastal integrated survey and assessment and "digital ocean" framework.

5.4.8 Ms. Wang mentioned that the third project will finish later than YSLME, and perhaps a time difference might make co-operation difficult. Mr. Jiang replied that this kind of situation was a common occurrence. The TDA would be built on the best available data, to summarise our understanding of the marine environment. Data collected later can contribute to later stages of project as an environmental status indicator.

5.4.9 Mr. Wen added that there was a second baseline pollution investigation carried out in China in 1998. The data were collected from near coast areas.

5.4.10 Mr. Jiang mentioned some regional data centres, e.g. NEAR-GOOS, PICES, UNEP-NOWPAP's Regional Activity Centers for data information and pollution monitoring, GEF Global Ballast Water Project, PEMSEA demonstration activity in Bohai Sea, East Asian Marginal Seas, GLOBEC, World Data Centre for Oceanography. He indicated that it would appropriate if necessary data and information could be collected from these sources.

5.4.11 Mr. Oh alerted the members that Korea National Fisheries Research and Development Institute (NFRDI) has a national long-term monitoring programme since 1921 that includes major physical and chemical parameters of water quality. The data are kept in NFRDI, and anyone can access them via the internet. Mr. Oh also mentioned NFRDI's regular monitoring projects.

5.4.12 Mr. Jiang mentioned that the Korea Oceanographic Data Centre has good information, and this resource should be used.

5.4.13 He also mentioned that the PMO had started discussions with UNEP Northwest Pacific Action Plan on co-operating activities. He also noted the good example of regional co-operation already in place between the RWG-Biodiversity and WWF's Yellow Sea Eco-region Planning Programme.

5.4.14 Mr. Oh asked the Chinese members if there are any pollution research projects in conjunction with fisheries and analysing tissue content. Ms. Wang mentioned China's participation in Mussel Watch, biomarkers, and fish liver analysis. Mr. Chuanlin Huo mentioned that Yellow Sea Fisheries Research Institute carries out these kinds of research, while his institute does research on marine toxicology and biomarkers to assess persistent organic pollutants (POPs).

5.4.15 The Meeting took note of the sources of data information presented by the participating countries, and agreed that efforts should be made to collect relevant data and information from all sources, including those mentioned during the discussion of this agenda item.

5.4.16 The Meeting also noted a presentation of Mr. Kenneth Sherman's of the US National Oceanic Atmospheric Administration, which indicated that ecosystem indicators are cross-cutting by many of this Project's components. The Meeting recognised the cross-component issues of the Project, and recommended that the Regional Science and Technical Panel consider the cross-component issues, especially with regard to ecosystem indicators. Mr. Chang suggested that the Project should consider sustainable development indicators as one means to monitor Project success.

6 DATA AND INFORMATION NEEDS FOR THE POLLUTION COMPONENT

6.1 Discussion on Yellow Sea pollution problems, identification of data and information requirements, and agreement on their format

6.1.1 The PMO presented Document UNDP/GEF/YS/RWG-P.1/5, and members were asked to complete the table listing the problems, data and information requirements to support or refute the problem, data format, and temporal and spatial scale of data to be collected.

6.1.2 Members separated into two groups by countries, to complete the table. Upon return to the plenary session, each country presented their additions and changes to the table. Mr. Oh suggested that some parameters required further information on the types of input and the medium in which the chemical existed – in sea water, sediment, or biota. He also suggested that GIS data should be used, where available, to complement the data and show the locations of the chemicals.

6.1.3 Mr. Huo presented the results from China's discussion session, which were similar to those of Korea, with one additional information – data related to dumping.

6.1.4 The members contributed their expertise in proposing pollution-related problems of the Yellow Sea, and spent a sizeable amount of effort to produce the comprehensive list of required data and formats. Members also discussed the causal chain and governance analysis and finalised this information. The parameters for the intercalibration exercises are also attached. The tables are attached to this report as Annex IV.

6.1.5 The Meeting agreed that if both countries do not have data for a given parameter, then that parameter will be deleted from the table. If only one country has data, then the parameter is kept, and the other country should search for the missing information. If both countries have limited information, then that parameter is kept, and both countries will search further for that parameter.

6.2 Country presentations on available data/information on sources, pathways, and distribution of pollutants; determination of "hot spots;" monitoring procedures; and analysis of pollutant fate and transport

6.2.1 The topics under this agenda item were already discussed under other agenda items, and are captured in the respective parts in this report.

7 REQUIRED COSTED ACTIONS AND WORKPLAN

7.1 Required actions for TDA preparation

7.1.1 Ms. Chiang introduced the Full Time Equivalent (FTE), as a proposed method for the Project to have a regional guideline to calculate the costs of activities. She informed the members of the background and rationale of this agenda item, namely it was a task charged to the PMO by the 2nd Regional Technical Meeting.

7.1.2 After extensive discussion on the different economic situations and different methods in calculating the activities costs in the participating countries, members recognised that the discussion on the method of calculation is beyond the responsibilities of the regional working group. Therefore, they could not reach agreement on this issue.

7.1.3 Following discussions with other partners of the Project, the PMO informed the Meeting that necessary consultations will be carried out by the PMO with the relevant governmental agencies and the NPCs to resolve this issue. Mr. Jiang recalled that the initial intention to calculate the costs of the activities was to identify the ideal amount of the costs for the activities, but not for the calculation of the contracts. He also reminded the members that the total project budget is fixed, and it would not be possible to exceed the approved budget amount.

7.1.4 Members reviewed the list of activities and actions required for preparation of the pollution component of the TDA. Following some clarifications provided by the PMO, the meeting felt that the activities discussed and agreed during the 2nd Regional Technical Meeting are appropriate for the first 2 years of project implementation. The meeting made slight changes in the list of activities, and agreed on the activities and actions to be taken during the first two years of project implementation.

7.1.5 The revised agreed list of activities is attached to this report as Annex V.

7.2 Information gaps

7.2.1 Ms. Wang mentioned that organic pollutant data and information was quite lacking in China, and this was a stark information gap.

7.2.2 Members discussed how to fill the information gaps and agreed that a joint survey with other RWGs was necessary. After careful consideration, members proposed that two to four persons from this component should participate in the joint survey with the fisheries and ecosystem groups, to collect necessary samples from sea water, sediment and biota.

7.2.3 Members also recommended that biota samples and information should be shared from the fisheries group, as the fisheries group will already collect this information.

7.2.4 It was agreed that sampling within the coastal areas would be done separately by each country, as existing monitoring activities already meet the necessary requirements.

7.2.5 Members also agreed that the joint-survey would be basin-wide, while other remaining information gaps would be obtained from existing national projects and programmes.

7.3 Workplan for 2005 to 2006

7.3.1 Ms. Chiang presented the proposed workplan of the RWG-P for 2005-2006. Members discussed and agreed on the pollution component's workplan for 2005 to 2006. The workplan is attached to this report as Annex VI.

8 OTHER BUSINESS

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

8.2 Mr. Oh suggested that the PMO could use a software, prepared by an expert of KORDI that can easily present data in an easy to understand format. The Project Manager agreed to consult with the expert concerned, and find a way to use the software.

8.3 Mr. Jiang suggested that RWG members should consider the training opportunities of the APEC training centre operated in the South Sea Institute of KORDI in October every year. For this year, the three-week training course will focus on oil pollution and pollution policy. Mr. Oh was asked to invite Chinese participants to the training workshop. The PMO will communicate will Mr. Oh to discuss how the training

programme can complement the capacity building tasks provided by this Project. The meeting felt that this would be a valuable opportunity to upgrade capacities of the participating institutions, and invited the Project Manager to explore the possibility to organise joint training activities.

8.4 Ms. Lee asked how co-financing can contribute to each activity. The PMO replied that the NPC is responsible for co-ordinating the co-financing sources, and the PMO will discuss this further with the NPC.

8.5 The PMO was requested to again remind the NPCs to provide the project briefs which had already been requested once before.

9 DATE AND PLACE FOR NEXT RWG-P MEETING

9.1 The Chairperson invited members to consider the date and place for the 2nd RWG-P Meeting.

9.2 Members agreed to have the next RWG-P Meeting in Busan, Korea, 10-13 October 2005. The PMO will contact all members, should there be any changes.

10 ADOPTION OF THE MEETING REPORT

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

11 CLOSURE OF THE MEETING

11.1 The Chairperson thanked Ms. Lee and the PMO staff for organising the Meeting. He also thanked the Korean and Chinese RWG members for their contributions and co-operative nature throughout the Meeting.

11.2 Mr. Jiang thanked the members for their accomplishments on producing the data and information table. He commented that the use of data should not be limited to serve the TDA, but also should be used for preparing regional status reports on marine pollution.

11.3 Ms. Chiang thanked the Chairperson and local staff for their assistance in the Meeting's preparation. She also thanked all members for their hard work and achieving the expected outcomes of the Meeting.

11.4 Ms. Lee thanked all members for their hard work, and wished that the co-operative spirit shown in this Meeting would be extended to the future of the RWG-P and other working groups.

11.5 The Meeting closed at 1500 hours on 9th April 2005.

Annex I

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Annex II

Agenda

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Annex III

Revised Terms of Reference for the UNDP/GEF Yellow Sea Project Regional Thematic Working Group - Pollution

Background:

To facilitate the achievement of the regional goals and objectives, Regional Thematic Working Groups (RWG) for each component (Ecosystem, Biodiversity, Fisheries, Pollution, and Investment) shall be established with overall responsibility for ensuring effective implementation of project activities and to provide a mechanism for exchange of information and experience of management experiences in each country.

Membership:

Each of the five RWGs will include:

- Two scientists (social and natural) from each country;
- One additional expert drawn from the legal, regulatory, investment, and/or environmental management fields, from each country;
- One Chairperson for each RWG; and
- The Working Group Chairpersons will be members of the Regional Science and Technical Panel.

Working modalities:

Each RWG will represent the regional perspective and not just the national perspective. Working "without walls," the RWGs will communicate primarily through email, with one or two working meetings annually. Each RWG will operate on the basis of working parties involving participation of experts from all coastal countries together with external experts where this is considered necessary. The RWGs report to the Regional Scientific and Technical Panel through the Project Management Office (PMO), although they may also have national reporting requirements from National Project Co-ordinators.

Meetings:

The PMO, in consultation with the Chairpersons, shall convene meetings of the RWGs according to an agreed schedule, which will form part of the agreed work plan and timetable for the work of the Project.

The PMO shall act as Secretariat to the RWGs, and shall ensure that reports of the meetings are circulated to all members of the working groups, and are copied to the members of the RSTP.

Tasks:

- Provide technical inputs/comments for the project workplans in their respective areas of competency;
- Develop annual and quarterly work plans and implement activities in respective thematic area, based on and fully integrated in the project workplan, and make annual and quarterly progress reports;
- Be responsible for regional co-ordination within area of competency;
- Facilitate creation of effective national thematic network;

- Organise and conduct working parties and training within area of competency;
- Develop relevant regional recommendations, guidance and strategy within area of competency;
- Contribute scientific knowledge in the area of expertise to the development of the TDA;
- Assist in development and implementation of the Regional Strategic Action Programme (SAP) and National Yellow Sea Action Plans (NYSAP);
- Contribute to the development of the Priority Investment Portfolio;
- Assist, through the Chairperson, in effective project management by assisting with scheduling, scoping, and budgeting for various interlinked activities;
- Contribute scientific and technical advice to the formulation of proposals for national and regional actions and donor funding;
- Network with national and international institutions and specialists in respective focal area;
- Assist in preparing and implementing regional pilot and/or demonstration projects;
- Liaise closely with PMO, through RWG Chairpersons;
- Contribute scientific and technical expertise to YSLME data and information system development, public awareness activities and stakeholder participation;
- Co-operate with other RWGs; and
- Develop and maintain a database within area of competence.

MAJOR RESPONSIBILITIES OF
REGIONAL WORKING GROUP – POLLUTION

Location of WG Chair: People's Republic of China

Tasks:

- Coordinate the development of a regional system of effective marine contaminant reduction and mitigation. Facilitate the establishment of regional quality assurance system.

- Establish and support a well functioning network of monitoring centres throughout the region. Compile reliable data to catalyze reduction and prevention of contamination.

- Identify "Hot Spots." Prepare regional procedures for remediation and prevention, for adoption and implementation.

- Develop regional guidelines for monitoring and assessment of the marine environment in the Yellow Sea.

- Provide guidance in developing regional strategies for pollution control and management.

- Provide scientific guidance for the development of the pollution chapter of the TDA.

- Provide scientific guidance in the development and implementation of the SAP and NYSAP.

- Prepare workplan of pollution component with detailed costed actions for consideration and approval of PSC.

Annex IV

Data and Information Requirements for the Pollution Component and Causal Chain Analysis for Yellow Sea Pollution-Related Problems

Table 1. Data and information requirements.

Problem	Information needed to detect problem	Kinds of data needed	Data	Type of Input	Temporal Scale*	Spatial Scale (W, B, C, E, M)**	ROK Has Data?***	PRC Has Data?***	Priority (H, M, L)	
									KOREA	CHINA
Deteriorating water quality (rivers, lakes, seas)	water quality characteristics	dissolved oxygen	% saturation		seasonal for past 20 yrs	W (1degX1deg)	X	W	H	H
			NO_2 - µg/L		seasonal for past 20 yrs	""	X	W	H	H
			NO_3 - µg/L		""	""	X	W	H	H
			ammonium - µg/L		""	""	W	W	H	H
			total dissolved N - µg/L		""	""	X	W	H	H
			total particulate N		""	""	N	N	M	M
			total dissolved P - µg/L		""	""	N	N	M	M
			orthophosphate		""	""	X	W	H	H
			total particulate P		""	""	N	N	M	M
			N:P ratios		""	""	X	W	H	H
			silicates		""	""	X	W	H	H
			chlorophyll a - µg/L		seasonal for past 20 yrs	""	W	W	M	H

Problem	Information needed to detect problem	Kinds of data needed	Data	Type of Input	Temporal Scale*	Spatial Scale (W, B, C, E, M)**	ROK Has Data?***	PRC Has Data?***	Priority (H, M, L)	
									KOREA	CHINA
		carbon	total particulate C		seasonal for past 20 yrs	""	N	?	M	M
		fecal coliform	colonies/100 ML		seasonal for past 20 yrs	C	W	W	M	M
		COD	mg/L		seasonal for past 20 yrs	B, C, E	X	W	M	H
		SS	mg/L		seasonal for past 20 yrs	B, C, E	X	W	H	M
		Heavy Metals	Cd, Cr, Cu, Pb, Hg, Zn, As	seawater	annual for 10 years	W	W	W	H	M
		Organic Pollutants	Organotin	seawater	annual for 5 years	C	X	?	H	L
			Phenolic Compounds	seawater	annual for 5 years	C	W	N	H	L
		Oil		seawater	annual for 20 years	C, E	W	X	H	H
	physical characteristics	salinity	ppt		seasonal for past 20 yrs	W (1degX1deg)	X	W	H	M
		temperature	C		seasonal for past 20 yrs	W (1degX1deg)	X	W	H	M
		pH			seasonal for past 20 yrs	W (1degX1deg)	X	W	M	M
		transparency	m		seasonal for past 20 yrs	W (1degX1deg)	W	W	H	M
		circulation			biannual for 20 years	~~	X	?		M
	biota	Heavy Metals	Cd, Cr, Cu, Pb, Hg, Zn, As		annual for 10 years	C, E	W	W	H	H
		Organic Pollutants	Organotin		annual for 5 years	C, E	X	W	H	M
			PCBs		annual for 10 years	C, E	X	W	H	H
			Dioxins and Furans		annual for 5 years	C, E	W	?	M	M

Problem	Information needed to detect problem	Kinds of data needed	Data	Type of Input	Temporal Scale*	Spatial Scale (W, B, C, E, M)**	ROK Has Data?***	PRC Has Data?***	Priority (H, M, L)	
									KOREA	CHINA
			OCPs (9): Aldrin, chlordane, DDT & metabolites, dieldrin, endrin, heptachlor, hexachlorbenzene, hexachlorocyclohexanes, mirex		annual for 10 years	C, E	X	W	H	H
			PAHs (16): Naphthalene, acenaphthylene, acenaphthene, fluorine, phenanthrene, anthracene, pyrene, bezo[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a] pyrene, indeno[1,2,3-cd]anthracene, benzo[ghi]perylene		annual for 10 years	C, E	X	W	H	M
		Other Substances of Concern	PBDE		annual for 5 years	C, E	W	N	H	L
			PBB		annual for 5 years	C, E	N	N	M	L
			Phenolic Compounds		annual for 5 years	C, E	W	N	H	L
		lipid			annual for 10 years	C, E	W	?	H	L
		biomarker			annual for 5 years	C	W	?		L

Problem	Information needed to detect problem	Kinds of data needed	Data	Type of Input	Temporal Scale*	Spatial Scale (W, B, C, E, M)**	ROK Has Data?***	PRC Has Data?***	Priority (H, M, L)	
									KOREA	CHINA
	sediment	Heavy Metals	Cd, Cr, Cu, Pb, Hg, Zn, As		annual for 10 years	B, C, E	W	W	H	H
		Organic Pollutants	Organotin		annual for 5 years	B, C, E	X	W	H	M
			PCBs		annual for 10 years	B, C, E	X	W	H	H
			Dioxins and Furans		annual for 5 years	B, C, E	W	?	M	M
			OCPs (9): Aldrin, chlordane, DDT & metabolites, dieldrin, endrin, heptachlor, hexachlorbenzene, hexachlorocyclohexanes, mirex		annual for 10 years	B, C, E	X	W	H	H
			PAHs (16): Naphthalene, acenaphthylene, acenaphthene, fluorine, phenanthrene, anthracene, pyrene, bezo[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a] pyrene, indeno[1,2,3-cd]anthracene, benzo[ghi]perylene		annual for 10 years	B, C, E	X	W	H	M
		Other Substances of Concern	PBDE		annual for 5 years	B, C, E	W	N	H	L
			PBB		annual for 5 years	B, C, E	N	N	M	L

Problem	Information needed to detect problem	Kinds of data needed	Data	Type of Input	Temporal Scale*	Spatial Scale (W, B, C, E, M)**	ROK Has Data?***	PRC Has Data?***	Priority (H, M, L)	
									KOREA	CHINA
			Phenolic Compounds		annual for 5 years	B, C, E	W	N	H	L
		TPH			annual for 10 years	B, C, E	X	W	H	H
		organic C			annual for 10 years	B, C, E	W	W	M	H
		grain size			annual for 10 years	B, C, E	W	W	H	M
		sulphide			annual for 10 years	C, E	X	W	H	H
	Inputs	Heavy Metals	Pb, Hg	Atm Inputs	annual for 10 years	C	?	?	M	M
			PCBs	atm. Input	annual for 10 years	C	?	?	M	L
			OCPs (9): Aldrin, chlordane, DDT & metabolites, dieldrin, endrin, heptachlor, hexachlorbenzene, hexachlorocyclohexanes, mirex	atm. Input	annual for 10 years	C	?	?	M	L
			PAHs (16): Naphthalene, acenaphthylene, acenaphthene, fluorine, phenanthrene, anthracene, pyrene, bezo[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a] pyrene,	atm. Input	annual for 10 years	C	?	?	M	M

Problem	Information needed to detect problem	Kinds of data needed	Data	Type of Input	Temporal Scale*	Spatial Scale (W, B, C, E, M)**	ROK Has Data?***	PRC Has Data?***	Priority (H, M, L)	
									KOREA	CHINA
			indeno[1,2,3-cd]anthracene, benzo[ghi]perylene							
		Other Substances of Concern	PBDE	?	annual for 5 years	C	?	N	L	L
			PBB	atm. Input	annual for 5 years	C	?	N	L	L
	Inputs	Heavy Metals	Cd, Cr, Cu, Pb, Hg, Zn, As	Riv inputs	annual for 10 years	E	W	W	H	M
		Organic Pollutants	Organotin	ship/port	annual for 5 years	E	W	?	H	M
			OCPs (9): Aldrin, chlordane, DDT & metabolites, dieldrin, endrin, heptachlor, hexachlorbenzene, hexachlorocyclohexanes, mirex	riv. Input	annual for 10 years	E	W	N	H	M
			Phenolic Compounds	riv. Input	annual for 5 years	E	W	N	H	M
		Oil		riv. Input	annual for 20 years	E	W	W	H	M
	Dredging and Dumping	Dredged Material	MT/Y		20 years	C, M	W	X	M	H
		Sewage Sludge	MT/Y		20 years	M	W	W	M	M
	Litter				10 years	C	W	N	H	L
	Land Reclamation	Land Reclamation	Km^2		20 years	C	X	W	M	M
	Oil and Gas Industry	discharge			15 years	C	W	W	M	M

Problem	Information needed to detect problem	Kinds of data needed	Data	Type of Input	Temporal Scale*	Spatial Scale (W, B, C, E, M)**	ROK Has Data?***	PRC Has Data?***	Priority (H, M, L)	
									KOREA	CHINA
		production			15 years	B, C	X	X	M	L
	Shipping	Traffic and Cargo			20 years	W	W	X	H	H
		Spill Accidents	MT		20 years	W	X	X	H	H
	Coastal Industries		Location Map		20 years	B, C, E	W	W	H	M
decline in fish and other marine species	disease and death in marine organisms	harmful algal bloom	# occurrences		annual for past 20 yrs	C, E, M	X	X	M	H
			duration		annual for past 20 yrs	C, E, M	X	W	M	H
			month of occurrence		annual for past 20 yrs	C, E, M	X	X	M	H
			areal size of occurrence		annual for past 20 yrs	C, E, M	X	W	M	H
		parasites	# occurrences		annual for past 5 yrs	C, E	W	W	M	L
			duration		annual for past 5 yrs	C, E	W	W	M	L
			month of occurrence		annual for past 5 yrs	C, E	W	W	M	L
			areal size of occurrence		annual for past 5 yrs	C, E	W	W	M	L
		fisherfolk income	gross annual income per household		annual for past 20 yrs	County/City	?	W	L	M
deteriorating human health quality	death and disease in humans	loss of labour pool	# of able-bodied persons not employed		annual for past 20 yrs	County/City	N	N	L	L
		nat'l/individual insurance costs	average insurance premium costs in USD		annual for past 20 yrs	County/City	N	?	L	M

Problem	Information needed to detect problem	Kinds of data needed	Data	Type of Input	Temporal Scale*	Spatial Scale (W, B, C, E, M)**	ROK Has Data?***	PRC Has Data?***	Priority (H, M, L)	
									KOREA	CHINA
		hospitalization / outpatient fee	fee in USD		annual for past 20 yrs	""	N	?		L
		introduced human-affected diseases	#, type of new diseases		annual for past 20 yrs	""	N	?		
deteriorating beaches and coastal areas	quality of recreational areas	fecal coliform	colonies/100 ML		bathing season for past 10 yrs	Bathing beaches	W	W	M	H
		enterococcus	colonies/100 ML		bathing season for past 5 yrs	Bathing beaches	N	N	M	M
		litter			bathing season for past 10 yrs	C	W	W	M	H
		transparency	m		seasonal for past 20 yrs	C	W	W	M	H
		sewage			bathing season for past 10 yrs	Bathing beaches	W	?	M	M
		income from tourism activities	USD		past 20 yrs	C	W	X	M	H
Notes:	*Temporal data listed is ideal time frame for historical records. Minimum literature review should include 10 years of historical data. **Spatial scale notes: W = whole Yellow Sea; B = associated river basins; C = coastal areas; E = estuary; M = middle of the ocean. *** X = have full data; W = have partial data for listed temporal and/or spatial scales; N = do not have; ? = have very few data or not sure.									

Table 2. Causal chain analysis.

Problem	**Impacts**	**Immediate causes (technical)**	**Underlying causes**	**Root causes**	**Governance analysis**
Deteriorating water quality (rivers, lakes, seas)	loss of recreational areas	eutrophication of waters	urbanisation	rapid coastal population growth	poor/ineffective legal instruments
	loss of tourism income	point & non-point inputs	modification of inland water flow to Yellow Sea	environmentally unfriendly technology	inadequate/insufficient infrastructure base
	increased sedimentation	oil spills	resource use conflict	inadequate/insufficient knowledge	inadequate mgmt/planning
	loss of water supply	restricted water circulation	land reclamation		insufficient stakeholder involvement in mgmt/planning
	more costly water supply	ballast water	upland land clearance		insufficient financing mechanisms & support
	decline in coastal community health		dredging		insufficient outreach
	decline/shift in spp. diversity/numbers		aquaculture		
	loss of fishing industry income		dumping		
	decline in human/marine organism health				
	harmful algal bloom and emerging diseases in the ocean				
	"dead zones," reduced O2, fish kills				

deteriorating human health quality	loss of labour pool	eutrophication of waters	urbanisation	rapid coastal population growth	poor/ineffective legal instruments
	increased nat'l/individual hospital/insurance costs	point & non-point inputs	resource use conflict	environmentally unfriendly technology	inadequate mgmt/planning
	increased human-affected diseases			inadequate/insufficient knowledge	insufficient stakeholder involvement in mgmt/planning
					insufficient financing mechanisms & support
					inadequate/insufficient infrastructure base
					insufficient outreach
decline in fish and other marine species	decline in food source	eutrophication of waters	resource use conflict	rapid coastal population growth	poor/ineffective legal instruments
	loss of income for fisherfolks, aquarium	point & non-point inputs		inadequate/insufficient knowledge	inadequate infrastructure base
	degradation of food web	oil spill		rapid development of industry	inadequate mgmt/planning
	decline/shift in spp. diversity/numbers	ballast water		habitat destruction	insufficient stakeholder involvement in mgmt/planning
	marine mammal, seabird death				insufficient financing mechanisms & support
	human poisoning				
deteriorating beaches and coastal areas	loss of recreational areas	eutrophication of waters	resource use conflict	rapid coastal population growth	insufficient stakeholder involvement in mgmt/planning
	loss of tourism income	point & non-point inputs	land reclamation	inadequate/insufficient knowledge	insufficient financing mechanisms & support
	decline in coastal community health	oil spill	urbanisation		inadequate infrastructure base
			upland land clearance		poor/ineffective legal instruments
					insufficient outreach

Table 3. Parameters for intercalibration exercises.

Medium	Target Pollutants	Korea	China	Regional	Priorities		
					Korea	China	Regional
Water	NO2	●	●	●	1	1	1
	NO3	●	●	●	1	1	1
	Ammonia	●	●	●	1	1	1
	Total dissolved N						
	Total particulate N						
	Total dissolved P						
	Phosphate	●	●	●	1	1	1
	Total particulate P						
	Silicates	●	●	●	1	1	1
Sediment	Trace metals	●	●	●	3	2	2
	PCBs	●	●	●	2	2	2
	OCPs	●	●	●	2	2	2
	PAHs	●	●	●	2	2	2
	Organotins	●	○	○	4	4	4
	Phenolic compounds	●	○	○	5	5	5
	PBDEs	●	○	○	6	6	6
	Organic carbon						
	Grain size						
	Oil	●	●				
Biota (bivalves)	Trace metals	●	●	●	3	2	2
	PCBs	●	●	●	2	2	2
	OCPs	●	●	●	2	2	2
	PAHs	●	●	●	2	2	2
	Organotins	●	○	○	4	4	4
	Phenolic compounds						
	PBDEs	●	○	○	5	5	5
	Lipid						

Note: ● : Compulsory
○ : Optional
1 = high priority; 6 = low

Annex V

Pollution Component Revised List of Activities

Objective IV. Pollution Component	
IVA. Critical Spots	
Activity 1. Determine and rank critical spot sources of water quality degradation	Review previous and ongoing monitoring system and assess methodologies and/or technical guidelines (including target contaminants, QA/QC, intercalibration exercises, data exchange, etc.)
	Develop technologies for monitoring contaminants and nutrients
	Present outcomes of ranking, data and info in WG meeting 2
	Prepare a regional synthesis (consultant)
	Finalise national outputs and synthesis (WG meeting 3)
	Publish the outcomes (printing)
	Inputs to final TDA
IVB. Contaminant Levels	
Activity 1. Develop baseline data and summarize contaminant and nutrient levels in the YSLME	Review existing data & info on contaminant levels
	Data quality control for baseline data WG meeting 2
	Present outcomes of ranking, data and info in WG meeting 2
	Environmental Survey with other working groups (if not, need ship time)
	Prepare a regional synthesis (consultant)
	Finalise national outputs and synthesis (WG meeting 3)
	Inputs to final TDA
Activity 2. Develop regional monitoring network strategy	Establish a monitoring network / or use the existing ones (PMO)
	Draft Monitoring guidelines / standards (consultant)
	Agree on the guidelines / standards (WG meeting 3)
	Intercalibration exercise of participating labs (Contract)
	Development of indicators to assess the implementation of relevant international conventions
Activity 3. Determine and rank critical spot sources of water quality degradation	Prepare format for data & info collection (PMO), no need to rank the spots
	Identification of hot spots
	Contract to relevant national institution(s) to collect hot spots data and information (contract to Nat'l focal points)
	Discussion & further requirements (WG meeting 2)
	Revise the hot spots data & info
	Inputs to final TDA

IVC. Analysis of the Fate and Transport of Contaminants to Facilitate SAP Analysis	
Activity 1. Review existing understanding of fate and transport of contaminants and nutrients	Review existing understanding
	Present outcomes of reviewing from national outputs in WG meeting 2
	Prepare a regional synthesis (consultant)
	Finalise national outputs and synthesis (WG meeting 3)
	Practice & intercalibration of the procedure
	Publish the outcomes (printing)
	Inputs to final TDA
Activity 2. Perform fate and transport analyses of contaminants and nutrients for management and policy development, including EIA process, ICZM	Analysis for fate and transport of contaminants and nutrients
	Impact prediction of impact of discharged contaminants and nutrients on the environment
Activity 3. Pollution prevention and management	ICM actions for controlling discharge of contaminants and nutrients
IVD. Regional Strategy for Pollution Control	
Activity 1. Review and compare national regulations and laws on water quality and pollution control, develop proposals	Contract to relevant national institution(s)
	Regional review (WG meeting 4)
	Regional analysis and suggestion on harmonisation
	Publish review report
	Inputs to national and regional SAP
Activity 2. Develop investment strategies	Economic valuation of hot spots, & identify the opportunities (Consultant)
	Identify hot spots in both source, and impact (WG meeting 4)
	Prepare draft strategy (consultant)
	Discuss the draft (WG meeting 4)
	Revise the draft (Consultant)
	Finalise the investment strategy (WG meeting 5)
	Publish the investment strategy
	Inputs to regional SAP
Activity 3. Develop funding mechanism to implement the regional strategy	Prepare an implementation plan (consultant)
	Agree on the implementation plan (WG meeting 5)
	Contracts for implementation
Activity 4. Develop regional priorities and strategies to reduce contaminant and nutrient levels	Root cause analysis for contaminants
	Discuss the draft (WG meeting 3)
	Revise the draft
	Finalise the strategy (WG meeting 4)
	Input to SAP

Global Environment Facility
United Nations Development Programme

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in the Yellow Sea Large Marine Ecosystem

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