First Meeting of Regional Working Group on Pollution Reduction (RWG-P)
Dalian, PR China, 10-12 October 2017

Terms of Reference of activities in Component 3 and Component 4 in relation to mandate of RWG-P in UNDP/GEF YSLME Phase II Project

Background

1. These terms of reference are prepared by Members of NWGs of PR China and RO Korea and the Secretariat.

2. Upon receipt of these terms of reference, the Secretariat has reformatted these documents to keep consistency in structure in all TORs. Contents of some TORs were also edited with occasional inputs to some TORs in line with original design in the project document. Methodologies, activities to achieve deliverables and start and end dates of activities remain the same to respect the intellectual outputs of the authors.

Contents

Activity 1 of Output 3.1.1 (REV)

Establish regional pollution monitoring guideline, environmental quality standards and network based on any existing ones: harmonize regional methodology and update regional monitoring guideline including for emerging contaminants

TERMS OF REFERENCE

Marine Environment Specialist to develop a proposal for regional pollution monitoring guideline, environmental quality standards and monitoring networks

Consultancy classification: Individual Consultant
Budget line: 71200, Activity 1 of Output 3.1.1, Component 3. Budget: USD 16,000;
Estimated start of work: Mid-October 2017–June 30, 2018

Objectives

The objective underlying the proposed consultancy is to develop a proposal of regional pollution monitoring guideline and provide maps of anthropogenic pollutants, eg. POPs or metals in the YS. To do this, it is necessary to harmonize monitoring methodology and update monitoring guidelines.

Expected Outputs

The consultant is expected to deliver the following results:

1. A proposal based on existing marine pollution monitoring programs of both countries, and monitoring methodology and guidelines of both countries, and including QA/QC programs
2. A report to summarize spatial distributions and potential risks of several contaminants such as POPs and metals in environmental media along the YS and to summarize marine pollution monitoring programs of both countries

Activities

The consultant, under supervision of the Chief Technical Advisor and technical guidance of RWG-P in close collaboration with the local project team, will conduct the following activities under the two outputs:

- Review the existing YSLME Networks of China and Korea for anthropogenic pollutants, and propose a network for collaboration and coordination
- Review the existing national marine pollution monitoring programs by Chinese and Korean governments, the existing monitoring guidelines and methodology, and the environmental quality standards
- Review existing data and information on anthropogenic pollutants including legacy/new POPs, metals, and/or emerging contaminants in the YS, propose target compounds for monitoring guidelines and methodology and propose hotspot areas
- Review QA/QC programs for reliable and compatible data set, propose intercalibration exercise of participating laboratories.
- Organize and conduct working parties and training within area of competency

- Taking into account of social and economic context, administration needs and technical levels as well as the above assessment outcomes, propose a draft framework plan for establishing the monitoring network in the Yellow Sea at regional level for improved the effectiveness.

Inputs
UNDP/GEF YSLME Phase II Project management Office (PMO) will provide the background information and documents.

Timing
The consultancy will begin in November 2017 and complete in June 30, 2018.

Reporting
The consultant will produce the following reports within the specified timeframe:
1. By March 31, 2018, submit the draft proposals;
2. By June 30, 2018, submit the final proposals.

The consultant can submit reports electronically to Mr. Yinfeng Guo, CTA/Manager at email: yinfengg@unops.org. to the PMO. All reports should be submitted in English.

Competencies
- A good understanding of marine environmental monitoring of nutrients and emerging contaminants;
- Advanced university education at MSc or Ph.D. level with expertise in the area of environmental science, marine sciences or marine chemistry;
- At least 10 years of professional experience in coastal and marine environments;
- Strong skills in analysis and evaluation, and experience in implementing environmental projects;
- Ability to produce high quality reports and publications in English.

Activity 2 of Output 3.1.1 (REV)

Support to apply modeling & calculate nutrient loading in hot spots/ critical habitats: 2 pilot sites in China and 2 sites in RO Korea

TERMS OF REFERENCE

Support to apply modeling and estimation of land based nutrients loading in hot spots (including Haizhou Bay, Jiangsu, PR China)

Consultancy classification: subcontract (NMEMC)
Budget line: 72100, Activity 2 of Output 3.1.1, Component 3. Budget: USD 44,000;
Estimated start of work: Mid-October 2017 – June 30, 2018

Background and Justification
Based on the transboundary diagnostic analysis of the Yellow Sea, one of the major environmental problems is the enrichment of nutrients in the Yellow Sea which is the major cause of harmful algal

blooms in the region. Water pollution in coastal areas has caused social and political attention because of its significant impacts on not only the environment, but also the economy and society as well. More importantly, water pollution issue has been intertwined with eutrophication caused by the nutrients pollution from land based pollutant sources, atmospheric deposition and aquaculture, etc. Usually, land based nutrients discharge is recognized as one of the main pollutant sources to the marine environment, especially from the river inputs. Therefore, estimation of the nutrients loading from the river inputs is thought to be the major tools to identifying the pollutant sources and understanding nutrient pollution levels in the hot spots and critical habitats in the YSLME region.

In order to help local governments seek for the solution of the reduction the nutrient pollutant to the sea, and with spin-off effect of ecological services for public benefits, the project will conduct an evaluation the total nutrients load from land based sources and good practices for the nutrients reduction that can be applied across YSLME in particular.

Objectives
The objective underlying the proposed consultancy is to apply a **watershed model and estimation of land based nutrients loading in hot spots,** respectively in China and RO Korea

Immediate Objectives
The objectives underlying the proposed consultancy are:

1. To support a watershed model for the nutrients loading estimation in the hot spots, respectively in PR China and in RO Korea;
2. To estimate nitrogen and phosphorus discharges from the river basins and identify the nutrients sources, respectively in PR China and in RO Korea.

Expected Outputs
The consultant is expected to deliver the following results:

1. Technical description of the watershed model used for estimation of nutrients loading in the hot spots;
2. Calculate the nutrients load and identify the nutrients sources, and to propose advice on appropriate nutrient control and reduction schemes for the local government agencies.

Activities
Under supervision of the Chief Technical Advisor and technical guidance of the RWG-P, in close collaboration with the local project team, the consultant will conduct the following activities.

Output 1: Technical description of the watershed model used for this task

- Make a list of watershed models that can be potentially applied to the river basins for this task;
- Conduct a technical review of the watershed models and select the most suitable model considering the structure, data requirements and other technical aspects of the models;
- Provide a technical description in detail of the selected watershed model.

Output 2: A report for estimation of the nutrients loads and identification of the pollutant sources

- Review the nutrient pollution and eutrophication status in the demonstration area;
- Apply the selected watershed model to estimation the nitrogen and phosphorus discharge, including the demonstrate results of model calibration and validation.
- Estimation the nutrient loads from land-based sources in the demonstration area, analysis the temporal and spatial distribution sand the mass balance results of nitrogen and phosphorus for each of the river basins;
- Identify the main nutrient sources in the study area and evaluate the appropriate demonstration effectiveness for the other regions in the YSLME;
- Based on the annual loads of nutrients and contribution of different pollution sources, propose advice on appropriate nutrient control and reduction schemes for the local government agencies;

Inputs
UNDP/GEF YSLME Phase II Project management Office (PMO) will provide the background information and documents of completed and proposed projects,and provide logistics support to field trip to project sites.

Timing
The consultancy will begin in October 20, 2017 and will finish in March 31, 2018.
Reporting
The subcontractor will submit reports in accordance with the following timeframe:

1. by November 1, 2017, submit the method of calculation; and
2. by March 31, 2018, submit the final report.

All reports should be submitted in English. Reports should be submitted to Mr. Yinfeng Guo, CTA/Manager at email: yinfengg@unops.org

Activity 1 of Output 3.1.2 (REV)

Diagnostic analysis of ID sources & sinks of pollutants, review available data & info, report environmental status and trends of YS, and identify gaps and explore mechanisms for data and information sharing between the two countries

TERMS OF REFERENCE
Diagnostic analysis of sources & sinks of pollutants, and environmental Status and trends of YS

Consultancy classification: Individual consultant
Budget line: 71200, Activity 1 of Output 3.1.2, Component 3. Budget: USD 8,000;
Estimated start of work: Mid-October 2017 – mid March, 2019

Objectives

- To assess environmental status and trends of Yellow Sea;

- To Diagnostic analysis of ID sources & sinks of pollutants;
- To conduct gap analysis and develop data and information sharing mechanisms

Expected Outputs
The consultant is expected to deliver the following results:

1. Report on Marine environmental status and trends of the Yellow Sea, including sources & sinks of pollutants and environmental status and **temporal & spatial** trends;
2. Data sharing mechanism framework, including the principle and methods of sharing and exchanging Data and Information products

Activities and main outputs
Under supervision of the Chief Technical Advisor and technical inputs fro RWG-P in close collaboration with the local project team, the consultant will undertake the following activities:

Output 1: Report on Marine environmental status and trends of the yellow sea

- Diagnostic analysis of sources & sinks of pollutants.
- Collecting Information and data about distribution of pollution sources.
- Analysis of pollution sources' types, spatial distribution and main pollutants flux. The types of pollution include industrial, domestic sewage and waste disposal; the channels of pollution include sewage, river and etc.
- Review of available data & info, Analysis of the status and **temporal & spatial** trends of YS seawater quality.
- Regular monitoring data collection, as well as relevant investigation and literature data.
- Evaluation of seawater quality status and trends of the YS area, by means of interpolation analysis and regression analysis. The method of interpolation is inverse distance weighting.

Output 2: Data sharing mechanism framework

- Analysis of the policy of monitoring data sharing in China's Marine environment and the existing problems with international data sharing, and propose a framework for the construction of relevant sharing mechanism.
- Recommendations for data sharing services
- Determine the data sharing management system.
- Establish data sharing management mechanism to supervise and manage data sharing reviews and services, and ensure the safe and reasonable use of data.

Inputs
UNDP/GEF YSLME Phase II Project Management Office (PMO) will provide the background information and documents, and will be responsible for providing logistics support to facilitate travel to project sites and meeting with relevant stakeholders, including access to information and data about the project sites.

Timing
The consultancy will begin in mid-September 2017 and complete in mid-March 2018.

Reporting
The consultant needs submit the following reports within the specified timeframe:

1. By December 31,2017, submit a draft framework plan for marine environmental status and trends of the Yellow sea; and start to collect routine monitoring data and related investigation and literature data;
2. By June 30, 2018, submit the final report on marine environmental status and trends of the Yellow sea; and submit a draft proposal for data sharing mechanism framework; and
3. By March 30, 2019, submit data sharing mechanism framework.

The consultant can submit reports electronically to the PMO. All reports should be submitted in English.

Competencies

- A good understanding of marine environmental status and trends of the Yellow sea.
- Advanced university education at MSc or Ph.D. level with expertise in the area of biology, marine sciences or natural resource management.
- At least 14 years of professional experience in marine environmental monitoring and assessment
- Strong skills in analysis and evaluation, and rich experiences in implementing environmental projects
- Ability to develop high quality reports and publications in English

Activity 2 of Output 3.1.2 (REV)

Support for monitoring and data acquisition for sharing on pollutants from atmosphere-based sources

TERMS OF REFERENCE

Subcontract for monitoring and acquisition of data about atmospheric nutrients and heavy metals **in the Yellow Sea**

Consultancy classification: subcontract (NMEMC)
Budget line: 72100, Activity 2 of Output 3.1.2, Component 3. Budget: USD 50,000;
Estimated start of work: Mid-October 2017 – mid March, 2019

Objectives

The objective underlying the proposed consultancy is to collect data about nutrients and heavy metals from atmospheric dry and wet deposition in 1~2 sites, construct the assessment method and assess the total amounts of nitrogen and phosphate in various forms from atm-based sources in the Yellow Sea.

Expected Outputs

The subcontractor is expected to deliver the following results:

1. Provide atmospheric deposition monitoring or acquisition data for one year at least.
2. Establish the assessment method for assessing deposition flux of nitrogen and phosphate in various forms from atm.-based sources.

Activities
Under supervision of the Chief Technical Advisor and technical guidance of RWG-P of YSLME Phase II Project, in close collaboration with the local project team, the subcontractor will:

- Investigate the level of atmospheric nutrients such as nitrogen, phosphorus andsome heavy metals in atmospheric aerosols and precipitation in different seasons in the Yellow Sea, which were based on 1~2 coast base stations.
- Obtain particle size distribution of atmospheric particle pollutants and meteorological data in order to determine the dry sedimentation rate of particulate pollutants in typical area of the Yellow Sea.
- Establish the assessment method based on the Williams model and assess the total amounts of pollutants in various forms from atm-based sources in the Yellow Sea.
- Obtain air quality data for 1~2 typical coastal cities along the Yellow Sea as auxiliary data for Trans-boundary Diagnostic Analysis.
- Propose effective cooperation between the two countries to reduce pollutants deposition from atm-based sources in the Yellow Sea.

Inputs
UNDP/GEF YSLME Phase II Project Management Office (PMO) will provide the background information and documents

Timing
The subcontractor will begin in October 2017 and complete in December 2019.
Reporting
Prepare and submit a detailed assessment report for nutrients from atm-based sources in the Yellow Sea. Key elements of the report include:

- Review of nitrogen ,phosphorus and some heavy metals marine atmospheric deposition;
- Characteristics of Air Pollution in Typical Coastal Cities along the Yellow Sea in China
- Level and seasonal distribution of nutrients from atm-based sources in the Yellow Sea, which will be based on monitoring and acquisition data;
- Assessment of deposition flux of pollutants from atm-based sources.
- Proposed management actions to reduce the atm-based pollution.

The subcontractor will submit reports electronically to the PMO. The report should be submitted in English.

Activity 3 of output 3.1.2 (REV)

Support for monitoring and data acquisition for sharing on fertilizer use

TERMS OF REFERENCE

monitoring and acquisition data for sharing on fertilizer use to reduce land-based source pollutant discharges

Consultancy classification: subcontract (NMEMC)
Budget line: 72100, Activity 3 of Output 3.1.2, Component 3. Budget: USD 50,000;
Estimated start of work: Mid-October 2017 – mid March, 2019

Background
Component 3 of UNDP/GEF YSLME Phase II Project addresses improving ecosystem carrying capacity with respect to regulating and cultural services. In Outcome 3.1 of Component 3 entitled "Ecosystem health improved through a reduction in pollutant discharges (e.g. nutrients) from land-based sources",the project will support a series of activities that focus on the development and improvement of the strategies and methods to efficiently reduce the pollutant discharge from land-based sources of YS, especially the nutrient. Output 3.1.2 of Outcome 3.1 specifically leads to construct an effective mechanism to monitor and acquire data and information for sharing regarding the sources and sinks of contaminants. As known, fertilizer wash off from agricultural activities has been considered as an important reason of the excessive nutrient supply to coastal marine waters. As one of proposed activities, enhanced marine environmental data and information sharing on fertilizer use is necessary and meaningful for better understanding of the current status of nutrient discharge in the YS, and the effects of the relevant pollutant control measures. At the national and regional level, data and information are required for the preparation and adjustment of national regulations and economic strategy.

Objectives
The development objective underlying the proposed consultancy is to enhance environmental quality and reduce pollutant discharge from land-based sources of the Yellow Sea by taking effective actions to monitor and improve the use of fertilizers.

The immediate objective underlying the proposed consultancy is to monitor and acquire data and information of fertilizer use in the coastal provinces and cities along the Yellow Sea, and construct an assessment method to estimate the total amounts of nitrogen and phosphate caused by fertilizer use.

Expected Outputs
The subcontractor is expected to deliver the following results:

1. A data report of monitoring and evaluation of the amount of fertilizer use in agricultural activities in coastal provinces along the Yellow Sea, including the 3 provinces of PR China and the 5 provinces of RO Korea, for one year at least.
2. An assessment method for estimating the total amounts of nitrogen and phosphorus caused by fertilizer use.

Activities
The consultant under supervision of the Chief Technical Advisor and technical guidance of the RWG-P, in close collaboration with the local project team, the consultant will conduct the following activities:

- Conduct a review of the current status of fertilizer use in the YS, including relevant information about fertilizer use in both countries, the characteristic parameters of the agricultural-used fertilizer, the policies and regulations for the control of nonpoint source pollution, and other information and data available currently.

- Collect and evaluate data and information of the amounts of fertilizer use in the YS coastal provinces, including the 3 provinces of PR China and in the 5 provinces of PO Korea.
- Establish an assessment method to estimate the total amounts of nitrogen and phosphorus attributed by fertilizer use in the coastal provinces along the Yellow Sea.
- Analyze the characteristic of fertilizer use in YS, and assess the status and trends of the stresses caused by fertilizer use.
- Prepare and submit the study report of fertilizer use in the Yellow Sea.

Inputs
UNDP/GEF YSLME Phase II Project management Office (PMO) will provide the relevant background information and documents

Timing
The consultancy is planned to start begin in mid-October 2017 and will complete in March 31 2019.

Reporting
The consultant will prepare and submit a detailed assessment report for fertilizer usein the Yellow Sea. Key elements of the report include:

- By June 2018, draft data report of fertilizer use in the YS coastal area.
- By March 2019, final data report of fertilizer use in the YS.

The subcontractor will submit reports electronically to the PMO. The report should be submitted in English.

Activity 4 of Output 3.1.2 (REV)

Support for monitoring and data acquisition for sharing from sea-based sources

TERMS OF REFERENCE

Assessment of the sea-based mariculture pollution and ship-based pollution in the Yellow Sea in PR China

Consultancy classification: subcontract (NMEMC)
Budget line: 72100, Activity 4 of Output 3.1.2, Component 3. Budget: USD50,000;
Estimated start of work: Mid- November 2017 – mid March, 2019

Objectives
The objective underlying the proposed consultancy is to establish the assessment model of nutrients discharge from sea-based mariculture, pollutants discharge from ships and assess the total amounts of nitrogen and phosphate in various forms discharge from mariculture and pollutants discharge from ships in coastal areas of the Yellow Sea in PR China.

Expected Outputs

The subcontractor is expected to deliver the following results:

1. Methodologies for monitoring and assessment of nutrients discharge from sea-based mariculture and pollutants discharge from ships;
2. An assessment report of the amounts of nutrients discharge from sea-based mariculture and pollutants discharge from ships in the Yellow Sea in PR China.

Activities

Activities include but not necessarily limited to the following tasks:

- Establish the assessment model of nutrients (nitrogen and phosphate) in various forms discharge from different culture systems of sea-based mariculture and pollutants discharge from ships in the Yellow Sea.
- Investigate the yield of different cultured organisms (e.g., fish, shellfish, etc.) as well as its nutrients discharge coefficient in the cage culture and raft culture systems during the cultured period in coastal areas of the Yellow Sea.
- Investigate the yield of non-feeding organisms (mainly filter-feeding bivalves, such as mussels, oyster, scallops, etc.) and the content of nitrogen and phosphate in vivo, then assess the amounts of nitrogen and phosphate uptake from the marine environment in the Yellow Sea during cultured period by the organisms.
- Assess the amounts of nitrogen and phosphate discharge from sea-based mariculture in the Yellow Sea in PR China based on the established assessment model and the investigation data.
- Investigate the type of ships, classification of the pollutants (oily sewage, domestic sewage, ship garbage, etc.) discharged from ships and other required information, then assess the amounts of ship-based pollutants of different classification in the Yellow Sea in PR China based on the established assessment model and the investigation data.
- Present management actions to reduce the nutrients discharge from sea-based mariculture and pollutants discharge from ships under the diagnostic analysis of the feature of sea-based mariculture pollution and ship-based pollution in the Yellow Sea in PR China.

Inputs

UNDP/GEF YSLME Phase II Project management Office (PMO) will provide the background information and documents.

Timing

The consultancy will begin in November 2017 and complete in December 2019.

Reporting

The subcontractor will prepare and submit a detailed assessment report for sea-based mariculture pollution and ship-based pollution in YSLME in PR China. Key elements of the report include:

- Current status of sea-based mariculture pollution and ship-based pollution in PR China;
- Challenges and difficulties;
- Monitoring and assessment method;
- Assessment of nutrients discharge from mariculture and pollutants from ships;
- Management actions to reduce the pollution.

The consultant will submit reports in English electronically to the PMO.

Activity 1 and 2 of Output 3.2.1 (REV)

Develop regional strategy for using wetlands as nutrient sink, cost-effective and sustainable mechanism to treat municipal wastewater & sewage: good practices and experience sharing and learning

TERMS OF REFERENCE

Develop regional strategy for using wetlands as nutrient sink, and synthesize good practice and knowledge to treat municipal wastewater and sewage

Consultancy classification: Subcontract (NMEMC)
Budget line: 71200, Activity 1 of Output 3.2.1, Component 3. Budget: USD16,000;
Estimated start of work: November 1 2017 – June 30, 2018

Objectives

The objective underlying the proposed consultancy is 1) to develop a regional strategy for using wetlands as nutrient sink, especially for the coastal wetlands; and 2) to catalyze investment in cost-effective and environmentally friendly pollution reduction from land-based sources through wetland restoration and construction to improve the ecosystem health of the Yellow Sea.

Immediate Objectives

The objectives underlying the proposed consultancy are:

- Review of the status of coastal wetlands in nutrient removals for the Yellow Sea coastal area, and the location, the method, the principle and the results of nutrient removal projects up to 2016 in PR China and RO Korea, and to compare the advantages and disadvantages;
- To strategize approaches and methods to enhance investment, capacity, knowledge and awareness raising to mainstream use of wetland into urban planning, ocean park development, coastal wetland restoration projects and other investment decisions to enlarge wetland sink areas;
- to synthesize and document knowledge in using wetland as nutrient sinks for improving the ecosystem health of Yellow Sea for replication of good practices for investment.

These objectives will also support of achieving SDG 14 and implementing CBD, RAMSAR and other relevant Conventions.

Expected Outputs

The consultant is expected to deliver the following results:

1. A review report of past and present and future projects in using wetland as nutrient sink, especially focused on the Yellow Sea Coastal Area, project designs, investment modalities, cost-effectiveness, ecosystem services generated from these projects and lesson learnt; and
2. Proposed recommendations on strategies, approaches and methods to enhance investment, capacity, knowledge and awareness raising to mainstream use of wetland into urban planning, ocean park development, coastal wetland restoration projects and other investment decisions to enlarge wetland sink areas;
3. Four case studies detailing the design, implementation modalities, results and services of wetland and species in removing nutrients from the projects, and cost-benefits of such projects;
4. An overview of technologies, cost-benefits, cost and effect and value of wetland services in restoring coastal and marine environment.

Activities

Activities include but not necessarily limited to the following tasks:

Output 1: Synthesis for the practices using wetland as nutrient sinks in the Yellow Sea:

- Conduct desk review to assess the status and trends of the threats, stresses and underlying causes on nutrient load in the Yellow Sea, especially focused on the underlying causes such as physical factors, policy, biological factor, etc.
- Desk review to coastal wetlands distribution of Yellow Sea Coastal area, identifying the vegetation, area, history, sediment and water condition, and ecological service of these wetlands.
- Survey the past and present and future projects mainly concentrated on using wetland as nutrient sinks based on the published and grey literatures focusing on project designs, investment modalities, cost-effectiveness, ecosystem services generated from these projects and lesson learnt; and then teasing out the work concepts, researching progress, technical proposal, mainly focused on the tackled problem, the solutions and the efficiency, etc.
- Analyze constraints, opportunities, threats, issues, problems and capacity needs and identify solutions through consultation with stakeholders and interest groups, forming a series technical scheme in nutrient removals based on coastal wetlands.
- Incorporate comments into a final report, and then submit a final draft in electronically(in English).

Output 2: Proposed recommendations on strategies, approaches and methods to enhance investment, capacity, knowledge and awareness raising to mainstream use of wetland into urban planning, ocean park development, coastal wetland restoration projects and other investment decisions to enlarge wetland sink areas

- Facilitate the conduct of framework YSLME nutrient removal projects, which included develop explicit goals, time-bound targets and actions in line with the proposed solutions to assist the bordering countries of YSLME to implement provisions of the CBD, Ramsar and other conventions of a regional approach;
- Identify areas of the coastal wetland as nutrient remover, especially for these projects, mainly using the criteria for selection, taking into account of both social and cultural

context as well as and assessment result, propose a series project at regional level for improved ecosystem services.

- Identify opportunities to enhance investment, capacity, knowledge and awareness raising to mainstream use of wetland into urban planning, ocean park development, coastal wetland restoration projects and other investment decisions to enlarge wetland sink areas;
- Consolidate the assessment results into a concrete proposal of recommendations for using wetlands as nutrient sinks;
- Taking into account the comments from the workshop, revise and develop the proposal into a program for the YSLME management.

Output 3: Four case studies detailing the design in theory and practice, monitoring system, results and services of wetland and species in removing nutrients from the projects, and cost-benefits

- Prepare a synthesis report of latest developments in using wetland as nutrient sinks to diversify approaches for coastal wetland restoration with amplified spinning effects;
- To select and agree on wetland restoration modalities, including 1) return fish ponds and salt-making ponds to bays and coastal marshes, such as Wuyuan Bay, Xiamen; 2) using wetland for tertiary treatment associated with sewage treatment plants, such as Ningbo World Bank Project; 3) use species and aquaculture to achieve the co-benefits of sustainable harvest and environmental performance, such as intertidal shell fish farming in RO Korea; and 4) nutrient bio–extraction in Long Island sound, New York
- Prepare four case studies detailing the design in theory and practice, monitoring system, results and services of wetland and species in removing nutrients from the projects, and cost-benefits of such projects, especially in the YS, if applicable;
- Document the investment modality for replication.

Inputs

UNDP/GEF YSLME Phase II Project Management Office (PMO) will facilitate the access to information, reports, contacts and facilitate visits to project sites.

Timing

The consultancy will begin in November1, 2017 and complete in June 30, 2019.

Reporting

The consultant will produce the following reports within the specified timeframe:

1. By December31, 2017, a draft synthesis report on the use wetlands as nutrient sink;
2. By March31, 2018, a concrete proposal of recommendations for using wetlands as nutrient sinks;
3. By December 10, 2017, a draft synthesis report and case studies for review; and
4. By June 30, 2018,a final report and case studies.

The consultant can submit reports in English electronically to Mr. Yinfeng Guo, CTA/Manager at email: yinfengg@unops.org.

Competencies

- A good understanding of development and coastal wetlands environment contexts of North East Asia
- Advanced university education at MSc or Ph.D. level with expertise in the area of biology, marine sciences or natural resource management
- At least 7 years of professional experience in coastal and marine ecosystems
- Strong skills in analysis and evaluation, and experience in implementing environmental projects
- Ability to produce high quality reports, publications in English

Activity 1 of Output 3.3.1 (REV)

Review of policies and regulations in China and RO Korea dealing with pollution control and assess compliance with UNCLOs, the future WE Want, multi-lateral environmental agreements and programs ratified by both countries, and prioritize legal and regulatory reforms in both countries

TERMS OF REFERENCE

Legal Expertto review country compliance with international ocean-related environmental agreements

Consultancy classification: Individual consultant
Budget line: 71200, Activity 1 of Output 3.3.1, Component 3. Budget: USD8,000;
Estimated start of work: late November 2017 until late June 2018

Background
Component 3 of UNDP/GEF YSLME Phase II Project aims at improving ecosystem carrying capacity with respect to regulating and cultural services. In Outcome 3.3 of Component 3 entitled "Strengthened legal and regulatory processes to control pollution", the project will support several Activities leading to four project targets, to be concise,1) regional guidelines for micro-plastics monitoring and assessment; 2) new incentives and measures adopted in coastal cities in support of recycling economy; 3) new provincial regulations to improve water quality; and 4) new profitable businesses developed from waste reuse and recycling.

As one of the proposed activities, Activity One may be further broken into three sub-activities which are as follows: 1) review of policies and regulations in China dealing with pollution control, 2) assess compliance with UNCLOs, the Future We Want, multi-lateral environmental agreements and programmes ratified by PR China, and 3) prioritize legal and regulatory reforms at domestic level. Satisfactory accomplishment of sub-activity one provides good reference for achieving the four project targets. Drafting new guidelines and regulations, adopting new incentives and measures, and developing new green profitable businesses should all be conducted based on the current legal and regulatory framework. On the other hand, ideas, norms, plans and/or techniques etc. arising from the other four Activities may provide valuable feedback to the process of conceiving legal and regulatory reforms. Review of current policies and regulations on pollution control can lead to not only a library for policy-makers for informed decisions but also to precisely find their inherent inconsistencies and gaps including those as described in SAP for YSLME and

propose targeted solutions. Compliance assessment with applicable agreements/programmes establishes a two-way channel by which domestic regulations and policies can be analyzed and improved to be compliant with international or regional standards and best domestic practices may be identified and populated into related agreements/programmes in future negotiations. All in all, Activity One is indispensable for Outcome 3.3 and thus Component 3. In this context, the project plans a consultancy with the following terms of reference (TOR).

Objectives

The objective underlying the proposed consultancy is to enhance the regulating services of YSLME in particular by strengthening the legal and regulatory processes to control pollution through, inter alia, improving pollution-concerned legal and policy system at domestic level by ontology analysis and international/regional compliant comparative assessment taking into account the principles and approaches of YSLME-based integrated coastal and marine management.

Expected Outputs

The consultant is expected to deliver the following results:

1. An inventory of domestic laws/regulations/policies dealing with pollution control in PR China
2. An inventory of international/regional environment agreements/programmes effective for PR China with respect to pollution control
3. An analysis report concerning inconsistencies and gaps of domestic laws/regulations/policies dealing with pollution control in PR China and compliance assessment with relevant environment agreements/programmes, together with recommendations on legal and regulatory reforms

Activities

The consultant under supervision of the Chief Technical Advisor and technical guidance of RWG-G and P in close collaboration with the local project team will conduct the following activities to achieve the three outputs:

<u>Output 1: An inventory of domestic laws/regulations/policies dealing with pollution control</u>

- With assistance from legal intern in PMO and National Coordinators from PR China and RO Korea, to conduct an inventory of domestic laws, regulations, policies of PR China and RO Korea in relation to pollution control, reduction and management;
- Review contents of above laws, regulations and policies;

<u>Output 2: An inventory of international/regional environment agreements/programme effective both for China and ROK with respect to pollution control</u>

- To conduct inventory of international and regional environment agreements and programs effective in both countries with respect to pollution control, reduction and management. (The inventory should be compiled with four essential parts – an overall introductory review, indexes of contents systematically structured within discretion of the consultant, summaries including simple analysis of important clauses or articles consistent with the index, and copies of the official documents related to pollution control);
- To identify sources of information and download for analysis. Copies and related information of the official documents may be obtained from libraries, reliable internet services, or domestic/international authorities such as local governments, State Oceanic

Administration, Ministry of Transport, Ministry of Agriculture, Ministry of Foreign Affairs, and secretariat of relevant organizations, with assistance from legal intern in PMO;

- Provide guidance legal intern in PMO to upload these documents on project website to use the inventories as practical manual for domestic decision makers or executive staff regarding pollution control so that the inventory itself should be easy to understand and specific provisions need to be easily located when needed for reference;
- Incorporate comments and submit the final inventories electronically. The introduction, index, and summaries should be in English while copies of the main texts of the official documents will be in English and could be in Chinese and Korean if possible.

Output 3: An analysis report concerning inconsistencies and gaps of domestic laws, regulations and policies dealing with pollution control in China and compliance assessment with relevant environment agreements/programmes, together with recommendations on legal and regulatory reforms

- Review Outputs 1 & 2 thoroughly by collecting and analyzing background and historical implementation information there of which could include contemporary social, economic and environmental contexts, meeting minutes and reports, guidelines, resolutions or declarations, administrative decisions, court or arbitration judgments, expert opinions, media reports, questionnaire answers, etc.;
- Identify inconsistencies or gaps of domestic laws/regulations/policies with same or different statutory level(s) including the implementation thereof;
- Conduct comparative assessment between Output 1 and Output 2 and identify potentially non-compliant clauses or issues;
- Determine YSLME-based integrated management principles and approaches for coastal and marine pollution taking into account domestic management realities, project targets, progress of the other Activities, YSLME Phase I Project achievements, outcomes of review of Output 2, and other well-acknowledged ideas, doctrines or techniques;
- Identify gaps existing between domestic laws/regulations/policies and outcomes of Step 4;
- Propose new regulations or amendments based on Steps 2, 3, and 5 as appropriate;
- Summarize the best domestic practices for pollution control which are not covered by but hopefully could contribute to the future international/regional regimes;
- Form the final analysis report by compiling the outcomes of the aforementioned Steps and recommend legal and regulatory reforms with clear priorities and goals.

Inputs

UNDP/GEF YSLME Phase II Project management Office (PMO) will assist to provide the background information and documents, and will be responsible for providing financial support and the logistics support to participation in designated workshops or meetings and spread of questionnaires.

Timing

The consultancy will begin in late-November 2017 and complete in June 20, 2018.

Reporting

The consultant will produce the following reports within the specified timeframe:

1. By December 20, 2017, submit the inventory of domestic laws/regulations/policies dealing with pollution control in PR China;

2. By January 31, 2018, submit the inventory of international/regional environment agreements/programmes effective both for China and ROK with respect to pollution control;
3. By April 30, 2018, submit the analysis report concerning inconsistencies and gaps of domestic laws/regulations/policies dealing with pollution control in China and compliance assessment with relevant environment agreements/programmes, together with recommendations on legal and regulatory reforms.

The consultant can submit reports electronically to Mr. Yinfeng Guo, CTA/Manager at email: yinfengg@unops.org. All reports should be submitted in English unless otherwise indicated in the present TOR.

Competencies

- Advanced university education at Master or Ph.D. level with expertise in area of law or policy of sea
- At least 5 years of professional experience in coastal and marine management and technical support
- Strong skills in analysis and evaluation, and ability to communicate and produce high-quality reports/publications in English
- Experience with international/regional marine environment treaties/initiatives/programmes/projects

Activity 4 of Output 3.3.1 (REV)

Support to develop regulatory measures for marine litter monitoring

TERMS OF REFERENCE

Developing regulatory measures for marine litter management in pilot areas of Yellow Sea in PR China

Consultancy classification: subcontract (NMEMC)
Budget line: 71200, Activity 4 of Output 3.3.1, Component 3. Budget: USD48,000;
Estimated start of work: November 01, 2017 and end in September 30, 2019

Background and Justification

Marine litter, including plastics and microplastics, is considered "a global concern affecting all the oceans of the world". It has been observed everywhere: from coastal areas to remote areas far from any anthropogenic pollution sources; from surface waters throughout the water column to the deep water and ocean sediments; and from the equator to the poles, including trapped in sea ice. The pollution is significant and widespread, with plastic debris found on even the most remote coastal areas and in every marine habitat. More than 800 marine species have been found to interact with marine litter to date, with ingestion and entanglement the two main types of

interaction. Based on the transboundary diagnostic analysis of the Yellow Sea, one of the major environmental problems is the marine litter in the Yellow Sea.

Marine litter commonly stems from shoreline and recreational activities, commercial shipping and fishing, and dumping at sea. The majority of marine litter (approximately 80 per cent) entering the seas and oceans is considered to originate from land-based sources. Marine litter is as much a transboundary global problem as well as a local issue with a multitude of sources. Litter pollution in the marine and coastal environment is a challenging restoration and governance issue. Similar to many environmental problems, marine litter pollution is transboundary and therefore the governance solutions are complex. Reducing litter inputs and impacts on marine ecosystems is the first critical step in marine environment restoration. It requires a variety of solutions at local, regional, national, and global scales.

With the problem worsening, formal governance through international institutions or instruments, regional organizations or governments alone cannot resolve this exponentially increasing environmental problem. It has been recognized the limitations of existing international law and are calling for the development of a new international instrument specifically addressing marine litters. Although this is an important way forward, the process will be complex, may not be supported by all coastal states, and will not come into force any time soon.

A faster way forward might be to develop regulatory measures for marine litter monitoring, disposal, handling, reuse, and recycle in pilot site to enable investment on recycling economies. Dalian and Weihai, will be selected as the pilot cities. It is expected that this project will contribute to knowledge building in YSLME.

Objectives

The objective underlying the subcontract is to provide regulatory measures for marine litter monitoring, disposal, handling, reuse and recycle in pilot province or city of Yellow Sea. The project will support a series of activities leading to enhanced marine litter management capacity, and development and application of regional guidelines on the control of marine litter.

Expected Outputs

The subcontractor is expected to deliver the following results:

1. Assessment of existing regulatory and policy incentives in the management of marine litter(micro-plastics) in pilot city;
2. Recommendation for prevention and control of marine litter in pilot city.

Activities

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

- Review of historical monitoring data of marine litter(microplastics) in pilot city
- Assessment of the types, distribution, quantity and composition, sources and identification of stakeholders of marine litter and (microplastics), and identify the “hotspot” area.
- Review of current policies and regulations together with current technologies for reducing litter
- Identification of gaps of existing management policies based on historical monitoring data assessment

- Drafting proposals for development of policy or financial incentives for consideration by provinces or cities report to incentivize investment by private sector in prevention, control, recycling, reuse of litter;
- Prepare case studies for lessons learning and dissemination of project outcomes

Inputs
UNDP/GEF YSLME Phase II Project management Office (PMO) will facilitate the access to information and reports of completed and proposed projects, and provide logistics support to field trip to project sites.

Timing
The subcontractor will begin in November 01 2017 and end in September 30, 2019.

Reporting
The subcontractor will produce the following reports within the specified timeframe:

1. By June 30 2018, prepare and submit a draft of regional assessment report on marine litter(micro-plastics) pollution, key elements of the contents include:
2. Status of marine litter (micro-plastics) pollution in PR China
3. current policies and regulations, best available technologies and gaps
4. By 30 December 2018, submit economic analysis of using best available technologies and good management practices in reducing litter for consideration by pilot province or cities;
5. By September 30, 2018, submit proposal(s) for development of policy or financial incentives for consideration by provinces or cities incentivize investment by private sector;

All reports should be submitted in English and Chinese. Reports should be submitted to Mr. YinfengGuo, CTA/Manager at email: yinfengg@unops.org.

Activity 1 of Output 3.4.1 (REV)

Regional review of existing policies and regulations regarding solid waste disposal as well as technologies for reducing production including recycling opportunities

TERMS OF REFERENCE
Regional review of existing policies and regulations regarding solid waste disposal as well as technologies for reducing production including recycling opportunities

Consultancy classification: subcontract (NMEMC)
Budget line: 72100, Activity 1 of Output 3.4.1, Component 3. Budget: USD8,000;
Estimated start of work: in November 01 2017 and end in June 30, 2018

Background and Justification
The prevalence of marine litter is the result of many different factors, including changing production and consumption patterns, inadequate waste management, and gaps in regulation of waste materials. The diverse sources require a comprehensive response. Given the practical challenges of removing decades of accumulated litter from the oceans, it is clear that prevention, rather than remediation, is critical. Accordingly, countries frequently utilize a variety of laws and

policies to prevent, manage, and reduce the proliferation of marine litter. Many of these approaches are part of the general frameworks to reduce the generation and spread of solid waste, rather than being part of frameworks specifically designed to address marine litter. Policies and laws need to address not only the removal of litter but are generally more successful when they govern the production, use, and disposal of products that would otherwise become marine litter. Based on the transboundary diagnostic analysis of the Yellow Sea, one of the major environmental problems is the marine litter in the Yellow Sea. The increase in marine litter and construction of concrete structures such as jetties and wharfs has also increased the habitat available to the asexual reproductive stage of the jellyfish, another environmental issue in this region. In order to help to develop regulatory measures to control and reduce regional marine litter from the source, the project will conduct an assessment and review regarding solid waste disposal as well as technologies for reducing production including recycling opportunities. It is expected that this review will contribute to knowledge building in YSLME.

Objectives

The objective underlying the proposal is to catalyze strengthening regional and national governance for the production, use, and disposal of products that would otherwise become marine litter.

Immediate Objectives

The objectives underlying the proposal are:

- to map and review national regulatory frameworks and other instruments to identify gaps in addressing solid waste disposal, and catalyze to make an informed decision about priorities for preventing marine litter at the source.

Expected Outputs

The subcontractor is expected to deliver the following results:

1. A scoping study report with recommendations on policies and regulations regarding solid waste disposal as well as technologies for reducing production including recycling opportunities.

Activities

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

1. Conduct desk review to analyze laws and policy that address production and consumer use of a variety of items that end up as marine litter, especially the most abundant type of marine litter, plastic, from its incipient "nurdle" or pre-manufacturing resin stage to ubiquitous and persistent consumer goods such as single-use plastic bags and utensils.
2. Conduct desk review to analyze legislation governing waste disposal into the marine environment, including land-based disposal; cleanup of land-based waste; abandoned, lost, and discarded fishing gear; and litter from ships.
3. Identify gaps in addressing solid waste disposal at regional level.
4. Prepare the draft scoping study report with recommendations on policies and regulations regarding solid waste disposal as well as technologies for reducing production including recycling opportunities. Submit it for consultation and review by members of the Regional Working Group on Pollution of the YSLME Phase II Project.
5. Incorporate comments and submit a final study report electronically.

Inputs

UNDP/GEF YSLME Phase II Project management Office (PMO) will facilitate the access to information and reports of completed and proposed projects, and provide logistics support to field trip to project sites.

Timing
The subcontractor will begin in November 01 2017 and end in June 30, 2018.

Reporting
The subcontractor will produce:

1. by end of October, an activity report and draft scoping study report;
2. by July 30, 2018, the final report.

All reports should be submitted in English.Reports should be submitted to Mr. YinfengGuo, CTA/Manager at email: yinfengg@unops.org.

Activity 2 of Output 3.4.1 (REV)

Develop & test monitoring system, and conduct a regional baseline survey of marine litter in collaboration with other relevant organizations

TERMS OF REFERENCE
Regional baseline survey of marine litter

Consultancy classification: Individual consultant
Budget line: 71200, Activity 2 of Output 3.4.1, Component 3. Budget: USD8,000;
Estimated start of work: November 012017 and end in June30, 2018

Background
Marine litter, including plastics and microplastics, is considered "a global concern affecting all the oceans of the world". It has been observed everywhere: from coastal areas to remote areas far from any anthropogenic pollution sources; from surface waters throughout the water column to the deep water and ocean sediments; and from the equator to the poles, including trapped in sea ice. The pollution is significant and widespread, with plastic debris found on even the most remote coastal areas and in every marine habitat. More than 800 marine species have been found to interact with marine litter to date, with ingestion and entanglement the two main types of interaction. Based on the transboundary diagnostic analysis of the Yellow Sea, one of the major environmental problems is the marine litter in the Yellow Sea.

Marine litter commonly stems from shoreline and recreational activities, commercial shipping and fishing, and dumping at sea. The majority of marine litter (approximately 80 per cent) entering the seas and oceans is considered to originate from land-based sources. Marine litter is as much a transboundary global problem as well as a local issue with a multitude of sources. Litter pollution in the marine and coastal environment is a challenging restoration and governance issue. Similar to many environmental problems, marine litter pollution is transboundary and therefore the governance solutions are complex. Reducing litter inputs and impacts on marine ecosystems is the first critical step in marine environment restoration. It requires a variety of solutions at local, regional, national, and global scales.

It is important to understand marine litter distribution in the environment and their implications on marine habitats and marine biota. Development of monitoring (early warning) system, and conducting a regional baseline assessment of marine litter, will help understand marine litter (micro-plastic) pollution characteristics, such as temporal and spatial distribution, and their sources etc. Assessment of the distribution of marine litter in the marine environment in the Yellow Sea will also contribute to identify the "hotspot" area, and promote development of regional or local the management measures.

Objectives

The objective underlying the subcontract is to draft regional baseline survey report, and provide data support for marine waste management in the Yellow Sea region. The project will support a series of activities leading to enhance marine litter monitoring, promote to establish regional monitoring (early warning) system.

Activities

The following activities will be undertaken:

- Review published papers which addressing the distribution of marine litter (microplastic) in surface water, beaches, and biota,
- Analyze the challenge of marine litter and microplastic, including definition of size, categories, shape, baseline etc., as well as sampling and laboratory analysis methods
- Draft a marine litter (microplastics) monitoring scheme
- Assessment of regional marine litter (microplastics) pollution status
- Drafting report on status of marine litter(microplastics) in the Yellow Sea

Expected Outputs

The subcontract is expected to deliver the following results:

1. Provide Regional marine litter baseline assessment report

Timing

The subcontractor will begin in November 012017and end inJune30, 2018.

Reporting

The subcontractor will produce the following reports within the specified timeframe:

1. By March 31 2018, prepare and submit a draft of assessment report on marine litter pollution, key elements of the contents include:
    a. Status of marine litter (microplastics) pollution
    b. Challenges and difficulties for marine litter monitoring and assessment
2. By June 30, 2018, submit final assessment report on marine litter pollution

Competencies

- A good understanding of marine litter monitoring and assessment
- Advanced university education at MSc or Ph.D. level with expertise in the area of marine litter monitoring and management
- At least 5 years of professional experience in marine litter research.
- Strong skills in analysis and evaluation, and experience in implementing environmental projects
- Ability to produce high quality reports and publications in English

Payment and Submission
The consultant will be paid for a lump sum of USD 8,000 for consultancy upon submission of the first report (50%) and the final report on marine litter management (50%) to Mr. YinfengGuo, CTA/Manager at email: yinfengg@unops.org.

Develop & test monitoring system, and conduct a regional baseline survey of marine litter in collaboration with other relevant organizations

Activity 3 of output 3.1.1 (REV)

Review of control mechanisms from point sources and evaluate facilities and equipment to control/reduce discharge from industrial and municipal sources and control/mitigation mechanism of pollution from point sources

TERMS OF REFERENCE
Consultant to synthesize knowledge on control of pollution from industrial and municipal sources

Consultancy classification: individual consultant
Budget line: 71200, Activity 3 of Output 3.1.1, Component 4. Budget: USD16,000;
Estimated start of work: November 1, 2017 and December31, 2018

Objectives
The objective underlying the proposed consultancy is to review of pollutant control mechanisms and evaluate facilities and equipment to reduce discharge from industrial and municipal sources through online monitoring and control to improve the ecosystem health of the Yellow Sea.

Immediate Objectives
The objectives underlying the proposed consultancy are:

- to synthesize and document knowledge in using pollution control technologies for improving the ecosystem health of Yellow Sea for replication of good practices for investment

Expected Outputs
The consultant is expected to deliver the following results:

1. A study report with recommendations on discharge control mechanisms from point sources.
2. A retrospective analysis report of evaluate facilities and equipment to reduce discharge especially **the waste water** from point sources; and
3. To develop and update discharge control and mitigation plan and mechanisms from point sources.

Activities
The consultant under supervision of the Chief Technical Advisor and technical guidance of the

RWG-P, in close collaboration with the local project team will conduct the following activities:

- To Prepare a desk review report of latest developments in using facilities and equipment to mitigate pollution for replication and prepare practice note for dissemination;
- To analyze factors leading to, or potentially leading to the achievement of discharge control, or failures of the control mechanisms, including institutional, political, technical, capacity development and other factors;
- Conduct prospective assessment of ecological benefits of proposed control plan and update mitigation plan or design project which can reduce discharge from point sources

Inputs

UNDP/GEF YSLME Phase II Project management Office (PMO) will facilitate the access to information and reports of completed and proposed plans and projects, and provide logistics support to field trip to point sources.

Timing

The consultancy will begin in 1 November, 2017 and complete on December31, 2018.

Reporting

The consultant will produce the following reports with specific timeframe:

1. by March 31,2018, submit the study report with recommendations of discharge control mechanisms from at least **one** point site; and
2. by May 31,2018, submit the retrospective analysis report of evaluate facilities and equipment to reduce discharge from point sources; and
3. by December 31,2018, submit the final proposal for update guidelines or plans on controlling pollutant and discharge from YSLME area.

All reports should be submitted in English. Reports should be submitted to Mr. Yinfeng Guo, CTA/Manager at email: yinfengg@unops.org.

Competencies

- A good understanding of discharge control mechanisms
- Advanced university education at MSc or Ph.D. level with expertise in the area of pollutant control and marine litter management
- At least 5 years of professional experience in pollutant or discharge control research.
- Strong skills in analysis and evaluation, and experience in implementing environmental projects
- Ability to produce high quality reports and publications in English

Activity 4 of output 3.1.1 (REV)

Economics analysis of reduction of nutrients for better environment and ecosystem of pilot sites

TERMS OF REFERENCE

Environmental Economist to Assess Ecosystem Services of Wetland Projects

Consultancy classification: subcontract (NMEMC)
Budget line: 71200, Activity 4 of Output 3.1.1, Component 3. Budget: USD16,000;
Estimated start of work: December 1, 2017 and complete on June 20, 2018.

Background and Justification
Based on the transboundary diagnostic analysis of the Yellow Sea, one of the major environmental problems is the enrichment of nutrients in the Yellow Sea which is the major cause of harmful algal blooms in the region. Water pollution in coastal areas has caused social and political attention because of its significant impacts on not only the environment, but also the economy and society as well. More importantly, water pollution issue has been intertwined with other issues such as coastal wetland loss, marine ecosystem degradation and coastal land reclamation, eutrophication from aquaculture, etc. Therefore, more cost-effective, innovative and integrated approaches rather than traditional engineering methods are needed to tackle water pollution in coastal areas under high development pressures in this rapidly changing time.

Manmade wetlands or use of wetland for tertiary treatment of pollution have been recognized as effective ways to remove nutrients and other pollutants from land-based sources in YS region by the PR China, RO Korea and international financial institutions such as the World Bank. Studies indicate that the constructed wetland's efficiency in water pollutants is reliable, particularly for nutrients removal with a very low wastewater background concentration, meaning it is suitable for the non-point source pollution.

In the mission of the Project Management Office of the YSLME Phase II Project, Darushan of Shandong Province was identified as the site for demonstration in the following areas: 1) economic analysis of the impact and benefits of restoration projects as a way to promote continued comprehensive approaches and investment to restore the coastal and estuarine ecosystems; 2) conduct of total pollution loading in the bay area including from maricuture; and 3) support the application of IMTA to mariculture for improved productivity and reduced nutrients loading; and 4) design of new wetland restoration projects taking into account the good practices and experiences at home and abroad.

Since 2005, both public and private sector invested in coastal restoration, consolidation of mudflat, sand beaches and artificial wetland construction with a total investment of nearly $100 million. The restoration covers bay area of Darushankou from the north, and to Pudao Island to the south, with coordinates as 36°43′N~36°47′N and 121°28′E~121°34′E. In accordance with the Darushan National Ocean Park monitoring and assessment report in 2015, water quality of the park remains good, qualified for level 1, the sediments are classified as level 1; Phytoplankton species abound, biodiversity is rich with sound ecological structure. Yet the ecosystem services in monetary terms have not been assessed, nor have the benefits of continued restoration and adoption of sustainable mariculture been assessed. In the discussion with local government officials, Rushan Municipal Government will consider continued investment in restoration of the Darushan National Ocean Park which is now a four-start scenic spot attracting hundreds of thousands of visitors in summer each year. Potential sources of funding include the blue bay initiative managed by State Oceanic Administration of PR China.

This consultancy will cover two phases. The scoping phase will determine the scope of studies of

economic analysis of project, while the assessment phase will entail the retrospective assessment of wetland restoration, coastal mudflat and artificial wetland development projects and prospective analysis of the projects proposed for funding by Blue Bay initiative. Demonstration of TPL, IMTA and design of new wetland restoration projects will be covered in other activities of the project in Outcome 3.1 and Outcome 3.2.

Objectives

The objective underlying the proposed consultancy is to catalyze investment in pollution reduction from land-based sources through wetland restoration and construction to improve the ecosystem health of the Yellow Sea.

Immediate Objectives

The objective underlying the proposed consultancy are:

- to conduct a scoping study for a subsequent subcontract; and
- to assess the social and economic impact and environmental benefits of existing pollution reduction from land-based sources and wetland restoration/construction projects in Darushan Bay area, and the economic potential of planned restoration and wetland construction projects for funding under Blue Bay Action Plan to help local government to make informed investment decision making;

Expected Outputs

The subcontractor is expected to deliver the following results:

4. A scoping study report with recommendations on retrospective economic analysis of benefits of nutrient reduction and/or wetland construction or restoration projects since 2005 and a prospective economic analysis of planned projects for wetland restoration, pollution reduction from land-based sources and from aquaculture in Rushan Bay, Shandong Province.
5. A retrospective economic analysis report of benefits of nutrient reduction and/or wetland construction or restoration projects since 2005; and
6. a prospective economic analysis report of planned wetland restoration and pollution reduction projects in Rushan Bay, Shandong Province.

Activities

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

<u>Scoping studies phase:</u>

- To design a time-bound and budgeted workplan in consultation with YSLME Phase II Project PMO and Rushan Municipal Government for the scoping study;
- To collect second-hand data, map, previous survey results of estuarine biodiversity of the Rushan Ocean Park, evaluation reports of restoration projects, and development plan and projects in the project areas to be funded by Blue Bay Initiative and other sources;
- To conduct a 3-5 day field trip to the project site and meet with stakeholders for information collection and discuss assessment scope;
- To prepare an inception report with details of assessment scope, projects covered, methodologies, parameters and data sources, workplan to support access to funding for

investment, information needed to support the assessment from Rushan City or other parties related with the assessment;

Assessment phase

- To conduct cost-benefit analysis of wetland ecosystem restoration projects since 2005, including ecosystem services from restoration projects including provisioning, regulating, cultural and supporting services;
- To document good practices in restoration for replication and prepare practice note for dissemination;
- To analyze factors leading to, or potentially leading to the achievement of the project results, or failures of the project, including institutional, political, technical, capacity development and other factors;
- Conduct prospective assessment of ecological benefits of proposed restoration project for funding by Blue Bay Action Plan
- Provide illustration of impact and effects such as tables, graphs, pictures, etc

Inputs

UNDP/GEF YSLME Phase II Project management Office (PMO) will facilitate the access to information and reports of completed and proposed projects, and provide logistics support to field trip to project sites.

Timing

The consultancy will begin in 1 November, 2017 and complete on March 31, 2018.

Reporting

The subcontractor will produce:

4. by end of December, 2017, an activity report and draft scoping study report for review; and
5. by June 20, 2018, final report.

All reports should be submitted in English. Reports should be submitted to Mr. Yinfeng Guo, CTA/Manager at email: yinfengg@unops.org.

Activity 3 of Output 3.2.1

technical support to design wetland habitats to achieve blue bay in three pilot sites in China and application of clean production technologies and relevant technology transfer

TERMS OF REFERENCE

Technical assistance in design artificial wetland for restoring coastal ecosystem services of Yellow Sea

Consultancy classification: subcontract

Budget line: 72100, Activity 3 of Output 3.2.1, Component 3. Budget: USD180,000;
Estimated start of work: November 15, 2017 and end in June 30, 2018

Background and Justification

Water pollution in coastal areas has caused social and political attention because of its significant impacts on not only the environment, but also the economy and society as well. More importantly, water pollution issue has been intertwined with other issues such as coastal wetland loss, marine ecosystem degradation and coastal land reclamation, eutrophication from aquaculture, etc. Therefore, more cost-effective, innovative and integrated approaches rather than traditional engineering methods are needed to tackle water pollution in coastal areas under high development pressures in this rapidly changing time.

In recent days, the wise use of natural and artificial wetlands for water purification has become one of hot issues on its valuable and exploitable aspects for the protection of water quality in catchments, rivers, lakes and estuarine environments. According to recent findings of scientific research, there is a global and regional consensus that artificial (constructed) wetlands represent a low-cost technology that can reduce the nutrient discharge to marine environment.

Manmade wetlands or use of wetland for tertiary treatment of pollution have been recognized as effective ways to remove nutrients and other pollutants from land-based sources in YS region by the PR China, RO Korea and international financial institutions such as the World Bank. Studies indicate that the constructed wetland's efficiency in water pollutants is reliable, particularly for nutrients removal with a very low wastewater background concentration, meaning it is suitable for the non-point source pollution. Better still, they can be integrated into agricultural and fish production systems where the products are useable and/or re-cycled for optimal efficiency. However, currently, constructed wetlands are rarely installed because of lack of interests of countries and the need for in-house research, training and development.

Since no wetland can provide all ecosystem services indefinitely, it would be suggested to consider the designing wetland habitats that will best restore ecosystem services by applying clean production technologies. "Strategic" restoration and/or application to design wetland habitats would use an adaptive management approach, targeting three pilot sites with application of clean production technologies, and prioritizing the location, size, and type of wetland needed for a watershed to provide optimal levels of ecosystem services.

Objectives:
The development objective underlying the proposed consultancy is reduction of pollution and enhancing ecosystem resilience in two pilot sites through design and implementation of artificial wetlands projects

Immediate Objectives

Specific objectives of this task include:

- Proposals for wetland construction to two pilot sites in PR China;

Expected Outputs

The subcontractor is expected to deliver the following results:

3. Demonstration site profiling reports detailing the baselines of social, economic and environmental conditions;
4. Two technical proposals detailing the design of wetland habitats including information on siting, intended multiple benefits, construction, operation, maintenance and monitoring of constructed treatment wetlands

Activities

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

Output 1: Demonstration site profiling reports detailing the baselines of social, economic and environmental conditions;

- With assistance from National Coordinator in PR China and members of the IMCC, identify demonstration sites that have interests in restoring ecosystem health and services while increasing productivity from production sectors;
- Conduct social, economic and environmental profiling of identified demonstration sites;
- Working closely with consultants for Activity 3 of Output 3.2.1, identify the good practice and experiences of using wetland as nutrient sinks being implemented globally that are providing significant water quality benefits while demonstrating additional benefits such as wildlife habitat;

Output 2: Two technical proposals detailing the design of wetland habitats including information on siting, intended multiple benefits, construction, operation, maintenance and monitoring of constructed treatment wetlands

- Conduct social and economic assessment including gender sensitivity assessment of proposed projects, stakeholder consultations and make proposals for management responses to be considered in the project;
- Develop "Factsheet" explaining wetland habitats, performance and scientific knowledge of constructed wetlands to meet societal and ecological needs
- In collaboration with consultants for Activity 4 of Output 3 .1.1, prepare analytical report on cost-benefits, cost and effect and value of wetland services in restoring coastal and marine environment
- Finalize two technical proposals on design of wetland habitats including information on siting, intended benefits, feasibilities, construction, operation, maintenance and monitoring of constructed wetlands;

Inputs

UNDP/GEF YSLME Phase II Project Management Office (PMO) will provide the background information and documents, and will be responsible for providing logistics support to facilitate travel to project sites and meeting with relevant stakeholders, including access to information and date about the project sites.

Timing
The consultancy will begin in November 15, 2017 and end in June 30, 2018.

Reporting
The subcontractor will produce reports within the following timelines:

1. By December 31, 2017, submit the two site profiling reports;
2. By June 1, 2018, provide final proposals.

All reports should be submitted in English. Reports should be submitted to Mr. Yinfeng Guo, CTA/Manager at email: yinfengg@unops.org.

Activity 3 of Output 3.3.1 (REV)

Review technologies for waste reduction, reuse, recovery, and economic studies on recycling uses

TERMS OF REFERENCE
To review technologies for waste reduction, reuse, recovery, and economic studies on recycling uses

Consultancy classification: individual consultant
Budget line: 71200, Activity 3 of Output 3.3.1, Component 3. Budget: USD8,000;
Estimated start of work: November 1, 2017 and end in December 31, 2018.

Background and Justification
Based on the transboundary diagnostic analysis of the Yellow Sea, one of the major environmental problems is the enrichment of nutrients in the Yellow Sea which is the major cause of harmful algal blooms in the region. Water pollution in coastal areas has caused social and political attention because of its significant impacts on not only the environment, but also the economy and society as well. More importantly, water pollution issue has been intertwined with other issues such as coastal wetland loss, marine ecosystem degradation and coastal land reclamation, eutrophication from aquaculture, etc. Therefore, more cost-effective, innovative and integrated approaches rather than traditional engineering methods are needed to tackle water pollution in coastal areas under high development pressures in this rapidly changing time.

Objectives

The objective underlying the proposed consultancy is to catalyze regional and national governance for waste reduction, reuse and waste recycling.

Expected Outputs
The consultant is expected to deliver the following results:

1. A study report with recommendations and good practices on retrospective economic analysis of business developed from waste reduction, reuse and recycling
2. An economic analysis report of benefits of using new technologies for waste reduction, reuse and waste recycling.

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

- to review of good practices that can be applied across YSLME in particular in waste reduction, reuse, and waste recycling technologies; A case study from Dongtou,Wenzhou City, Zhejiang province: after more than 10% reduction in fishing boats in Wenzhou city, many fishing boats are left unused and livelihoods of fisher folks are affected by the policy of buy-back. For Baifuchuanmu Company, they employed fish folks as employees and they worked over the old fishing boats. The fishing boats were reused and made to antique furniture.
- To assess the social and economic impact and environmental benefits of using existing recycling facilities in waste reduction, reuse and waste recycling.
- to develop economic studies and benefit scenario to help local government to make informed investment decision making in Blue Economy

Inputs
UNDP/GEF YSLME Phase II Project management Office (PMO) will facilitate the access to information and reports of completed and proposed projects, and provide logistics support to field trip to project sites.

Timing
The consultancy will begin in November 1, 2017 and end in December 31, 2018.

Reporting
The consultant will produce:

1. by March31, 2018, draft synthesis report including good practices and economic benefit scenario and case studies for review; and
2. by December 31, 2018, final report and case studies.

Reports should be submitted to Mr.Yinfeng Guo, CTA/Manger at email: yinfengg@unops.org

Activity 4 of Output 3.3.1 (REV)

support to develop regulatory measures for marine litter monitoring

TERMS OF REFERENCE

Developing regulatory measures for marine litter management in pilot areas of Yellow Sea in PR China

Consultancy classification: subcontract (NMEMC)
Budget line: 71200, Activity 4 of Output 3.3.1, Component 3. Budget: USD48,000;
Estimated start of work: November 01, 2017 and end in September 30, 2019

Background and Justification
Marine litter, including plastics and microplastics, is considered "a global concern affecting all the oceans of the world". It has been observed everywhere: from coastal areas to remote areas far from any anthropogenic pollution sources; from surface waters throughout the water column to the deep water and ocean sediments; and from the equator to the poles, including trapped in sea ice. The pollution is significant and widespread, with plastic debris found on even the most remote coastal areas and in every marine habitat. More than 800 marine species have been found to interact with marine litter to date, with ingestion and entanglement the two main types of interaction. Based on the transboundary diagnostic analysis of the Yellow Sea, one of the major environmental problems is the marine litter in the Yellow Sea.

Marine litter commonly stems from shoreline and recreational activities, commercial shipping and fishing, and dumping at sea. The majority of marine litter (approximately 80 per cent) entering the seas and oceans is considered to originate from land-based sources. Marine litter is as much a transboundary global problem as well as a local issue with a multitude of sources. Litter pollution in the marine and coastal environment is a challenging restoration and governance issue. Similar to many environmental problems, marine litter pollution is transboundary and therefore the governance solutions are complex. Reducing litter inputs and impacts on marine ecosystems is the first critical step in marine environment restoration. It requires a variety of solutions at local, regional, national, and global scales.

With the problem worsening, formal governance through international institutions or instruments, regional organizations or governments alone cannot resolve this exponentially increasing environmental problem. It has been recognized the limitations of existing international law and are calling for the development of a new international instrument specifically addressing marine litters. Although this is an important way forward, the process will be complex, may not be supported by all coastal states, and will not come into force any time soon.

A faster way forward might be to develop regulatory measures for marine litter monitoring, disposal, handling, reuse, and recycle in pilot site to enable investment on recycling economies. Dalian and Weihai, will be selected as the pilot cities. It is expected that this project will contribute to knowledge building in YSLME.

Objectives
The objective underlying the subcontract is to provide regulatory measures for marine litter monitoring, disposal, handling, reuse and recycle in pilot province or city of Yellow Sea. The project will support a series of activities leading to enhanced marine litter management capacity, and

development and application of regional guidelines on the control of marine litter.

Expected Outputs

The subcontractor is expected to deliver the following results:

3. Assessment of existing regulatory and policy incentives in the management of marine litter(microplastics) in pilot city;
4. Recommendation for prevention and control of marine litter in pilot city.

Activities

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

- Review of historical monitoring data of marine litter(microplastics) in pilot city
- Assessment of the types, distribution, quantity and composition, sources and identification of stakeholders of marine litter and (microplastics), and identify the "hotspot" area.
- Review of current policies and regulations together with current technologies for reducing litter
- Identification of gaps of existing management policies based on historical monitoring data assessment
- Drafting proposals for development of policy or financial incentives for consideration by provinces or cities report to incentivize investment by private sector in prevention, control, recycling, reuse of litter;
- Prepare case studies for lessons learning and dissemination of project outcomes

Inputs

UNDP/GEF YSLME Phase II Project management Office (PMO) will facilitate the access to information and reports of completed and proposed projects, and provide logistics support to field trip to project sites.

Timing

The subcontractor will begin in November 01 2017 and end in September 30, 2019.

Reporting

The subcontractor will produce the following reports within the specified timeframe:

6. By June 30 2018, prepare and submit a draft of regional assessment report on marine litter(microplastics) pollution, key elements of the contents include:
7. Status of marine litter (micorplastics) pollution in PR China
8. current policies and regulations, best available technologies and gaps
9. By 30 December 2018, submit economic analysis of using best available technologies and good management practices in reducing litter for consideration by pilot province or cities;
10. By September 30, 2018, submit proposal(s) for development of policy or financial incentives for consideration by provinces or cities incentivize investment by private sector;

All reports should be submitted in English and Chinese. Reports should be submitted to Mr. Yinfeng Guo, CTA/Manager at email: yinfengg@unops.org.