



Implementing the Strategic Action Programme for the Yellow Sea Large Marine Ecosystem:  
Restoring Ecosystem Goods and Services and Consolidation of a Long-term Regional  
Environmental Governance Framework (UNDP/GEF YSLME Phase II Project)

## **Proceedings of the 1st Meeting of the Regional Working Group on Mariculture (RWG-M) of the UNDP/GEF YSLME Phase II Project**

Shidao Hotel, Rongcheng, PR China  
26–27 October 2017



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# PROCEEDINGS OF THE MEETING

## I. Opening of the Meeting

1. The 1st Meeting of the Regional Working Group on Pollution (RWG-M) of the UNDP/GEF YSLME Phase II Project was held in Shidao Hotel, Rongcheng, on 26–27 November 2017 organized by the Secretariat. National Coordinator and Members of the RWG-M from RO Korea, Chair of National Working Group on Mariculture, representatives from YSFRI from PR China, Korea Marine Environment Management Corporation (KOEM) and staff of the Secretariat participated in the Meeting.
2. Mr. GUO, CTA of PMO opened the meeting and welcomed all participants to Rongcheng, PR China. He introduced briefly outcomes from the 1st Meetings of the MSTP and the interim YSLME Commission Council which launched the 2nd Phase of the Project and the expected outcomes of the meeting in line with the directions of the first meeting of the Interim Commission Council and approved workplans and TORs of the RWG-M. He also invited the participants to give a self-introduction of the name and organization they represent.
3. Participants were invited to introduce themselves and then each gave a brief description of their organizations and expertise related to the mandate of the RWG-M. The list of participants is attached to this report as Annex I.

## 2. Organization of the meeting

### 2.1. Election of Chair and designation of rapporteurs

4. Mr. Yinfeng GUO invited the representatives of PR China and RO Korea to nominate the Chair and Vice Chair for the meeting. The meeting agreed to have Professor Jianguang FANG to serve as an interim Chair and Mr. Ikkyo CHUNG as a co-Chair and designated the Secretariat as rapporteur respectively.

### 2.2. Adoption of agenda

5. The Chair introduced the agenda and the list of meeting documents, and invited comments from the participating countries. The Chair asked the Secretariat to introduce agenda described in the program – 1) review and refine the TOR of RWG-M and workplan for 2017-2019; 2) review and build consensus on the approaches and methodologies for project activities related with sustainable mariculture; 3) discuss and agree on the elements of an IMTA training module and additional information needs; 4) review and confirm IMTA demonstration sites and GEF interventions; and 5) identify areas of collaboration with partners and potential collaborative activities for support by the Project.
6. The meeting agreed to proceed as described in the program as attached to this report as Annex II.

### **3. Review and refine documents approved by the 1st Meeting of Interim YSLME Commission Council**

#### **3.1. Project workplan in 2017 and activities related to the mandate of RWG-M**

7. Upon the request of the Chair, Mr. GUO, CTA of the Secretariat introduced project workplan for 2017 and activities related to RWG-M. After presentation by the Secretariat, the Chair opened the floor for discussion and invited participants to provide comments if any.
8. Ms. LIM from RO Korea suggested to have further clarification on the activities to improve capacity in disease diagnosis since disease has not been identified in operations of IMTA in both PR China and RO Korea and consequently Activity 2 of Output 2.3.1 on study visit to improve capacity disease diagnosis be removed from the Output. In response to the comments, Mr. GUO suggested to reallocate the budget for this activity to other activities such as travel for international workshops, etc.
9. Mr. CHUNG, Co-Chair of the Meeting pointed to the fact that the current development of IMTA in RO Korea has not been active in the YS, but rather in the southern part of RO Korea.
10. Ms. CHAE from RO Korea suggested to consider other types of mariculture being implemented in the western part of RO Korea while not limiting the project interests in IMTA only.
11. Mr. GUO from the Secretariat agreed to the suggestion made by Ms. CHAE and suggested to consider “sustainable mariculture” which includes IMTA in workshops and demonstrations.
12. Regarding end of project targets for Outcome 2.3 related with sustainable mariculture, the meeting discussed and agreed to change “project target and deliverables” as follows:
  - 5% reduction of contaminants 5% reduction of contaminants including nutrients
  - Delete “certification scheme” in the deliverables
  - demonstration sites in the YS YS and beyond
13. Mr. OH, National Coordinator (NC) of RO Korea introduced the current and future situation of RO Korea regarding budget for 2017 as well as 2018, and reminded the meeting of the needs for consultation with Korean government especially with MOF in the implementation of activities.

#### **3.2. Terms of reference of RWGs and Chairs/Vice Chairs, TOR of RWG-M and RWG-M workplan (2017-2019)**

14. Upon the request of the Chair, the Secretariat introduced TOR of RWGs and Chairs/Vice Chairs with focus on TOR of RWG-M, TOR of RWG-M and RWG-M workplan (2017-2019). After presentation, the Chair opened the floor for discussion and invited participants to provide comments for possible revision on TOR which could be submitted for further consideration at the next MSTP.
15. Mr. Dohoon KIM from RO Korea asked clarification on 1) training module – who will develop and who will be the target users; 2) timeframe for activities on economic analysis - to be started in 2018 or 2019; and 3) allocation of budgets through subcontract.

16. In response to the inquiries raised by Professor KIM, Mr. GUO, CTA of the Secretariat clarified that economic analysis of IMTA scaling up will be started in 2018. On the allocation of budget in subcontract, Mr. GUO iterated that the China is the only eligible country to receive the grant in this Project and that in spite of this co-financing from both countries are needed to deliver the expected results as GEF grant only serves as a seed money. He also suggested the meeting to consider possible ways to use limited budgets in more effectively (e.g., international workshop by inviting international experts, etc.). As for preparation of a training modules, Mr. GUO emphasized that these modules are used in training programs and courses that contain basic texts, handouts, instruction for trainers, topics for targeted users. The modules of IMTA will be prepared in Chinese first to satisfy the needs of replication of IMTA in China and then in English at a later stage with involvement of RO Korean experts as well.

## **4. Session 1: Planning IMTA promotion in YSLME**

Session I featured the approaches and planning processes to promote IMTA in PR China and RO Korea.

### **4.1. Part I: IMTA development in YSLME (Country presentations)**

17. In Part I, both PR China and RO Korea introduced their policies and programs in support of IMTA promotion in the two countries.
18. Mr. FANG presented policies and programs in support of IMTA promotion in PR China with focus on elements of the National Marine Functioning Zoning (2011-2020), including:1) Promote the ecological health farming mode; 2) Encourage qualified fishery enterprises to expand offshore farming and intensive farming; 3) Strengthen the protection of aquatic species and seed cultivation; 4) Develop standardized, large-scale seed production base, improve aquatic product coverage; 5) Strengthen aquatic feed research and development input, and actively promote the use of artificial feed. He highlighted the suggestions of a number of academicians for the national government to adopt carrying capacity as the key management measures to ensure development of aquaculture in a sustainable way. He also emphasized the significance of concept of “carrying capacity” to make mariculture in both seawater and freshwater at sustainable levels.
19. In response to the presentation made by Professor FANG, Mr. Hyung Chul KIM from RO Korea asked if there are any suggestions and enforcement actions made for local government based on the concept of “carrying capacity for sustainable mariculture”. In response, Professor FANG pointed out that GAP could be more suitable than establishing standards in the local level given the diversified modalities of IMTA operation along the long coastlines of PR China. Also, Ms. Jihong ZHANG from PR China echoed the concerns of Professor FANG in developing standards because of the geographical diversification and varied nature of coastal lines in PR China.
20. Mr. Miseon PARK from RO Korea also introduced current research status of IMTA in PR Korea including an IMTA project (2011-2013) lead by NIFS, and advised the central and local governments to take consideration of reflecting results into rules and regulations. She also reiterated the importance of policies and industrial cooperation in order to develop technology and commercialize IMTA.
21. Both presentations are attached as Annexes in this proceeding.

#### **4.2. Part II: Project approaches to promote IMTA in YSLME (PMO presentation)**

22. Upon the request of the Chair, Mr. GUO from the Secretariat presented the TORs of Activity 4 of Output 2.3.1 (survey of coastal areas suitable for IMTA and economic analysis of benefits of replication of IMTA across PR China) and Activity 5 of Output 2.3.2 (developing national plan to promote IMTA).
23. After presentation, Mr. Dohoon KIM from RO Korea raised questions on economic analysis especially how to evaluate – 1) financial feasibility and 2) environmental values. He also mentioned that as far as results of financial feasibility and economic values are shared with coastal communities, little concern on the “willingness to participate” will be raised as there would be less difficulties to face, especially in small coastal communities. He also asked a question what contribution from RO Korea could be made under the current status, facilitating the development of Dongchu Island Fishery Corporation in Sungo Bay as an IMTA demonstration and training center which will be implemented by China.
24. Mr. FANG requested the meeting to consider the participation of Korean experts on the development of feasibility study report.
25. In response to the inquiries, Mr. GUO from the Secretariat stressed on the importance of having business case on IMTA, by mentioning the Dongchu Island Fishery Corporation in Sungo Bay can be developed as an IMTA demonstration and training center and outcomes from this activity will provide solid and clear evidence to the policy makers. He also mentioned that RO Korea can contribute to identifying best practices to be reflected into the current laws and regulations of both countries. Prior to reflecting into the laws and acts, feasibility study as a preliminary step should be carried out by considering many potential factors. With technical support from experts, there is a possibility for local governments to consider further steps to scale up IMTA, for example, through assisting in developing IMTA operations, mobilizing resource persons and organizing annual sustainable mariculture conference and etc.
26. Mr. CHUNG suggested the meeting to consider that since implementation of IMTA is site specific, local government should develop their own policies and regulations.
27. The meeting agreed to implement activities addressed in the TORs with recognition of significance of feasibility study and economic analysis as summarized by the Co-Chair.

## **5. Session 2: Establishing YSLME as a Knowledge Hub in IMTA**

#### **5.1. Part I: Existing knowledge of IMTA in YSLME (Country presentations)**

28. Upon the request of the Chair, Mr. FANG introduced status of IMTA in PR China and future plan in IMTA development. Slides of his presentation are attached as a part of the proceeding. In his presentation, a new eco-farming of kelp with oyster in Sungo Bay was introduced which has been implemented since 2016.
29. Mr. HC KIM from RO Korea also introduced the research outcomes from IMTA projects conducted in RO Korea, together with environmental assessment.

30. The meeting encouraged to share more valuable information between countries including experience and lessons learned.

## **5.2. Part II: Developing training manuals for IMTA (PR China presentations)**

31. Upon the request of the Co-Chair, Mr. FANG introduced the draft TOR on the development of training modules of IMTA, with outcomes of the assignment to be developed in Chinese with a total of 100-150 pages, including boxes, tables and graphs describing the process, essential skills to start and operate IMTA coastal areas. Detailed tasks were also introduced to discuss at this meeting.
32. Mr. CHUNG, the Co-Chair showed a concern over the lack of communication with RO Korea on the contracting process of training module development. He also reiterated the fact that training module should be developed in close collaboration between the two countries.
33. Mr. FANG summarized the discussion made, suggesting that the draft version written in Chinese will be prepared first. In developing the English version, cooperative work with experts from RO Korea is needed because of lack of data and information on IMTA development in RO Korea.
34. After in-depth discussion, the Meeting agreed to have participation of RO Korea in the current version with minor revisions.

## **5.3. Part III: Enhancing knowledge management of IMTA in YSLME**

35. The Co-Chair then facilitated an open discussion on ways and means to establish YSLME as a knowledge hub of IMTA through the project website. Mr. Lin FAN suggested PMO to review the website of an European Horizon 2020 project(<http://www.aquaspace-h2020.eu/>) for cross-site learning. The Meeting agreed to share knowledge of IMTA using the current project website.

# **6. Session 3: Standardizing IMTA as good management practice**

## **6.1. Part I: Sustainable mariculture standards and/or guidelines in YSLME (Country presentations)**

36. Upon the request of the Chair, a presentation on the mariculture standards and guidelines at national level in relation to enterprises, species or variety. Disease and technology was made by Mr. Jinghui FANG of PR China.
37. Mr. CHUNG, the Co-Chair pointed out the difference of training module and guideline and suggested to have a working group to develop a draft guideline.
38. The meeting discussed the feasibility of developing standards under the framework of Aquaculture Stewards Council (ASC), but was questioned by the limitation of species-specific standards and certification which cannot reflect the true value of IMTA as a mariculture ecosystem with different trophic levels.
39. The meeting agreed to look for appropriate experts from both countries and inform Secretariat the name of candidates before November 3, 2017.



40. As for issue of standards, the meeting was informed that there are no standards related to aquaculture and IMTA related in PR China, but with a few standards for freshwater aquaculture areas.
41. As for RO Korea, Mr. KIM presented his study on “Economic effectiveness of IMTA in Korea” composed of several categories, called “economic values, economic analysis and limitations and future researches”. In the presentation, he emphasized on necessity of review on 1) technical feasibility; 2) institutional revision; and 3) economic feasibility. With introduction of one pilot study of IMTA in Tongyoung as an example, he stressed on the necessity of implementing bio mitigation study to estimate pollution reduction effects by shellfish and seaweed which will ultimately contribute to the quantification of economic values. He also briefly explained current status in RO Korea of existing regulations dealing with disease control, facilities for aquaculture facing difficult time to keep and follow rules and regulations in reality. He also mentioned that the ROK government is under consideration of developing standards by reflecting in situ and detailed information can be shared in upcoming workshops if available.
42. Ms. Jihong ZHANG introduced to four types of standards on mariculture in PR China, i.e. national standards, ministerial standards, local standards and enterprise standards, and suggested to consider local and enterprise standards. The Chair agreed that the latter two standards are more appropriate for project support.
43. Finally, the meeting suggested to consider the development of GAP of IMTA as an option. After further clarification of the difference between GAP and standards, the meeting decided to develop GAP of IMTA as contribution of the project to the IW community.

## **6.2. Part II: Project approaches to incentivise IMTA (PMO presentations)**

44. The Secretariat introduced good aquaculture practice (GAP) for IMTA with possible tasks to be carried out.
45. Mr. KIM raised inquiries on the vague difference among training module, regional guidelines and GAP which seem to be overlapped. He also raised a question who will certify.
46. In the response of the inquiries raised from Mr. KIM, Mr. GUO of the Secretariat responded that standards can be developed in line with relevant international guidelines for aquaculture certification programs, such as the United Nations Food and Agriculture Organization (FAO) Technical Guidelines on Aquaculture Certification and the International Social and Environmental Accreditation. It is also worthwhile of considering combining GAP and Guidelines in the context.
47. Mr. KIM suggested not to expand activities further, but rather to consider possible development of best practice since GAP is also in the process of development in Tongyoung, Korea, which will be useful for later uses.
48. Mr. FANG suggested to combine the regional mariculture guidelines with the GAP of IMTA, with support from two experts each from PR China and RO Korea, and it was so decided at the meeting.

## **7. Session 4: IMTA demonstration (Country presentations)**

49. Upon the request of the Chair, Mr. Lin FAN of PR China presented three demonstration sites, i.e. Dongchu island, Zhangaidao island and Haiyang. In the presentation, IMTA activities being conducted at three demonstration sites were also specified with various species at different tropic levels cultured in the same water demonstration area. He

expected that economic benefits will be increased by reusing organic wastes through improvement of IMTA system as described in the TOR.

50. Mr. KIM from RO Korea asked if there are any plans to evaluate environmental impact in aquaculture farming areas. He reiterated that the environmental impacts should be evaluated on IMTA which is distinctive factor from poly-culture.
51. In response to the question raised by Professor KIM, Mr. FAN responded that appropriate measurement on nutrients and organic matters will be carried out to monitor environmental impacts.
52. Mr. LIM from RO Korea asked results coming from IMTA system applied with technology on indoor and outdoor which might have different results from conventional IMTA systems.
53. In response to the questions, Mr. FAN responded that the results will be total different which could come from the ways to deal with feces from fishes being cultured in-door system.
54. Without further comments, the Meeting adopted the draft TORs as presented.

## **8. Session 5: Collaboration with other partners**

55. The Meeting invited the Secretariat to give suggestions on collaboration with other regional organizations to facilitate achievement of YSLME SAP objectives.
56. In response to the request from the Chair, Mr. GUO suggested to work with FAO by applying with existing GAP into IMTA in the YS.
57. As for collaboration with partners, Mr. FANG mentioned that the collaboration on freshwater sector with EU will be terminated this year and expected to continue collaboration for the next 4 years, and possibly with UNIDO.
58. Mr. CHUNG, the Co-Chair suggested to consider financial support for international experts to participate in any events dealing with IMTA and sustainable mariculture, which may contribute to visibility and sharing of knowledge of YSLME.
59. Mr. GUO of the Secretariat stressed on the importance of GAP and guidelines and suggested to consider to have two experts (one from each country) and TOR to be developed by the Secretariat. The results of the consultancy in development of the GAP will be shared at the upcoming regional workshop (as listed in the Activity 1 under Output 2.3.1) to be held on 3rd quarter, back to back with the 2nd RWG meeting by inviting more experts from collaborating partners including EU, and FAO etc.

## **9. Agenda of next RWG meeting**

60. The Chair requested the Meeting to provide response on two issues – 1) potential agenda or topics to be discussed on the next Meeting and 2) potential venue and dates for next meeting.
61. In response to the issue on next meeting, the Meeting agreed tentatively to have next RWG-M meeting in August 2018 in Jeju island, RO Korea. The final dates and venue will be fixed later after consulting with the Secretariat.

## 10. Other business

62. Mr. GUO of the Secretariat suggested that additional information on GAP, guidelines, IMTA training module could contribute to achieve goals of the workshop.
63. Mr. FANG suggested the Secretariat to look for latest version of GAP developed by FAO.
64. Mr. FANG suggested to have discussion on development of training modules with experts from RO Korea in March or April 2018 in Sanya, Hainan of PR China. Suggestions and ideas to be shared at this workshop will be good asset to develop the training modules for IMTA in English.

## 11. Wrap-up and closure of the meeting

65. In the wrap-up, Mr. CHUNG, the Co-Chair expressed his sincere appreciation to all participants with active participation and thanked to the Secretariat for organizing this Meeting. The Meeting understood that close and enhanced cooperation from two participating countries is necessary to deal with critical works ahead.
66. Mr. OH, NC of Korea suggested the Secretariat to upload all presentations made at all RWG meetings on project website to allow wider information sharing of YSLME activities.
67. In response to the inquiry of Mr. OH, Mr. GUO replied that all presentation materials shared by presenters will be available together with meeting proceedings at the YSLME temporary url link.
68. The Chair and Co-Chair expressed their appreciation to all participants for their active participation and friendship in the discussion.
69. Following the closing remarks, the Chair declared the closure of the meeting at 11:00A.M. on 27th October 2017.

## Annex 1. List of Participants

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## Annex 2. Agenda of the Meeting

Day 1: 26 October (Thursday)	
08:30~09:00	Registration for participants
09:00~09:10	<b>Opening of the meeting</b> <ul style="list-style-type: none"><li>• Welcome addresses</li><li>• Introduction of the members and participants</li></ul>
09:10~09:30	<b>Organization of the meeting</b> <ul style="list-style-type: none"><li>• Election of Chairs and designation of rapporteurs</li><li>• Adoption of agenda</li></ul>
09:30~10:30	<b>Review and refine the following documents approved by the Interim YSLME Commission:</b> <ul style="list-style-type: none"><li>• Project Workplan in 2017 and activities related to the mandate of RWG-M</li></ul>
10:30~10:45	Coffee break
10:45~12:00	<ul style="list-style-type: none"><li>• Terms of Reference of RWGs and Chairs/Vice Chairs;</li><li>• TOR of RWG-M;</li><li>• RWG-Mworkplan (2017-2019)</li></ul>
12:00~13:30	Lunch and Break
12:00~13:30	<b>Session 1: Planning IMTA promotion in YSLME</b> <p>In this session, the meeting will discuss the approaches and planning process to promote IMTA in respective countries.</p> <p><b>Part 1: IMTA development in YSLME (country presentations)</b></p> <ul style="list-style-type: none"><li>• Policies and programs in support of IMTA promotion in PR China, by NWG member in PR China; and</li><li>• Policies and programs in support of IMTA in RO Korea, by NWG member in RO Korea</li></ul> <p><b>Part 2: Project Approaches to promote IMTA in YSLME (PMO presentation)</b></p> <ul style="list-style-type: none"><li>• Review of TOR for Activity 4 of Output 2.3.1: survey of coastal areas suitable for operation of IMTA, and economic analysis for benefits for replication of IMTA across YSLME and PR China;</li><li>• Review of TOR for Activity 5 of Output 2.3.2: develop national plan to promote IMTA</li></ul>
15:30~15:45	Coffee Break
15:45~18:00	<b>Session 2: Establishing YSLME as a Knowledge Hub in IMTA</b> <p><b>Part 1: Existing knowledge of IMTA in YSLME (country presentation)</b></p> <p>In the part, the two countries will present the current knowledge of IMTA in relation to policies, legislation, economic analysis of IMTA, scientific reports on environmental performance, training modules, training programs, certification, standards, national programs, etc.</p> <ul style="list-style-type: none"><li>• IMTA Knowledge and availability in PR China;</li><li>• IMTA knowledge and availability in RO Korea</li></ul>

### **Part 2: Developing training manuals for IMTA (PR China presentation)**

In this Part, the meeting will review the TOR of training module development and additional information to be added, as well as approaches to making the training modules more relevant and useful to learners.

- Review of Activity 1 of Output 2.3.2: Developing IMTA training modules
- Open discussion

### **Part 3: enhancing knowledge management of IMTA in YSLME**

The Chair will facilitate an open discussion on ways and means to establish YSLME as a knowledge hub of IMTA to be integrated into the project website.

## **Day 2: 27 October (Friday)**

### **09:00~10:30 Session 3: Standardizing IMTA as good management practice**

#### **Part 1: sustainable mariculture standards and/or guidelines in YSLME (country presentations)**

- mariculture standards and guidelines in PR China;
- mariculture standards and guidelines in RO Korea;

#### **Part 2: Project approaches to incentivize IMTA (PMO presentations)**

- Review of TOR to develop regional guidelines for sustainable mariculture; and
- Review of TOR to develop IMTA standards

**10:30~10:45** Coffee Break

### **10:45~12:00 Session 4: IMTA demonstration (Country presentations)**

In this session, RWG members will discuss selection criteria, baseline status, expected results, GEF intervention, methodologies, etc. in relation to demonstration and replication of IMTA in PR China and RO Korea.

- Demonstration of IMTA in PR China
- Demonstration of IMTA in RO Korea

#### **Session 5: Collaboration with other partners**

In this session, the RWG members will be invited to give suggestions on collaboration with other regional organizations to facilitate achievement of YSLME SAP objectives. Based on discussion, collaborative events or activities will be proposed for support by the Project.

#### **Agenda of next RWG meeting**

#### **Other business**

#### **Wrap-up and closure of the meeting**

**12:00~13:30** Lunch Break

**13:30~18:00** Field visit to Dongchu Island, of Rongcheng, an IMTA demonstration site in PR China.

## **Day 3: 28 October (Saturday) departure from Rongcheng**

## Annex 3. Revised terms of reference

### Output 2.3.1: Widespread practice of sustainable mariculture, where appropriate, increasing productivity per unit area and income

#### Develop GAP for IMTA

##### Background

In the TDA of YSLME, unsustainable mariculture is identified as one of the key transboundary environmental concerns represented by the falling productivity per unit area as the area under cultivation grows. This fall in productivity may be due to the fact that only unsuitable cultivation areas now remain, or that increased proximity of farms has resulted in increased disease transmission between farms, raised concentrations of organic wastes and increased competition for food resources among cultivated organisms. These factors increase stress and lower the growth and survival rates of the cultured organisms, thus reducing productivity. Unsustainable mariculture also contributes to the pollution and eutrophication identified as transboundary concerns in the TDA.

Studies have shown that the social, economic and environmental benefits of IMTA are significant. Using the 17 major measurement and valuation parameters by Costanza et al (1997), the conclusion was that the core services of marine aquaculture ecosystem in Sangou Bay are high in that total value per year per hectare of IMTA of kelp and abalone is 3-4 times higher than combined value of monoculture kelp and monoculture scallop. The total value per year per hectare of kelp + abalone + sea cucumber reached nearly RMB 1 million yuan, 5 times higher than the combined value of monoculture kelp and monoculture scallop. Study by other researchers also prove that IMTA can often be more profitable (in context of net present value (NPV)) than monoculture systems.

##### Objectives

The objective underlying this consultancy is standardize IMTA for easy replication to other sites in YSLME and outside YSLME.

##### Expected Outputs

The subcontractor is expected to deliver the following results:

- GAP of IMTA

##### Tasks

Under supervision of the Chief Technical Advisor and technical guidance of the RWG-F, in close collaboration with the local project team, the subcontractor will conduct the following activities:

- Identify a response person or coordinator for development and facilitation of consultation and approval of the GAP.
- Prepare a plan for GAP development, review and approval by the MSTP and Interim Commission Council;
- Identify and establish a GAP development group.
- Design the review and approval process for the GAP of IMTA under the framework of Interim Commission Council. The structure should consider a body to ensure guidance and oversight for the process with broad-based membership from aquaculture industry, nongovernmental conservation or aquaculture associations and societies, academic and regulatory bodies, etc.
- Define the most important elements of IMTA, including but not limited to acceptable species, materials, methods and processes;

- Identify appropriate quantitative performance metrics and targets that directly address food safety, environmental and social concerns, and product traceability. SMART criteria of the BAP standards should be applied in the field.
- Develop auditing procedures by which to evaluate adherence to those practices.
- Conduct stakeholder analysis and prepare a stakeholder participation plan to ensure that the overall process is transparent.
- Prepare and revise a preliminary draft for comments by MSTP and Interim Commission Council.

### **Reporting**

The subcontractor will produce reports within the following timelines:

- By December 20, GAP working group is established;
- By March 31, key elements of GAP of IMTA prepared;
- By December 2018, draft GAP prepared and submitted;
- By June 2019, final GAP of IMTA submitted.

## **Survey of coastal areas suitable for operation and economic analysis of benefits and costs for replication of IMTA across YSLME**

### **Background and justification**

Studies in China and RO Korea have shown that the social, economic and environmental benefits of IMTA are significant, and UNDP has identified IMTA as key technologies for countries to achieve blue economy and to reduce pressure on capture fishery while meeting demand for seafood. Based on the experiences of IMTA in Sungo Bay, the project seek to develop an promotion plan in Shandong province, preceeded by survey of coastal areas suitable for operation of IMTA, and economic analysis of benefits and costs of replicating IMTA in the Province.

### **Objectives**

The objective underlying this consultancy is to understand coastal areas suitable for operation of IMTA and project the potential ecosystem services of IMTA replication in these areas.

### **Expected Outputs**

The subcontractor is expected to deliver the following results:

- Feasibility report for replication of IMTA in Shandong Province;
- Assessment report of ecosystem services from potential IMTA sites

### **Tasks**

Under supervision of the Chief Technical Advisor and technical guidance of the RWG-M, in close collaboration with the local project team, the subcontractor will conduct the following tasks:

- Develop feasibility assessment criteria for development of IMTA in coastal areas of YSLME;
- Develop survey plan and conduct IMTA feasibility survey in coastal areas of YSLME and identify locations, areas, current mariculture practice and availability of markets;
- Conduct "willingness to participate" survey of coastal communities or companies in suitable coastal areas for IMTA operations;
- Assess capacity needs of suitable coastal areas for IMTA and availability of technical support;
- Assess existing enabling policy environment for development of IMTA, and identification of projects and programs that facilitate IMTA replication;
- Identify institutional, policy, technical, financial and managerial gaps in replication of IMTA in identified coastal areas suitable for IMTA operations;



- evaluate the incremental ecosystem services of full operation of IMTA in suitable areas in YSLME, and assess the incremental costs of IMTA operations.
- prepare feasibility study report in English and Chinese.

### **Reporting**

The subcontractor will produce reports within the following timelines:

- By December 30, submit the inception report of the consultancy;
- By June 30, submit feasibility report for replication of IMTA in Shandong Province;
- By December 31, submit the assessment report of mariculture areas proposed to apply IMTA

## **Develop a plan to promote IMTA in Shandong Province**

### **Background and justification**

The targets of YSLME Phase II Project among others include reduce nutrient reduction and increased income to fishermen in mariculture. To achieve this target, the Project will support the development of GAP of IMTA, preparation of training modules of IMTA and survey of suitable areas for application of IMTA in Shandong Province. This approach and TORs of related activities were reviewed and endorsed by the Regional Working Group on Sustainable Mariculture in October, 2017.

### **Objectives**

The objective underlying this consultancy is to develop an process- and action-oriented plan to promote IMTA in Shandong Province.

### **Expected Outputs**

The subcontractor is expected to deliver the following results:

- Gap analysis report for replication of IMTA in Shandong Province;
- Promotion plan of IMTA in Shandong Province.

### **Tasks**

Under supervision of the Chief Technical Advisor and technical guidance of the RWG-M, in close collaboration with the local project team, the subcontractor will conduct the following tasks:

- based on the inputs from assessment of suitable IMTA sites in YSLME, identify the suitable sites for promoting IMTA;
- identify the policy, institutional, technical, legal (access to sea use), financial and market barriers and bottlenecks that impede the promotion of IMTA in Shandong Province and YSLME and in PR China;
- formulate reforms and improvements to strengthen the policy and regulatory framework, institutional capacity, technical skills, consumer awareness to promote IMTA at provincial level;
- conduct rapid needs assessment and identification of types of training courses needed for replication of IMTA;
- prepare first draft and review by NWG-M;
- consult with stakeholders in particular regulatory bodies and aquaculture associations and societies at national and provincial level and revise the promotion plan;
- finalize the draft for review and adoption by Shandong Ocean and Fishery Department;
- integrate lessons and recommendations into TDA and revised YSLME;

### **Reporting**

The subcontractor will produce reports within the following timelines:

- By December 30, submit the inception report of the consultancy;
- By September, 2018, submit gap analysis report for replication of IMTA in Shandong Province based on the results of survey of coastal areas suitable for operation;
- By December 31, submit promotion plan of IMTA in Shandong Province.

## **Output 2.3.2 Adoption of integrated multi-tropic aquaculture (IMTA) where appropriate**

### **Support to demonstrate IMTA in three sites**

#### **Objectives**

The objective underlying this consultancy is to replicate IMTA to Haiyang and Zhangzidao of Shandong and Liaoning Provinces

#### **Expected Outputs**

The subcontractor is expected to deliver the following results:

- Baseline report that identifies interventions to replicate IMTA in three demonstration sites;
- Technical report supported by monitoring data generated from project-procured instruments detailing the results of demonstration and lessons learnt.

#### **Tasks**

Under supervision of the Chief Technical Advisor and technical guidance of the RWG-M, in close collaboration with the local project team, the subcontractor will conduct the following tasks:

- Conduct baseline assessment of demonstration sites using relevant indicators of project monitoring and evaluation plan;
- Identify gaps, needs and feasibility of application of IMTA in demonstration sites, and conduct cost-benefit analysis of each demonstration site;
- Determine objectives, tasks, interventions, equipment needed, budget, roles of UNOPS, demonstration site and service provider (YSFRI), timeframe, indicators of success, frequency of monitoring and appraisal of each demonstration site;
- upon signing of agreement/subcontract with UNOPS, service provider (YSFRI) and demonstration site, mobilize expertise to supply solutions to demonstration sites in accordance with the schedule and tasks specified in the agreement/subcontract.
- Submit quarterly progress report to PMO and report any variance and issues that will affect the implementation of the demonstration projects;
- Submit technical or thematic report to PMO in accordance with the agreed deliverable and request for advance of fund;
- Facilitate and coordinate visits and monitoring missions of UNOPS, SOA, RWG-M members, auditors, evaluators and trainees and report the progress of demonstration during the visits and missions;
- Assist in preparation of information and materials for communication purposes of the project;
- Collect and analyse monitoring data and report to PMO in accordance with the scheduled deliverables;
- Coordinate the certification of compliance of the demonstration site with GAP of IMTA by a third party, if necessary;
- conduct pilot CBA and valuation studies of IMTA demonstration in three sites;
- Prepare a case study to showcase the costs and benefits of IMTA to promote wide application of the technologies.

#### **Reporting**

The subcontractor will produce reports within the following timelines:

- By December 30, 2017, submit the inception report of the consultancy;
- By March 31, 2018, submit baseline report of three demonstration sites;
- From June 30, 2018 to December 31, 2019, submit biannual technical reports supported by monitoring data generated from project-procured instruments detailing the results of demonstration and lessons learnt.



