



Regional Working Group Report

FISHERIES

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

Report of Second Meeting

Pusan, ROK, 17~20 November 2005



About this publication:

This publication contains the report of the Second Meeting of the Regional Working Group for the Biodiversity 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. The meeting reviewed and synthesized Fisheries data and information for the Yellow Sea acquired during extensive data collection exercises, analyzing the gaps in the data and discussing the difficulties in data and information collection. Members discussed the status and patterns-of-change in the Yellow Sea and agreed upon the preparation of data and information for input to the final Transboundary Diagnostic Analysis (TDA) for the YSLME Project.

For reference purposes, this report may be cited as:

UNDP/GEF 2006. Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem, Report of the Second Meeting of the Regional Working Group for the Fisheries Component (17th-20th November 2005). UNDP/GEF/YS/RWG-F 2/3.

Cover design: Ms. YUN Euidea

Photo credits: Mariculture in the Yellow Sea, Courtesy of Dr. JIN Xianshi from Yellow Sea Fisheries Research Institute.

**REDUCING ENVIRONMENTAL STRESS
IN THE YELLOW SEA
LARGE MARINE ECOSYSTEM**

**Report of the Second Meeting of the
Regional Working Group for the Biodiversity Component
UNDP/GEF Yellow Sea Project**

Busan, Republic of Korea, 17th to 20th November 2005



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

UNDP/GEF/YS/RWG-F.2/3
Date: 20 November 2005
English only

**Second Regional Working Group Meeting
For the Fisheries Component of
The UNDP/GEF Yellow Sea Project**
Busan, Korea, 17th to 20th November 2005

Meeting Report

1. OPENING OF THE MEETING

1.1 Welcome addresses

- 1.1.1 On behalf of the UNDP/GEF Yellow Sea Project, Mr. Jeffrey Archer, Fisheries Officer for the Project Management Office (PMO), opened the meeting, welcoming all participants to Busan. He especially welcomed the large number of observers and briefly introduced the objectives of the meeting.
- 1.1.2 The Chairperson of the Regional Working Group for Fisheries (RWG-F), Mr. Jin Xianshi, welcomed all participants to the meeting, and expressed his thanks to PMO for organising the meeting.

1.2 Introduction of the members

- 1.2.1 Participants were invited to introduce themselves and each gave a description of his/her background and involvement in the project. Observers also introduced themselves, describing their areas of input to 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 The Chairperson invited the Secretariat to introduce the documents prepared for the meeting.
- 2.1.2 Mr. Archer from the PMO introduced the list of documents (Document UNDP/GEF/YS/RWG-F.2/inf.1) and informed the meeting that the documents in front of them included the discussion documents:

- Expected Outcomes and Outputs of the 2nd RWG-F meeting;
- Activities to be Implemented 2005 to 2006;
- A Brief Description of the Governance Analysis; and
- Workplan for the Fisheries Component (2005 to 2006),

and the informational documents:

- Report of the 1st RWG-F Meeting;
- Report of the 1st RSTP Meeting; and
- Report for the Technical Meeting for the Cooperative Study Cruises (October, 2005) provided as background documents for the discussion.

- 2.1.3 The Secretariat made special mention that document UNDP/GEF/YS/RWG-F.2/6 was missing and document UNDP/GEF/YS/RWG-F.2/5 was provided in an incomplete form, as this relied on the full data and information collection reports from the participating countries, which were not received prior to the meeting, but were distributed during the meeting.

2.2 Organisation of Work

2.2.1 The Chairperson invited the Secretariat to introduce this agenda item, referring to Document UNDP/GEF/YS/RWG-F.2/inf.3.

2.2.2 The Secretariat introduced document UNDP/GEF/YS/RWG-F.2/inf.3 describing the "Provisional Working Programme" for the meeting and noted that the meeting would be conducted in plenary as best as possible, but suggested that some aspects may be addressed in sessional working groups where necessary.

3. ADOPTION OF THE MEETING AGENDA

3.1 The Chairperson briefly explained each agenda item, referring to the Provisional Agenda (Document UNDP/GEF/YS/RWG-F.2/1) and Provisional Annotated Agenda (Document UNDP/GEF/YS/RWG-F.2/2).

3.2 Participants were asked to consider the agenda prepared by the Secretariat, and to propose any amendments or additions that they might wish.

3.3 Ms. Connie Chiang mentioned that the UN procedures of contracting would be explained to the participants, and requested the Chairperson to allow some time during the meeting to include this short session. The Chairperson suggested to include this explanation after Agenda Item 6.

3.4 The meeting adopted the agenda with no modification, which is attached as Annex II to this report.

4. EXPECTED OUTPUTS FROM THE SECOND RWG-F MEETING

4.1 The Chairperson invited the Secretariat to introduce Document UNDP/GEF/YS/RWG-F.2/4 and explain the expected outputs from this Meeting.

4.2 Mr. Archer presented the outcomes and outputs anticipated from the meeting, stating that the main objectives were: the review and synthesis of the data and information of the fisheries component for the Yellow Sea marine basin acquired during the recent collection exercise, based on the data/information requirements of this Regional Working Group, for preparation of the Transboundary Diagnostic Analysis (TDA).

4.3 He reported that the major outcomes of the meeting were expected to be:

- An awareness of the quality, gaps, difficulties and barriers to collecting data and information on fisheries, fisheries resources and mariculture, and an understanding of the mechanisms to address these issues.
- An awareness of the region-wide status and patterns-of-change in fisheries resources and mariculture in the Yellow Sea, with agreements on the current status and patterns-of-change in benthic and pelagic resources, biodiversity, biomass, trophic structure, carrying capacity, abundance and distribution, production levels, etc. of fisheries resources in the Yellow Sea;
- A revised list of 'perceived problems' and Causal Chain Analysis agreed at the First RWG-F meeting.
- An improved state-of-knowledge of the existing national laws and regulations on fisheries and how these may contribute to potential governance issues.
- An agreement on the preparation of the Fisheries Component inputs for the preparation of the Draft TDA.

- Understanding of the Fisheries Component's role in the upcoming Cooperative Surveys of the Yellow Sea Marine Basin.
- Agreement on activities to be implemented during 2005 to 2006 including the objectives of the body-of-work that is required to be implemented prior to the next RWG-F meeting, the role of consultants and members of the RWG-F in the process.
- Agreement on list and schedule of activities for the RWG-F for 2005 to 2006.

4.4 Mr. Archer then informed the group of what tangible outputs were expected from the meeting. These were:

- A list of activities to address the gaps, data calibration issues and the barriers and difficulties to collection of data and information, etc.
- A listing of the formats and presentation of data for input to the final TDA document.
- An updated causal chain analysis based on contemporary fisheries and mariculture information, finalized for input to the Draft TDA.
- A workplan for the Regional Working Group – Fisheries showing activities for 2005 to 2006, to submit for approval to the 2nd PSC Meeting.
- Approved statements of works for each of the impending consultant activities and proposals for suitable candidates.
- A workplan and list of responsibilities for activities leading up to, during, and after the co-operative cruise for the Fisheries component.

4.5 The group requested further explanations regarding definitions for “data gaps,” “consultants,” and the “causal chain and governance analysis.” The Secretariat explained that “gaps” referred to missing data, unavailable data, or non-existing data. “Consultants” referred to qualified persons that would be contracted to implement activities. The Secretariat also explained that the RWG-I will be responsible for overseeing the governance analysis for all components, but that each component should carry out its own causal chain analysis, and provide relevant socio-economic data and information to the teams that will carry out the governance analysis. More information about this will be provided later in the meeting.

4.6 Members took note of the expected outputs, and will keep them in mind when discussing the agenda items.

5. CONSIDERATION OF THE ON-GOING ACTIVITIES UNDER THE FISHERIES COMPONENT

5.1 Review of Collected Fisheries Data and Information

5.1.1 The Chairperson invited the National Fisheries Research and Development Institute, Korea, and Yellow Sea Fisheries Research Institute, China to present the fisheries-related data and information collected over the past months.

5.1.2 Mr. Sohn Myoung-Ho presented the activity's progress-to-date for Korea's fisheries national review, explaining the types of data and information that have been collected, methods used to carry out assignment, current known trends and status of fisheries

based on available data, and problems with the activity (Document UNDP/GEF/YS/RWG-F. 2/5).

- 5.1.3 Mr. Sohn showed the Korean fisheries current status based on data and information collected covering the period of 1980 to 2004. He stated that 60-70% of the required data had been collected, but did not present all the data to the group, as the format for the final presentation should be first agreed with the Chinese members. Instead, Mr. Sohn suggested the format tables of how data are expected to be shown in the final product.
- 5.1.4 Mr. Sohn summarized the data and information to-date by stating that Korean fishing grounds have expanded since the 1960's, and that Total Catch, which was as its peak during mid 1980's, has gradually decreased since, showing a continual downward trend. He also stated that the ratio of total catch from the Yellow Sea is around 20% in relation to total country catch recently, and although numbers of fishing vessels and horse power (HP) show an increasing trend, the mean tonnage of vessels is showing a decreasing trend in recent years. CPUEs (Catch per tonnage, boats, HP) have been decreased sharply, and he added that the species composition of the catch has changed a little in the past decade.
- 5.1.5 Mr. Sohn ended his presentation by stating that there is insufficient data for some parameters: catch data – exact fishing area, detailed CPUE data (Catch per hauls, fishermen, fishing gears, etc) by fisheries, biological/ecological data, detailed effort data (number of fishing gears, fishermen, hauls, work days, tows, etc) – by region, by fisheries, and by region and fisheries. Mr. Sohn clarified that region is defined here as Korean provinces.
- 5.1.6 Mr. Jin Xianshi presented the activity's progress-to-date for China's national review, explaining the types of data and information that have been collected, the sources of data, carrying capacity stock assessment models, socio-economic data, such as national laws and regulations on fisheries, national laws on management and conservation measures, and the China-Korea fisheries agreement signed in August 2000.
- 5.1.7 Mr. Jin explained the gaps in data are: 1) an absence of data covering the entire Yellow Sea for commercial fisheries and past surveys; 2) no catch data for species levels in specific areas; and 3) a proportion of Yellow Sea catch data is mixed with East China Sea catch data.
- 5.1.8 Finally, the condition of Chinese fisheries was shown, describing the regional and migratory routes of important species, amount of seasonal catch by species, dominant stocks, and CPUE.
- 5.1.9 Mr. Archer enquired if any country had any form of navigational information to identify discrete locations for spawning and fishing areas.
- 5.1.10 Both countries stated that they did not possess this information and that spatial information is defined only by polygons drawn on maps.
- 5.1.11 Mr. Jin and Ms. Yeon noted that the WWF/KORDI/KEI Yellow Sea Ecoregion Planning Programme (YSEPP) has fisheries data provided by China and Korea which is also in the form of polygons, and much of this information can also be utilised for the purposes of the fisheries component.

5.1.12 The PMO agreed to review the YSEPP GIS data and examine how this may be used in the analysis of fisheries data and information.

5.1.13 Mr. Archer enquired as to what spatial scales that data and information have been collected. In the agreed data table, both countries had agreed to collect data and information at the 'province' level, but during discussions, both countries had stated that they are collecting data for 'regions'. Mr. Archer mentioned that the biodiversity component agreed to collect China's data and information to the level of 'city' (which is a apparently a larger administrative unit than 'county'), which was roughly equivalent in size to the 'province' level of Korea. There are approximately 10 'city' units along the Chinese coastline, whereas there are four provinces along the Korean coastline.

5.1.14 Both China and Korea confirmed that they have collected data at the province level and should continue to use this data, even if scale is different.

5.1.15 During further data format discussions, Mr. Jin recommended to the group that Kilo Watts (KW) power be used as the standard for calculating CPUE as opposed to gross HP, as the latter was considered to not be an effective a figure to use.

5.1.16 Members agreed to utilise the KW in the calculation of CPUE for each country.

5.1.17 Mr. Jang In-Kwon noted problems in inputting data during the collection activities, in particular with the lack of knowledge on the format being used by China for their collection. He recommended that both countries adopt standardised format for inputting data and information.

5.1.18 Mr. Archer stated that this was in fact, one of the priority items of the meeting – to develop agreements and standardise data and information input in light of the recent data and information collection activities, beyond that which was agreed on at the first RWG-F meeting. This was critical and the group should take some time to ensure that an appropriate format for all data was agreed upon. This issue will be dealt with at the end of this agenda.

5.1.19 Mr. Archer enquired to members as to whether collected data and information currently included any details on low value/trash fish levels in catch, that would allow us to identify the level of catch and use, especially concerning the production of feed for aquaculture species, as this was a growing global concern as the aquaculture industry expands.

5.1.20 Members stated that catch records for both countries do not contain details on levels of low value species or trash fish and this data could not be determined from the data and information that they had collected, and while members were interested in obtaining information on low value/trash fish realising the importance of this information, there is little data available from both Korea and China. Members suggested that the RWG-Investment should be responsible for analysing this data and information, and the governance analysis consultants should collect this information.

5.1.21 Mr. Archer stated that the Food and Agriculture Organisation for the United Nations (FAO) has detailed information on low value/trash fish for China developed during the APFIC Regional Workshop on Low Value and "Trash Fish" in the Asia-Pacific in Vietnam (2005), but does not seem to possess the same quantity or quality of data for Korea.

5.1.22 The PMO agreed to discuss the issue of low value/trash fish with the investment group and whether it was possible for the governance analysis consultants to be able to acquire this kind of fisheries data.

5.1.23 Concomitantly, the PMO would examine the FAO databases to see what information could be used to fill this data gap.

5.1.24 Mr. Jeung Gab-Yong presented socio-economic data related to fisheries resources in Korea: number of vessels by fisheries, number of fisherpersons by region, fisheries income, consumption per capita, export and import, contribution to GDP, TAC, and national legislation.

5.1.25 The group enquired whether 'Consumption per capita' included the consumption of both fresh and seawater species, and Mr. Jeung confirmed that it did include both.

5.2 Review of Collected Mariculture Data and Information

5.2.1 Mr. Jang presented the method used to carry out this activity, namely visits to provincial governments, Korea Ministry of Maritime Affairs and Fisheries, and web searches, and showed data that had been collected by the Korean team. Mr. Jang also described the remaining work to be done. He mentioned that reliable data or information on licenses is not available in the websites and had to visit provincial governments, and showed samples of data by totals for provinces or cities, but not for whole country,

5.2.2 Mr. Jang continued to describe total production levels of marine farmed organisms, aquaculture licenses and area of marine farms (Ha), and aquaculture methods (by habitat) of marine farmed organisms at the level of province or city.

5.2.3 Mr. Jang described the data and information gaps in the Korean data stating that mariculture data in Korea, more than 10 years old, is not available and that only production information from legal farms was included in the data and information. He stated that there was no way of knowing the exact contribution to production by illegal mariculture farms but estimated that they may add as much as 20-30% to the total production figures.

5.2.4 Mr. Fang Jian Guang gave the mariculture data and information collection activity progress report for China, showing the group data from as early as 1988 – 2004, and explaining the current status of mariculture in China, species that are cultured, culture types, annual yield by city and province, effects of mariculture and suggestions for addressing problems caused by mariculture which included: strengthening of investments to improve equipment quality, techniques and efficiency; resolving problems in culture technologies, water quality control and purification and resolution of other mariculture-related pollution issues; developing high level of effectiveness of culture facilities and auto-control techniques.

5.2.5 Mr. Fang went on to describe the gaps in the data and information stating that some data are available by species, but some by groups, and that it was impossible to get recent information to determine the change in number of new mariculture licenses and the change in area of land covered by mariculture because of rapid growth of mariculture in recent years. He remarked that the licensing of mariculture farms in China is a recent event, and only data of from the last year are available.

- 5.1.26 Mr. Archer asked the group whether it was possible to determine the amount of organisms that are imported or cultured, and then introduced to the natural environment in order to 'enhance' natural stocks, as this was a need and request to the RWG-F by the RWG-B.
- 5.1.27 Mr. Jeung stated that enhancement data was not available for Korea.
- 5.1.28 Mr Fang stated that it is included in China's data, but it is difficult to know the quantities for each species, or how much is derived from natural vs. cultured organisms.
- 5.1.29 Members agreed not to collect any additional data as this is not a core focus for RWG-F data collection, but agreed that if they can locate the data in the information that they collected, then they would provide it to RWG-B.**

Presentation of Final Data Products

- 5.2.6 Participants reiterated the need for consistency in expression of species names in the final reports. Members noted that the scientific names were not a problem. **Members agreed to use common names as listed in FishBase. Additionally, members agreed to list the local Chinese and Korean names, and one master list of all species including scientific, English, Chinese and Korean names would be prepared and included in the final report.**
- 5.2.7 Members held two sessional working groups (for fisheries and for mariculture) to discuss the format in which to present the final data for the regional synthesis and TDA.
- 5.2.8 Mr. Jang presented the agreed data formats that will could used by both countries for the input of mariculture-specific data. He explained to members that parameters that either country did not possess would not be included in the spreadsheet.
- 5.2.9 The agreed data-input tables for use by both countries to standardise the input of data and information are attached in Annex III.**
- 5.2.10 There was a brief discussion on the spatial scales for collection and presentation of data and information.
- 5.2.11 Members agreed that the previous decision to show data to the level of provinces, except for licenses or number of farms, was still valid after the data and information exercise.**
- 5.2.12 Members also agreed that total production (marine production only) by province will be collected and total freshwater production by country will be added. If total farmed area by province information can be obtained, then this would also be included.**
- 5.2.13 Ms. Yeon In Ja presented the agreed data input spreadsheet system developed by the Fisheries group, which provides a format for the input of fisheries-specific data.
- 5.2.14 Members of the group discussed the requirements for historic data on trawling (Year of survey, number of stations, bottom trawl coverage, data type) and how to equitably provide data to obtain a regional picture.

- 5.2.15 Korea stated that their data was limited and patchy, whilst China claims to possess a very detailed dataset, with a large temporal coverage.
- 5.2.16 At the end of discussions, it was agreed that Korea would supply what data they could and that China would match what Korea provided, and could assist in the filling-in of any additional gaps in the dataset, if needed.**
- 5.2.17 Members reviewed and modified the format of the data-input spreadsheets, based on the available data from both countries.
- 5.2.18 The group agreed on the format of data-input, but the spreadsheet was not finalised pending more information from Korea and China regarding the trawl surveys. Korea and China agreed to provide the finalised version to the PMO by the 25th November, 2005.**
- 5.2.19 The fisheries group also presented an agreed list of species to be used in the data collection and analyses. This is a list of species nominated from each country as having a 'major' importance to them. This is in contrary to the previous agreement where 10 species would be selected that represented the 'commercially important' species shared by both countries. **The agreed list is attached in Annex IV.**
- 5.2.20 Korea presented the format for socio-economic data. Members discussed, modified and agreed on the format that is attached as Annex V.**
- 5.2.21 Members then reviewed the original 'required data and information' table, agreed at the 1st RWG-F meeting, and revised the data parameters based on the current data and information availability. This exercise revealed the current and actual availability of data and information and highlighted the gaps. **The completed table is attached as Annex VI.**
- 5.2.22 Finally, members reviewed the preliminary causal chain analysis also developed at the 1st RWG-F meeting and made some modifications. Members deemed that a more thorough review of the data and information would be provided in the final reports provided at the end of the data and information collection activity. **The agreed revised causal chain analysis is attached as Annex VII.**

6. CONSIDERATION OF THE CO-OPERATIVE STUDY CRUISES

- 6.1 The Chairperson invited the Secretariat to present a summary of the Technical Meeting for the Co-operative Study Cruises, 17-18 October 2005 (Document UNDP/GEF/YS/JC.1/3).
- 6.2 Mr. Archer presented the outcomes and agreements of the Technical Meeting, describing the agreements on cruise dates, survey route, sampling stations and transect locations, and the personnel allocations made for each working group that will be onboard during the survey. He also described the discussions and agreements on transportation of equipment and personnel, the role of scientists and their responsibilities, the preparation of equipment and the research vessel, sample and data sharing and follow-up work.
- 6.3 Mr. Archer noted that the Chief Scientist for China and Chief Scientist for Korea have both been selected for the cruise, and both have the appropriate authority and responsibility for the cruise. He also stated that the Captain of the ship was

ultimately responsible for the safety of the ship and personnel and would make the relevant decisions during the cruise.

- 6.4 During the discussions, members noted that there were not enough team members for the fisheries group, as Dr. Jin would be the Chief Scientist, and would have to deal with other responsibilities regarding the sampling and overall co-ordination of the cruise. Thus, the fisheries team is now one person short.
- 6.5 Mr. Archer stated to the group that since he was participating in the winter cruise, he will be available to assist all components in their sampling activities. However, as he will have his own task to perform on behalf of the PMO, he cannot be dedicated to fill the vacancy of a fisheries scientist.
- 6.6 The Fisheries group recommended that as the Pollution and Biodiversity groups have already completed their 2nd RWG meetings and have finalised their team member numbers, it may be necessary to approach the Ecosystem Component and ask them to reduce their number of personnel by at least one person, to allow for a replacement for Mr. Jin to be added to the Fisheries Component.
- 6.7 **The PMO agreed to raise this issue at the upcoming 2nd RWG-E Meeting.**
- 6.8 A question was raised as to whether the northern portion of the spring survey stations falls within an area that could be an issue for North Korea, and may pose some difficulties especially for scientists of the South Korea. Mr. Jin noted that the research vessel has previously had clearance to travel in that area.
- 6.9 **The PMO agreed to confirm the exact status of these northern stations in relation to the sensitive areas around North Korea, and would defer the issue to the Project Steering Committee for a decision about future of these sampling stations if it is an issue.**
- 6.10 A suggestion was made for the Fisheries Component to undertake an otolith study during the cruise to determine 'age composition'. During discussions, this was not deemed a priority activity, and it was agreed that length data would provide sufficient information for age composition analysis. **However, it was agreed that if any group required age composition information, they could undertake whatever study they wanted, so long as the priority goals of the cruise were met, no extra inconvenience or expense to the vessel or all concerned was created, and was conducted for the mutual benefit of all involved.**
- 6.11 The group discussed the equipment requirements for the cooperative cruise, describing the issues and ways to resolve them.
- 6.12 The group informed the PMO that both countries were not able to locate suitable electronic balances with the required sensitivity, for use on-board the vessel. **Members agreed to purchase standard electronic balances for in-lab use, and use manual scales on-board the vessel. Savings made by not purchasing the more expensive scales would be used to purchase more, cheaper scales to expedite the measurement of samples.**
- 6.13 Mr. Jin reported that the actual cost of the 'Bongo' net systems was about USD 7800, exceeding the previous estimate given by the RWG-F during the Technical Meeting. As this was a critical piece of sampling equipment, it would only be possible to purchase one Bongo net..

6.14 Mr. Archer voiced his concern about the lack of redundancy and the possibility of failure or loss of this critical piece of equipment, and therefore the loss of all associated data.

6.15 Members agreed to purchase only one Bongo net and four horizontal nets.

6.16 Members finalised the workplan, equipment manifest, budget for the Fisheries Component for the cooperative study cruise. Korea also provided to the PMO, the final list of samples to be relocated to Korea (for the approval process) at the completion of the survey. **The agreed documents are attached as Annex VIII.**

6.17 Members recommended that a technical meeting should be held before the spring co-operative study cruise. The meeting should be organised some time in late March 2006, perhaps back-to-back with a cross component meeting.

6.18 The PMO agreed to examine the possibility of these dates for these two meetings.

7. ACTIVITIES TO BE IMPLEMENTED DURING 2005 TO 2006

7.1 Ms. Chiang briefly introduced the UNOPS contracting procedure for the benefit of the group, describing the different contract modalities, contract types, the general contractual processes and procurement system, emphasising the time it takes to complete the process and the urgency for expedient actions by members of the working group. Ms Chiang described the contract process for institutes and individuals and emphasised the significant contract levels, i.e. less than USD 30,000 and greater than USD 30,000, which have significantly different contract procedures and implications to both contractor and incumbents.

7.2 The Chairperson invited the Secretariat to introduce Document UNDP/GEF/YS/RWG-F.2/7 and describe the body of work that is required to be implemented prior to the 3rd RWG-F meeting.

7.3 Mr. Archer summarised the tasks of this agenda item and asked the members to familiarise themselves with the upcoming activities, the input required by both the members of the RWG-F and consultants, the schedule of implementation of the work, and asked the members to propose appropriate candidates to undertake the consultant tasks. He described the immediate activities of the RWG-F in lieu of the recent data and information exercise and considering the approaching deadline for inputs to the TDA. Mr. Archer then described the activities that follow these, describing the discrete actions for the various sub-components.

7.4 The Chairperson invited members to consider the activities of the RWG-F for 2005 to 2006, make any necessary revisions and propose appropriate candidates for the required consultant activity.

7.5 After the PMO clarified a few questions from the members, members suggested a number of potential candidates for consultant contracts, for each of the upcoming activities.

7.6 The PMO agreed to send the Statement of Work to these candidates soon after the meeting, and request for bids for the work.

- 7.7 Mr. Archer presented the process of governance analysis for the Project, describing the background, the components, and a suggested implementation structure of governance analysis. He stated that a review of the implementation plan and discussions with governance experts revealed a need for a consultant(s) to undertake a full governance analysis integrating the outcomes from each component.
- 7.8 Mr. Archer also noted that there are some implications to the RWG-F should an integrated governance analysis be carried out as above, namely, there may be an additional requirement for the Fisheries Component to provide data and information for the governance analysis to assist and expedite the activity to meet the deadline.
- 7.9 **Members agreed on the proposed governance analysis presented by the PMO, and expressed a continuous commitment and willingness to support the PMO and the consultant(s) in the process of the analysis by providing additional relevant data if necessary.**
- 7.10 Members recommended that the consultant consider the collection of the following information, and the RWG-F may be able to provide this information to the consultant to expedite the governance analysis given the short amount of time before the TDA should be produced:
- Management related departments (e.g. government structure);
 - Fisheries and related laws and regulations and standards, etc.; and
 - Current and planned activities (e.g. Fisheries management programmes, etc).
- 7.11 **The PMO agreed to provide this list to the consultant as soon as one is selected.**

8. WORKPLAN FOR 2005 TO 2006

- 8.1 The Chairperson invited the Secretariat to introduce Document UNDP/GEF/YS/RWG-F.2/9, the Fisheries Component workplan.
- 8.2 Mr. Archer presented the workplan for the Regional Working Group – Fisheries, stating that some changes had been made to reflect the current situation. He invited members to review and revise the workplan for the RWG-F, for submission and approval at the 2nd PSC Meeting in December 2005.
- 8.3 **Members revised the workplan for the Fisheries Working Group for 2005 to 2006 that is attached as Annex IX.**

9. OTHER BUSINESS

- 9.1 The Chairperson invited members to raise any other issues that need to be considered by this meeting.
- 9.2 Ms. Chiang commended the members for their progress on the data and information collection activity, and for almost completing the activity. She also informed members that for the second round of RWG Meetings, 4 out of 5 Components had to change their previously agreed dates. This caused some extra work and delay in implementation of activities. Ms. Chiang asked all members to keep to the agreed meeting dates, and informed members that last minute changes in RWG

membership and meeting times due to conflicting schedules also created lots of additional work for the PMO to arrange the meeting and accommodations.

- 9.3 Mr. Archer mentioned to the group that both regional communication and mutual understanding were major objectives of this project. He mentioned that the PMO had established a number of mechanisms to facilitate communication within and between countries (such as the new e-discussion groups on the YSLME website), and although he commended the Fisheries Component for their national and regional communication so far, he urged them to develop this even further, particularly in regards to communication with Component Chairs, NPCs and the PMO.
- 9.4 Mr. Archer also gave special thanks to the observers to the meeting, stating that their input can only increase the level of achievement of the project, and hoped that observers would continue to be a feature of the RWG-F meetings.

10. VENUE FOR THE NEXT REGIONAL WORKING GROUP MEETING

- 10.1 The Chairperson invited members to consider the date and place for the 3rd RWG-F Meeting.
- 10.2 **Members agreed to have the Third RWG-F Meeting in Weihai, China, from 21-24 August 2006.**

11. ADOPTION OF THE MEETING REPORT

- 11.1 The Chairperson led the adoption of the draft meeting report prepared by the Secretariat.

12. CLOSURE OF THE MEETING

- 12.1 The Chairperson, Mr. Jin Xianshi gave his thanks to the host, to the participants, and to the PMO for the efficient management of the meeting.
- 12.2 Ms. Yeon In Ja of Korea thanked the chair and the PMO for the work hard and support over the past days, and gave particular thanks to participants and observers.
- 12.3 On behalf of the PMO, Mr. Jeffrey Archer thanked the Chair for his efficient moderation of the meeting, the participants for their hard work and contribution, and the observers for their important input.
- 12.4 The Chairperson formally closed the meeting at 16:00hrs, 20th November, 2005.

Annex I

List of Participants

People's Republic of China

Mr. JIN Xianshi

Director, Fishable Resources & Ecosystem
Management Division
Yellow Sea Fisheries Research Institute
106 Nanjing Road
Qingdao 266071
Tel: 86-532-8584-9430
Fax: 86-532-8581-1514
Email: jin@ysfri.ac.cn

Mr. FANG Jian Guang

Director, Mariculture Ecology and Carrying
Capacity Division
Yellow Sea Fisheries Research Institute
106 Nanjing Road
Qingdao 266071
Tel: 86-532-8582-2957
Fax: 86-532-8581-1514
Email: fangjq@ysfri.ac.cn

Mr. WANG Jun

Associate Professor
Yellow Sea Fisheries Research Institute
106 Nanjing Road
Qingdao 266071
Tel: 86-532-8583-6344
Fax: 86-532-8581-1514
Email: wangjun@ysfri.ac.cn

Republic of Korea

Ms. YEON In Ja

Senior Scientist
West Sea Fisheries Research Institute
National Fisheries Research & Development
Institute (NFRDI)
707, Ulwang-dong, Jung-gu, Incheon,
400-420, Republic of KOREA
Tel: 82-32-745-0551
Fax: 82-32-745-0549
Email: ijyeon@nfrdi.re.kr

Mr. JANG In Kwon

Senior Researcher
West Sea Fisheries Research Institute
National Fisheries Research &
Development Institute (NFRDI)
707 Ulwang-dong, Jung-gu, Incheon
400-420, Republic of KOREA
Tel: 82-32-745-0570
Fax: 82-32-745-0558
Email: jangik@nfrdi.re.kr

Mr. JEUNG Kab Yong

Associate Research Fellow
Korea Maritime Institute
1027-4 Bangbae-3-Dong, Seocho-Gu,
Seoul, Korea 137-852
Tel: 82-2-2105-2745
Fax: 82-2-2105-2859
Email: kyjeung@kmi.re.kr

Observers

Mr. SOHN Myoung Ho

Junior Scientist
West Sea Fisheries Institute
National Fisheries Research & Development
Institute (NFRDI)
707 Ulwang-dong, Jung-gu, Incheon
400-420, Republic of KOREA
Tel: 82-32-745-0545
Fax: 82-32-745-0607
Email: mhsohn@nfrdi.re.kr

Mr. CHO Woo Ik

FM & Natural Resource Dept.
Sundosoftware, Inc.
World Meridian Venture Center
II 15F, 426-5, Gasan-Dong
Geumcheon-Gu, Seoul
Republic of KOREA
Tel: 82-2-2025-6800
Fax: 82-2-2025-6511
Email: wicho@sundosoftware.com

Mr. CHOI Seok-Gwan

Distant-water Fisheries Resources
National Fisheries Research
& Development Institute
408-2, Shirang-ri, Gijang-up, Gijang-gun,
Busan
Republic of KOREA
Tel: 82-51-720-2334
Fax: 82-51-720-2337
Email: sgchoi@nfrdi.re.kr

Project Management Office (PMO)

Mr. ARCHER Jeffrey

Fisheries/Biodiversity Officer
UNDP/GEF Yellow Sea Project
Korea Ocean Research and Development
Institute
1270 Sa-dong Sangnok-gu Ansan-si
Gyeonggi-do 426-744
Republic of Korea
Tel: (82-31) 400 7832
Fax: (82-31) 400 7826
email: jeff@yslme.org

Ms. KIM Hyo Jeong

Researcher
Korea Maritime Institute
1027-4, Bangbae 3-Dong
Seochu-Gu,
Seoul, 137-851 Republic of KOREA
Phone: 82-2-486-6244
Fax: 82-2-2105-2779
E-mail: katehkim@gmail.com

Mr. IM Yang Jae

Junior Scientist
West Sea Fisheries Research Institute
National Fisheries Research &
Development Institute(NFRDI)
707 Ulwang-dong, Jung-gu, Incheon
400-420, Republic of KOREA
Tel: 82-32-745-0543
Fax: 82-32-745-0549
Email: yjlim@nfrdi.re.kr

Ms. CHIANG Connie

Environment Officer
UNDP/GEF Yellow Sea Project
Korea Ocean Research and Development
Institute
1270 Sa-dong Sangnok-gu Ansan-si
Gyeonggi-do 426-744
Republic of Korea
Tel: (82-31) 400 7833
Fax: (82-31) 400 7826
email: connie@yslme.org

Ms. YUN Euidea

IT Support Staff
UNDP/GEF Yellow Sea Project
Korea Ocean Research and Development
Institute
1270 Sa-dong Sangnok-gu Ansan-si
Gyeonggi-do 426-744
Republic of Korea
Tel: (82-31) 400 7830
Fax: (82-31) 400 7826
email: euidea@yslme.org

Mr. SONG Kapsung

Driver
UNDP/GEF Yellow Sea Project
Korea Ocean Research and Development
Institute
1270 Sa-dong Sangnok-gu Ansan-si
Gyeonggi-do 426-744
Republic of Korea
Tel: (82-31) 400 7794
Fax: (82-31) 400 7826
email: kapsung@yslme.org

Annex II

Agenda

1. OPENING OF THE MEETING

- 1.1 Welcome addresses
- 1.2 Introduction of the 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 2ND RWG-F MEETING

5. CONSIDERATION OF THE ON-GOING ACTIVITIES UNDER THE FISHERIES COMPONENT

- 5.1 Review of collected Fisheries data and information
- 5.2 Review of collected Mariculture data and information

6. CONSIDERATION OF THE COOPERATIVE STUDY CRUISE

7. ACTIVITIES TO BE IMPLEMENTED DURING 2005 TO 2006

- 7.1 Regional Data and Information Synthesis
- 7.2 Data and Information Input for TDA
- 7.3 Regional Stock Assessment
- 7.4 Carrying Capacity
- 7.5 Sustainable Mariculture
- 7.6 Laws, Regulations and Fisheries Management Plans

8. WORKPLAN FOR 2005 TO 2006

9. OTHER BUSINESS

10. VENUE FOR NEXT REGIONAL WORKING GROUP MEETING

11. ADOPTION OF THE MEETING REPORT

12. CLOSURE OF THE MEETING

Annex III

Agreed Data Formats

The following are the agreed tables describing the format for data-entry for the Fisheries Component covering fisheries production, mariculture production and socio-economics. Sample data has been provided in some cases as a guide only.

**Table X. Tonnage and
 KW of Boats**

Year	Powered Vessel			Tons/Vessel	Non-powered Vessel		Tons/vessel	Total	
	No.	Tons	KW		No.	Tons		No.	Tons
1986									
1987									
1988									
1989									
1990									
1991									
1992									
1993									
1994									
1995									
1996									
1997									
1998									
1999									
2000									
2001									
2002									
2003									
2004									
Mean									

Table X. Reproduction and Spawning Characteristics by Species

Species		Reproduction				Remarks
Common Name	Scientific Name	Fecundity (× 10,000)	Optimum temp. (°C)	Min length at maturity (cm)	Season	

Table X. Seasonal Density Distribution of Species by Bottom Trawl Survey

Major Species	Year					
	Spring		Winter		Total	
	Mean	Range	Mean	Range	Mean	Range
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Major Species	Year					
	Spring		Winter		Total	
	Mean	Range	Mean	Range	Mean	Range
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Major Species	2005					
	Spring		Winter		Total	
	Mean	Range	Mean	Range	Mean	Range
1						
2						
3						
ETC						

**Table X. Total production of marine farmed organisms in X Year
(unit: M/T)**

Kind	species	Province					TOTAL
		Incheon	Gyeonggi	Chungnam	Jeonbuk	Jeonnam	
Finfish	<i>Paralichthys olivaceus</i>	65			8	2,243.5	2,316.5
	<i>Lateolabrax latus</i>			28	7	91.3	126.3
	<i>Epinephelus septemfasciatus</i>				-	2.0	2.0
	<i>Acanthopagrus schlegelii</i>			191	-	31.3	222.3
	<i>Oplegnathus fasciatus</i>			343	-	-	343.0
	<i>Pagrus major</i>				-	29.3	29.3
	Other sea breams				-	73.0	73.0
	<i>Miichthys miiuy</i>				-	-	-
	<i>Sciaenops ocellatus</i>				-	-	-
	<i>Seriola quinqueradiata</i>				-	0.3	0.3
	Puffers			3		2.3	5.3
	<i>Sebastes schlegelii</i>		54	2,094	7	1,657.8	3,812.8
	Other rock fishes				-	3.0	3.0
	<i>Muguil spp.</i>	26	106	483	271	83.8	969.8
	<i>Pleurogrammus azonus</i>					-	-
	<i>Konosirus punctatus</i>	5			104	18.0	127.0
	<i>Stephanolepis sp.; Thamnaconus sp.</i>			16		-	16.0
	Other finfishes	3				-	3.0
subtotal	99	160	3,158	397	4,235.3	8,049.3	
Crustaceans	<i>Fenneropenaeus chinensis</i>	36	26	637	81	399.0	1,179.0
	<i>Penaeus japonicus</i>					-	-
	subtotal	36	26	637	81	399.0	1,179.0
Shellfish	<i>Crassostrea gigas</i>	1,004		9,933		12,542.8	23,479.8
	<i>Rapana venosa</i>					-	-
	<i>Haliotis discus hannai</i>				-	306.5	306.5
	<i>Chlamys farreri nipponensis</i>					0.3	0.3
	<i>Cyclina sinensis</i>			79	-	-	79.0
	<i>Macra chinensis</i>					-	-

	<i>Scapharca subcrenata</i>				-	2,695.3	2,695.3
	<i>Solen spp.</i>				-	-	-
	<i>Ruditapes philippinarum</i>	29		14,889	10,096	204.0	25,218.0
	<i>Meretrix lusoria</i>				-	-	-
	<i>Atrina pectinata</i>					499.3	499.3
	<i>Scapharca broughtonii</i>					-	-
	<i>Macra veneriformis</i>						-
	<i>Mytilus coruscus</i>					813.0	813.0
	Other shellfish				-	-	-
	subtotal	1,033	-	24,901	10,096	17,061.0	53,091.0
Seaweeds	<i>Porphyra spp.</i>	344	3,688	14,684	15,731	45,744.0	80,191.0
	<i>Laminaria japonica</i>					5,293.3	5,293.3
	<i>Undaria pinnatifida</i>			335		54,351.5	54,686.5
	<i>Gelidium amansii</i>					-	-
	<i>Gigartina spp.</i>					-	-
	<i>Codium fragile</i>					9.5	9.5
	<i>Hijika fusiforme</i>					5,702.8	5,702.8
	<i>Enteromorpha spp.</i>					12.5	12.5
	Other seaweed					-	-
	subtotal	344	3,688	15,019	15,731	111,113.5	145,895.5
Others	<i>Synthina roretzi</i>					-	-
	<i>Stichopus japonicus</i>					-	-
	subtotal	-	-	-	-	-	-
total(mt)		1,512	3,874	43,715	26,305	132,808.8	208,214.8

	sp.; <i>Thamnaconus</i> sp.)	-	-	-	-	0.8	2	1	-	-	16.0	19.3
	Other finfish	-	-	3	3	-	-	6	32	6	3.0	53.3
	subtotal	718	1,266	4,536	4,337	3,572.5	2,442	3,321	5,925	8,766	8,049.3	42,932.5
Crustaceans	<i>Fenneropenaeus chinensis</i>	353	339	1,479	737	915.5	853	1,209	1,150	1,084	1,179.0	9,297.9
	<i>Penaeus japonicus</i>	25	1	-	-	-	-	-	-	-	-	26.6
	subtotal	378	340	1,479	737	915.5	853	1,209	1,150	1,084	1,179.0	9,324.5
Shellfish	<i>Crassostrea gigas</i>	17,252	13,709	10,525	8,801	12,197.0	12,136	10,616	13,652	26,398	23,479.8	148,766.3
	<i>Rapana venosa</i>	-	-	-	-	-	2	-	-	-	-	-
	<i>Haliotis discus hannai</i>	54	25	6	0	-	3	5	15	259	306.5	672.3
	<i>Chlamys farreri nipponensis</i>	-	-	-	-	-	-	-	-	-	0.3	0.3
	<i>Cyclina sinensis</i>	16	7	-	33	3.0	46	25	219	189	79.0	617.0
	<i>Mactra chinensis</i>	-	-	-	-	-	-	2	-	-	-	-
	<i>Scapharca subcrenata</i>	2,923	742	385	1,086	362.5	166	933	94	553	2,695.3	9,937.3
	<i>Solen spp.</i>	1,792	1,711	1,645	27	-	1	-	-	1	-	5,175.8
	<i>Ruditapes philippinarum</i>	7,330	8,755	8,443	12,434	11,504.5	12,939	14,653	9,703	25,462	25,218.0	136,439.3
	<i>Meretrix lusoria</i>	39	17	-	-	-	-	-	1	1	-	58.0
	<i>Atrina pectinata</i>	-	-	-	48	276.0	500	309	144	196	499.3	1,971.3
	<i>Scapharca broughtonii</i>	93	65	15	1	-	-	-	-	-	-	174.0
	<i>Mactra veneriformis</i>	476	178	-	-	-	-	-	-	-	-	654.0
	<i>Mytilus coruscus</i>	7,302	9,840	8,853	1,438	1,886.8	1,200	1,866	1,676	901	813.0	35,776.8
Other shellfish	4	-	-	-	2.5	4	-	-	-	-	10.0	
	subtotal								25,504			340,255.8

		37,281	35,048	29,872	23,867	26,232.3	26,995	28,409		53,959	53,091.0		
Seaweeds	<i>Porphyra spp.</i>	67,758	55,068	47,582	70,565	71,011.3	46,095	58,050	70,112	67,718	80,191.0	634,149.0	
	<i>Laminaria japonica</i>	5,734	8,066	7,762	1,645	5,315.5	3,323	3,677	5,220	5,989	5,293.3	52,023.0	
	<i>Undaria pinnatifida</i>	93,658	73,614	105,899	53,739	45,987.5	45,408	37,105	50,882	42,537	54,686.5	603,514.5	
	<i>Gelidium amansii</i>	-	-	-	-	4.0	-	-	1	-	-	5.0	
	<i>Gigartina spp.</i>	-	-	-	-	0.5	-	-	-	-	-	0.5	
	<i>Codium fragile</i>	-	-	-	-	-	-	-	18	-	9.5	27.5	
	<i>Hijika fusiforme</i>	9,420	5,764	8,618	6,245	5,665.8	2,912	1,716	2,751	8,412	5,702.8	57,206.0	
	<i>Enteromorpha spp.</i>	817	628	882	1,054	1,201.5	1,051	1,200	2,113	116	12.5	9,075.3	
	Other seaweed	-	1	-	488	48.3	68	0	43	-	-	-	648.5
	subtotal	177,387	143,141	170,742	133,736	129,234.3	98,856	101,747	131,140	124,772	145,895.5	1,356,649.3	
Others	<i>Synthia roretzi</i>	-	-	-	-	-	-	-	-	-	-	-	
	<i>Stichopus japonicus</i>	-	-	-	5	2.0	1	-	-	-	-	8.0	
	subtotal	-	-	-	5	2.0	1	-	-	-	-	8.0	
total		215,764	179,794	206,629	162,682	159,956.6	129,147	134,685	163,718	188,581	208,214.8	1,749,170.1	

**Table X. Change in total production of major marine farmed species from XXXX Year to XXXX Year
(unit: M/T)**

Kind	species	year										TOTAL
		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	
Finfish	Flounder(<i>Paralichthys olivaceus</i>)	380	827	2,674	1,829	1,525.5	867	1,616	2,011	2,469	2,316.5	16,514.8
	Korean rock fish(<i>Sebastes schlegelii</i>)	112	381	1,765	2,337	1,600.3	1,036	1,302	2,351	4,246	3,812.8	18,941.3
	other finfish	226	58	98	171	446.8	540	403	1,563	2,052	1,920.0	7,476.5
	subtotal	718	1,266	4,536	4,337	3,572.5	2,442	3,321	5,925	8,766	8,049.3	42,932.5
Crustaceans	<i>Fenneropenaeus chinensis</i>	353	339	1,479	737	915.5	853	1,209	1,150	1,084	1,179.0	9,297.9
	<i>Penaeus japonicus</i>	25	1	-	-	-	-	-	-	-	-	26.6
	subtotal	378	340	1,479	737	915.5	853	1,209	1,150	1,084	1,179.0	9,324.5
Shellfish	<i>Crassostrea gigas</i>	17,252	13,709	10,525	8,801	12,197.0	12,136	10,616	13,652	26,398	23,479.8	148,766.3
	<i>Ruditapes philippinarum</i>	7,330	8,755	8,443	12,434	11,504.5	12,939	14,653	9,703	25,462	25,218.0	136,439.3
	other shellfish	12,699	12,584	10,904	2,632	2,530.8	1,918	3,139	2,149	2,099	4,393.3	55,046.6
	subtotal	37,281	35,048	29,872	23,867	26,232.3	26,995	28,409	25,504	53,959	53,091.0	340,255.8
Seaweeds	<i>Porphyra spp.</i>	67,758	55,068	47,582	70,565	71,011.3	46,095	58,050	70,112	67,718	80,191.0	634,149.0
	<i>Undaria pinnatifida</i>	93,658	73,614	105,899	53,739	45,987.5	45,408	37,105	50,882	42,537	54,686.5	603,514.5
	other seaweed	15,971	14,459	17,262	9,432	12,235.5	7,354	6,593	10,146	14,517	11,018.0	118,985.8
	subtotal	177,387	143,141	170,742	133,736	129,234.3	98,856	101,747	131,140	124,772	145,895.5	1,356,649.3
total		215,764	179,794	206,629	162,682	159,956.6	129,147	134,685	163,718	188,581	208,214.8	1,749,170.1

Table X. Overview of marine farmed production for last 10 years (unit: M/T)

Kind	Year										total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	
Finfish	718	1265.5	4536.3	4337	3572.5	2442.3	3320.5	5925	8766.3	8049.3	42932.7
Crustacean	378.1	340.1	1479	737.3	915.5	853	1208.5	1150	1084	1179	9324.5
Shellfish	37281.1	35047.6	29872	23866.8	26232.3	26994.5	28408.5	25503.6	53958.6	53091	340256
Seaweed	177387	143141	170742	133736	129234	98856	101747	131140	124772	145896	1356650
Others	0	0	0	5	2	1	0	0	0	0	8
Total	215764	179794	206629	162682	159957	129147	134685	163718	188581	208215	1749171

Table X. Production ratio of marine farmed organisms(kinds) for last 10 years

Kind	Year										total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	
Finfish(%)	0.3	0.7	2.2	2.7	2.2	1.9	2.5	3.6	4.6	3.9	2.5
Crustacean(%)	0.2	0.2	0.7	0.5	0.6	0.7	0.9	0.7	0.6	0.6	0.5
Shellfish(%)	17.3	19.5	14.5	14.7	16.4	20.9	21.1	15.6	28.6	25.5	19.5
Seaweed(%)	82.2	79.6	82.6	82.2	80.8	76.5	75.5	80.1	66.2	70.1	77.6
Total(%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total(mt)	215764	179794	206629	162682	159957	129147	134685	163718	188581	208215	1749171

Total farmed production in 2004 (unit:mt)

Kind	Province					TOTAL
	Incheon	Gyeonggi	Chungnam	Jeonbuk	Jeonnam	
Finfish	99	160	3,158	397	4,235.3	8,049.3
Shrimp	36	26	637	81	399.0	1,179.0
Shellfish	1,033	-	24,901	10,096	17,061.0	53,091.0
Seaweed	344	3,688	15,019	15,731	111,113.5	145,895.5
total(mt)	1,512	3,874	43,715	26,305	132,808.8	208,214.8

**Table X. Aquaculture Licenses and Area of Marine Farmed Species for XXXX Year
(No, number of licenses; ha, farmed area)**

		ha	ha	ha	ha	ha
	Finfish					
	Crustaceans					
	Shellfish					
	Seaweed					
	Polyculture					
	Collective farms					
	Total					

**Table X. Aquaculture licenses and area of marine farmed species for last 10 years
(No, number of licenses; ha, farmed area)**

Kind	species	year																			
		1995		1996		1997		1998		1999		2000		2001		2002		2003		2004	
		No	ha	No	ha	No	ha	No	ha	No	ha	No	ha	No	ha	No	ha	No	ha	No	ha
Fish	<i>Paralichthys olivaceus</i>																			0.0	0.0
	<i>Lateolabrax latus</i>																			0.0	0.0
	<i>Epinephelus septemfasciatus</i>																			0.0	0.0
	<i>Acanthopagrus schlegelii</i>																			0.0	0.0
	<i>Oplegnathus fasciatus</i>																			0.0	0.0
	<i>Pagrus major</i>																			0.0	0.0
	Other sea breams																			0.0	0.0
	<i>Miichthys miiuy</i>																			0.0	0.0
	<i>Sciaenops ocellatus</i>																			0.0	0.0
	<i>Seriola quinqueradiata</i>																			0.0	0.0
	Puffers																			0.0	0.0
	<i>Sebastes schlegelii</i>																			0.0	0.0
	Other rock fishes																			0.0	0.0
	<i>Mugil spp.</i>																			0.0	0.0
	<i>Pleurogrammus azonus</i>																			0.0	0.0
	<i>Konosirus punctatus</i>																			0.0	0.0
	<i>Stephanolepis sp.; Thamnaconus sp.</i>																			0.0	0.0
	Other finfishes																			0.0	0.0
	subtotal																			394.0	1196.8
Crustacean	<i>Fenneropenaeus chinensis</i>																			272.0	1642.4
	<i>Penaeus japonicus</i>																			0.0	0.0
	Other crustaceans																			0.0	0.0
		subtotal																			272.0
Shellfish	<i>Crassostrea gigas</i>																			286.0	2327.5
	<i>Rapana venosa</i>																			0.0	0.0
	<i>Haliotis discus hannai</i>																			377.0	948.1
	<i>Chlamys farreri nipponensis</i>																			31.0	203.0
	<i>Cyclina sinensis</i>																			105.0	1021.0
	<i>Mactra chinensis</i>																			3.0	46.0
	<i>Scapharca subcrenata</i>																			57.0	649.0
	<i>Solen spp.</i>																			0.0	0.0
	<i>Ruditapes philippinarum</i>																			349.0	3786.0
	<i>Meretrix lusoria</i>																			10.0	181.0
	<i>Atrina pectinata</i>																			0.0	0.0

	<i>Scapharca broughtonii</i>																			64.0	1041.0	
	<i>Macra veneriformis</i>																			8.0	60.0	
	<i>Mytilus coruscus</i>																			17.0	232.0	
	Other shellfish																			3.0	3.0	
	subtotal																			1310	10497.6	
Seaweed	<i>Porphyra spp.</i>																			611.0	16041.0	
	<i>Laminaria japonica</i>																			40.0	265.5	
	<i>Undaria pinnatifida</i>																			28.0	347.0	
	<i>Gelidium amansii</i>																			0.0	0.0	
	<i>Gigartina spp.</i>																			0.0	0.0	
	<i>Codium fragile</i>																			0.0	0.0	
	<i>Hijika fusiforme</i>																			20.0	212.5	
	<i>Enteromorpha spp.</i>																			0.0	0.0	
	<i>Sargassum fulvellum</i>																			6.0	47.0	
Other seaweed																			0.0	0.0		
subtotal																				705.0	16913.0	
Polyculture	sp.1+sp.2																			25.0	206.5	
	sp.3+sp.4																			0.0	0.0	
	sp.5+sp.6																			0.0	0.0	
	sp.7+sp.8																			0.0	0.0	
	subtotal																			25	206.5	
Collective farms	species 1																			733.0	25141.0	
	species 2																			0.0	0.0	
	species 3																			0.0	0.0	
	species 4																			0.0	0.0	
	subtotal																			733	25141	
Others	<i>Synthina roretzi</i>																			0.0	0.0	
	<i>Stichopus japonicus</i>																			9.0	75.0	
	<i>Styela clava</i>																			0.0	0.0	
	polychaetes																			0.0	0.0	
	Others																			17.8	42.2	
subtotal																				26.8	117.2	
total(mt)																					3465.8	55714.5

Kind	year																					
	1995		1996		1997		1998		1999		2000		2001		2002		2003		2004			
	No	ha	No	ha	No	ha	No	ha	No	ha	No	ha	No	ha	No	ha	No	ha	No	ha		
Fish																					394.0	1196.8

**Table X. Overview of Aquaculture Methods for XXXX Year
(No, number of licenses; ha, farmed area)**

Kind	Habitat(methods)	Province											
		Incheon		Gyeonggi-do		Chungnam-do		Jeongbuk-do		Jeonnam-do		total	
		No.	ha	No.	ha	No.	ha	No.	ha	No.	ha	No.	ha
Fish	Land-based tank culture	2	0.1	1	0.4	5	0.4	7	0.3	154	23.6	169	24.8
	Pond culture	26	214.7	2	26.3	23	184.5	21	77.0	56	387.2	128	889.7
	Cage culture	5	5.0	6	7.0	40	118.0	8	8.0	38	144.3	97	282.3
	Other methods											0	0.0
	subtotal	33	219.8	9	33.7	68	302.9	36	85.3	248	555.1	394	1196.8
Crustacean	Pond culture	32	99.3	32	139.6	91	752.6	65	398.4	52	252.5	272	1642.4
	subtotal	32	99.3	32	139.6	91	752.6	65	398.4	52	252.5	272	1642.4
Shellfish	Hanging culture	22	165.0	15	102.0	61	296.0	1	10.0	22	85.0	121	658.0
	Bottom culture	129	1309.0	30	470.0	341	2822.0	335	3165.0	169	1883.5	1004	9649.5
	Cage culture	8	19.0	0	0.0	1	5.0	1	1.0	47	137.0	57	162.0
	Land-based tank culture	6	0.2	0	0.0	2	0.3	0	0.0	120	27.6	128	28.1
	subtotal	165	1493.2	45	572.0	405	3123.3	337	3176.0	358	2133.1	1310	10497.6
Seaweed	Net culture(floating, pole methods)	17	427.0	25	799.0	54	3155.0	96	2552.0	419	9108.0	611	16041.0
	Long-lined culture	17	132.0	0	0.0	14	207.0	0	0.0	37	273.5	68	612.5
	Other methods	0	0.0	0	0.0	1	10.0	1	10.0	24	239.5	26	259.5
	subtotal	34	559.0	25	799.0	69	3372.0	97	2562.0	480	9621.0	705	16913.0
Polyculture	Seaweed+seaweed											0	0.0
	Seaweed+shellfish	2	22.0	6	61.0	1	17.0	0	0.0	16	106.5	25	206.5
	Shellfish+shellfish											0	0.0
	Others											0	0.0
	subtotal	2	22.0	6	61.0	1	17.0	0	0.0	16	106.5	25	206.5

Others	Sea cucumber	Pond culture	0	0.0	0	0.0	7	25.0	2	50.0	0	0.0	9	75.0
	Polychaetes	Pond culture											0	0.0
		Others	3	16.2	0	0.0	2	6.0	9	12.5	4	7.4	18	42.1
		subtotal	3	16.2	0	0.0	9	31.0	11	62.5	4	7.4	27	117.1
Collective farms		Bottom culture	118	1638.0	77	3621.0	194	4576.0	48	1361.0	296	13945.0	733	25141.0
		Seaweed											0	0.0
		Others											0	0.0
		subtotal	118	1638.0	77	3621.0	194	4576.0	48	1361.0	296	13945.0	733	25141.0
Total			387	4047.5	194	5226.3	837	12174.8	594	7645.2	1454	26620.6	3466	55714.4

Kind	Habitat(methods)	Province											
		Incheon		Gyeonggi-do		Chungnam-do		Jeongbuk-do		Jeonnam-do		total	
		No.	ha	No.	ha	No.	ha	No.	ha	No.	ha	No.	ha
Total	Tank culture(fish, shellfish)	8	0.3	1	0.4	7	0.7	7	0.3	274	51.2	297	52.9
	Pond culture(fish, shrimp)	58	314	34	165.9	121	962.1	88	525.4	108	639.7	409	2607.1
	Cage culture(fish, shellfish)	13	24	6	7	41	123	9	9	85	281.3	154	444.3
	Hanging culture(shellfish)	22	165	15	102	61	296	1	10	22	85	121	658
	Bottom culture(shellfish)	247	2947	107	4091	535	7398	383	4526	465	15828.5	1737	34790.5
	Net culture(seaweed)	17	427	25	799	54	3155	96	2552	419	9108	611	16041
	Long-lined culture(seaweed)	17	132	0	0	14	207	0	0	37	273.5	68	612.5
	Other methods(seaweed)	0	0	0	0	1	10	1	10	24	239.5	26	259.5
	Polyculture(seaweed+shellfish)	2	22	6	61	1	17	0	0	16	106.5	25	206.5
	Others	3	16.2	0	0	2	6	9	12.5	4	7.4	18	42.1
Grand total		387	4047.5	194	5226.3	837	12174.8	594	7645.2	1454	26620.6	3466	55714.4

Socio-Economic Data and Information.

Vessels by Fishery

		2000	2001	2002	2003	2004
Total	Number Power Vessel Non-power Vessel					
	GT Power Vessel Non-power Vessel					
Distant Waters Fisheries	Number GT					
Off-shore, Coastal Fisheries	Number GT					

Vessels by Province

Name 1	Number GT					
"	Number GT					
"	Number GT					
"	Number GT					
"	Number GT					

Number of Fishermen by Province

		2000	2001	2002	2003	2004
No. of Persons						
Province	Province 1					
	Province 2					
	"					
	"					
	"					

Fisheries Income

	2000	2001	2002	2003	2004
Fisheries Income (USD) by country					

Fisheries consumption per capita (kg)

	2000	2001	2002	2003	2004
Total					

Exports of fishery products

	2000	2001	2002	2003	2004
Total					

Imports of fishery products

	2000	2001	2002	2003	2004
Total					

Economic importance of fisheries (GDP Contribution)

	2000	2001	2002	2003	2004
GDP					
Fisheries					
GDP Contribution					

Annex IV
Agreed List of Species
To be used in the data collection and analysis

No.	English Name	Scientific Name	Chinese Name	Korean Name
1	Small yellow Croaker	<i>Larimichthys polyactis</i>	小黄鱼	참조기
2	Spanish Mackerel	<i>Scomberomorus niphonius</i>	蓝点马鲛	삼치
3	Anchovy	<i>Engraulis japonicus</i>	鯷鱼	멸치
4	Chub Mackerel	<i>Scomber japonicus</i>	鲈鱼	고등어
5	Large-head Hairtail	<i>Trichiurus lepturus</i>	带鱼	갈치
6	Pacific Herring	<i>Clupea pallasii</i>	鲱	청어
7	Sandlance	<i>Ammodytes personatus</i>	玉筋鱼	까나리
8	Acetes	<i>Acetes chinensis</i> and <i>A. japonicus</i>	毛虾	젓새우
9	Fleshy Prawn	<i>Fenneropenaeus chinensis</i>	中国对虾	대하
10	Squid	<i>Todarodes pacificus</i> , <i>Loligo</i> sp. and <i>Sepia</i> sp.	头足类	오징어

Annex V

Data and Information Table

Problem	Type of Data Required	Type, Unit and Frequency:	Temporal Requirements:	Available:	Available:	
				ROK?	CHINA?	
Decline in Many Commercially Important Fishery Species	Landings	Tonnes, by species (10 important species)	30 years	Y (18 years - 1986 to 2004)	Y (18 years - 1986 to 2004)	
	Fishing Effort	No. Boats, by fishery (not by fishery total only)	30 years	Y (18 years - 1986 to 2004)	Y (18 years - 1986 to 2004)	
		HP of boats, by fishery (not by fishery total only)	30 years	Y (18 years - 1986 to 2004)	Y (18 years - 1986 to 2004)	
	Composition of Catch	% Species of catch (10 species)	30 years	Y (18 years - 1986 to 2004)	Y (18 years - 1986 to 2004)	
	Biological data	Growth pattern by species, spawning season, etc.	10 indicator species	Y	Y	
		Reproduction, by Species	10 indicator species	Y	Y	
		Spawning Season, by Species	10 indicator species	Y	Y	
	Survey Result	Species Composition		20 years	5 coastal, annually. Once In 1970s.	2-3times in every decade since 1980s with large coverage.
		Biomass (Korea to check, have trawl survey relative biomass), (China has)		20 years	5 coastal, annually. Once In 1970s.	2-3times in every decade since 1980s with large coverage.
		Environmental Characteristics - delete this parameter		20 years	5 coastal, annually. Once In 1970s.	2-3times in every decade since 1980s with large coverage.
		Ichthyoplankton	20 years	5 coastal, annually. Once In 1970s.	2-3times in every decade since 1980s with large coverage.	

	New Survey Result	Species Composition, Biomass, and Ichthyoplankton	2 surveys/Jan; May.		
	Ecological Characteristics	Migration pattern by species, spawning and nursery areas by species (From YSEPP data set)	10 species	Y	Y
Lack of knowledge of Carrying Capacity	Basin-Scale survey, Existing methods/models	Estimated from survey data - e.g Stomach Contents (number species, weight, frequency)		N	Y
Unsustainable Mariculture	Change in extent of marine farms	ha per region (province, habitat) per annum	Min 25 yrs	10 years (1995 to 2004)	10 years (1995 to 2004)
	Change in marine farming production	Tonnes per species (or kinds of organisms) per annum		10 years (1995 to 2004)	10 years (1995 to 2004)
Environmentally Destructive aquaculture practices	Change in the condition of habitats in the vicinity of aquaculture facilities	(Abundance and distribution of important species) delete ...List of diseases and variation (conversion of natural habitat to farming areas) of farming, case studies.	At least 10 years	10 years (1995 to 2004)	10 years (1995 to 2004)

Socio-economic Data Required	Vessels by Fishery	No. of vessels, power and gross tons		from 2000 to 2004	from 2000 to 2004
	Number of Fisherman by Region (by province)	Province, No. persons		from 2000 to 2004	from 2000 to 2004
	Fisheries Income	by country, by fisherperson		from 2000 to 2004	from 2000 to 2004
	Fishery Consumption Per Capita	by country, per kg, per capita		from 2000 to 2004	from 2000 to 2004
	Fishery Export and Import	by country, value (USD), volume		from 2000 to 2004	from 2000 to 2004
	Economic Importance of Fisheries (e.g. Employment, GDP Contribution)	%GDP (investment group may provide Employment data)		from 2000 to 2004	from 2000 to 2004

Annex VI

Revised causal chain analysis

Problem	Impacts	Immediate Causes (Technical)	Underlying cause	Root cause	Governance	Priority rank	Trans-boundary?	If yes, priority rank
						(H, M, L)		(H, M, L)
Fisheries Issues								
Decline in CONDITIONS of Many Commercially Important Fishery Species	<i>Reduction in trophic level, Reduction in overall size of some commercially valuable species, Change in composition of species</i>	Over-exploitation of target species	Insufficient management and control of fisheries activities, Over-Capacity of fishing fleets, Illegal Fishing, Insufficient monitoring and enforcement, weak scientific-based knowledge on status of stocks	Increasing demand for marine resources due to rapid population and economic expansion	Insufficient legal instruments at national and regional levels, insufficient implementation of national regulatory instruments; lack of regional harmonization of regulations(?). Insufficient knowledge and infrastructure base	H	Y	H
Uncontrolled Aquaculture Practices	<i>Damage to coastal natural habitat (deleted 'infrastructure'), damage to environmental quality, Introduction of pathogens, increase in disease outbreak</i>	<i>(deleted 'Over-extensive and') Over-intensive aquaculture activities and Over-exploitation of natural habitats, Introduction of foreign species</i>	Increasing mariculture activities, Effect of mariculture activities on surrounding habitats	Increasing demand for marine resources (mariculture products) due to rapid population and economic expansion	Inadequate legal instruments at national and regional levels, inadequate implementation of national regulatory instruments; lack of regional harmonization of regulations. Inadequate knowledge and infrastructure base	H	Y	H

Inadequate Capacity to Assess Ecosystem	<i>Incapacity to adequately manage activities and management resources, and mitigate effects</i>	Insufficient information and environmental impact assessments	Insufficient knowledge and infrastructure base	Poor regional coordination, communication and collaboration, insufficient financing mechanisms and support	Insufficient understanding and associated policies	M	Y	M
--	--	---	--	--	--	---	---	---

Annex VII

A. Fisheries Component – Cooperative Study Cruise Final Budget

Budget Item	Unit cost (USD)	Units	Subtotal	Purchase country / Remarks	Budget Distribution	
					China	Korea
Activities						
Prepare for Joint Survey						
Prepare reagents and chemicals for analyses	10.00	300.00	3,000.00	China, assorted reagents and chemical for numerous processes, average price=\$10.	100%	
Bottles and fish boxes and baskets	15.00	300.00	4,500.00	China	100%	
Dissection tools and measuring boards	50.00	40.00	2,000.00	China, sampling knives, surgical equipment, and scientific measuring equipment	100%	
National Meeting: Coordination and logistics	140.00	20.00	2,800.00	5 persons per country	50%	50%
Transportation for scientists	650.00	5.00	3,250.00	5 Korean scientists come to China		100%
Regional Meeting: Attended by both countries. Prepare unified methods and standards	110.00	20.00	2,200.00	10 persons, 2 days meeting in China	45%	55%
Adjust in situ instruments and devices	1,000.00	1.00	1,000.00	Transportation, Calibration of all equipment, standards, reagents, etc.	100%	
Subtotal			<u>18,750.00</u>			
Hardship allowance	30.00	252	7,560.00	12 scientists, 21 days, \$30/day		
			<u>6,300.00</u>			

After survey

Air tickets Korea to China) Activity: Improve analytical procedures and methods	650.00	5.00	3,250.00	5 Korean scientists come to China		100%
Activity: Processing of biological specimens in Lab.	70.00	120.00	8,400.00	8 person, 15 days in China (4 per country)	50%	50%
Activity: Acoustic estimation and preparing data in Lab.	110.00	30.00	3,300.00	2 persons 15 days in China (one per country)	50%	50%
Laboratory Costs: Consumables and Utilities	50.00	15.00	750.00	15 days in China	100%	
Preparing cruise report meeting	200.00	21.00	4,200.00	7 person, 3 days in Korea	50.0%	50.0%
Air tickets (China to Korea)	650.00	2.00	1,300.00	2 Chinese scientists come to Korea	100%	
Meeting in each nation	140.00	20.00	2,800.00	5 persons, 2 days in each country, includes meeting room, accommodation, meals.	50%	50%
Stomach contents analysis	60.00	30.00	1,800.00	2 person, 15 days in each country	50%	50%
Identification of egg and larvae	60.00	30.00	1,800.00	2 person, 15 days in each country	50%	50%
Move all facilities and devices to Institutions in Korea and China	30.00	100.00	3,000.00	Korean & Chinese	10%	90%
Data analysis	60.00	30.00	1,800.00	2 person, 15 days in each country	50%	50%
Preparing the survey results report	110.00	36.00	3,960.00	3 person, 6 days in each country	50%	50%
Subtotal			36,360.00			

Equipment (Purchase and transport)

Electronic balances	2,000.00	3.00	6,000.00	(sensitivity 0.1g,0.01 g), and hanging balances	100%	
Ichthyoplankton nets (Bongo)	7,800.00	1.00	7,800.00	2 Bongo,	100%	
Horizontal nets	300.00	4.00	1,200.00	Horizontal trawling	100%	
Spare parts			1000	cables, for on-board equipment	100	
			<u>16,000.00</u>			
Total			<u>77,410.00</u>			

B. List of Samples to be Relocated to Korea from China at the End of the Cruise

ITEM	UNIT	VOLUME	QUANTITY	TYPE	REMARK
Ichthyoplankton(Egg & Larvae)			92		
Vertical sample	BOTTLE	1 L	46	Liquid	Formalin solution
Horizontal sample	BOTTLE	1 L	46	Liquid	Formalin solution
Stomach			10		
Target species					
- Cod (<i>Gadus macrocephalus</i>)	PVC CONTAINER	20 L	1	Liquid	Formalin solution
- Small yellow croaker (<i>Larimichthys polyactis</i>)	PVC CONTAINER	20 L	1	Liquid	Formalin solution

– Yellow goosefish (<i>Lophius litulon</i>)	PVC CONTAINER	20 L	1	Liquid	Formalin solution
– Skate ray (<i>Okamejei kenojei</i>)	PVC CONTAINER	20 L	1	Liquid	Formalin solution
– Grassfish (<i>Liparis tanakai</i>)	PVC CONTAINER	20 L	1	Liquid	Formalin solution
Dominant species	PVC CONTAINER	20 L	5	Liquid	Formalin solution
Otoliths (fish)			1000		
Target species					
– Cod (<i>Gadus macrocephalus</i>)	BOTTLE	5 ml	100	Liquid	Water
– Small yellow croaker (<i>Larimichthys polyactis</i>)	BOTTLE	5 ml	100	Liquid	Water
– Marbled sole (<i>Limanda yokohamae</i>)	BOTTLE	5 ml	100	Liquid	Water
– Pointhead flounder (<i>Cleisthenes pinetorum</i>)	BOTTLE	5 ml	100	Liquid	Water
– Croaker (<i>Collichthys niveatus</i>)	BOTTLE	5 ml	100	Liquid	Water
Dominant species	BOTTLE	5 ml	500	Liquid	Water

C. Workplan for Fisheries Component for the Winter Cooperative Study Cruise

Annex VIII
Workplan for Fisheries Component
2005 to 2006

