

## 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 mariculture; 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 Pudaos 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-star 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:

1. 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.
2. A retrospective economic analysis report of benefits of nutrient reduction and/or wetland construction or restoration projects since 2005; and
3. 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.

#### Scoping studies phase:

- 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:

1. by end of December, 2017, an activity report and draft scoping study report for review; and
2. 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](mailto:yinfengg@unops.org).