PROJECT INTERIM NARRATIVE REPORT

(To be updated at operational closure and financial closure of the project)

Date submitted
91007/ UNDP/GEF YSLME Phase II Project

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Project ID and title	91007	UNDP/GEF YSLME Phase II Project	
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1 EXECUTIVE SUMMARY

Start and end date	**11 July 2014 – 31 December 2020 (after two extensions)**
Overall budget	Total allocated resources: USD233,044,196, inclusive of GEF grant USD7,562,430; UNDP co-financing USD1,692,000; government and NGO co-financing (in cash and in kind) USD223,789,766.
Purpose	Foster a long-term sustainable institutional, policy, and financial arrangements for effective ecosystem-based management of the Yellow Sea
UNOPS Project Manager	Mr. Yinfeng GUO
Geographical area	For the purposes of defining boundaries, the northwestern project extent is a line drawn in a northeasterly direction from Penglai on the Shandong Peninsula to Lushun of Dalian of Liaoning Province. The Bohai Sea is excluded from the project area. The southern boundary is defined by a line drawn from the north bank of the Yangtze River (Chang Jiang) estuary to the south side of Jeju island and from there north to the Korean mainland. A map indicating the boundary of the YSLME covered by Phase II Project can be found on page 9 of the TDA 2020 via weblink: http://www.yslmep.org/?page_id=82.

Summary of the report's highlights.

As of October 9, 2020, the project has spent a total of USD USD7,403,028 of the USD7,562,430 GEF grant. These resources have enabled the project to achieve end of project targets of eight of the sixteen Outcomes according to the monitoring by the Project Management Office.

The transboundary diagnostic analysis (TDA) of environmental problems in 2007 was updated in 2020, and the update of the 2009 Strategic Action Programme (SAP) of the YSLME has been technically cleared by the National Working Groups (NWGs) of the PR China and RO Korea. The YSLME TDA/SAP updates being delivered for the benefits of the people of the YSLME provide tangible example of the utility of the science-based strategic planning approach to LME management and governance. In fisheries management, a 22% reduction of fishing vessels in PR China and 17% reduction in RO Korea have been achieved, along with increase of catch per unit effort (CUPE) by 18.4% from 2016 to 2017 in restocking, well above the expected 5% target. The comprehensive benefit of the IMTA demonstration in Sanggou Bay of PR China has increased by 131% while maintaining water quality of the ambient mariculture areas well within the national sea water quality standards. Integrated Multitrophic Aquaculture (IMTA) is also scaled up for replication nationwide by MARA in March 2020 as a good practice in response to COVID-19 pandemic. Through SAP implementation, the water pollution degree and areas of eutrophication were reduced, compared with that of five year ago and further efforts are needed for the nutrient levels to be maintained within the carrying capacity of the YSLME. The demonstration of integrated monitoring of wetland in Jiaozhou Bay of PR China indicates that wetland vegetation types are diverse, increasing important roles of the coastal wetland as migratory birds staging sites and improved water quality in the bay area. There is also observed decline of marine litter on beaches covered in the national monitoring programs and concrete reduction of solid waste in demonstration sites in both countries. The project has achieved the target of expanding the

coverage of marine protected area (MPA) of the marine and coastal areas to 3 percent, including designation of two new MPAs and a potential MPA with direct project support. The project facilitated the development and consensus building among the two countries on the monitoring programs of jellyfish, climate change, N/P/Si changes and HABs. With implementation of the two programs, data sharing will become more regular using agreed methodologies and monitoring network.

Gaps exist in implementation in regional governance, maintenance of coastal wetland with global biological significance and monitoring of ecosystem changes for informed decision making. The MOU for establishing the post-YSLME Project coordination mechanism is being discussed with details of the mechanism to be further defined. Project interventions have failed to maintain the areas of critical habitats at the 2009 SAP baseline level but the coastal reclamation trend was significantly reversed with the introduction of moratorium on coastal reclamation in PR China in Yellow Sea in 2018.

Good practices identified by the Project include the use of the science in the application of ecosystem-based management and in the update of the TDA and SAP, and successful mobilization and partnership with NGOs, academia and business associations in delivering on the ground tangible results in reducing stresses.

A number of TE recommendations are proposed for follow-up by the partners, including the preparation of a sustainability plan in the 4th quarter of 2020. Management responses are yet to be discussed at the ICC-4 to scale up and sustain the implementation of the YSLME SAP through a yet-to-be developed regional governance mechanism. A budgeted workplan with identification of responsible parties to complete the remaining 9 outputs is prepared to complete 4 reports by end of October and the remaining during operational closure and financial closure of the project. One or more retainer contracts to individual consultants need to be issued by UNOPS using the project contingency budget to assist the two countries in achieving sustainability of hard-gained project results.

2 BACKGROUND

Description of project background and information including UNOPS role, original outputs, outcome and impact. If there have been any amendments or adjustments, please include its detail as well.

Yellow Sea Large Marine Ecosystem (YSLME) is a water body bordered by PR China, RO Korea and DPR Korea, covering an area of 400,000 km^2. The people around the Yellow Sea rely on the Yellow Sea LME's ecosystem carrying capacity to provide capture fisheries resources, mariculture, support for wildlife, provision of bathing beaches and tourism, and its capacity to absorb nutrients and other pollutants. Fishing efforts were increased threefold between the 1960s and early 1980s, during which time the proportion of demersal species, such as small and large yellow croakers, hairtail, flatfish and cod, declined by more than 40 percent in terms of biomass. Other major transboundary problems include increasing discharge of pollutants; changes to ecosystem structure leading to an increase in jellyfish and harmful algal blooms; 40 percent loss of coastal wetlands from reclamation and conversions projects. The environmental foundation needed to sustain economic growth may be irreversibly altered, and the important human health implications

of a deteriorating environment such as increased agriculture and food contamination and air and water pollution, have resulted in a series of efforts to improve the environment.

The YSLME Phase II Project builds upon four years of regional cooperation for the sustainable use of the YSLME put in place by PR China and the RO Korea, supported by the Global Environment Facility (GEF) since 2004. The second phase project started on July 11 of 2014, and was extended twice. The Project was first extended to December 31 of 2019 and then further extended to December 31, 2020.

The objective of the UNDP/GEF YSLME Phase II Project (hereinafter referred to as YSLME Phase II Project) is to foster long-term sustainable institutional, policy, and financial arrangements for effective ecosystem-based management of the Yellow Sea (YS). To achieve this objective, the project will support the formation of an YSLME coordination mechanism that will oversee the implementation of the SAP; and will support the states' efforts to reduce the decline in biological resources and to restore depleted fish stocks in the Yellow Sea.

There are four components with a total of sixteen outcomes in the project:

1. Sustainable national and regional cooperation for ecosystem-based management.
2. Improved Ecosystem Carrying Capacity with respect to provisioning services.
3. Improved Ecosystem Carrying Capacity with respect to regulating and cultural services.
4. Improved Ecosystem Carrying Capacity with respect to supporting services.

The key outcomes sought are:

1. Establishment of a self-sustaining cooperative mechanism for ecosystem-based management.
2. Recovery of depleted fish stocks and improved mariculture production and quality.
3. Improved ecosystem health;
4. improved inter-sectoral coordination and mainstreaming of ecosystem-based management principles at the national level, maintenance of habitat areas, strengthened stakeholder participation in management and improved policy making.
5. Skills and capacity significantly developed for region-wide ecosystem-based management.

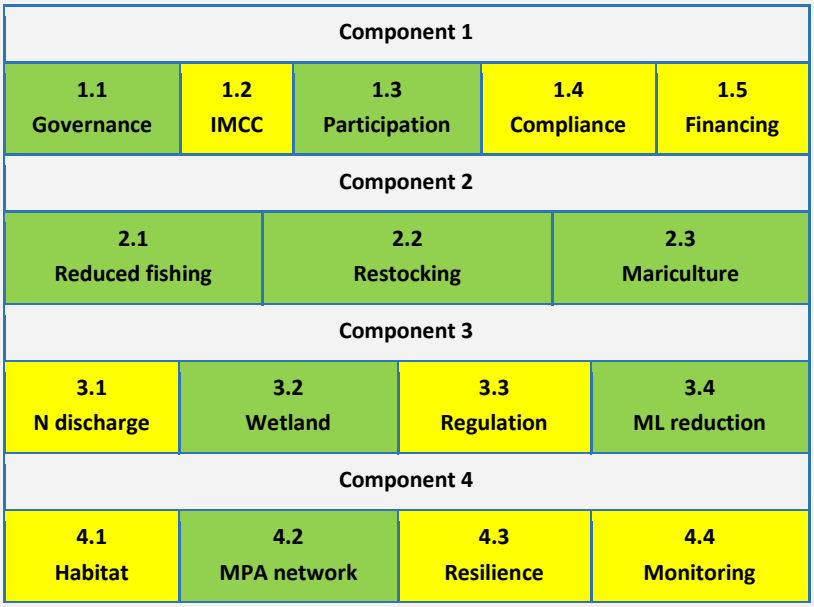
The project is implemented by UNOPS in accordance with its financial regulations, rules, practices and procedures. The project board is serviced by the YSLME Interim Commission Council represented by Ministry of Foreign Affairs (MOFA) of RO Korea, the Ministry of Natural Resources (MNR) of PR China, UNDP/GEF and UNOPS. The Secretariat services are performed by Project Management Office located in Incheon of RO Korea.

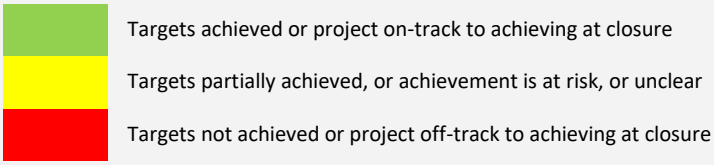
3 PROJECT RESULTS

3.1 Review of project objectives

Description of how the project performed against planned outputs, outcomes and impact. Also, mention the benefits achieved to date and any expected benefits after project closure.

The project has 4 components and 16 outcomes. Below is a summary of the assessment of the achievement of the project of the sixteen outcomes.





In the section below, indicators, baseline, end of project targets and overall assessment of performance of each outcome is presented in a succinct way. For more details of the assessment, please refer to **Annex I**.

Component 1: Ensuring Sustainable Regional and National Cooperation for Ecosystem-Based Management

Outcome 1.1 Regional Governance structure - the YSLME Commission – established, Operational and sustained, based on strengthened partnerships & regional co-ordination; wider stakeholder participation and enhanced public awareness

Indicator: Status of YSLME Commission and subsidiary bodies at regional level
Baseline: *ad hoc* regional co-ordination through the YSLME Regional Project Board and weak cross sector management at the national level
End of project targets: 1) All the Terms of Reference for the YSLME Commission and Subsidiary Bodies approved by all participating country Governments; 2) Functioning YSLME Commission
Overall assessment: *End of project target is highly likely to be achieved during the remaining period of the project.* The interim YSLME Commission and its subsidiary bodies were institutionalized with agreed TORs and rules of procedures to successfully coordinate the implementation of the SAP facilitated by the YSLME Phase II Project. The mechanisms have been operationalized in the past three years through conduct of 5 meetings of the interim YSLME Commission Council (ICC), 11 meetings of the six Regional Working Group (RWGs), and a series of technical workshops and exchange visits including the 3rd YSLME Science Conference. This update of the TDA in 2020 reflects the strong commitments of PR China and RO Korea and other partners in sustaining the science-based LME approach. Both countries also committed to use the concrete scientific findings of the TDA to inform their discussions towards the ongoing update of the SAP

that will outline joint management and governance efforts towards achieving the sustainable management of the YSLME. There is a strong likelihood that the project will provide a tangible example of the utility of this science-based strategic planning approach to LME management and governance as supported by the GEF.

Outcome 1.2 Improved inter-sectoral coordination and collaboration at the national level, based on more effective IMCCs

Indicator: Status of Inter-Ministerial Coordinating Committee (IMCC)
Baseline: Sector management has been the normal arrangements with limited inter-sector or inter-ministerial interactions; where coordination was done, it was on a case by case such as fishery management activities
End of project targets: 1) Participation of Ministries in the IMCC will include but not limited to the following: Ministry of Foreign Affairs, Ministry of Finance, relevant department or ministry of ocean & fishery; 2) Two meetings of IMCC every year and functioning coordination
Overall assessment: Both PR China and RO Korea has operationalized and strengthened the IMCC in the implementation of the project. The future of the IMCC under the new governance mechanism remains to be clarified after the regional coordination mechanism is established but *the likelihood of having the IMCC or similar national coordination mechanism is high given the active participation in TDA and SAP update and participation in the YSLME II Project implementation.*

Outcome 1.3 Wider participation in SAP implementation fostered through capacity building and public awareness, based on strengthened Yellow Sea partnership and wider stakeholder participation; improved environmental awareness; enhanced capacity to implement ecosystem-based management

Indicator: Number of the YS Partnerships; Number of activities on capacity building and public awareness; Number of participants in capacity building activities
Baseline: 20 members of the Yellow Sea Partnership
End of project targets: Number of partnerships: 40; Number of capacity building activities: 25; Number of public awareness initiatives: 15; Number of participants in capacity building activities: about 200
Overall assessment: The Project collaborated with more than 50 global, regional and national organizations from PR China and RO Korea in implementation of the YSLME Phase II Project. MOUs, Project Cooperation Agreements (PCAs), Grant Service Agreements (GSAs) and other agreements were signed with 15 organizations in PR China, RO Korea and USA to enable operation of the project office in RO Korea and PR China, implement the project with project cooperation and grant modality and use of audio and visual materials in the production of project videos. The Project organized 57 events, including technical workshops (21), ICC and RWG meetings (22), training courses (8) and study visits (6) benefitting a total of 1,845 participants with 30% women. The project also organized 15 public awareness-raising activities in collaboration with its partners. A list of these events is available in a separate document, and programs and presentations of all the events are accessible from project website (www.yslmep.org). The project also produced and implemented a communication strategy. Communication products and distribution channels and impact are introduced in detail in the section J of the report on communication impact.

Outcome 1.4 Improved compliance with regional and international treaties, agreements and guidelines

Indicator: Status of recognition and compliance to regional and international treaties and agreements
Baseline: Regional and international treaties and agreements are recognized by PR China, but not fully compliant.
End of project targets: Better compliance of the relevant regional and international treaties and agreement e.g. UNCLOS, the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, CBD, Ramsar, The FAO Code of Conduct for Responsible Fisheries, and the bilateral agreements between PR China and RO Korea on environment protection and fisheries
Overall assessment: *This target is fully anticipated within the project duration.* The Project approach to achieving compliance of international ocean-related treaties and agreements is through review of the gaps in compliance with international instruments, in particular the FAO Code of Conduct for Responsible Fisheries (CCRF) and implementation of suites of compliance activities. Development and adoption of national responsible fisheries certification standards in PR China and regional guidelines on responsible fisheries in YSLME are two deliverables in this regard. The national responsible fisheries certification standards are in the process of review by Ministry of Agriculture and Rural Affairs (MARA) of PR China, and there is already a consensus on the regional guidelines for responsible fisheries in YSLME for adoption by the two countries. Capacity gaps in compliance with FAO CCRF have been addressed through various project activities contributing to awareness and capacity development and level of compliance.

Outcome 1.5 Sustainable financing for regional collaboration on ecosystem-based management secured, based on cost-efficient and ecologically-effective actions

Indicator: Agreement on the financial arrangement for the YSLME Commission
Baseline: YSLME Commission does not exist at start of project
End of project targets: Financing agreement between and among countries agreed to fully support YSLME for at least 5 years.
Overall assessment: Target yet to be achieved. Financing agreement for operation of the YSLME mechanism after project closure and secretariat staffing is included in the bilateral discussion on the MOU and post-YSLME Project coordination mechanism. It is likely that the financing mechanism will be finalized within the project duration but the financing arrangement is uncertain due to the COVID-19 pandemic.

<u>Component 2: Improving Ecosystem Carrying Capacity with Respect to Provisioning Services</u>

Outcome 2.1 Recovery of depleted fish stocks as shown by increasing mean trophic level
Indicator: Number of fishing boats decommissioned from the fleet in YSLME waters

Baseline: 54,068 in 2015 in Liaoning, Shandong and Jiangsu; 26,439 fishing vessels operating in Yellow Sea in RO Korea in 2011
End of project targets: Fishing boat numbers substantially reduced by 10%, in line with the 2020 target of 30% reduction
Overall assessment: *The project has achieved the end of the project target.* There is 22% reduction of fishing vessels in three provinces of PR China from 2015-2018 based on statistics of vessel reduction in China Fisheries Yearbook, and 17% reduction of the fishing vessels operating in Yellow Sea in RO Korea from 2011 to 2017.

Outcome 2.2 Enhanced fish stocks through re-stocking and habitat improvement

Indicator: Status of major commercially important fish stock from restocking and habitat improvement
Baseline: Effectiveness of restocking and habitat protection not evaluated
End of project targets: Measurable improvement (5%) in standing stock and catch per unit effort (CPUE)
Overall assessment: *The Target is achieved.* Based on the results of demonstration of restocking in one site in PR China and assessment of effectiveness of fishing closure, the commercial fish stock from restocking and habitat improvement has achieved the project target of 5% improvement in CPUE.

Outcome 2.3 Enhanced and sustainable mariculture production, by increasing productivity per unit area, as a means to ease pressure on capture fisheries
Indicator: 1) Type of mariculture production technology; 2) Level of pollutant discharge from mariculture operations
Baseline: Declining quality of mariculture products; Declining quantity of production per unit area from mariculture; Environmental impacts of mariculture not evaluated
End of project targets: Reduction of contaminants caused by mariculture production (5% reduction in the demo sites); Measurable increase (5% increase in the demo sites) in mariculture production per unit area; Discharge of nutrient and other discharges from mariculture
Overall assessment: *The project targets are fully achieved.* In the two demonstration areas supported by the Project, the Project has achieved the target of 5% increase in mariculture production per unit area and reduction of nutrients and contaminants by 5%. In addition, there is also successful scaling up of IMTA in the city of Rongcheng, and promotion through government circular of carrying capacity and IMTA for replication nationwide.

Component 3: Improving Ecosystem Carrying Capacity with respect to Regulating and Cultural Services

Outcome 3.1 Ecosystem health improved through a reduction in pollutant discharges (e.g. nutrients) from land-based sources

Indicator: Level of pollutant discharges particularly nitrogen in YSLME tributaries
Baseline: Discharge reductions do not meet the regional target
End of project targets: 10% reductions in N discharges every 5 years
Overall assessment: The project supported a number of studies and assessment of the nutrient loadings in the Yellow Sea including demonstration of nutrient loading and watershed modelling. Through the areas of eutrophication having a trend of marked decrease from 2015 to 2017 according to Marine Environment Quality Bulletin issued by State Oceanic Administration (2018), the considerable nitrogen inputs from atmospheric disposition at a magnitude similar to that from land-based source and limited improvements in fertilizer use efficiency in the same acreage of farmland in the three provinces of the Yellow Sea in PR China suggest that *meeting the project targets is unlikely within the project duration*.

Outcome 3.2 Wider application of pollution-reduction techniques piloted at demonstration sites.
Indicator: Types of technologies applied for pollution reduction

Baseline: Some innovations such as man-made wetlands are being undertaken nationally but without regional coordination or dissemination of results
End of project targets: Successful demonstration of use of artificial wetlands in pollution control in 1 site and replicated in about 2 coastal municipalities and local government units

Overall assessment: Consultancy on use of constructed wetland as nutrient sinks clearly indicates the progress being made in the use of constructed wetland as nutrient sinks in both countries. Similarly, the demonstration of integrated monitoring of wetland in Jiaozhou Bay shows diverse wetland vegetation types though with rapid expansion of *Spartina alterniflora,* increasing use of the areas by migratory birds as staging sites including the rediscovered critically endangered Chinese crested tern (*Sterna bernsteini*) and improved water quality in the bay area. These achievements have shown that the two countries have accomplished the project target but with indirect contribution by the YSLME Project.

Outcome 3.3 Strengthened legal and regulatory processes to control pollution

Indicator: Status of legal and regulatory process to control pollution
Baseline: Weak legal and regulatory framework to control pollution in provinces bordering in the YSLME
End of project targets: Develop evaluation tools, in the first year, to assist in harmonizing national and provincial legislation to improve coastal water quality in Shandong, Jiangsu and Liaoning provinces
Overall assessment: *Target is yet to be achieved.* The ongoing revision of the marine environmental protection law (MEPL) in PR China initiated in 2019 provides a timely opportunity to transform the results and recommendation of project-supported assessment into legal and policy recommendation for consideration in the revision process. Yet the process of update or development of any marine-environment related laws and regulations at provincial and local levels is postponed due to the ongoing revision of MEPL at national level.

Outcome 3.4 Marine Litter controlled at selected locations

Indicator: Status of the control of marine litter at selected locations
Baseline: Due to a lack of appreciation of the problem little action is currently being undertaken
End of project targets: 1) Regional Guidelines on control of marine litter based on those initiated by NOWPAP produced and adopted for use in the Yellow Sea; 2) Established regional data base in the first year, and significant reduction in the quantities of marine litter at selected beach locations
Overall assessment: *The target of the project has been achieved*. The project interventions to reduce marine litter in the Yellow Sea region covered legal studies, monitoring and policy advice at local level, and demonstration with engagement of citizen science and NGO actions to understand the status of marine litter from the fishery and aquaculture sector and concrete reduction of wastes and garbage at village level through partnership development with private sector. In the past decade, there is also observed decline of marine litter on beaches covered in the national monitoring programs in both countries.

<u>Component 4: Improving Ecosystem Carrying Capacity with respect to Supporting Services</u>

Outcome 4.1 Maintenance of current habitats and the monitoring and mitigation of the impacts of reclamation

Indicator: Areas of critical habitats; Status of mitigation of reclamation impacts
Baseline: Coastal habitats critical to maintaining ecosystem services continue to be converted or reclaimed unchecked
End of project targets: Areas of critical habitats maintained at current level.
Overall assessment: Project interventions to maintain the areas of critical habitats at the baseline level were unsuccessful due to continued reclamation and the fast economic development. But the

coastal reclamation trend was significantly checked with the introduction of moratorium on coastal reclamation in PR China in Yellow Sea and Bohai Sea in 2018. Lessons learnt were reviewed and fed into the development of YSLME Biodiversity Conservation Plan pending endorsement by both countries. Engagement of NGOs and demonstration of community co-management in conservation of coastal wetland helped local stakeholders and MPAs find alternative solutions to conflicts of coastal fisheries and migratory bird protection. Considering the time needed to save the remaining coastal intertidal flats and restore the degraded coastal wetland, *the* project target is unlikely to be achieved within the project timeframe.

Outcome 4.2 MPA network strengthened in the yellow Sea

Indicator: level of ecological connectivity in expansion of the Yellow Sea MPA system.
Baseline: the planned expansion of the MPA system currently does not take into account ecological connectivity
End of project targets: Increase 3% total areas as MPAs; the planned expansion of the MPA system currently does take into account ecological connectivity (measured by use of developed connectivity tool kit or other means)
Overall assessment: The project has achieved the target of expanding the coverage of MPA of the marine and coastal areas to 3 percent. As of 2019, the MPAs including fish spawning and nursery ground account for more than 5 percent of the areas of the Yellow Sea. There are two newly established MPAs by partners in an area of 218 km^2 and a potential designation of 42 km^2 as a new MPA with direct project support. The stakeholders of the two countries was fully capacitated through training and discussion in building biophysical connectivity of the MPAs in the region focusing on Spotted Seal and Spoon-billed Sandpiper and the initial establishment of the YSLME MPA Network for communication for Spotted Seal and Spoon-billed Sandpiper.

Outcome 4.3 Adaptive management mainstreamed to enhance the resilience of the YSLME and reduce the vulnerability of coastal communities to climate change impacts on ecosystem processes and other threats identified in the TDA and SAP

Indicator: Status of incorporation of adaptive management of climate change regional strategies and in ICM plans for selected coastal communities
Baseline: Inadequate considerations are being given to the impacts of climate change (CC)
End of project targets: 1) CC adaptation strategies incorporated in regional strategies such as YSCWM and plankton communities; 2) ICM plans in coastal communities incorporate CC adaptation to improve climate resilience
Overall assessment: Overall, the likelihood of project intervention in achieving this outcome is unclear. In Project has failed to understand the relationships between the changes of the YSCWM and structure of the plankton communities due to lack of quantitative analysis and the need for in situ observations at multiple scales and the high-resolution biological-physical modelling. The regional adaptive management strategy to climate change lack data-supported vulnerability analysis to base adaption strategies. In the Dandong adaption plan, local governments have not been actively involved to address local needs and subsequent buy-in.

Outcome 4.4 Application of Ecosystem-based Community Management (EBCM) in preparing risk management plans to address climate variability and coastal disasters

Indicator: Status of Regional Monitoring Network for application of ECBM
Baseline: National Monitoring will continue without regional linkages and harmonization making regional analyses difficult or impossible

End of project targets: 1) Agreed number of cruises & parameters for the regional monitoring network established and data shared regionally via the project web site. 2) Regular LME-wide assessments; enhanced information exchange; periodic scenarios of ecosystem change
Overall assessment: The project facilitated the development and consensus building among the two countries on the Regional Jellyfish Monitoring Program, and A Comprehensive Regional Monitoring System: Monitoring Strategies for Climate Change, N/P/Si Changes, HABs (Harmful algal blooms), and Jellyfish Blooms. Data from the two countries are also shared in the development of the monitoring programs and harmful marine organism workshops. With implementation of the two programs, data sharing will become more regular using agreed methodologies to collect data from the agreed monitoring network. In this sense, *the target is partially achieved but the implementation of the two regional programs are yet to be fully implemented.*

3.2 Review of the Project Implementation

Descriptions of the detailed actions taken to ensure sustainability and resilience of results regarding social and gender, economic, environmental and capacity building aspects. Omit sub-section(s) if not applicable for your project.

The Project collaborated with more than 50 global, regional and national organizations from PR China and RO Korea in implementation of the YSLME Phase II Project. MOUs, Project Cooperation Agreements (PCAs), Grant Service Agreements (GSAs) and other agreements were signed with 15 organizations in PR China, RO Korea and USA to enable achievement of the project end of the project targes and development objectives.

The Project organized 57 events, including technical workshops (21), ICC and RWG meetings (22), training courses (8) and study visits (6) benefitting a total of 1,845 participants with 30% women. The project also organized 15 public awareness-raising activities in collaboration with its partners. The list of Meetings, Workshops, and Study Visits with gender-segregated data is attached as **Annex II**.

The project engaged a total of 31 service providers provided consultancies on assessment, review, studies, development of training modules, videos, etc. **Table 1** illustrates the engagement types and deliverables produced through GEF grant and co-financing from RO Korea. A list of the 141 reports and products is attached in Annex III as YSLME bibliography. All the documents listed in **Annex II** and **Annex III** are web-linked and accessible from project website (www.yslmep.org).

Table 1: Number of deliverables and engagement types in YSLME Phase II Project

Type	Number of Contractors	Number of deliverables
GSA	7	35
PCA	4	62
Subcontractor	5	18
Individual Consultant	16	26
Total	31	141

In the YSLME Phase II Project, the sustainability of the application of science-based adaptive management of the YSLME is ensured with the adoption of the updated TDA and SAP demonstrating the countries' commitment to long term environmental objectives. Institutionally, the regional coordination mechanism to be established by the countries will provide the very means to coordinating the implementation, review and monitoring and evaluation of the progress of updated SAP. The inter-ministerial coordination mechanism established in the two countries will also serve as an important element of sustainability of the project. Another indicator of sustainability will be the YSLME countries commitment to financing a long-term regional coordination mechanism. Social sustainability has been achieved through active involvement of stakeholders in many aspects of the project and needs to be further strengthened. Technically, the project has established and operationalized six regional working groups (RWGs) and national working groups (NWGs) and will be continuously maintained in the post-YSLME project period to monitor and assess implementation of the SAP. At the same time, training modules were prepared and made available to wider stakeholders in their own languages to help further disseminate the knowledge and expertise.

3.2.1 Strategic planning

Updating the TDA and the adoption of the updated SAP of the YSLME as a subsidiary document of the Memorandum of Understanding between PR China and RO Korea on the post-YSLME Project arrangement are the two ambitious targets agreed at the inception period of the second phase of the YSLME Project. These are also essential instruments in sustaining regional governance of the YSLME in the coming decade. The six Regional Working Groups (RWGs) consisting of eminent experts from both PR China and RO Korea in the areas of assessment and monitoring, habitats, fish stocks, governance, pollution reduction and sustainable mariculture were fully engaged in the update process of TDA (2007) and SAP (2009-2020). National Marine Hazard Mitigation Service (NMHMS) of the Ministry of Natural Resources (MNR) of PR China and the Korea Marine Environment Management Corporation (KOEM) of the Ministry of Oceans and Fisheries (MOF) of RO Korea facilitated the consultation and coordination at the national level. The update process confirmed that challenges identified in the original TDA remain to be crucial in the coming years. These include fishing effort exceeding ecosystem carrying capacity; unsustainable mariculture; pollution and contaminants; eutrophication; change in ecosystem structure; habitat loss and degradation; and climate change. The TDA 2020 highlights microplastics, seasonal ocean acidification, broader range of climate change impacts, and changes in patterns of harmful algal blooms, possible increase in frequency of toxic algal blooms, and drifting macroalgae Sargassum as emerging issues to the YSLME that the updated SAP will need to respond in the next decade.

The SAP is a policy document negotiated between PR China and RO Korea in responding to the transboundary marine environmental challenges in the Yellow Sea and achieving the vision and mission of the YSLME regional mechanism. The TDA was completed in July 2020 and is the primary source of scientific and technical information for the recommended strategic actions. This document provides the 3 goals, 10 targets and enabling measures to anticipate the continued management of the YSLME for the decade ahead. At the time of the Interim Commission Council (ICC) meeting held on October 19, 2020, the SAP will be approved in principle and will be signed after going through clearance by line ministries in the two countries.

Agreed monitoring protocols, strategies and plans will be integrated in the SAP, covering monitoring of marine litter and jellyfish, assessment of the effectiveness of closure and fishing vessel buy-back scheme, watershed modelling to tracking the migration of the spotted seals, regional responsible fisheries guidelines, biodiversity conservation plan, etc.

3.2.2 institutional sustainability

The interim YSLME Commission and its subsidiary bodies were institutionalized with agreed TORs and rules of procedures to successfully coordinate the implementation of the SAP facilitated by the YSLME Phase II Project. The mechanisms have been operationalized in the past three years through conduct of 5 meetings of the ICC, 11 meetings of the 6 Regional Working Group (RWGs), and a series of technical workshops and exchange visits including the 3rd YSLME Science Conference. Bilateral consultations are ongoing to conclude a MOU to specify the post-project institutional arrangement for coordinating the implementation of the SAP.

Both PR China and RO Korea have operationalized and strengthened the IMCC in the implementation of the project. The future of the IMCC under the new governance mechanism remains to be clarified after the regional coordination mechanism is established but the likelihood of having the IMCC or similar national coordination mechanism is high given the active participation in TDA and SAP update and participation in the YSLME II Project implementation.

3.2.3 Financial sustainability

During the implementation of the SAP, both PR China and RO Korea leveraged significant amount of investment while the project management office in terms of staffing was supported by the GEF. Financing agreement for operation of the YSLME mechanism after project closure and secretariat staffing is included in the bilateral discussion on the MOU and post-YSLME Project coordination mechanism. It is likely that the financing mechanism will be finalized within the project duration but the financing arrangement is uncertain due to the COVID-19 pandemic.

3.2.4 Social sustainability

Active involvement of stakeholders in as many aspects of the project as possible. Yellow Sea Partnership (YSP) was established in 2006 in the first phase, and is a multi-stakeholder initiative at global, regional, national and local scales to implement the YSLME SAP. This partnership is further backstopped by the UNDP/GEF YSLME Phase II Project through the adoption of the Guidelines for Strengthening the Yellow Sea Partnership seeking to assist the wider participation in the SAP implementation with respect to continuing and expanding current efforts to protect the marine environment and its resources in the region. The Project Management Office (PMO) of the YSLME project serves as Secretariat for partnership arrangement and facilitate the organization of meetings and activities. The Guidelines also specifies the partnership arrangements, values and eligibilities.

The YSLME Phase II Project collaborated with more than 50 global, regional and national partners from PR China and RO Korea in implementation of the YSLME Phase II Project. MOUs, Project Cooperation Agreements (PCAs), Grant Agreement Agreements (GSAs) and other agreements were signed with 15 organizations in PR China, RO Korea and USA to enable operation of the project office in RO Korea and PR China, implement the project with project cooperation and grant modality and use of audio and visual materials in the production of project videos. Benefiting from the Yellow Sea Partnerships, the Project organized 57 events, including 21 technical workshops, 8 training courses and 6 study visits benefitting a total of 1,845 participants. The project also organized 15 public awareness-raising activities in collaboration with its partners.

The Project established the Yellow Sea Grant Program and awarded seven organizations in the amount of USD $484,448 to contribute to achievement of the end of project targets related with

public education and awareness, sustainable livelihoods, fish restocking and IMTA, reduction of marine waste and marine litter, and conservation and protection of endangered migratory species and their coastal habitats. These grantees are:1) Beijing Chaoyang District Yongxu Global Environmental Institute (GEI), 2) Blue Ribbon Ocean Conservation Association (BROCA), 3) China Aquatic Products Processing and Marketing Alliance (CAPPMA), 4) Chinese Academy of Fishery Science (CAFS), 5) Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences (IGSNRR), 6) Shanghai Rendu Ocean NPO Development Center, 7) China Biodiversity Conservation and Green Development Foundation (CBCGDF). The grants contributed to the delivery of the following concrete impact, including: 1) improved understanding of the state of the Yellow Sea and public participation through education, field trips and other educational activities; 2) Improvements in management effectiveness of conservation areas for aquatic genetic resources through strengthening policy and regulatory framework; 3) higher awareness of the concept of carrying capacity of ecosystem led to improved awareness from the frontlines and stress reduction to endangered species and change of the destructing behavior; 4) Strengthened partnership and a wider stakeholders' participation for bigger impact; 5) strong likelihood of integration of social responsibility into private sector business development and changing behavior in mariculture production, processing and wholesaling and addressing management gaps and community engagement in conservation; and 6) leveraging additional financial resource of USD $726,536 for implementation of the SAP of YSLME.

The Project work with enterprises in the demonstration of sustainable mariculture, marine ranching, and the promotion of responsible mariculture in partnership with business association. In PR China, integrated multitrophic aquaculture (IMTA) was demonstrated in Sungo Bay with stocking of kelp and oyster and in Haiyang in a pond-based IMTA with two enterprises. Demonstration in Sungo Bay shows that the yield increased by 14.8 percent, labor costs reduced by 10 percent, and economic benefits increased by 57.85 percent. The comprehensive benefit of the IMTA demonstration area increased by 131.1 percent. Meanwhile, DO, total inorganic nitrogen concentration, chlorophyll-a concentration in the surface, phytoplankton and POM can meet the high standard established in the national sea water quality standards. In Haiyang, the nitrogen and phosphorus in the seawater is significantly reduced in the IMTA pond, with a total of CNY193,000 net profit in the 1 ha outdoor pond stocked with sea cucumber. A training center with 120 m^2 meeting room for use in training on IMTA has been constructed by Dongchu Island Fishery Cooperation, a community-based enterprise specializing in aquaculture of kelp, abalone, scallop, sea urchin and sea cucumber with technical assistance from YSFRI/PRC. Three training courses for Chinese mariculture managers and academia were conducted in 2018 and 2019 respectively.

A twinning between YSLME and Caribbean Regional Fishery Mechanism (CRFM) was facilitated by IW:Learn of IOC/UNESCO to transfer the IMTA knowledge in three Caribbean countries, signalling widespread recognition of YSLME as a source of knowledge and expertise in sustainable mariculture.

The social capital generated through partnership in Phase II Project can further be catalyzed in the implementation of the updated SAP.

3.2.5 Capacity building and technical sustainability

The Project collaborated with more than 50 global, regional and national organizations from PR China and RO Korea in implementation of the YSLME Phase II Project. MOUs, Project Cooperation Agreements (PCAs), Grant Service Agreements (GSAs) and other agreements were signed with 15

organizations in PR China, RO Korea and USA to enable operation of the project office in RO Korea and PR China, implement the project with project cooperation and grant modality and use of audio and visual materials in the production of project videos. The Project organized 57 events, including technical workshops (21), ICC and RWG meetings (22), training courses (8) and study visits (6) benefitting a total of 1,845 participants with 30% women. The project also organized 15 public awareness-raising activities in collaboration with its partners.

3.2.6 Replication

The project through its 4 components has disseminated the experiences and lessons learnt adapting to other regions of the PR China and the world, in particular in the application of science and ecosystem-based management approaches to fisheries, sustainable mariculture, MPA networking through LME:LEARN and the Biennial GEF IW Conference.

Knowledge management: Through knowledge management, the project has produced training modules on monitoring of marine microplastics, a toolkit for developing a network of marine protected areas using the principle of biophysical connectivity, and the training manual on integrated coastal management. These training toolkits were used as materials at the six training courses (1 for MPA networking, 4 for IMTA and 1 for microplastics) organized by the Project. IMTA training were also provided by regional working group members in PR China and RO Korea in Asia Aquaculture Conference in 2018 and during the Xiamen World Ocean Week in the same year.

Cross-site visit: Organization of cross-site visit to local government officials, business representatives and ocean managers is another project approach to help replicate project experiences and good practices. The project facilitated the exchange visits of Korean experts to two marine ranching sites in PR China and three marine environmental monitoring labs based in Dalian (NMEMC) and Qingdao (FIO and NCSEMC). Likewise, Chinese experts also visited two labs in ROK (KOEM and KIOST) and two marine ranching sites (Jeju and Gunsan). With assistance from Eco-Horizon, a Korean NGO, MPA staff were able to visit two MPA sites in RO Korea exchanging experiences in monitoring of migratory birds and managing MPA for tidal flats.

South-South Cooperation and/or Triangular Cooperation: A twinning between YSLME and Caribbean Regional Fishery Mechanism (CRFM) was facilitated by IW:Learn of IOC/UNESCO to transfer the IMTA knowledge in three Caribbean countries, signalling widespread recognition of YSLME as a source of knowledge and expertise in sustainable mariculture. The PMO and YSFRI and Chudao Village hosted a week-long field visit by Mr. Milton Haughton, Executive Director of CRFM and a senior government official from its member country Jamaica. The visit made the CRFM determined to lobby IMTA as the blue growth path towards sustainable mariculture and will integrate IMTA in future development programs and bilateral cooperation. Due to COVID-19 pandemic, a return visit to Caribbean countries planned in February 2020 was cancelled but the YSLME team is in close contact with CRFM to assist in follow-up actions to promote IMTA in Caribbean region, including translation and distribution of the MARA notification as a good practice in response to COVID-19 in mariculture sector.

Communications and awareness:
The project prepared the YSLME Communication and Awareness Raising Strategy in 2018 to guide YSLME Project in further strengthening the replication of project's data and information, and fostering knowledge exchange and partnership building through communication and visibility. (Copy of the Strategy is available from the bibliography of project deliverables in Annex III). The communication strategy entails for the following features and products:

***Online Presence*:**
The key platforms utilized by the Project for disseminating its knowledge and communication products, as well as project updates and events are the Project's website and social media accounts, which are accessible via the following links:
(YSLME Project's website) http://www.yslmep.org/
(Facebook account) https://www.facebook.com/YSLME-Project-633427193814768
(Instagram account) https://www.instagram.com/undp_gef_yslme_phaseii_project/?hl=en%20
(Twitter account) https://twitter.com/YSLMEP
(WeChat account) https://mp.weixin.qq.com/s/KUZZxfIWfNyd1vEsuZR1HA
Audience metrics for Facebook: To date, the YSLME Facebook page has reached 2.7K. In terms of gender groups 51% of likes are from women, and 48% likes are from men.

Communication Products:
(Newsletter and Press Releases) http://www.yslmep.org/?page_id=91
To date, 50 news releases have been issued by the YSLME PMO, while YSLME news have also been posted or shared by various partners. (Media Monitoring System with links uploaded and accessible from website) In addition, 56 news releases were also published by YSLME partners either in English, Chinese and Korean languages.

(Fact Sheets)
• Two Fact Sheets on Marine Litter and Coastal Wetland Restoration are undergoing final technical review, and are targeted for publication in July 2020

(Videos)
http://www.yslmep.org/?page_id=3438

(information videos)
Six information videos produced capturing progress and initiatives being undertaken to address key issue areas in the Yellow Sea:
• Short information video on Saving the Critically-Endangered Spoon-billed Sandpiper in English, Chinese, and Korean versions (released May 2020-Biodiversity Day)
• Restoring the Ecosystem Carrying Capacity and Enabling the Return of Fish Species in the Yellow Sea (released June 2020- World Oceans Day)
• Sealing a New Ecological Contract with the Yellow Sea through IMTA: The Story of Dongchu Island (released June 2020- World Oceans Day)
• Cracking Down on the Tiny but Dangerous Microplastics: Responding to Challenges of Marine Litter (released June 2020- World Oceans Day)
• Saving the Remaining Intertidal Mudflats in the Yellow Sea for the Critically-Endangered Spoon-billed Sandpiper (released June 2020- World Oceans Day)
• Developing a Network of Marine Protected Areas in the Yellow Sea (released June 2020)
• Restoring the Ecosystem Carrying Capacity of the Yellow Sea/ Project Video (undergoing final edits, targeted for release in July 2020)

(Brochures)
• Project Brochure
• IMTA Brochure (in English and Chinese version)
• YSLME SAP contributions to SDG14 Brochure (ongoing and targeted for release in July 2020)
• 3rd YSLME Science Conference

(Event Banners)
• Web banners accompanied by YSLME Messages were created as part of commemoration of key international environment-related celebrations (i.e. World Biodiversity Day, World Migratory Birds Day, World Earth Day, World Oceans Day)

(Training modules)
• IMTA Training Manual (http://www.yslmep.org/wp-content/uploads/2020/05/YSLME-Training-Module-for-Integrated-Multitrophic-Aquaculture-in-PR-China-09202018-1.pdf)
• MPA Network Design Toolkit (http://www.yslmep.org/wp-content/uploads/2019/11/YSLME-MPA-Network-Design-Toolkit.pdf)
• Marine Microplastics Monitoring (http://www.yslmep.org/wp-content/uploads/2019/10/YSLME-Training-module-on-marine-microplastics-PDF-version.pdf)

(Technical Reports)
• Technical Reports and videos related to Fish Stock Recovery, Sustainable Mariculture, Habitat Conservation, Pollution Reduction and Good Governance (http://www.yslmep.org/?page_id=82). The bibliography of the technical reports is listed in Annex III.

(IW:LEARN Linkages) YSLME updates/news features have been shared and released via the IW:LEARN newsletters and website, such as:
• 3rd Asia Pacific Regional Network Newsletter 2020 (https://iwlearn.net/resolveuid/da6a1495-7d88-4b24-9ed0-f19e64bf49ea)
• https://iwlearn.net/events/data-and-information-management-workshop-for-lmes-of-asia
• https://iwlearn.net/marine/highlights/yslme-gears-up-for-the-3rd-science-conference
• https://iwlearn.net/marine/highlights/launching-yslme-phase-ii-project

(Awareness Raising Activities)
(High-level YSLME events) Meeting Reports http://www.yslmep.org/?page_id=80
(Workshops, Trainings) Training Resources http://www.yslmep.org/?page_id=84
(YSLME Small Grants Programme) SGP-related Documents http://www.yslmep.org/?page_id=82
(Beach Clean Up) Partnership with BROCA, Rendu, OSEAN http://www.yslmep.org/?p=3095

(Webinars)
• Webinar on Results of Census on Spoon-billed Sandpipers in China (May 2020)
• Webinar on Management Planning for Spotted Seals in the Yellow Sea (May 2020)

(Project brochure)
Guided by Dr. Andrew Hudson, Head of Water and Ocean Governance Programme of UNDP, the prepared a project brochure showcasing the transformational changes from implementation of the YSLME SAP in the two project phases. The brochure entitled "*the YSLME Story: Management and Governance for the Restoration and Protection of the Yellow Sea Large Marine Ecosystem*", is still under preparation at the time of preparing for this report, and is expected to be completed after the project wrap-up meeting to be held on October 19, 2020.

(Special issue on carrying capacity of YSLME in peer-reviewed journal)
Over 80 percent of fisheries occur within 200 nautical miles in the world. Dr. Shermen (NOAA) classified these coastal areas under most intensive human interferences into 66 large marine ecosystems in the 1990s which have successfully leveraged support by the Global Environment Facility (GEF) to strengthen good regional ocean governance to address depletion of fish stocks, loss of biodiversity, eutrophication and ecosystem changes. With assistance from the UNDP and

funding of the GEF, TDA and SAP of YSLME were developed and implemented from 2005 to 2020 and updated using science and ecosystem-based adaptive management approach. In partnership with *Acta Oceanologica Sinica*, the project is in the process of mobilizing submission of 20 papers from partners undertaking research and assessment through PCA, GSA, subcontract and ICAs with GEF/UNDP funding. The special issue gives audience a holistic view of the strategic planning approach to addressing challenges to the marine ecosystem and case studies of on-the-ground applications for better governance of LMEs in the future in the areas of governance, fish stocks and mariculture, ecosystem health and habitat and biodiversity.

Some of the key features of the Special Issue include:

- Featuring UNDP/GEF YSLME Project results in both Phase I and Phase II
- Demonstrate how LME planning and implementation approach was implemented in Yellow Sea and lessons learnt
- Review the effectiveness and sustainability of regional approach to addressing interconnected challenges in coastal and marine environment management
- Provide a series of case studies and in-depth examination of how ecosystem-based approach and nature-based solutions are operationalized on the ground in reducing fishing efforts, restocking, sustainable mariculture, migratory species conservation, and joint monitoring of harmful marine organisms;
- Focus on both natural and social sciences and adopt an inter-disciplinary approach towards governance of the Yellow Sea

The accepted papers for inclusion in the special issue is included in **Annex IV**. It is expected that the papers will be submitted before December 31, 2020, and the special issue will be published in the mid of 2021. The special issue will serve as a follow-up to the TDA to help replicate project results in a scientific way to wider audience of LME community.

3.3 Review of the Project Expenditures

3.3.1 Project Budget and expenditures

The project has a total grant of USD7,562,430. **Table 2** below presents the yearly expenditure from 2017 to 2020, balance as of September 30, 2020, revised budget in 2020 and budget specified in project document. As of September 30, 2020, the project has disbursed an USD7,403,028, with a balance of USD159,401 to be delivered in the fourth quarter of 2020.

Table 2: YSLME Phase II Project Yearly Expenditures and Balance per Components

Component Atlas Activity	2014 expenditure	2015 expenditure	2016 expenditure	2017 expenditure	2018 expenditure	2019 expenditure	2020 expenditure as of Sept 30	Total expenditure as of Sept 30	Balance	Revised Budget	ProDoc budget
Component 1	-	220,113	126,251	339,691	611,068	946,207	80,822	2,324,151	44,005	2,368,157	1,970,043
Component 2	-	1,594		66,030	339,758	487,524	244,141	1,139,048	-80,792	1,058,256	1,437,606
Component 3	-	1,472		58,650	258,156	365,634	529,086	1,213,000	-59,707	1,153,293	1,155,411
Component 4	-	5,076		86,714	495,228	1,360,385	526,935	2,474,338	126,643	2,600,981	2,621,370
Project Management	33,392	8,623	33,497	85,355	91,279	130,706	-130,362	252,491	129,253	381,744	378,000
Total	**33,392**	**236,878**	**159,748**	**636,442**	**1,795,489**	**3,290,456**	**1,250,622**	**7,403,028**	**159,401**	**7,562,430**	**7,562,430**

The project budget balance in the amount of USD 159,401 is planned for use in the fourth quarter for the following purposes. **Table 3** itemizes the cost categories and payment schedules.

Table 3: Cost categories and schedule of payment in the fourth quarter of 2020

Category	Activity	Amount (USD)	Remarks
HR	PMO Staff salary and fees to consultants	91,376	To be paid in October. Administrative Assistant contract will be extended until December 31, 2020, with a total of 10 working days
Procurement	Subcontracts (office management fees to IFEZ of Incheon, AOS, etc)	8,007	To be paid in October. Payment to Acta Oceanological Sinica (AOS) for the special issue of YSLME will be made in December 2020
	Interpretation service for the ICC-5 and translation of TDA/SAP into Chinese	10,235	To be paid in October
	Printing & Publication	10,475	YSLME project achievement brochure and technical reports. Partial payment to be made during Nov-Dec.
	Miscellaneous	3,618	Internet, management fee, communication, hard disk drive to copy all project files, documents shipping costs, etc
Fee	LMDC/CMDC	28,338	
Contingency		7,357	Alternative use of contingency is to hire a retainer consultant for preparing the sustainability plan and finalizing the SAP leading to signing off by the two countries during November and December of 2020
Total	**With management fee (9.5%)**	**159,401**	

3.3.2 Financial Audit

In line with the Project Closure Plan, an independent financial audit was organized by UNOPS complying with the UNDP/GEF audit policy. Due to the COVID-19, the financial audit was conducted virtually from 1 March 2020 until mid of April and the financial audit report was issued on 15 May 2020. The auditors confirmed that "the financial statement gives a true and fair view of, in all material respects, the expenditure of the project for the period from 3 July 2014 to 31 December 2019 in conformity with the terms of the agreements and in accordance with International Public Sector Accounting Standards. The full audit report is attached as **Annex V** of this report.

Follow-up audits of the project will also be arranged by UNOPS in line with its corporate audit requirements.

3.4 Project Closure Plan

As per agreement at the ICC-4 held in Jeju, RO Korea in November, 2019, the PMO prepared a closure plan under the guidance of UNOPS and in line with the requirements of the UNDP/GEF project closure.

The process of the closure consists of the operational and the financial closure. According to UNOPS procedure, the operational closure should be done with a proper handover of project deliverables to clients and obtaining a formal acceptance from the partner on the completion of the whole work undertaken by the project. The financial closure will be preceded by the operational closure. As per financial rules and regulations (Rule 116.07), UNOPS should produce the financial report to partners and, in accordance to financial rules and regulations (Rule 116.01), ensuring that funds for the project have been properly managed and spent in accordance to the terms and condition of the project agreement.

Table 4 below lists all the activities in the fourth quarter of 2020, responsible parties and schedule of the implementation of the closure plan.

Table 4: workplan of the fourth quarter of YSLME II Project

Activities		Responsible parties	Quarter 4											
			October				November				December			
			1	2	3	4	1	2	3	4	1	2	3	4
1	**Consensus building on the text of the MOU and post-YSLME arrangement**	PMO and National Coordinators												
2	**SAP 2020-2030**													
2-1	Finalize the technically cleared YSLME SAP 2020-2030	Ocean Adviser, PMO, RWGs of PRC and ROK												
2-2	Coordinate the refinement of SAP after clearance by IMCCs of ROK and PRC, and finalize the documents in consultation with the two countries	Retainer Consultant												
2-2	Sign the SAP document after IMCC clearance	National Coordinators												
3	**Transfer ownership of asset**													
3-1	Agreement of transfer of control of asset between UNDP and UNOPS	Administrative Assistant												
3-2	Sign documents for ownership transfer to users	Administrative Assistant												
3-3	Hand-over to MOF-designated institutions and collect and register signed acceptance documents to fill in G-drive	Administrative Assistant												
4	**Finalize YSLME Brochure to promote YSLME results**													
4-1	Review second draft submitted by Communication Specialist	PMO												

4-2	Gather feedback from partners	Communication Specialist	
4-3	Prepare forward for UNDP and GEF	UNDP/GEF	
4-4	Lay-out	Graphic Designer	
4-5	Clearance by UNDP and UNOPS	UNDP/GEF and UNOPS	
4-6	launch of the YSLME story	Communication Specialist	
5	**Website host**		
5-1	Update of website	Communication Specialist	
5-1	Procure hard disk to copy website content and send to IW:Learn	Administrative Assistant	
6	**Terminal Evaluation**		
6-1	Review of the terminal evaluation report and comments	Partners	
6-2	Prepare management response and submission to UNDP	PMO, National Project Coordinators	
6-3	Prepare sustainability plan and approval by partners	Retainer Consultant	
7	**Wrap-up meeting**		
7-1	Prepare agenda and consensus building	PMO	
7-2	Preparation of the meeting documents	PMO/TE mission	
7-3	Conduct of meeting	PMO/UNDP/UOPS	
7-4	Distribution of summary report, signature and prepare news report on IW:Learn	Administrative Assistant	
8	**Sending project files to UNDP, UNOPS, PRC and ROK**	Administrative Assistant	
9	**Special Issue on carrying capacity of YSLME on AOS**		
9-1	Prepare and submit papers by authors	Guest editors, Authors	
9-2	Make payments to AOS for peer-review	Administrative Assistant	
9-3	Review of papers (February 2021)	AOS	
9-4	Publish the special issue (July 2021)	AOS	

3.4.1 Documentation Requirements for Operational Financial Closure

The documents needed for operational and financial closure of the project in line with the UNDP requirements and the project management manual (PMM) of UNOPS are listed in the **Table 5** below. The PMO will submit to UNDP China an electronic version of all the key project documents in a disk or flash drive at the closure of the project. Closure documents and status of preparation are presented in **Table 5** below. As of October 14, 2020, nine reports are pending finalization.

Table 5: Closure documents and status of completion as of October 14, 2020

Categories	UNOPS	UNDP (if additional to UNOPS requirement)	Status
Project reports (implementation)	• Project document		Y
	• Inception report		Y
	• Project Closure Report*		Y
	• Project deliverables from PCAs, GSAs, subcontract and ICAs		Y
Project reports (financial)	• Key financial reports (FRs/PDRs)	Key financial reports (CDRs);	Y
	• Annual Workplans and budget revisions		Y
	• **Financial record on the return unspent balance, by 15 January 2021**		☐
	• **Final financial report**		☐
M&E reports	• **No-Objection Letter from the client (UNDP)**		☐
	• Audit report and follow-up action report		Y
	• Quarterly/Annual project reports (QPR/APR/PIR)		Y
	• Closure stage plan		Y
	• Quarterly quality assurance		Y
	• Cumulative project implementation review report 2020		Y
		• Mid-term evaluation report and management responses	Y
		• **Terminal evaluation report and management response**	☐
	• minutes of annual project review meetings		Y
	• **Inventory of assets and disposal documentation**		☐
	• Lessons learnt report and update UNOPS Project		Y
Communication products	• **official publications (YSLME Story)**		☐
	• List of news reports of project activities by YSLME and project partners		Y
Sustainability	• Agreement with partners on the host of project website		Y
	• **MOU to institutionalize the project cooperation mechanism**		☐
	• **Asset disposal feedback form**		☐
	• **Sustainability plan (TE recommendation)**		☐

3.4.2 Project Asset Disposal

The Asset Register was completed in March 2020 for equipment and other asset currently used by First Institute of Oceanography (FIO), Chinese Academy of Fishery Sciences (CAFS) and Yellow Sea Fisheries Research Institute (YSFRI). Confirmation of acceptance of asset in use by current users and by the Ministry of Oceans and Fisheries of RO Korea (MOF) to receive asset currently used by the PMO through donation was received. List of Asset with purchase value of USD 122,782 is attached to this report as **Annex VI**. Applicable documents to complete the transfer the ownership of asset between UNOPS and users have been prepared and will be sent for countersigning immediately after endorsement by UNDP of disposal plan, or signing of the transfer agreement between UNPOS and UNDP. The asset disposal plan was proposed to both countries on May 19, 2020 and two countries confirmed acceptance on September 12, 2020.

3.5 Migration of the Project Website

Project website will suspend its operation maintained by the ROK-based subcontractor after close of the PMO at the end of October. The website will be copied and migrated as knowledge management service on the website of IW:Leaern, a GEF-supported project to facilitate knowledge transfer and cross-LME learning implemented by the UNDP.

4 PERFORMANCE REVIEW

4.1 Monitoring and evaluation

Description of the forecasted schedule and the actual schedule for the project. In case of major deviations, mention causes and any lessons learned.

Implementation timeframe

UNDP/GEF YSLME Phase II Project Document, after signature by GEF Operational Focal Point and Project Focal Point of PR China, UNDP CO and UNOPS, became effective on July 11, 2014. Based on the Project Document, this four-year project was expected to end on July 10, 2018. In implementation of the project, the following milestone project implementation decisions were made to ensure the project could achieve the end of the project targets.

PMO restructuring: The Project began to undergo revision after 3 of the 6 project staff was on board in 2015, which concluded with recruitment of new project staff beginning on May 31, 2016, with Project Manager on board on November 1, 2016 and full staffing on March 24, 2017. Changes of project staffing in project design and in actual implementation are summarized below.

1st Project Extension: At the second meeting of the ICC (March 27-29, 2018, Dalian), the member states agreed to extend the project implementation for 18 months until December 31, 2019 due to late launch of the project.

Institutional restructuring in PR China: During March to October, 2018, an institutional restructuring took place in PR China which necessitated the amendment of agreements between UNOPS and MNR of PR China to ensure legal compliance of project implementation arrangement.

The MOU between UNOPS and SOA was amended and updated and the PMO Dalian branch was also moved to Beijing.

2nd Project Extension: The *ad hoc* ICC meeting (July 15-16, 2019, Qingdao) agreed to have a second extension of the project up to December 31, 2020 under the conditions that implementation of the project will close by June 30, 2020 while allowing the project to undergo the terminal evaluation, audit and project closure before December 31, 2020.

Impact of COVID 19 pandemic: At the closure of the 1st quarter of 2020, the partners agreed to extend implementation of activities until September 30, 2020, and at the end of the second quarter further agreed to extend project activities to October 31, 2020 to allow the project to apply adaptive management in the implementation of project activities, in particular the TDA update and negotiation of an updated SAP.

At the mid-term evaluation, the mission recommended early resolution of project management issues among project partners to allow smooth operation of the PMO. The project implementation would have been better planned if the 1st extension had been made until end of 2020 to allow project partners to better plan project implementation and lessen the burden of administrative and contractual extension arrangement for all PCAs, GSAs, subcontracts and ICAs.

Implementation monitoring and evaluation
The project submitted timely with adequate quality of all project monitoring reports (APRs, PIRs and QPRs of UNDP and quarterly assurance, quarterly narrative report and closure report of the UNDOPS), and institutionalized mechanisms to monitor the implementation and resolve implementation issues monthly between UNDP and UNOPS, and the project partners. Management information system has also been established to monitoring progress in implementation of PCAs, GSAs, subcontracts and ICAs through weekly review of progress. A summary report of implementation of Yellow Sea Program was also prepared.

4.2 risks and assumptions

Description of the forecasted schedule and the actual schedule for the project. In case of major deviations, mention causes and any lessons learned.

A total of 12 risks were identified in the project design and assessed for probability of occurrence and potential impact to implementation. The project reported on risk management in the annual project review reports (APRs) and annual project implementation reports (PIRs), indicating mitigation measures proposed and implemented, and identifying and acting upon new risks. The following risks are still pending before operational closure of the project:

1. Outbreak of novel coronavirus pneumonia requires continued adaptive management and alternative options to complete project activities within a reasonable timeframe and available resources leading to overall achievement of project results and operational closure by December 31, 2020.

   Management responses: While the PMO will be closed at the end of October, a retainer ICA will be mobilized in addition of Administrative Assistant to continue to facilitate the MOU

and SAP negotiation before operational closure of the project by December 31, 2020.

2. Uncertainties exist in continued engagement of stakeholders and operation of IMCC and SAP implementation with ecosystem-based approach due to slow in design of the regional ocean governance mechanism.

   Management responses: PMO will closely monitor and escalate progress with design of the mechanism to ensure full participation and sustainable hand-over of the interim mechanism supported by YSLME project. Meanwhile, a sustainability plan will also be prepared in line with the recommendation of the TE mission.

3. Financing agreement to the post-YSLME governance mechanism is yet to be discussed and integrated into the MOU to establish the post-YSLME Project coordination mechanism. Meanwhile, the budgeting cycle of both governments allows timely earmarking of funds for operation of YSLME mechanism immediately after project closure. And Secretariat staffing is agreed in advance, allowing timely budgeting for staffing and operation.

   Management responses: the retainer ICA will factor these issues in the MOU negation and sustainability plan implementation in close consultation with the partners.

4.3 Mid-term evaluation and management responses

Description of the implementation of the management measures in response to MTR recommendations

The project undertook the MTR in March 2018 facilitated by UNDP China and a total of 14 recommendations were proposed for implementation in order to achieve the objectives of the Project. The partners have accepted and implemented all the recommendations except staffing of the PMO through government secondment. Examples of implemented recommendations include:

- Providing interpretation for TE;
- Extension of the project for 18 months;
- Amending PCA with FIO to include more activities and budget to conduct monitoring through satellite tracking of spotted seal for connectivity analysis, climate change adaptation in Dandong and study on *Sargassum horneri*. PCA with YSFRI was also amended to include training for displaced fishermen joining the fishing vessel buy-back scheme for re-employment. One more PCA was signed with NCSEMC to monitor the wetland ecosystem of Jiaozhou Bay of Qingdao.
- A total of USD 480,000 were allocated to 7 grantees under YSGP, and a maximum of $100,000 for each project. All GSAs were completed in February 2020.
- Reducing the number of project activities from 114 to 81 by maintaining those that have been covered in the three signed PCAs and activities with TORs being cleared by the RWGs.
- Strengthening project delivering support system by scheduling weekly project review meeting between UNOPS and PMO, and monthly review meeting between UNOPS and UNDP.
- Producing project videos and through partnerships with stakeholders producing awareness and education activities to make on-the-ground impact with non-for-profit organizations, business associations and academia.
- On staffing of PMO through government secondment, the project instead recruited the environmental specialist to manage the YSGP and implementation of the project at

demonstration sites in China. MNR also strengthened the implementation support by designating a senior official to serve as the team leader to coordinate the technical review and update of the TDA and SAP.

4.4 terminal evaluation and management responses

Description of the implementation of the management measures in response to TE recommendations

Full report yet to be received. Management responses will be initially solicited from partners at the ICC-5 to be held on October 19, 2020, and finalized at the end of October. Status of implementation of the management responses will be reported at the annual project review report to be submitted to UNDP China and captured in the 4th quarterly narrative report of the UNOPS. Based on the summary of the TE report, retainer individual consultant(s) will be hired if the project has unprogrammed fund to help prepare the sustainability plan, identify champions and coordinate the finalization of the SAP for signing off before formal closure of the project by December 31, 2020.

4.5 Post project responsibilities

Description of any post-completion operations and maintenance strategy, instructions or manuals that clients need to follow. Document any outstanding issues which could not be resolved before the formal closure of the project, and provide recommendations for follow-on actions.

The terminal evaluation has put forward a number of recommendations for the project to address in the fourth quarter of 2020 and beyond for the project results to fully materialize and scale up.

- A sustainability plan should be prepared prior to project closure.
- Identify YSLME champions for sustaining the Yellow Sea Partnership
- Building upon the existing technical cooperation structures for the YSLME regional governance mechanism is sensible.
- A follow-up GEF project should focus more on regional issues and have a narrower scope
- The Joint Fisheries Committee (JFC), associated with the 2001 Fishery Agreement between RO Korea and PR China, should be engaged in the ecosystem-based management of the YSLME.
- Regional MPA initiatives offer opportunities for further strengthening joint collaboration
- Broaden stakeholder engagement among the agriculture and water resources management sectors.
- Promote development of a regional integrated coastal management strategy that consolidates or clusters local level ICM plans
- Strengthen regional NGO collaboration on innovative approaches, training, and public awareness.

The UNOPS will suggest to solicit initial feedback from government partners at the wrap-up meeting, and prepare formal management responses to these recommendations within two weeks of the wrap-up meeting. Meanwhile, the sustainability plan will also take into consideration the above recommendations.

5 LESSONS LEARNED

Description of any lessons learned which can be either positive or negative, project management controls and techniques that were effective to deliver results while managing risks and issues, and recommendations for future references.

The mid-term and terminal evaluation report have provided very useful insights to the project implementation based on evidence. In the terminal evaluation (TE), good practices and lessons learnt have been well documented with adequate justification for the partners to take up at post-project phase.

Good practices were also captured in the TE report, summarized below:

- The mechanism of establishing regional working groups (RWGs) across six thematic subjects was good practice for facilitating effective regional cooperation at the technical and political levels.
- Involvement of key stakeholders in the Phase I and Phase II projects helped maintain consistency and coherency on addressing the issues facing the YSLME
- Assigning coordination duties to the National Coordinator of NWG-G was a good practice in facilitating strong country ownership.
- Collaboration with other regional initiatives, e.g., SDS-SEA, NOWPAP, NEAMPAN, etc., was a good practice that enhances the likelihood that results achieved on the project will be sustained after project closure.
- The project website was maintained current with a comprehensive set of information posted, providing a practical platform for knowledge and information transfer.
- Production of high quality knowledge products, including videos, and utilization of the IW:Learn platform enhance the effectiveness of knowledge management.
- Expanding stakeholder engagement among civil society organizations and private sector was a good practice at facilitating multi-stakeholder buy-in for conservation and sustainable production initiatives.

There are also lessons learnt learned in the report, captured by the TE report and agreed by the UNOPS and PMO.

- The project scope was too broad, presenting both implementation and quality challenges.
- The 4-year timeframe for project implementation was too short, considering the complex project strategy and the time typically required to facilitate transboundary water governance.
- The demonstration activities under Components 2 and 3 should have been more oriented towards regional cooperation.
- The project indicator framework was not fully validated during project preparation or at project inception, resulting in confusion on interpretation and reporting of some of the results on the project. Developing a detailed monitoring plan would have also benefitted project monitoring and evaluation.
- A stakeholder engagement plan was not prepared for the project. There were shortcomings in stakeholder engagement that might have been addressed through development of a stakeholder engagement plan.
- Interaction across the working groups would have helped facilitate better cross-sectoral, inter-sectoral, and regional coordination.

- Combining the Project Manager and Chief Technical Advisor functions into one position was an under-estimation of the workload required for these two roles.
- A gender analysis and action plan should have been prepared at the project preparation phase (or at inception) to orient the gender mainstreaming strategy of the project.
- Social and environmental risks were not assessed in detail, and there were no safeguard plans developed for the project.
- The language barrier between Chinese and Korean stakeholders constrain engagement among some stakeholder groups. It would be advisable to ensure sufficient budget is allocated for adapting and overcoming this barrier.
- Co-financing allocations should extend beyond project closure to cover follow-up actions. Allocation of co-financing contributions should extend beyond the date of project closure, e.g., by 2-3 years, to cover the cost and oversight for follow-up actions.

In the implementation project, the following lessons have been captured, and escalated to the ICCs.

- The project implementation would have been better planned if the 1st extension had been made until end of 2020 to allow project partners to better plan project implementation and lessen the burden of administrative and contractual extension arrangement for all PCAs, GSAs, subcontracts and ICAs.
- The use of the science in the application of ecosystem-based management and in the update of the TDA and SAP provide a good example for replication in other LMEs.
- successful mobilization and partnership with NGOs, academia and business associations in delivering on the ground tangible results in reducing stresses help sustain the YSLME to achieve its long-term mission.

6 CONCLUSION

Report conclusion emphasizing any action or approval required from donor/clients for completing financial closure.

This report provides a comprehensive review of the progress made in achieving the end of project targets, sustainability of project results, lessons learnt, and financial delivery status, as well as status of implementation of the mid-term and terminal evaluation recommendations. A balance of USD159,401 remains to be disbursed primarily in October and remaining two months of the fourth quarter. Nine mandatory reports are yet to be prepared for submission to UNDP and a workplan to complete the remaining deliverables is prepared to complete 4 report by end of October and the remaining during operational closure and financial closure of the project. Retainer contracts to individual consultants need to be issued by UNOPS using the project contingency budget to assist the two countries in achieving greater sustainability of hard-gained project results.

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Date	Name	Title	Contribution
September 15, 2020	Jeenho Mok	Senior Administrative Assistant	Annexes and financial report
October 5, 2020	Boris Baduyev	Finance Associate	Expenditure report over years and as of September 30, 2020
October 9, 2020	Yinfeng Guo	Project Manager	Drafting wverall report
October 12, 2020	Sangjin Lee	Environment Economist	Proofreading and editing of the report

ANNEXES AND ATTACHMENTS

ANNEX I: Assessment of Development Progress of UNDP/GEF YSLME Phase II Project
ANNEX II: List of Meetings, Workshops, and Study Visits
ANNEX III: YSLME Bibliography
ANNEX IV: Special Issue of *Acta Oceanologica Sinica* – Carrying Capacity of the YSLME
ANNEX V: Audit Report
ANNEX VI: List of Assets and Disposal Modality
ANNEX VII: Management Responses to MTR recommendation and status of Implementation
ANNEX VIII: Management Responses to TE recommendation and status of implementation

ANNEX I: Assessment of Project Implementation Results

Component 1: Ensuring Sustainable Regional and National Cooperation for Ecosystem-Based Management

Outcome 1.1 Regional Governance structure - the YSLME Commission – established, Operational and sustained, based on strengthened partnerships & regional co-ordination; wider stakeholder participation and enhanced public awareness

Indicator 1: Status of YSLME Commission and subsidiary bodies at regional level
Baseline: ad hoc regional co-ordination through the YSLME Regional Project Board and weak cross sector management at the national level
End of project targets: 1) All the Terms of Reference for the YSLME Commission and Subsidiary Bodies approved by all participating country Governments; 2) Functioning YSLME Commission
Up-to-date overall assessment: ***End of project target is highly likely to be achieved during the remaining period of the project.*** The interim YSLME Commission and its subsidiary bodies were institutionalized with agreed TORs and rules of procedures to successfully coordinate the implementation of the SAP facilitated by the YSLME Phase II Project. The mechanisms have been operationalized in the past three years through conduct of 5 meetings of the interim YSLME Commission Council (ICC), 11 meetings of the six Regional Working Group (RWGs), and a series of technical workshops and exchange visits including the 3rd YSLME Science Conference. This update of the TDA in 2020 reflects the strong commitments of PR China and RO Korea and other partners in sustaining the science-based LME approach. Both countries also committed to use the concrete scientific findings of the TDA to inform their discussions towards the ongoing update of the SAP that will outline joint management and governance efforts towards achieving the sustainable management of the YSLME. There is a strong likelihood that the project will provide a tangible example of the utility of this science-based strategic planning approach to LME management and governance as supported by the Global Environment Facility.

Cumulative progress since project starts:

The establishment of the PMO (Secretariat) and operationalization:
The Project Manager, Environmental Economist, Environment Officer and Administrative/MIS/Finance Assistant were on board before March 24, 2017 to manage the project.

Operationalization of the Interim YSLME Commission and its subsidiary bodies:

1. Terms of reference of the Interim YSLME Commission Council and its Subsidiary Bodies, Rules of Procedures for the ICC, TORs of the six Regional Working Groups (RWGs) and Secretariat Staff were approved by the first meeting of the ICC held on July 13, 2017 and operationalized ever since. Both countries nominated National Project Coordinator (NPC), members of the Inter-Ministerial Coordinating Committee (IMCC), members to Regional Working Groups (RWGs) and National Working Groups (NWGs) but chairmanship of the six RWGs was determined by the two countries by end of July 2017.
2. The regional working group mechanism has been operationalized through conduct of 10 meetings of the six RWGs and adoption of proceedings: RWG-A (Incheon, ROK, November 21-22, 2017; Kunming, PRC, June 27, 2018); RWG-F (Yantai, PRC, October 17-18, 2017; Jeju, ROK, October 10-11, 2018); RWG-G (Seoul, ROK, Dec 14-15, 2017); RWG-H (Incheon, ROK, Sept 4-5, 2017); RWG-M (Weihai, PRC, Oct 26-27, 2017; Jeju, ROK, Nov 8-9); RWG-P (Dalian, PRC, Oct 10-12, 2017; Busan, ROK, June 4-5,

2019). The RWG meetings reviewed the TORs of all project interventions, and reviewed the deliverables as a quality assurance mechanism in its annual meetings and by communication.

Implementation and policy guidance of the Interim Commission Council:
Three ICCs meetings were held back to back with meetings of Management, Science and Technical Panels (MSTP) (July 13, 2017, Seoul; March 27-29, 2018, Dalian; March 12-14, 2019, Qingdao), and an *ad hoc* ICC was held on July 15-16, 2019, Qingdao, PRC. The ICC-4 was held in Jeju of ROK on November 27-29, 2019. Guidance on implementation issues at the ICCs covers the following aspects:

1. Infrastructure of the Interim YSLME Commission and staffing arrangements;
2. Project planning and M&E documents, such as project two-year workplans, procurement plan, financial reports, Inception Report and M&E plan, TORs of MTE, TE and audit and management responses, two project extension requests,
3. Project progress reports;
4. Specific project-level programs and plans, such as the roadmap for developing a sustainable regional environmental governance framework; partnership strategies; communication and awareness-raising strategy; Yellow Sea Grant Program (YSGP);
5. Implementation arrangements and partnership development, such as engagement of collaborating partners (FIO, NMEMC, YSFRI and NCSEMC) through Project Cooperation Agreements (PCAs);
6. Approaches, TORs of consultants involved in the development of the TDA and SAP update, establishment of the YSLME Commission, and financing mechanism; etc.

Progress with establishing the YSLME regional coordination/governance mechanism:
The roadmap for developing a sustainable regional environmental governance framework, approved by the two countries in March 2019 at the ICC-2, specifies the key elements of the YSLME Commission, gaps and barriers in terms of institution, policy and good governance for a sustainable Commission, and a plan of activities and timeframe for establishment of the Commission. ICC-2 held (March 28, 2018, Dalian) approved the plan for establishing the Yellow Commission in line with the roadmap and the TORs of Task Force on Rules and Governance (TF-RoG) and TF on Financing Mechanism (TF-FM). The Ocean Governance Specialist and Financing Specialist were hired to assist the TF-RoG and TF-FM to agree to the legal documents necessary to institutionalize the YSLME Commission and sustainable financing mechanism. At the ICC-3 (March 12-14, 2019, Qingdao), a consensus was reached among the ICC members to support a study on the flexible and innovative options for a sustainable YSLME governance mechanism. YSLME Commission, YSLME Stewardship or YSLME Forum, integration into existing multilateral ocean governance mechanism were proposed by the subcontractor Grandview Institution as the three possible options.

During the ad hoc ICC (Qingdao, July 15-16, 2019), report of the Grandview Institution, basic documents to institutionalize the YSLME Commission and YSLME Trust Fund were presented. According to the summary report, the meeting concluded on the following:

> *The Meeting emphasized the need to simplify the project arrangement in line with the project document by involving China and RO Korea only. Regarding the legal or political documents, structure of the secretariat and financing, simple and easy-to-operate approaches should be pursued in making the final arrangements. In this regard, a separate MOU dedicated to YSLME is needed.*
>
> *The meeting agreed to establish a post-YSLME mechanism participated by various stakeholders with the mechanism to play the central coordinating roles. The meeting supports to use the updated SAP as the guidance document to the operation of the mechanism. There will be cooperation projects under the mechanism, with resources mobilized and made available*

through various sources in line with their respective procedures. The meeting agreed to have an office to serve the mechanism. The two countries agreed to settle the details within the remaining months of the project.
At this stage, there does not seem to be a need to establish a trust fund to operationalize the mechanism and the implementation of the SAP. Should need arise in the future, sources of funding other than from the two countries can be tapped.

The MOU draft prepared by ROK was shared with PRC at the ICC-4 and a revised version was sent to ROK in mid-May, 2020. And MOU was not shared with UNDP nor UNOPS, and the infrastructure of the mechanism, staffing and location of the PMO is also being discussed bilaterally.

TDA update
The TDA update process started in 2017 and was completed in May 2020. The 1st Meetings of the Management, Science and Technical Panel (MSTP) and Interim YSLME Commission Council (ICC-1, July 11-13, 2017, Seoul) agreed to initiate the process with an evaluation of the progress of the implementation of the National Strategic Action Programme (2009-2020) (NSAP). The 1st Meeting of the Regional Working Group on Governance (RWG-G-1, December 14-15, 2017, Seoul) endorsed the terms of reference of the NSAP review. The review reports of NSAP implementation in the two countries were presented at the 3rd Meetings of the MSTP and ICC (MSTP/ICC-3, March 12-14, 2019, Qingdao) and published as *Interim Review Report on the Progress of Implementation of the National Strategic Action Programme for YSLME 2009-2020 of the People's Republic of China* (C-NSAP) and *An Analytical Study on the Implementation of the National Strategic Action Plan (NSAP) for the Yellow Sea Large Marine Ecosystem (YSLME) of the Republic of Korea* (K-NSAP). A workshop on the TDA and SAP updates was conducted at the 3rd YSLME Science Conference in Qingdao on July 17-18, 2019, and comments were solicited as to the following steps to the SAP update. This included an examination of the causal chain for priority problems in the YSLME and an assessment of emerging problems. The results of the third Korea-China Harmful Marine Organism Workshop and the four side events at the 3rd YSLME Science Conference were also fed into the TDA report. TDA/SAP updates meetings were held on 5 August and August 12-13, 2019, in ROK and PRC respectively with participation of all Chairs of NWGs and invited experts. Comments from RWGs, NWGs, and other stakeholders were provided regarding the TDA in general and the causal chain analysis in particular. Revisions to the TDA were discussed and finalized at the 4th Interim Commission Council (ICC-4, November 2019, Jeju).

The six Regional Working Groups (RWGs) were fully engaged in the update process of TDA (2007) and SAP (2009-2020). National Marine Hazard Mitigation Service (NMHMS) of the Ministry of Natural Resources (MNR) of PR China and the Korea Marine Management Corporation (KOEM) of the Ministry of Oceans and Fisheries (MOF) of RO Korea facilitated the consultation and coordination at national level, while the Project Management Office organized a series of regional consultations to help reach consensus on the final conclusions and recommendations of the TDA update, including engagement of an international consultant to consolidate the NSAP reviews by the two countries. The international consultant (Paul Gremillion) has consolidated the draft updated TDA and SAP (2020-2030) and second draft was submitted on September 9, and third draft submitted on October 17, 2019 and was reviewed at the pre-ICC-4 workshop. A revised draft of the updated TDA was submitted to the two countries on January 20, 2020, and the final draft was shared with the two countries teams in June 2020.

The primary transboundary issues for the updated TDA differ only slightly from the original transboundary issues identified in the original TDA. These are: 1) fishing effort exceeding ecosystem carrying capacity; 2) unsustainable mariculture; 3) pollution and contaminants; 4) eutrophication; 5) change in ecosystem structure; 6) habitat loss and degradation; and 7) climate change. Nine emerging

issues and 15 targets and actions are recommended in the updated SAP. After consultation with UNDP/GEF, the TDA will be published as a UNDP knowledge product.

SAP update:
The international consultant (Paul Gremillion) is also tasked to facilitate the update of the SAP. The SAP update process was clarified in the workshop on TDA and SAP updates conducted at the 3rd YSLME Science Conference in Qingdao in July 2019, and the workplan to develop the SAP was discussed at the 4th Interim Commission Council (ICC-4, November 2019, Jeju). The meeting reviewed and approved the SAP update workplan and requested RWGs to formulate a new framework of SAP taking into account the hierarchical restructuring of the transboundary environmental problems. The meeting requested the Secretariat to coordinate the preparation and submission of the final version of updated SAP for adoption at the next meeting of the ICC scheduled in 2020. Based on the plan, the two countries submitted the management actions to PMO by end of February, 2020, and a consolidated SAP update prepared by international consultant was shared with the two countries in early June. The international consultant also provided further guidance on the SAP update process, and will schedule a series of virtual meetings to resolve difference between the two countries on approaches, objectives, targets, management actions and indicators.

Outcome 1.2 Improved inter-sectoral coordination and collaboration at the national level, based on more effective IMCCs

Indicator 2: Status of Inter-Ministerial Coordinating Committee (IMCC)
Baseline: Sector management has been the normal arrangements with limited inter-sector or inter-ministerial interactions; where coordination was done, it was on a case by case such as fishery management activities
End of project targets: 1) Participation of Ministries in the IMCC will include but not limited to the following: Ministry of Foreign Affairs, Ministry of Finance, relevant department or ministry of ocean & fishery; 2) Two meetings of IMCC every year and functioning coordination
Up-to-date overall assessment:
Both PR China and RO Korea has operationalized and strengthened the IMCC in the implementation of the project. The future of the IMCC under the new governance mechanism remains to be clarified after the regional coordination mechanism is established but ***the likelihood of having the IMCC or similar national coordination mechanism is high given the active participation in TDA and SAP update and participation in the YSLME II Project implementation.***

Cumulative progress since project starts:
In RO Korea, inter-ministerial coordinating committee (IMCC) as a part of the infrastructure of YSLME regional coordination mechanism was established with the following membership: Ministry of Foreign Affairs (MOFA) as GEF National Focal Agency and the Ministry of Oceans and Fisheries (MOF) as GEF National Implementing Agency. Other relevant Ministries including Ministry of Environment, Ministry of Unification will be engaged the project deems necessary.

In PR China, the IMCC before April 2019 included State Oceanic Administration (now known as Ministry of Natural Resources, MNR), Ministry of Agriculture (now known as Ministry of Agriculture and Rural Affairs, MARA), and provincial governments of Liaoning, Shandong and Jiangsu. With the reorganization of the SOA into the Ministry of Natural Resources (MNR), the management of marine ecology and environment and marine protected areas previously under the mandates of the SOA is now shared by Ministry of Ecology and Environment (MEE) and National Forestry and Grassland Administration (NFGA). Under this circumstance, the MNR issued the notification on the working mechanism under the phase II of the UNDP/GEF YSLME Project that specifies the members of the inter-ministerial coordination

committee, expert committee, and adjusted the membership of the NWGs and National Coordinator. The new mechanism includes MNR, MEE, MARA and NFGA as members.

Both PR China and the RO Korea held regular meetings of the IMCC right before meetings of the MSTPs and ICCs. Representatives from MOFA and MOF of ROK participated in all the five ICCs, while SOA, MOARA and representatives from Jiangsu, Shandong and Liaoning participated in the first two meetings of the ICC. MNR, MARA and NFGA representatives participated in the ICC-3 and ICC-4, and the ad hoc ICC.

Outcome 1.3 Wider participation in SAP implementation fostered through capacity building and public awareness, based on strengthened Yellow Sea partnership and wider stakeholder participation; improved environmental awareness; enhanced capacity to implement ecosystem-based management

Indicator 3: Number of the YS Partnerships; Number of activities on capacity building and public awareness; Number of participants in capacity building activities
Baseline: 20 members of the Yellow Sea Partnership
End of project targets: Number of partnerships: 40; Number of capacity building activities: 25; Number of public awareness initiatives: 15; Number of participants in capacity building activities: about 200
Up-to-date overall assessment: ***The target is fully achieved.***

Cumulative progress since project starts:
The Project collaborated with more than 50 global, regional and national organizations from PR China and RO Korea in implementation of the YSLME Phase II Project. MOUs, Project Cooperation Agreements (PCAs), Grant Agreement Agreements (GSAs) and other agreements were signed with 15 organizations in PR China, RO Korea and USA to enable operation of the project office in RO Korea and PR China, implement the project with project cooperation and grant modality and use of audio and visual materials in the production of project videos. The Project organized 57 events, including technical workshops (21), ICC and RWG meetings (22), training courses (8) and study visits (6) benefitting a total of 1,845 participants with 30% women. The project also organized 15 public awareness-raising activities in collaboration with its partners.

A list of these events is available in a separate document, and programs and presentations of all the events are accessible from project website (www.yslmep.org).

The project also produced and implemented a communication strategy. Communication products and distribution channels and impact are introduced in detail in the section J of the report on communication impact.

Outcome 1.4 Improved compliance with regional and international treaties, agreements and guidelines
Indicator 4: Status of recognition and compliance to regional and international treaties and agreements
Baseline: Regional and international treaties and agreements are recognized by China, but not fully compliant.
End of project targets: Better compliance of the relevant regional and international treaties and agreement e.g. UNCLOS, the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, CBD, Ramsar, The FAO Code of Conduct for Responsible Fisheries, and the bilateral agreements between China & ROK on environment protection and fisheries
Up-to-date overall assessment: ***Achieving this target is fully anticipated within the project duration.***
The Project approach to achieving compliance of international ocean-related treaties and agreements is through review of the gaps in compliance with international instruments, in particular the FAO Code of

Conduct for Responsible Fisheries and implementation of suites of compliance activities. Development and adoption of national responsible fisheries certification standards in PR China and regional guidelines on responsible fisheries in YSLME are two deliverables in this regard. The national responsible fisheries certification standards are in the process of review by Ministry of Agriculture and Rural Affairs, and there is already a consensus on the regional guidelines for responsible fisheries in YSLME for adoption by the two countries. Capacity gaps in compliance with FAO CCRF have been addressed through various project activities contributing to awareness and capacity development and level of compliance.

Cumulative progress since project starts:
The project through the Legal Expert delivered two reports: 1) *the assessment report on China's legal framework in compliance with the international and regional legal instruments for the implementation of SAP in the YSLME Project II,* and 2) *the assessment report of China's national and local capacity for implementation of international legal documents in the YSLME Phase II Project*.

Legal reforms in the areas of marine litter, wetland, environmental risk assessment, fisheries and climate change adaptation are needed in accordance to the legal compliance assessment. The project acted upon the gaps on implementation of the FAO Code of Conduct for Responsible Fisheries (CCRF).

- supported the development of the national responsible fisheries certification standards by YSFRI under the PCA. The draft was reviewed and endorsed by Fisheries Management Bureau of MARA, PR China as per communication between CTA and YSFRI.
- Chinese Academy of Fisheries Sciences through GSA prepared the criteria and regulation for assessment of performance of conservation areas for aquatic genetic resources. The draft was submitted to MARA for review and training workshops on application were also conducted with partial support by the grant.
- The regional guidelines for incorporating FAO Code of Conduct for Responsible Fisheries (CCRF) in YSLME context, or the regional guidelines of responsible fisheries in YSLME, were drafted by YSFRI and consent was secured from the Chair of NWG-Fish Stock of RO Korea with additional inputs on the context of RO Korea.

The second report provides a review of the national and local capacity in implementation of UNCLOS, CBD, RAMSAR, UNFCCC and FAO Code of Conduct for Responsible Fisheries (CCRF). The following recommendations in relation to implementation of FAO CCRF have been implemented in the implementation of the YSLME II Project:

- providing training to fishermen who wants to transfer to another business, e.g. training on how to run a recreational fishery (PCA with YSFRI to provide training to fishermen for reemployment);
- Promote the construction of natural reserves, especially the marine germplasm resources conservation areas. Improve the infrastructure construction and the management practice as well, and share the experience of good practice. (through Grant Support Agreement with Chinese Academy of Fishery Sciences under Yellow Sea Grant Program)
- Enhance the construction of marine ranch demonstration project and promote the sharing of good practice. Develop marine ranch guidelines and operational models. (one study visit to marine ranching sites in ROK was organized in late 2019 to a group of 8 officials and experts from China)
- Strengthen the monitoring and assessment of fisheries resources. Improve the investigation capacity and the dynamic monitoring network of fishery resources nationwide. Increase investment in funds and further study the ecological protection of fishery resources, so as to raise resource investigation and dynamic monitoring capacity. (captured in draft SAP)

- Carry out ecological mariculture and build pilot project. Promote technologies that are healthy and environment-friendly. Spread the responsible mariculture experiences and publicize the good models as well. (through GSA with China Aquatic Products Processing and Marketing Association (CAPPMA), YSLME responsible mariculture alliance was established with endorsement of 33 members. IMTA training modules were prepared in Chinese and English for replication and scaling up in China and elsewhere).
- Carry out economic and social analysis on the fishing boat reduction, total quantity control of fish catch, pilot mariculture projects etc. to further the integrate management of coastal zone. (undertaken through PCA with YSFRI)

Hosted by Ocean University of China, Korea University and KOEM from ROK and the Project, the International Seminar on the Law and Policy to Promote Regional Ocean Governance in the YSLME Region was organized in 17-18 November 2018 in Qingdao, PRC to enhance the understanding of regional ocean governance (ROG) theory, share information on good ROG practices, and discuss about how to improve the law and policy framework to achieve a more effective governance with more than 50 experts.

In order to create an enabling regional framework for implementation of the YSLME SAP, a report was prepared by the Legal Expert entitled *Improving SAP to synergize the implementation of international conventions on marine protection and sustainable uses of marine resources*. The results of the report were presented at the SAP update workshop held in November 2019, and were also integrated for review and consideration by the two countries under enabling conditions for implementation of YSLME SAP. One of the key recommendations, i.e. actions with regional nature should be given priority, was well accepted by the two countries in formulating targets and management actions to resolve difference in SAP process.

Outcome 1.5 Sustainable financing for regional collaboration on ecosystem-based management secured, based on cost-efficient and ecologically-effective actions

Indicator 5: Agreement on the financial arrangement for the YSLME Commission
Baseline: YSLME Commission does not exist at start of project
End of project targets: Financing agreement between and among countries agreed to fully support YSLME for at least 5 years.
Up-to-date overall assessment:
Target yet to be achieved. Financing agreement for operation of the YSLME mechanism after project closure and secretariat staffing is included in the bilateral discussion on the MOU and post-YSLME Project coordination mechanism. It is likely that the financing mechanism will be finalized within the project duration but the financing arrangement is uncertain due to the COVID-19 pandemic.

Cumulative progress since project starts:
Initial discussion was held on financial arrangement of the regional marine environmental cooperation mechanism in the first meeting of the RWG-G (December 14-15, 2017, Seoul). The meeting decided to continue to seek external grant such as GEF and GCF to support the operation of the YSLME Commission if established within the project timeframe. The Financing Specialist prepared the proposal for YSLME Trust Fund to enable the Commission to accept resources from different donors as alternative financing to implementation of the YSLME SAP. At the ad hoc ICC (July 27-29, 2019, Qingdao), the meeting decided that "*At this stage, there does not seem to be a need to establish a trust fund to operationalize the mechanism and the implementation of the SAP.*

Should need arise in the future, sources of funding other than from the two countries can be tapped.
"

Financing agreement for operation of the YSLME mechanism after project closure and secretariat staffing is included in the bilateral discussion on the MOU and post-YSLME Project coordination mechanism. It is likely that the financing mechanism will be finalized within the project duration but the financing arrangement is uncertain due to the COVID-19 pandemic.

Component 2: Improving Ecosystem Carrying Capacity with Respect to Provisioning Services

Outcome 2.1 Recovery of Depleted fish stocks as shown by increasing mean trophic level

Indicator 6: Number of fishing boats decommissioned from the fleet in YSLME waters
Baseline: 54,068 in 2015 in Liaoning, Shandong and Jiangsu; 26,439 fishing vessels operating in Yellow Sea in RO Korea in 2011
End of project targets: Fishing boat numbers substantially reduced by 10%, in line with the 2020 target of 30% reduction
Up-to-date overall assessment: ***The project has achieved the end of the project target.*** There is 22% reduction of fishing vessels in three provinces of PR China from 2015-2018 based on statistics of vessel reduction in China Fisheries Yearbook, and 17% reduction of the fishing vessels operating in Yellow Sea in RO Korea from 2011 to 2017.

Cumulative progress since project starts:

Implementation of fishing vessel buy-back program
PR China has set the national targets to reduce 20,000 fishing vessels with a total capacity of 1.5 million KW and reduce fishing landings by 15 percent during the 13th FYP (2016-2020). In addition, fishing closure in Yellow Sea from May 1 to September 16 has been introduced in 2017 by Ministry of Agriculture of China (now known as Ministry of Agriculture and Rural Affairs) to restore the declining fish stocks. Based on information provided by PR China using data from China Fisheries Yearbook, the number of motored fishing vessels has been reduced from the baseline of 54,068 in 2015 to 42,182 in 2018, with a total reduction of 11,886 in the provinces of Liaoning, Shandong and Jiangsu, representing a 22% reduction. (Table 1)

Table 1: fishing vessel reduction from 2015-2018 in the provinces of Liaoning, Shandong and Jiangsu

Province	2015 motored fishing vessel number	2018 motored fishing vessel number	Reduced number of vessels by 2018	Percentage of reduction
Liaoning	22,353	16,320	6,033	27%
Shandong	24,653	19,624	5,029	20.4%
Jiangsu	7,062	6,238	824	11.7%
Subtotal	54,068	42,182	11,886	22.0%

Under Project Cooperation Agreement (PCA), the YSFRI conducted a joint assessment of the effectiveness of buy-back scheme in PR China. The highest number of marine capture fishing vessels of four provinces and one city fishing in the Yellow Sea occurred in 2003, with about 80,000 fishing vessels. By 2018, the fishing vessels have been reduced to about 47,000, a reduction by 41.2%. Horsepower of marine capture fishing vessels in the four provinces and one city fishing in the Yellow Sea increased steadily from 2003 to 2015 (except 2004, 2006 and 2012), and then suddenly drop down from 2016 up to 2018. In RO Korea, horsepower per vessel in 2016 is about 40% higher than that in 2004 (Dohoon Kim, 2019). Marine catch of four provinces and one city fishing in the Yellow Sea increased until 1998 and kept stable until 2015 and start to decrease in 2016 up to 2018. For the CPUE of four provinces

(Liaoning, Hebei, Shandong and Jiangsu) and one city (Tianjin) fishing in the Yellow Sea, the peak was 1.35 tonnage/kW in 2004, and the lowest value occurred in 2018 with 0.76 tonnage/kW. In general, the CPUE in Yellow Sea shows a decreasing trend except in 2004, 2007 and 2012.

According to the Five-Year Plan for Reducing Fishing Vessels in Littoral Seas (2014-2018, and 2019-2023), a total of 4,413 vessels will be reduced by 2023 based on the baseline year of 2013 (45,598 vessels). According to this plan, a reduction of 2,315 vessels will be achieved during phase I (2014-2018). In the NSAP review report submitted by RO Korea, the number of fishing vessels of the Yellow Sea was reduced from 26,439 in 2011 to 21,929 in 2017, showing a 17% reduction.

Reduction in fisheries output

There is a continued reduction in fisheries outputs in the two countries, evidenced by a significant reduction in RO Korea up to 2017 and a decrease of annual total allowable catch from 13 million tons to 10 million tons from inshore and offshore capture fisheries, or 25 percent reduction to be achieved in 2018 in PR China.

Social safeguards measure

In commensurate with the efforts of reducing fishing vessels and outputs, the project also intervened in assurance of social safeguards. A study on the social and economic implication of the implementation of the fishing vessel buy-back scheme in PR China was conducted, suggesting to focus on livelihood support and vocational skills training to enhance the employment of displaced fishermen. Yantai University through a PCA between YSFRI and UNOPS conducted trainings for 207 fishermen with support from the provincial and local fishery bureaus in Shandong from November 10 – 29, 2019. Upon completion of trainings, 54 trainees were awarded certificates from marine ranching and recreational fishery safety officer, 69 trainees were awarded certificates for recreational fishing guide, and 84 trainees received certificates for marine ranching technical manager. A follow-up questionnaire survey was conducted to the trainees with 60 responses. The results show that the outbreak of Covid-19 has rendered 6.67% of responding fishermen out of work, and 31.67% of fishermen still maintain their jobs. However, 10% of fishermen are having long-term unpaid leave, while 33.33% are only receiving partial monthly payment. In terms of income, 11% of respondents reported no income during the pandemic.

Assessment of license system

YSFRI through the PCA conducted *assessment of effectiveness of license system and recommendations for improvement of license system in China*. The study found that: (1) license system has already restricted the quantity of marine fishing vessel numbers that had fishing activities in the Yellow Sea. However, the total tonnage and horsepower increased, which means management still needs to be strengthened to control the fishing vessel quantity, tonnage and horsepower in a reasonable range, so that the fishery resources in the Yellow Sea can be utilized in a reasonable and sustainable manner; (2) although China has taken a series of measures to reduce the number of fisherman within the fishery industry, it has positive effect on fisherman's income, which is the best feedback for the future implementation of various fishery systems. The study recommends that: (1) to completely control fishing intensity and protect marine fishery resources, China should implement input control management together with output control, improving the existing input control management system and introducing advanced output control management system; (2) conduct comprehensive surveys and stock assessment of fishery resources to serve scientific management and decision-making for fishery management. The two recommendations were reflected in the draft SAP submitted by PR China.

Outcome 2.2 Enhanced fish stocks through re-stocking and habitat improvement

Indicator 7: Status of major commercially important fish stock from restocking and habitat improvement
Baseline: Effectiveness of restocking and habitat protection not evaluated
End of project targets: Measurable improvement (5%) in standing stock and catch per unit effort;
Up-to-date overall assessment: ***The Target is achieved.*** Based on the results of demonstration of restocking in one site in PR China and assessment of effectiveness of fishing closure, the commercial fish stock from restocking and habitat improvement has achieved the project target of 5% improvement in CPUE.

Cumulative progress since project starts:
Total allowable catch (TAC), marine ranching involving artificial reef, fishing closure, fish fry release and marine forests plantations and license system are the key measures in the PR China and RO Korea to recover fish stocks and support fishermen's revenue. Based on the results of demonstration of restocking in one site in PR China and fishing closure, the commercial fish stock from restocking and habitat improvement has achieved the project target of 5% improvement in CPUE. Interventions and results are summarized below.

Total allowable catch (TAC)
Both PR China and RO Korea have introduced total allowable catch (TAC) system in fishery management. Currently RO Korea applies TAC system to 11 species with 70 TAC observers, while PR China piloted the system in 2017 starting with two species. Swimming Crab (*Portunus trituberculatus*) is under TAC in both countries, providing an ideal example for learning in application of TAC to improve management effectiveness of fish stocks. In line with targets of the UNDP/GEF YSLME Phase II Project to recover depleted fish stocks by taking a combination of measures ranging from reducing fishing efforts to restocking, the YSLME Project Management Office (PMO) organized the Korea-China Workshop on Stock Assessment in Tongyeong, RO Korea on 30-31 July 2018 co-hosted by MOF of RO Korea, SOA and Ministry of Agricultural and Rural Affairs of PR China (MARA). Attended by more than 20 fisheries experts and researchers from 9 research institutes, universities, public agencies of PR China, RO Korea and United States of America, the workshop facilitated the exchange of experiences among participating countries in stock assessment methodologies and processes using Swimming Crab and small yellow croaker as two case species. Use of TAC as a conservation and management measure for joint stock management in Yellow Sea is still at infantry stage.

Marine ranching
Marine ranching through artificial reef is a common approach to adopted by both countries to restore depleted fish stocks. In PR China, three groups of national marine ranches are piloted and supported by Ministry of Agriculture and Rural Affairs with a total of 64 operations in Yellow Sea, East China Sea and South China Sea in 2017. In RO Korea, a total of 36 marine ranches are established to restock the fish population including in the Yellow Sea. Initial study by Shandong Ocean and Fisheries Department indicate positive results of marine ranching in restocking fish population. According to FIRA of ROK, efforts to establish marine forests in ROK was made at 21 and 24 sites respectively in 2015 and 2016, creating areas of 3,236 ha and 3,064 ha with support of project funding 35.7 million USD and 34.7 million USD respectively. This initiative is encouraged nationally through a national Act enforced since 2012 by designating 10th May every year as Marine Gardening Day. Projects on Marine Ranches have also been implemented by applying at 19 sites in 2015 and 2016 with support of project funding 19 million USD in 2015 and 2016 respectively.

Marine ranching has produced some tangible results in project demonstration sites, based on the report *entitled Analysis of the Construction Progress of Haiyang Fuhan National Marine Ranching*

Demonstration Area and the report on *Construction and effect analysis of artificial reefs in the Pipakou waters of Haiyang City.*

In Shandong Province, the restocking of fish through artificial reef in coastal areas of Haiyang City with an investment of CNY 37 million from 2013 to 2017 in a sea area of 57 ha was demonstrated. Stones, tubular concrete reef, rectangular concrete reef, steel frame reef, square concrete reef, waste fishing vessels were deployed following technical advice from the project-recruited consultants. Seabed algae field in the artificial reef areas has been formed, and algae and shellfish start to stick to the reefs after one year of deployment, dominated by *Ulva pertusa*, Sea mustard, *Ostrea plicatula*, reaching 50% coverage of reef area. Fish, shrimps and crabs are also increasing significantly. Based on the assessment in October of 2012, the abundance of 23 economic species in the reef area have increased 2.29 times. The number of fish caught per net is 90, 3.5 times increase. Catch per unit time is 7,154 g per net, an increase of 2.82 times than in 2012. In 2017, Shandong Fuhan Marine Science and Technology Co. Ltd deployed another 1,800 square steel-integrated monolithic reefs (3m X 3m X3m) and establish marine ranching observation system in a sea area of 7.8 ha in Haiyang Fuhan National Marine Ranching Demonstration Area in the external waters of Pipakou located in the east of Haiyang City, Shandong Province.

The project supported two exchange visits, one in ROK for Chinese experts to visit marine ranching sites in Jeju and Gunsan (October 14-18) and one in PRC (May 6-9, 2019) for Korean experts to visit Fuhan of Haiyang and Hailufeng of Qingdao. The events were facilitated by Korea Fisheries Resources Agency (FIRA) of the Ministry of Oceans and Fisheries and the Korea Marine Environment Management Corporation (KOEM) in RO Korea, and YSFRI in PR China. Through the exchange visits, the participants from both countries were convinced of the cost-effectiveness of investment by private sector in PR China and national government in RO Korea, with 5 to 6 times return in investment. For example, the study visit in RO Korea shows that marine ranching for fishery, tourism and mix purposes has a cost-benefit ratio of 1:6 according to assessment of FIRA.

Fishing closure

Under the PCA with YSFRI, the assessment report of the effectiveness of closure in the Yellow Sea was prepared. According to the report, in January 2017, Bureau of Fisheries of the MARA issued the “most strict fishing closure system in history” for the mid-summer fishing closures in the Bohai Sea and the Yellow Sea - for waters of the Bohai Sea and the Yellow Sea in north of 35°latitude, fishing closure starts from May 1 at 12 p.m. to September 1 at 12 pm; and for waters in south of 35°N, the closure starts from May 1 at 12 pm to September 16 at 12 pm. According to the study, the abundance index of fish resources (CPUE) increased from 40.95kg/h in August 2016 to 48.51kg/h in August 2017, an increase of 18.4%. Compared with 2016, the abundance of resources for some major economic species also had increase trends in 2017. The study also suggested to establish a fishing closure for shrimp trawling, implement a special fishing license system during mid-summer fishing closure season to allowed vessels to switch to the light-seine and drift net, and accelerate the implementation of the total allowable catch (TAC) system.

Outcome 2.3 Enhanced and sustainable mariculture production, by increasing productivity per unit area, as a means to ease pressure on capture fisheries

Indicator 8: 1) Type of mariculture production technology; 2) Level of pollutant discharge from mariculture operations
Baseline: Declining quality of mariculture products; Declining quantity of production per unit area from mariculture; Environmental impacts of mariculture not evaluated

End of project targets: Reduction of contaminants caused by mariculture production (5% reduction in the demo sites); Measurable increase (5% increase in the demo sites) in mariculture production per unit area; Discharge of nutrient and other discharges from mariculture
Up-to-date overall assessment: ***The project targets are fully achieved.*** In the two demonstration areas supported by the Project, the Project has achieved the target of 5% increase in mariculture production per unit area and reduction of nutrients and contaminants by 5%. In addition, there is also successful scaling up of IMTA in the city of Rongcheng, and promotion through government circular of carrying capacity and IMTA for replication nationwide.
Cumulative progress since project starts:

IMTA demonstration:
In PR China, mariculture through IMTA was demonstrated in Sungo Bay with stocking of kelp and oyster and in Haiyang in a pond-based IMTA. Results show the average length, width and wet weight of kelp in IMTA sites were 323.75 cm, 43.45 com and 1,227 g respectively in IMTA modes, higher than 373.75 cm, 39.50 cm and 830.5 g under monoculture of kelp. The yield increased by 14.8 percent, labor costs reduced by 10 percent, and economic benefits increased by 57.85 percent. The comprehensive benefit of the IMTA demonstration area increased by 131.1 percent. DO, total inorganic nitrogen concentration, chlorophyll-*a* concentration in the surface, phytoplankton and POM can meet the high standard established in the national sea water quality standards. In the land-based pond IMTA demonstration, the nitrogen and phosphorus in the seawater is significantly reduced in the IMTA pond, with a total of CNY193,000 net profit in the 1 ha outdoor pond stocked with sea cucumber and scallop. In RO Korea, IMTA was demonstrated from 2011 onwards in coastal areas beyond YSLME by NIFS of RO Korea on IMTA of sea tangle, Gulfweed, Korean rockfish, Pacific Oyster and sea cucumber indicating that sea cucumber grew 2.7 times faster; survival rate of Korean rockfish increased by 33.4% (from 56.8% to 90.5%); no fish disease occurred in IMTA (40% of Rockfish farmed in monoculture infected with disease).

In the IMTA in Namhae of Korean rockfish, sea cucumber, Pacific Oyster, *Undaria* and *Saccharina japanoca*, studies found no significant difference in growth of body length and weight of Korean rockfish; no disease found in rockfish (36.7% under monoculture); Pacific Oyster grow faster by >20% in shell height and whole and meat weight, and 22.5% higher fatness; and sea cucumber grew >40% faster.

Scaling up IMTA in coastal areas of Shandong and outside Shandong
The project explored to use various approaches in replicating IMTA through further demonstration in land-based aquaculture, scaling up carrying capacity assessment in mariculture, training module development and organization of training courses in project impact areas, etc.

1) Paradigm shift to use of carrying capacity. In scaling up the IMTA, eminent experts from YSFRI of PR China proposed to national government to adopt **carrying capacity** as the key management measures to align aquaculture development on a sustainable path. The proposal received positive feedback and MARA was commissioned to review and translate into management measures.
2) The Project is supporting the ***replication of IMTA across coastal areas of Shandong Province***, a leading mariculture producer in PR China. The final report entitled *Survey report of coastal areas suitable for operation of IMTA and economic analysis of benefits from replication of IMTA across of Shandong Province of PR China* was submitted on 16th of August. Based on the review of sea use type, sea jurisdiction, marine development function zones and ocean conditions in Shandong Province, the study estimated that 589,754 ha of coastal areas in Shandong Province are suitable for land-based, bottom culture, long-line and case culture IMTA. Applicable IMTA models include shrimp-crab-shellfish-sea cucumber in pond, shellfish-seaweed or shellfish-seaweed-sea cucumber bottom culture. In shallow sea mariculture, shellfish-seaweed, shellfish-seaweed-sea cucumber, fish-shellfish-seaweed, abalone-seaweed-sea cucumber for longline and cage farming are recommended. The study serves as a very good basis in the development of the promotion plan.

3) To help transfer the knowledge of IMTA, the project has published a 170-page ***training module*** for IMTA in Chinese and English for use in training courses. *A final knowledge product documenting the experiences of PR China and RO Korea in IMTA is at the final stage of consolidation*. ***A training center*** with 120 m^2 meeting room for use in training on IMTA has been constructed by Dongchu Fishery Cooperation, a community-based enterprise specializing in aquaculture of kelp, abalone, scallop, sea urchin and sea cucumber with technical assistance from YSFRI/PRC. Two ***training courses*** for Chinese mariculture managers and academia were conducted in 2018.
4) Launch and operationalizing ***Responsible Mariculture Initiative***. The project awarded under the YSGP a 100,000 USD grant to a consortium of China Aquatic Product Processing and Marketing Alliance (CAPPMA) and Qingdao Marine Conservation Society (QMCS) in collaboration with the Aquaculture Stewardship Society (ASC). The project aims at addressing the multiple negative environmental and social impacts of unsustainable mariculture enterprises along the Yellow Sea coast across the provinces of Liaoning, Shandong and Jiangsu Provinces in China and also involve Republic of Korea's (ROK) mariculture enterprises and NGOs operating along ROK's Yellow Sea coast. It will focus on addressing habitat destruction, overfishing, fishing down the food chain, illegal and improper chemical use, eutrophication, increasing incidents of disease in wild stocks, degradation of worker's welfare and health by promoting better developed and operated mariculture enterprises via technical guidelines and market incentives supported by relevant policies and laws. On October 30, the Responsible Mariculture Initiative was launched by CAPPMA, QMCS and ASC, attracting commitments of 31 members in the supply chain. Aquaculture Stewardship Society standards will be promoted to mariculture enterprises as well through study visits, training on the certification process and exchange of experience.
5) The first draft of the ***GAP of IMTA*** was prepared and the Chinese version was sent to MARA for review and consideration as a voluntary standard for application under the responsible mairculture certification system.

Results and Sustainability

The promotion has some initial positive results in Shandong Province. In July 2019, a notification for adoption of sustainable mariculture in particular IMTA was issued to all fishery enterprises by Rongcheng Fisheries Management Bureau, indicating promising replication of the project results in Shandong Province.

On march 31, the Ministry of Agriculture and Rural Affairs issued a notification on implementation of 'Five Major Actions' for green and healthy aquaculture in 2020 in response to the outbreak of COVID-19. In the attached action plan for the extension of healthy ecological aquaculture in 2020, IMTA is mentioned as one of the nine ecological and healthy aquaculture technology models for demonstration and replication nationwide.

A twinning between YSLME and Caribbean Regional Fishery Mechanism (CRFM) was facilitated by IW:Learn of IOC/UNESCO to transfer the IMTA knowledge in three Caribbean countries, signaling widespread recognition of YSLME as a source of knowledge and expertise in sustainable mariculture. The PMO and YSFRI and Chudao Village hosted a week-long visit by Mr. Milton Haughton, Executive Director of CRFM and his colleagues. The visit made the CRFM determined to lobby IMTA as the blue growth path towards sustainable mariculture and will integrate IMTA in future development programs and bilateral cooperation. Due to COVID-19 pandemic, a return visit to Caribbean countries planned in February 2020 was cancelled but the YSLME team is in close contact with CRFM to assist in follow-up actions to promote IMTA in Caribbean region, including translation and distribution of the MARA notification as a good practice in response to COVID-19 in mariculture sector.

Component 3: Improving Ecosystem Carrying Capacity with respect to Regulating and Cultural Services

Outcome 3.1 **Ecosystem health improved through a reduction in pollutant discharges (**e.g. **nutrients) from land-based sources**

Indicator 9: Level of pollutant discharges particularly Nitrogen in YSLME tributaries
Baseline: Discharge reductions do not meet the regional target
End of project targets: 10% reductions in N discharges every 5 years
Up-to-date overall assessment: The project supported a number of studies and assessment of the nutrient loadings in the Yellow Sea including demonstration of nutrient loading and watershed modelling. Through the areas of eutrophication have a trend of marked decrease from 2015 to 2017 according to Marine Environment Quality Bulletin issued by State Oceanic Administration (2018), the considerable nitrogen inputs from atmospheric disposition at a magnitude similar to that from land-based source and limited improvements in fertilizer use efficiency in the same acreage of farmland in the three provinces of the Yellow Sea in PR China suggest that ***meeting the project targets is unlikely within the project duration***.

Cumulative progress since project starts:

National programs to improve water quality
During the project implementation period, the following actions at national level have been adopted and implemented in PR China that will lead to reduction of N during the 13th FYP period (2016-2020)

- In 2015, China issued "Water Pollution Control Action Plan", which has strengthened pollution control in industrial agglomeration areas. The Plan requires that by the end of 2017, the industrial agglomeration area should be built into a centralized sewage treatment facility, and an automatic online monitoring device was installed, and that the urban sewage treatment facilities in the sensitive areas would meet the grade I-level A emission standards. Results of implementation of the Plan were not reported. Considering the action plan proposed that by 2020, the national water environmental quality must make staged-based improvements and the urgency, complexity, toughness, and long-term nature of water pollution control efforts requires full implementation of the Plan, the CPC Central Committee and the State Council have emphasized great importance to the prevention and control of water pollution and published a new notification on the battle of pollution prevention and control in June of 2018. The new notification and opinion from The CPC central committee highlights the Action Plan for Prevention and Control of Water Pollution must be fully implemented and the targets raised in the "Water Pollution Control Action Plan" need to be fulfilled based on time schedule. The responsibilities of local governments for protection of water environment was also highlighted in the notification from The CPC Central Committee. Progress report on implementation of "Water Pollution Control Action Plan" has not yet been published by the ministry of Ecology and Environment.
- On July 11, 2016, State Council of China issued the Action Plan for Soil Pollution Prevention and Control. It clearly points out that a coordination mechanism among government, community, enterprises, and residents will be established.
- On November, 2016, the General Office of the CPC Central Committee and the General Office of the State Council issued the Opinions on Full Implementation of River Chief System; it has been made clear that the major leaders of Party and government organizations need to shoulder the posts as river chiefs.
- The Ministry of Transport issued the Special Action Plan for Ship and Port Pollution Prevention and Control (2015-2020) in 2015 to explore and establish a new mechanism for the reception and disposal of ship pollutants, and promote the construction of receiving facilities for pollutants and

improve receiving and disposing capabilities to meet the demand for receiving and disposing pollutants from ships
- As imported solid waste, China banned imports of 24 types of solid waste since 2017 in a fresh move to reduce environmental pollution, which covers waste plastics, unsorted scrap paper, discarded textiles, and other kinds of waste.
- On March 26, 2018, the Ministry of Ecology and Environment reviewed and adopted in principle the "Action Plan for the Implementation of the Proposal for the Reform of the Import Management System for the Prohibition of the Importation of Solid Waste into the Prohibition of Foreign Garbage for the 2018-2020".

Actions taken in RO Korea include:
- According to the Marine Environment Comprehensive Plan (2011-2020), more efforts by setting up strict law are being addressed to prevent pollutants from marine-based sources of pollution by strengthening legal framework, which is in line with recent trends globally. Strict restriction of ship-based pollutants (SOx and NOx), and ballast water as well initiated by International Maritime Organization (IMO).
- To understand characteristics of discharge of pollutants along coastal areas, comprehensive survey has been carried out since 2011. Valuable information on sources, water and sediment quality and transporting routes has being collected. Results of this survey provides insight of status of coastal environment especially ecosystems.
- To enhance efforts to reduce pollution, national action plan for the management of land-based sources of pollutants was established in 2013. This national plan has a goal to manage water quality in 50 out of 65 coastal areas planned to be managed in national scale which accounts for 75% achievement until 2020. Additional attempt to reduce non-point sources of pollution is also being made by setting up guidelines to follow. The funding for these activities especially contaminated sediment removal was allocated 10 million USD in 2017 and 12 million USD in 2018. Monitoring activities at sites completed are also being carried with financial support of 0.23 million USD in 2017 and 0.35 million USD in 2018. Distribution of contaminated sediment in designated areas is being conducted with financial support of 0.4 million USD in 2017 and 0.5 million USD in 2018.
- In ROK, a project on nutrition reduction and eutrophication phenomenon causing from land-based sources is being implemented in Han River watershed as a target site using data available. Outcomes of the project will be available in January 2019 which will contribute to the development of national strategy.

Assessment of marine pollutants in coastal areas in PR China and RO Korea

Nitrogen and phosphorus are the key nutritional components. Excessive inputs of nitrogen and phosphorus nutrients may change the structure of nutrients in water, cause eutrophication, destroy the structure of biological communities and may trigger deterioration of marine ecological environment such as red tide, which seriously affect the coastal ecological balance and its functions, especially in the summer.

According to the Report on Marine Environmental Status and Trends of the Yellow Sea in the past decade, a study supported by YSLME II Project, the water pollution degree in the Yellow Sea showed a trend of "serious" and to "reduced", and was the most serious in 2012. With a series of land and sea integrated policies and treatment measures introduced by the state, the water pollution degree and areas were significantly reduced compared with that in 2012, but have not yet recovered to the level of 2008. The main influencing factors of the seawater quality in the Yellow Sea were DIN (content of 0.6 mg/L) and DIP (0.015 mg/L). The high DIN (surface, 0.7 mg/L) and DIP (surface, 0.04 mg/L) content was mainly located at the coastal areas of Northern Yellow Sea and Jiangsu Coast. The high DIN (bottom, <

0.2 mg/L) and DIP (bottom, 0.04 mg/L) content was mainly located at the coastal areas of Jiangsu Coast. The main reason was the excessive discharge of artificial nutrients from rivers into the sea.

Data from the Korea Marine Environment Management Corporation (KOEM)'s Marine Environment Monitoring Network (MEMN) were used to survey the current status of pollutants found in the coastal waters of the Yellow Sea. Specifically, data were collected four times a year, in February, May, August and November, from 2014 to 2018, from the Central Yellow Sea, Southwest, and Jeju coasts, as well as the Korea Strait (along the South Coast, Gwangyang Bay, Yeosu coast, and Gamak Bay). The samples collected from these points were analyzed for concentrations of the following: dissolved oxygen (DO), chemical oxygen demand (COD), dissolved inorganic nitrogen (DIN), total nitrogen (TN), dissolved inorganic phosphorus (DIP), and total phosphorus (TP). A comparison of the average concentrations of these substances in the coastal waters over the last five years reveals the Central West coast to have the highest concentrations. In particular, its DIN and DIP, at 212 ug/L and 21.0 ug/L, respectively, are four times higher than those off Jeju. The COD in the Yellow Sea seemed to drop from 2016 until recently in 2018, when it began rising again. The DIN and TN concentrations in the region, however, have been steadily declining.

Assessment of pollutant discharge from rivers to Yellow Sea
According to the *Report on Marine Environmental Status and Trends of the Yellow Sea*, a YSLME-supported study, the annual discharge of pollutants from the Yellow Sea rivers (24 rivers and outlets in 2010 and 27 rivers and outlets in 2017) from 2010 to 2017 is increasing by 300%. From 2010 to 2017, the discharge of pollutants to the Yellow Sea rivers increased from 700,540 ton/year in 2010 to 2,011,737 ton/year in 2017. The largest discharge of pollutants into the sea is COD. Ammonia increased from 14,272 ton/year in 2010 to 44,386 ton/year in 2017. Average annual amount of sewage discharged into the Yellow Sea reached 1.41 billion tons, and the average annual amount of pollutants discharged into the sea reached 180,000 tons, of which, the average annual amount of CODCR was 102,000 tons, suspended solids 69,000 tons, ammonia nitrogen 0.59 million tons, and total phosphorus 0.17 million tons.

Fertilizer use: Through PCA with NMEMC of MEE, the project collected useful information to illustrate the fertilizer use from 2007 to 2017 in the provinces of Liaoning, Shandong and Jiangsu. The results indicate that by 2017, the total farmland areas in the three provinces stand at 22,881,370 ha, without much change comparing with 2008. Chemical fertilizer use in the three provinces slightly declined from 9,698,747 tons in 2007 to 9,493,094 tons. The fertilization intensity declined from 466kg/ha in 2007 to 396kg/ha in 2017 in Shandong, a reduction by 15%, and from 461kg/ha in 2007 to 399kg/ha in 2017 in Jiangsu, a reduction by 13%. There are also rigorous policies being introduced in PR China requiring zero increase in fertilizer use, accelerating the use of organic fertilizer, improving management and use of fertilizers and training in scientific use of fertilizers, etc.

Livestock:
In Yeongsangang, Hangang, Geumgang and Nakdonggang basins in RO Korea, over two million households raise a total of 258 million livestock with generation of 1.76 million tons of waste per day. The amounts of livestock waste recycled into resources have remained more or less steady since 2008. The amount of waste treated by commissioned parties has been rising consistently, particularly in the Nakdonggang and Geumgang basins. Septic treatment by individual farms was more popular in the Hangang and Geumgang basins in the past, and has been growing in the Nakdonggang basin recently.

Studies on nutrient discharge from sea-based sources (mariculture)
In the study by NMEMC on the nutrient inputs to marine environment, it is found that the total annual discharge of TN and TP from mariculture in the Yellow Sea is 144,443 tons and 45,678 t respectively. TN

and TP discharged from non-feeding cultured organisms accounted for 98.3% and 99.4% of total discharge respectively. After deducting the total amount of non-feeding aquaculture organisms removed from the marine environment, the net emissions of TN and TP in the offshore aquaculture of the Yellow Sea were 78,697 tons and 43,000 ton respectively. Compared with the assessment results in 2014, the total annual discharge of TN and TP from mariculture in the Yellow Sea is relatively large, accounting for 48.9% and 50.0% of the total discharge of mariculture in China respectively.

Studies on nutrient discharge from atmospheric deposition

The study by NMEMC of MEE was undertaken with project support, with the following findings: 1) in 2017, the dry deposition of atmospheric inorganic nitrogen in the Yellow Sea was about 304,382 tons. Nitrate nitrogen was the most important component in the dry deposition of inorganic nitrogen, accounting for 74.8%, followed by ammonia nitrogen (24.0%). The wet deposition amounts of nitrate-nitrogen, ammonia-nitrogen, nitrite-nitrogen and active phosphate were 203,437 tons/year, 247,068 tons/year, 2,245 tons/year and 1,322 tons/year respectively. 2) the total amount of inorganic nitrogen input by the atmosphere and by rivers to the western part of the Yellow Sea was equivalent.

Eutrophication in Yellow Sea

According to Marine Environment Quality Bulletin issued by State Oceanic Administration (2018), in 2017, 10,420 km^2 are classified as eutrophication area in summer and 25,090 km^2 as eutrophication area in fall in Yellow Sea. From 2011-2017, the areas of eutrophication are slightly increasing, but with marked decrease from 2015-2017.

Marine environmental monitoring guidelines and network

Through individual contract, the Proposal for the Guideline on Regional Pollution Monitoring of Target Pollutants and Framework Plan for Establishing the Monitoring Network in the Yellow Sea was prepared. The report reviewed the guidelines for marine environmental monitoring, marine environmental quality standards and monitoring network in PR China and RO Korea, and proposed a framework of marine environmental monitoring consisting of sites, contents, time and frequency and methods. As a similar initiative already existed between MEE of PR China and MOF of RO Korea, the framework was not agreed between the two countries.

Demonstration of nutrient reduction in priority watershed

Haizhou Bay

For 10% reductions in N discharge, with project support NMEMEC has been undertaking studies to calculate nutrient loading using exports coefficient model in Haizhou Bay, Jiangsu Province of PR China. Haizhou Bay lies on the western margin of the South Yellow Sea, near the city of Lianyungang, and receives water inflow mainly from the Linhong River, Qingkou River, Longwang River and Xiuzhen River. The bay has an area of approximately 876.39 km^2, has a major fishery base, with aquaculture industries boosting economic growth in Lianyungang by 4.3 times from 1995 to 2005 (OFBL, 2011).

According to the calculation results, TN production in Lianyungang city was about 118,156 tons/year, and the fertilizer use is the major source for production of TN, account for 76%, followed by livestock farming, urban sewage, rural sewage, account for 8%, 6%, 5% and 4% respectively. TN discharge in Lianyungang city is about 9,469 tons/year, among which industrial nitrogen discharge was 93 tons, and the fertilizer use is the major source for discharge of TN, account for 27%, followed by urban sewage, livestock farming, industry, freshwater aquaculture and rural sewage, accounting for 22%, 20%, 12%, 11% and 8% respectively. Comparing the result of the production and discharge of TN, only 8% of the TN production in Lianyungang city is transported into the water body, while more than 90% of the TN may be stored in the land. TN loading in Lianyungang city was about 4,175 tons/year, and the fertilizer use is

the major source for TN loading, account for 26%, followed by urban sewage, livestock farming, industry, freshwater aquaculture and rural sewage, account for 24%, 20%, 13%, 9% and 8% respectively. TN loading to haizhou Bay is about 6,411 tons/year, and the Linhong river is the major nutrient source to Haizhou Bay, account for 56%, followed by Xiuzhen river, accounting for 9% of the total loading for TN. TN and TP loadings to Haizhou Bay are estimated at 6,406 tons and 398 tons in 2018 based on project study, 12.4% and 9.5% lower than TN (7316.46 tons) and TP (439.76 tons) in 2015 (Lianyungang Inshore Marine Water Pollution Control Plan, 2016) respectively. Fertilizer use and livestock from Linhong River are the major contributors to the loadings.

The study concludes that 1) Linhong river is the major nutrient pollutant source to Haizhou Bay; 2) the nutrient load to Haizhou Bay mainly from the production in Lianyungang city itself, accounting for 66% for TN; 3) the agricultural sources are the dominated sources to Haizhou Bay; and 4) although the fertilizer use, livestock farming, urban sewage had the same contribution on TN loading, the potential loading from the fertilizer use should not be ignored, as the large magnitudes of the nutrients reserved in the farmland might discharge into the water body, especially in the wet year or in the flood season, nutrient loading may dramatically increase.

Based on the conclusions, the study suggests the following measures to local government for the nutrient reduction: 1) Focusing reduction efforts on Linhong river basin to control nutrient input to Haizhou bay; 2) non-point agricultural sources pollution control is the most important way for the nutrient reduction, especially the reduction of fertilize use and livestock farming.

To achieve the goal of nutrient reduction, the following measures are suggested: 1) reduction from sources by improving nutrient utilization efficiency, reducing excessive fertilizer input and implementing water-saving irrigation and runoff control; 2) loading process interception. Technologies include ecological ditches, buffer zones, ecological ponds and constructed wetlands whereby nitrogen, phosphorus and other nutrients in the drainage can be effectively removed by means of interception, adsorption, assimilation and denitrification; 3) nutrient reuse. Nitrogen, phosphorus and other nutrients from non-point source sewage can be re-entered into the crop production system to provide nutrients and achieve the purpose of recycling. For nitrogen and phosphorus nutrients in livestock manure and crop straw can be returned to the field directly, also the cultivation wastewater and biogas slurry can be returned to the field after pretreatment. Nitrogen and phosphorus nutrients in rural sewage, farmland drainage and eutrophic river water can be absorbed, purified and reused through the paddy field wetland system.

Han River

In RO Korea, major rivers flowing to the Yellow Sea are Han River and the Geum River. Flows and pollution loads to the Yellow Sea from the Han River Watershed were evaluated for the year 2016 based on the simulation results of REDPOLL. The annual total river flow from the Han River Watershed to the Yellow Sea is 21,286 x 10^6 m^3/year and the pollution loads are 978.8 x 10^3, comprising of suspended solids (SS) 836.5 x 10^3 ton/year, BOD 56.1 x 10^3 ton/year, total nitrogen (TN) 82.5 x 10^3 ton/year and total phosphorus (TP) 3.8 x 10^3 ton/year. As affected by the monsoon weather system, the monthly volume of river flows in July reaches 7,484 x 10^6 m^3/month accounting for 35.2% of the annual discharge. Likewise, the monthly pollution loads in July comprise more than a quarter of the annual loads: SS 49.4%, BOD 40.0%, TN 30.9% and TP 41.6%. In the Han River Watershed, the majority of pollution loads come from the diffuse source: SS 99.8%, BOD 86.8%, TN 75.2%, and TP 92.7%.

<u>Conclusions:</u>

PR China and RO Korea have implemented various programs and plans and investment to mitigate the discharge of pollutants to the Yellow Sea from land-based sources and sea-based sources. The water

pollution degree and areas were significantly reduced compared with that of five year ago. Discharges from rivers of TN and TP primarily from fertilizer use and livestock have significantly increased. For the levels to be maintained within the carrying capacity of the YSLME with reduction in sea areas classified as eutrophication, better understanding of the atmospheric deposition, transformation from chemical fertilizer to organic fertilizers, adoption of nature-based solutions to absorb nutrients from agriculture are needed, along with implementation of pollutant emission control measures in mariculture and scaling up of environmentally friendly mariculture technologies.

The consultancy reports also proposed some recommendations for inclusion in the future SAP implementation: 1) extending the geographical range of watershed modelling and loading studies to other major river watersheds in RO Korea, DPR Korea, and PR China; 2) establishing a tight coordination system between the ocean and environment, agriculture and other ministries to manage land-based pollution sources more efficiently and effectively; 3) establishing a marine atmospheric monitoring network for the Yellow Sea; and 4) targeted regional assessment and solutions on nutrients from land source, atmospheric deposition and maritime sources in the coastal waters of YS.

Outcome 3.2 Wider application of pollution-reduction techniques piloted at demonstration sites.

Indicator 10: Types of technologies applied for pollution reduction
Baseline: Some innovations such as man-made wetlands are being undertaken nationally but without regional coordination or dissemination of results
End of project targets: Successful demonstration of use of artificial wetlands in pollution control in 1 site and replicated in about 2 coastal municipalities and local government units
Up-to-date overall assessment:
Consultancy on use of constructed wetland as nutrient sinks clearly indicates the progress being made in the use of constructed wetland as nutrient sinks in both countries. Similarly, the demonstration of integrated monitoring of wetland in Jiaozhou Bay shows diverse wetland vegetation types though with rapid expansion of *Spartina alterniflora,* increasing use of the areas by migratory birds as staging sites including the rediscovered critically endangered Chinese crested tern (*Sterna bernsteini*) and improved water quality in the bay area. ***These achievements have shown that the two countries have accomplished the project target but with indirect contribution by the YSLME Project.***

Cumulative progress since project starts:

Regional strategy to use wetland as nutrient sinks
The regional strategy submitted by the consultant reviewed the roles of wetland in nutrient removal for the Yellow Sea Coastal area and the mechanisms of nutrient retention; the status and changes of coastal wetland in the Yellow Sea in both PR China and RO Korea; nutrient loads from river discharges and atmosphere, wastewater treatment and nutrient removal in the Yellow Sea wetland; and the mechanisms of using natural and artificial wetland as nutrient sinks for wastewater treatment. Four cases are examined and recommendations are also made aiming to increase the regulating services of wetlands by 1) use of wetland in urban planning, 2) conserving the existing coastal wetlands (especially the natural wetlands) and their functions by designating more protected areas such as marine parks for balancing the conservation and wise use of coastal wetlands, 3) enlarging the potential nutrient sink areas by carrying out more wetlands restoration projects in urban and coastal regions, 4) enhancing investments from central/local governments and other sources, and 5) raising the public awareness to support the construction or restoration of wetlands.

Some demonstration activities in the project area are closely followed up. In the City of Dalian, reduction of nutrient inputs from an upstream river into vulnerable Linshui Bay and restoration of bay

area are prioritized by national and local governments with earmarking of 320,000,000 yuan (equivalent to 48 million US dollars) from the two sources. In 2017, the central government support focused on strengthening the coastal embankment, restoration of sand beach, restoration of estuarine wetland while local investment of Dalian City upgraded the sewage treatment capacity of existing facilities. In Linshui Bay of Dalian, the technologies of restoration of coastal wetland in estuarine areas and upgrading the sewage treatment capacity of existing treatment facilities are used by the subcontractors. NMEMC provided technical assistance to the project.

Demonstration of monitoring of integrated ecosystem-based management of Jiaozhou Bay
Through a Project Cooperation Agreement (PCA) with North China Sea Environment Monitoring Center (NCSMEC), the project supported the monitoring of wetland ecosystem in Jiaozhou Bay of Qingdao to so as to provide the municipal government with scientific information and decision-making support for their future restoration and investment planning.

Qingdao Municipality has been paying high attention to the ecosystem protection and restoration of Jiaozhou Bay. A series of policies and measures has been issued to strengthen the protection of Jiaozhou Bay. In 2012, the protection control line of the Bay was demarcated, which prohibited reclamation, and protected natural coastline and wetland. In 2014, Regulation for Jiaozhou Bay Protection of Qingdao was issued and Jiaozhou Bay Conservation Committee was set up. In 2016, Jiaozhou Bay National Ocean Park was approved. In 2017, Jiaozhou Bay Conservation and Utilization Plan was further improved to fully integrate other planning for city development, marine functional zoning, land use, environmental protection, and exploration and utilization. And the Qingdao Municipality pioneered to promote the Bay Chief System, in order to protect the marine resource, prevent marine pollution, improve the marine environment and promote the integrated value of the bays. It is under this context that the Ministry of Natural Resources selected Jiaozhou Bay as a demonstration site of integrated ecosystem management. The study found that of the wetland vegetation areas of types, invasive species *Spartina alterniflora* and *Spartina anglica* account for 87% of the habitat, while local species *Phragmites communis* and *Suaeda salsa* only take 13% of the total vegetation areas. In Yanghe River, *Spartina alterniflora* area in 2008 only stood at 9.9 ha but the areas exploded rapidly to 297.8 ha in 2019. From January 2019 to November 2019, a total of 201,531 birds belonging to 114 species, 35 Families and 12 Orders were recorded in the wetland area of Jiaozhou Bay. The Chinese crested tern (*Sterna bernsteini*) was also discovered in the wetland area. Ecosystem and habitats types, as well as seaweed are surveyed. The project team mobilized participation of NGOs and university students and organized bird-watching activities for educational purposes. The study concluded that 1) since the implementation of the regulations on the protection of wetland in 2014 by strictly controlling the reclamation project and implementing policies such as reclaiming beaches and returning ponds to the sea, coastal wetland areas has increased to 27,729.85 hectares. 2) Jiaozhou Bay wetland plays an extremely important role in EAAF and should be included in the international wetland of importance. 3) wetland vegetation types are diverse though with rapid expansion of *Spartina alterniflora* and efforts should be made to mitigate its encroachment. 4) in 2019, the environmental quality of the waters in Jiaozhou Bay was generally good, with 74.8 percent of the waters meeting the quality standards for category I and II seawater, an increase of 1.1 percent over 2018. Yet 8.3% of the sea areas were in the fourth and worst category, an increase of 0.3% over 2018.

Based on the monitoring, the report recommends that to apply ecosystem-based management of the Jiaozhou bay, long-term and continuous comprehensive monitoring and research of Jiaozhou Bay is needed to guide the protection and restoration efforts in the years to come. It is essential to analyze the evolution process and overall functions of Jiaozhou Bay systematically on the basis of the integrity and characteristic of Jiaozhou Bay. According to the analysis, the plan on protection and restoration of Jiaozhou Bay could be worked out and the extent and scope of marine development could be

established, for the sake of the rational and effective utilization of marine resources, and correct positioning for the protection and management of Jiaozhou Bay in the future.

In the monitoring process, the local stakeholder, Jiaozhou Bay Management Committee (JBMC), was involved in the planning and provided advice to the conduct of the monitoring. Meanwhile the results of the study have been used by the JBMC and municipal governments in programming of resources for control of *Spartina,* according to the feedback of the team leader of the PCA.

Outcome 3.3 strengthened legal and regulatory processes to control pollution

Indicator 11: Status of legal and regulatory process to control pollution
Baseline: Weak legal and regulatory framework to control pollution in provinces bordering in the YSLME
End of project targets: Develop evaluation tools, in the first year, to assist in harmonizing national and provincial legislation to improve coastal water quality in Shandong, Jiangsu and Liaoning provinces
Up-to-date overall assessment: ***Target is yet to be achieved.*** The ongoing revision of the marine environmental protection law (MEPL) in PR China initiated in 2019 provides a timely opportunity to transform the results and recommendation of project-supported assessment into legal and policy recommendation for consideration in the revision process. Yet the process of update or development of any marine-environment related laws and regulations at provincial and local levels is postponed due to the ongoing revision of MEPL at national level.

Cumulative progress since project starts:
The project supported the following activities within the project duration to achieve the targets of the outcome:

1. Legal review of PR China and RO Korea regarding marine pollution control and compliance assessment with international ocean-related environmental agreements, undertaken by the project-hired Policy Expert

The Legal Expert reviewed the provisions of the marine environmental protection law of PR China, management measures, the various amendments and regulation in support of its implementation, as well as the international agreements and programs both PR China and RO Korea have joined. The legal sources of marine environmental protection in RO Korea were also reviewed. Initial findings indicate the management of pollutant discharge into the sea, land-based and sea-based pollution control as well as supervision are the key areas of inadequacy of existing legal framework in pollution prevention and control. The review suggests to link land and sea in pollution prevention and control, introduction of a hierarchical risk prevention and control mechanism, improving supervision and enhancing liability system. The Legal Expert also lists laws (21), regulations issued by the State Council (15), measures by the administrative departments of the State Council (9), regulations issued by the Local People's Congress (6), measures issued by the local governments (3), judicial Interpretations (5), national policies issued by the Central Committee of CPC and/or the State Council (13) as reference to this comprehensive research.

The ongoing revision of the marine environmental protection law (MEPL) in PR China initiated in 2019 provides a timely opportunity to transform the results and recommendation of the assessment into legal and policy recommendation for consideration in the revision process. Meanwhile, the process of update or development of any marine-environment related laws and regulation at provincial and local level is also postponed due to the ongoing revision of MEPL at national level.

In the RO Korea, through the Marine Environment Management Act, the RO Korea established a basis for the creation of "Plan for waste collection and disposal at sea" for the effective management of marine litter. Since 2008, the country has been establishing and implementing a basic plan for marine litter management every 5 years. The RO Korea has implemented a series of measures to minimize the occurrence of marine litter, such as the establishment of long-term plans for marine litter management and supply of compactors to minimize generation of solid wastes. The MOF has been supplying eco-friendly buoys to replace Styrofoam buoys which are cited as a major source of marine litter, and working to collect used Styrofoam buoys. In 2015, the MOF began supplying eco-friendly buoys to replace high-density Styrofoam buoys and 386 eco-friendly buoys products were developed in 2017.

2. Preparation of training module for marine microplastics monitoring for use in PR China, and conduct of a training to improve the capacity of coastal provinces in monitoring of marine microplastics in the coastal provinces of Yellow Sea.

Microplastics was not identified as a transboundary environmental problem during the first phase of the Project but understanding of the distribution and magnitude in the food chain is of critical importance to the peoples of the Yellow Sea. RO Kore started monitoring of microplastics in early 2010s, and PR China only started in 2017 by SOA. After the institutional restructuring in PR China, SOA was merged into MNR however the roles of monitoring microplastics and marine litter remains has shifted to Ministry of Ecology and Environment (MEE), which is completely a new mandate. Under this circumstance, training module for microplastics monitoring was prepared by the consultant in NMEMC with peer review by Korean experts for use in training in the YSLME region. Chinese version is also developed and used in conduct of a training for around 20 monitoring experts and officers in Shandong, Liaoning and Jiangsu of PR China held on July 30-31, 2019. The training was successful and well received. Jiangsu Provincial marine environment monitoring center purchased monitoring equipment and has designated staff to initiate the monitoring of microplastics in the province.

3. Strengthened cooperation between Chinese and Korean institutions in monitoring and understanding of microplastics

Facilitated by the YSLME Phase II Project, a group of six NMEMC colleagues visited the laboratories of KIOST and KOEM to exchange experience in microplastics monitoring. NMEMC and KIOST also collaborated in organizing a marine microplastics and litter workshop during the 3rd YSLME Science Conference to better understand the sources of microplastics and its magnitude in the ambient marine environment.

Outcome 3.4 Marine Litter controlled at selected locations

Indicator 12: Status of the control of marine litter at selected locations
Baseline: Due to a lack of appreciation of the problem little action is currently being undertaken
End of project targets: 1) Regional Guidelines on control of marine litter based on those initiated by NOWPAP produced and adopted for use in the Yellow Sea; 2) Established regional data base in the first year, and significant reduction in the quantities of marine litter at selected beach locations
Up-to-date overall assessment: *The target of the project has been achieved*. The project interventions to reduce marine litter in the Yellow Sea region covered legal studies, monitoring and policy advice at local level, and demonstration with engagement of citizen science and NGO actions to understand the status of marine litter from the fishery and aquaculture sector and concrete reduction of wastes and garbage at village level through partnership development with private sector. In the past decade, there

is also observed decline of marine litter on beaches covered in the national monitoring programs in both countries.

Cumulative progress since project starts:

Under this outcome, the project supported the following activities:

1) Review of existing polies and regulations regarding solid waste disposal of PR China

Based on the review of the project consultant Dr. Weiwei ZHANG, there are no laws or regulations specifically issued to address marine litter in PR China. Yet a series of relative laws and regulations have been enacted to prevent and control of marine litter pollution. The study suggests to 1) amend the relevant laws and regulations; 2) issue national marine pollution and control action plan; and 3) formulate local regulations for prevention and control marine litter.

2) Though Subcontract, Shandong Marine Resources and Environment Research Institute (SMRERI) submitted reports on status of marine litter and regulatory measures for marine litter management in Weihai city of PR China.

In the 1st RWG meeting on Pollution Reduction, it was agreed that the project would use the NOWPAP marine litter monitoring guidelines to conduct the baseline survey. In PR China, Weihai was selected as the demonstration site for reducing marine litter. SMRERI reported on the status of marine litter distribution, classification and sources, assessed the legal and regulatory framework gaps, and proposed incentive policies in recycling economies. In conclusion, the study emphasized to improve 1) incentives for public participants; 2) incentives from law and regulations 3) incentives about social mechanism 4) financial incentives 5) capacity building on media and data sharing.

A consultation meeting in Jinan was held to determine the scope of demonstration with initial interest from local government to support the collection of abandoned fish cages in aquaculture, collection of garbage from fishing boats before closure season, and support to establish a coastal city partnership to integrate marine litter into overarching environmental agenda of local governments. The first suggestion led to the approval of the GSA awarded to BROCA to demonstrate the collection of abandoned fish cases in aquaculture. Due to concern by UNOPS over the qualification of sole bidder to develop the coastal city alliance to reduce marine litter, the project finally was unable to support this initiative.

3) Both PR China and RO Korea prepared the baseline report of the marine litter.

NMEMC and Our Sea of East Asia Network (OSEAN (a Korean NGO specializing in marine litter monitoring) prepared the marine litter reports of PR China and RO Korea over the past years respectively. Based on the report from NMEMC, PR China has been monitoring marine litter on beaches and floating in open water since 2010. Concentrations have fluctuated, however the overall density of marine litter in 2018 was around 26,000 items/km^2, much lower than in 120,000 items/km^2 in 2015 based on the data collected from the 11 monitoring sites in YSLME region in PR China. Plastics are the most common marine litter composing polystyrene foam, plastic bags, plastic bottles and cigarette filters. Temporal trend of distribution of litter on the monitored beaches indicates that the number, weight and volume decreased significantly in the waters of Korean Peninsula in the past 10 years based on Korean National Marine Debris Monitoring Program (KNMDMP). For example, number of marine litter has reduced from about 520 items/100m in 2008 to 250 items/100m in 2017.

4) Through two grant support agreements (GSAs), Shanghai Rendu Ocean NPO Development Center (Rendu Ocean) prepared a report on fisheries-related marine litter, and BlueRibbon Ocean

Conservation Association (BROCA) demonstrate reduction in solid waste and fishery-related marine litter in the fishing village in Weihai City

Working with six NGO partners, Rendu Ocean launched 'Guard the Coastline' China Coastline Monitoring and Cleanup (CCMC) in 2014 to motivate China coastal NGOs and volunteers to join in marine debris monitoring and cleanup and collect relevant data regularly. Despite the 5 years' experience, their methodology was not designated for fishing debris monitoring. Through YSLME Phase II Project, the Korean NGO OSEAN sent two coaches to PR China and trained 12 trainees from 9 survey sites along China Yellow Sea coastline. Using the monitoring skills from the training workshop, Rendu Ocean in partnership with trainees from six NGOs assessed the level of fishery-based beach debris in the Yellow Sea Area of PR China. It conducted 3 replications at 9 sites along the Yellow Sea coastline from May to September 2019. The results show that the average distribution of fishery-based beach debris was 1,249 count per 300 meter and 30,668 g per 300 meter. Foam fragments are the most common debris in terms of count (48.3%) and weight (36.0%), followed by fishing net in terms of count (18.2%) and weight (31.9%). As foam fragment is exceptionally high in meso and micro plastic debris of Korean coast, aquaculture could be an important contributor to microplastics in PR China as well. Actions are suggested to be taken to reduce uncontrolled usage of foam plastic in fishery. Recollecting system of EPS buoys or foam boxes are also urged to be built.

YSLME supported BROCA through its grant program to establish an effective management system for marine debris in fishing village community docks, to reduce the quantity of runaway garbage into the sea and to improve recycling of resources and efficiency through partnership with two recycling private sector. Through the project support, villagers in Jinzi Village of Weihai City have directly reduced about 4,000 kg of waste (kitchen waste, recyclables and waste used in art production). After project implementation, the local community have learnt to classify garbage in the village, including kitchen waste, recyclables and other garbage so that kitchen waste is processed into recyclable feed additives and biodiesel by using waste treatment equipment donated by a collaborating recycling private sector. Recyclables, including fishing nets and other fishery wastes, are collected on a regular basis by Yueneng, another recycling private sector in Weihai City. BROCA has established good communication and partnership between the two recycling enterprises and the residents of the community through the establishment of community condominium committees whereby community residents can share their opinions, such as voting on the time and place of garbage collection. At the same time, BROCA also held various activities such as watching movies on the theme of marine protection, making works of art out of marine garbage, and round-table conference on marine protection, providing a platform for residents to participate in marine protection.

5) Organization of a workshop to share project experiences on marine litter monitoring and reduction with Weihai authorities

On December 16, 2019, the YSLME Phase II Project organized a workshop on prevention and control of marine litter in Weihai City of Shandong Province in collaboration with Shandong Marine Resources and Environment Institute. Fifteen representatives from Weihai Ocean Development Bureau, Weihai Ecology and Environment Bureau, NMEMC/MEE, BROCA, and Rendu Ocean participated in the workshop. Each of the four YSLME partners presented the results of their work under support by YSLME Phase II Project to the local stakeholders and exchanged views on next steps to prevent and control marine litter in Weihai.

According to local stakeholders, marine litter is not included in the routine survey in Weihai City after the institutional restructuring, and therefore it is useful to have a baseline survey. In particular, there is a need for seabed survey of marine litter. The research of Shandong Marine Resources and Environment

Institute, Rendu and BROCA complements the sources of information on status of marine litter and therefore is very welcome. Stakeholder feedback at the workshop include:

1. Fisheries and aquaculture are important economic generators in Weihai City. To address the marine litter from fisheries and mariculture sector in Weihai, the Ministry of Agriculture and Rural Affairs will support a project with an amount of CNY100 million to develop durable floats to replace existing short-lived floats in mariculture. Exchanges of experiences in development in the alternatives to plastic floats, such as biodegradable floats, is an area for further cooperation between China and RO Korea under the framework of the YSLME.
2. Collection of seashells such as from oysters from household and restaurants and subsequent reuse and recycling is also as area for future exploration in Weihai and other coastal cities.
3. Monitoring of land-based sources of marine litter in particular plastics is necessary and collaboration with NGOs and other partners is needed given the limited government capacity in resources and monitoring.
4. Monitoring and collection of debris in non-recreational coastal areas should be considered as a priority in the future.

The meeting also realized that while the governments should play key roles in prevention and control of marine litter, the roles of public welfare institutions can be critical as well on account of their technical expertise and capacity in monitoring. Partnership between government and private sector can be a variable solution to development and recycling solid waste and kitchen organic waste through market-based mechanisms.

Component 4: Improving Ecosystem Carrying Capacity with respect to Supporting Services

Outcome 4.1 Maintenance of current habitats and the monitoring and mitigation of the impacts of reclamation

Indicator 13: Areas of critical habitats; Status of mitigation of reclamation impacts
Baseline: Coastal habitats critical to maintaining ecosystem services continue to be converted or reclaimed unchecked
End of project targets: Areas of critical habitats maintained at current level.
Up-to-date overall assessment: Project interventions to maintain the areas of critical habitats at the baseline level were unsuccessful due to continued reclamation and the fast economic development. But the coastal reclamation trend was significantly checked with the introduction of moratorium on coastal reclamation in PR China in Yellow Sea and Bohai Sea in 2018. Lessons learnt were reviewed and fed into the development of YSLME Biodiversity Conservation Plan pending endorsement by both countries. Engagement of NGOs and demonstration of community co-management in conservation of coastal wetland helped local stakeholders and MPAs find alternative solutions to conflicts of coastal fisheries and migratory bird protection. Considering the time needed to save the remaining coastal intertidal flats and restore the degraded coastal wetland, ***the project target is unlikely to be achieved within the project timeframe.***

Cumulative progress since project starts:
Compared with the 1980s, the YSLME lost 9,700 km^2 of sea area, with 40 percent of total natural tidal flats lost. To reverse this decline trend, the participating countries have taken a strategic approach of conservation planning, policy development, and implementation of projects to restore ecologically and biologically important coastal areas in response.

YSLME Biodiversity conservation planning for 2020-2030

The Project has supported the development of YSLME Biodiversity Conservation Plan 2018-2030 based on two separate reviews undertaken by two consultants. The conservation status in RO Korea and PR China of 23 potential priority areas (PPAs) identified by WWF, KMI and KIOST in 2007 was reviewed. Status of biodiversity, positive achievements, gaps, underlying causes to base objectives, targets and actions to be proposed in the conservation plan up to 2030 were discussed at the biodiversity forum under the 3rd YSLME Science Conference held in Qingdao, 2019. PCA with FIO to assess the Implementation of CBD and RAMSAR also made recommendations for integration of SDG14, CBD and RAMSAR targets into YSLME SAP and YSLME Biodiversity Conservation Plan. The consolidated YSLME Biodiversity Conservation Plan 2018-2030 suggested 15 priority actions including improving wetland biodiversity, and MPA planning and management. The next step is to review the YSLME Biodiversity Conservation Plan (2020-2030) by the competent authorities in PR China and RO Korea for their adoption and implementation.

Status of intertidal flat of the Yellow Sea

In order to better understand the changes of intertidal flats and land use in YSLME, the Project reviewed the past and future reclamation to the critical coastal habitats. Using Ramsar Convention Criterion for critical bird habitat identification, 137 sites are identified as critical based on bird records derived from the bird watching and literatures. Areas with 14 shellfish indicator species were also identified. Satellite remote sensing imageries showed that the natural coastline occupied 29.9% of the total coastal line of Yellow Sea in 2009, but this ratio declined to 21.7% in 2016. Of the identified 137 critical bird habitats, 56 habitats on the coastal wetlands are covered by the national reserves and the ecological conservation redlines. However, 81 of the critical bird habitat sites are outside the ecological conservation redlines and national nature reserves. The project recommended protection of formation process of new flat habitats, wise use of reclaimed coastal marsh for ecological purposes, keeping the rolling relief in reclamation projects, and design and establish a network of fragmented wetland to increase effectiveness and connectivity.

RO Korea prepared a review of the status of intertidal mudflat in the eastern Yellow Sea. A total of 202,360 sea birds with 87 species were observed in 2018 at 34 major coastal wetlands in the RO Korea. The largest number of sea birds was identified in Suncheonman in Jeolla Province with 56 species and the largest population was observed in Janghang in Chungnam Province with 53,860 individuals.
The Project also prepared a report on *improving the effectiveness and impacts of Ecological Restoration project in the Yellow Sea*. The report reviewed the methodologies, standards and guidelines in increasing the effectiveness of restoration projects, and provided suggestions to improve the Yellow Sea ecosystem restoration projects, including incentives of conservation and compensation systems for ensuring the restoration projects to be proceeded smoothly, and improvements of relevant laws and regulations.

The project also assessed the ecosystems services of Rudong mudflat and Aoshan bay coastal area of PR China using 37 ecosystem services.

Efforts of the two countries in the protection of the coastal mudflat

- In 2018, the MNR of PR China requested suspension of all reclamation projects in coastal areas, and this new order is placed much hope to protect remaining but critically important intertidal of Yellow Sea. Development of the ecological redline policy of the PR China which covers 19,000 km^2 of coastal area in Liaoning, Shandong and Jiangsu Provinces of the PR China as Development Restricted Zones (DRZs) where any type of construction activities is banned. And there is an increasing number of protected wetlands in the Yellow Sea costal area of PR China.
- Restoration of coastal habitat was supported in RO Korea through co-financing. In RO Korea, a 7 million US dollar project was completed in Ganghwa to restore the ecosystem connectivity of

intertidal mudflats through replacing a causeway connecting two islands with a newly built bridge. In addition, a new monitoring project, "Fisheries Resources Changes based on Yellow Sea Ecosystem" was implemented from 2018 with a budget of 17.2 billion KRW for 5 years that expanded the comprehensive ecosystem monitoring in coastal area to open sea.

Strengthening the management effectiveness of coastal wetland and tidal flats
The project supported through grant Beijing Chaoyang District Yongxu Global Environmental Institute (GEI) to develop and promote community co-management to protect seabirds, ensure sustainable artisanal fishing practices, and promote regional cooperation and experience exchange among communities along the East Asia-Australasian Flyway network, including both in PR China and RO Korea. The project site is located around the Yalu River estuary wetland in Donggang County, Dandong City of Liaoning Province where the National Yalu River Estuary Wetland Reserve is located.

Another grant is provided to the Institute of Geographic Sciences and Natural Resources Research (IGSNRR) to improve the understanding of the waterbird habitat quality of IBAs in YSLME and along the waterbird flyway, and to understand ecological connectivity, life history and migration pattern of four endangered bird species: Relict gull (*Larus relictus*) and Great knot (*Calidris tenuirostris*) in Hangu Coastal Wetlands, Binhai New Area, Tianjin, and Oriental white stork (*Ciconia boyciana*) and Black-faced spoonbill (*Platalea minor*) in the Qinghe River Estuary Wetland, Lianyungang. Through a series of studies, conservation actions of endangered waterbirds and their habits were suggested based on activities actually conducted on site. Additionally, on-site survey on the sustainable fishery of aquaculture ponds in Qingkou River estuary and Linhong River estuary of coastal areas in Lianyungang City, Jiangsu Province was also conducted and the results from these survey helped improve the capacity of NGOs, raise awareness of the local communities, in particular the youngsters, in protecting natural wetlands and endangered waterbirds, explore the practices of balancing sustainable management of nearshore aquaculture and conservation of endangered waterbirds and their key habitats in YSLME, and improve the replication and application of the outputs in other project areas.

Outcome 4.2 MPA network strengthened in the yellow Sea

Indicator 14: level of ecological connectivity in expansion of the Yellow Sea MPA system.
Baseline: the planned expansion of the MPA system currently does not take into account ecological connectivity
End of project targets: Increase 3% total areas as MPAs; the planned expansion of the MPA system currently does take into account ecological connectivity (measured by use of developed connectivity tool kit or other means)
Up-to-date overall assessment:
The project has achieved the target of expanding the coverage of MPA of the marine and coastal areas to 3 percent. As of 2019, the MPAs including fish spawning and nursery ground account for more than 5 percent of the areas of the Yellow Sea. There are two newly established MPAs by partners in an area of 218 km^2 and a potential designation of 42 km^2 as a new MPA with direct project support. The stakeholders of the two countries was fully capacitated through training and discussion in building biophysical connectivity of the MPAs in the region focusing on Spotted Seal and Spoon-billed Sandpiper and the initial establishment of the YSLME MPA Network for communication for Spotted Seal and Spoon-billed Sandpiper.

Accumulated progress since project starts:
MPA development in YSLME (3% target)

- To date, 77 MPAs and aquatic germplasm resource conservation zones (refugia) in PRC (21,963 km^2) and 16 national MPA in ROK (386 km^2) are designated to protect marine mammals, birds, fishes,

mollusks, plants and algae in YS. By 2018, the MPAs of the PRC and ROK cover 5.58% of the project areas of the YSLME. From 2011 to 2017, MPAs along the entire RO Korean peninsula increased from 15 to 28 in number and from 289 km^2 to 586 km^2.

- *Surveys and production of overlays to analyze gaps and conservation needs of critical species and habitats*, i.e. seal, endangered migratory birds, fish spawning and nursery grounds, cold water mass, etc. have been conducted by FIO, NMEMC and YSFRI in PR China through PCAs. In the YSLME region, more MPAs have been designated, aiming to protect rare marine species. Based on the review of NMEMC and field studies, six sites (i.e., Rudong Coast, Luannan Coast, Yingkou Coast, Zhuanghe Coast in PR China, Sindo Island in DPR Korea, Saemangeum Coast in RO Korea) were identified as spatial gaps for conservation of endangered waterbirds and their habitats. One site (i.e., Bak-ryoung Island) was identified as spatial gap for conservation of spotted seals and their habitat. The study of FIO shows that before 2006, the total area of MPA was 1,293,601 ha, this value increased to 1,303,902 ha. By 2017. An assessment of YSLME indicates that by 2017 there are 25 national level aquatic germplasm resources conservation zones in the YSLME region, covering an area of 14,580 square kilometers. The study suggested to consider establishment of the MPAs in the northwest of Haizhou Bay and Qinghai fishing ground, west of Shidao fishing ground, south of Yanwei fishing ground, north of Haiyang island fishing ground, by considering the location of the spawning grounds and nursery grounds of anchovy, mackerel, small yellow croaker and Spanish mackerel in the Yellow Sea.
- *Achievements in new MPA designation*: Garolim Bay of RO Korea, Yancheng Tiaozini Wetland Park were established as new MPA and Xiaoyangkou of the PR China is under consideration to enhance the ecological connectivity. Garolim Bay Marine Species Protected Area in RO Korea was designated as an MPA site in July 2016. It covers an area of 91.237km^2 with a goal of protection of habitat and breeding grounds of protected marine species including spotted seal, and systematic conservation and protection of key habitats of marine and pelagic species. The Yancheng coastal wetland, the largest coastal wetlands nature reserve in the PR China and also one of the world's major winter habitats for red crowned cranes winter in the reserve was nominated a world heritage site in 2019. Yancheng Government designated 127 square kilometers to the Tiaozini Wetland Park to afford legal protection of the important staging sites for various migratory waterbirds. The FIO completed a study to support the government of Rudong in Jiangsu Province of PR China to designate 42.88 square kilometers for Xiaoyangkou wetland as a National Marine Protected Area. This site is selected as the critical stopover habitat for critically endangered spoon-billed sandpiper along the East Asia and Australian flyway with highest irreplaceability index. The proposal was approved and currently the proposed site is included in the ecological conservation redline and in the second batch of UNESCO World Heritage Site.
- The FIO of the PR China carried out an assessment study of the relevance of existing zoning schemes to connectivity of existing MPAs and/or potential MPAs to understand strength connectivity among MPAs and find potential regions for new MPAs. The detailed descriptions on protected areas of coastal areas in Provinces of Liaoning, Shandong and Jiangsu were made. In 2013, the planning for national ecological protection requested that ecological redlines should be delimited in important eco-functional areas, land and marine ecologically and environmentally sensitive and fragile areas in the PR China. By now, the three provinces around the Yellow Sea have formulated marine ecological redline zones which could be strength ecological connectivity among marine protected areas.
- The feasibility for designating Yellow Sea Cold Water Mass (YSCWM) a new MPA was assessed by FIO using the Ecologically or Biologically Significant Areas (EBSAs) criteria. The criteria for establishing a new MPA in/around the YSCWM are referred to as chlorophyll concentration, phytoplankton abundance, zooplankton abundance/biomass, benthos abundance/biomass, primary productivity, fishery resource, spawning, feeding and overwintering grounds, migration paths and habitat for endangered/threatened species, etc. This study proved the necessity to establish an MPA for protecting the ecosystem and environment in the YSCWM. However, factors demonstrating

long-term variation of the features of the YSCWM, like the variation of thermocline, boundary and the effects on marine organisms, are still not clearly understood, and its driving mechanisms are still poorly understood. This study emphasized the need to strengthen intergovernmental cooperation on the procedure of establishing an MPA in the YSCWM. And the cooperation was no only to focus on the research and survey, but also on the management of YSCWM as one of MPAs, by supporting facilities, restricting fishery and relevant education.

- The Chinese Academy of Fisheries Science (CAFS) of the PR China carried out the survey study on the conservation needs of critical nursery and spawning grounds of priority fish species in the Yellow Sea and make recommendations on new MPAs. This study analyzed the problems facing the spawning and nursery grounds of the major commercial fish species in the Yellow Sea and the protection measures adopted by the Chinese government, further make recommendations on new marine Aquatic Germplasm Resources Conservation Zone. This study also emphasized the fact that the establishment of marine protected areas protects the marine environments, species resources, and effectively maintain the balance of marine ecosystems, especially for the migratory public aquatic germplasm resources with important economic value and ecological status, such as small yellow croaker, mackerel, blue point mackerel, anchovy, etc. Although 25 marine aquatic germplasm resources protected areas along the coastline of the Yellow Sea are found at present, few protected areas that focus on the protection of small yellow croakers, anchovy, Spanish mackerel, mackerel and silver carp. In this study, suggestions for ensuring effectiveness of existing and newly proposed MPAs were made: 1) Consider the existing marine protected areas and strictly follow the relevant rules and regulations for the construction of marine protected areas in China, and formulate protected area construction specifications in terms of the regional layout, type structure, and protected species of protected areas to avoid the problems of unscientific protected objects, unreasonable scope of the protected areas and repeated construction; 2) Conduct scientific research work such as follow-up investigation and testing should be carried out regularly for their key protected species and their living environment for newly established marine protected areas.

<u>Biophysical Connectivity of MPAs</u>

- An MPA Network development training kit called “Designing a network of MPAs for the YS based on principles of biophysical connectivity” was developed by the Project. An MPA connectivity training was held in 23-27 July, 2018, in Seocheon, RO Korea to further expand the coverage of coastal areas as MPA in an effectively managed network using the training kit.
- In the *YSLME MPA Networking workshop* held on 14-16 January 2020, in Dalian, PR China, the Regional Working Group on Habitat of the UNDP/GEF YSLME Phase II Project reviewed the latest studies on migration and conservation status of the populations of Bohai/Yellow Sea of Spotted Seal, and requested the Project Management Office to organize a seminar dedicated for Spotted Seal with focus on the defining the boundary of the MPA network for populations of the Bohai/Yellow Sea. As a follow-up event, the workshop for the management plan for spotted seals was organized on 22 May 2020 through the webinar platform to share views and ideas on management planning, with three agenda as follows: 1) Satellite tracking and monitoring of Spotted Seals in YS; 2) Environmental DNA analysis of population of Spotted Seals; and 3) Regional management plan for spotted seals.
- Spotted seal MPA networking: Under the concept of MPA networking to improve management effectiveness of transboundary species and MPA expansion, FIO and Liaoning Marine and Fisheries Research Institute will collaborate with NIFS of RO Korea in conducting spotted seal migration through satellite tracking supported by the project. Environment DNA of the species has also been studied with the Project’s support to understand the scientific soundness of MPA network for the species. According to the satellite tracking study conducted, both the PR China and RO Korea considered to enhance MPAs, by considering current trend of the spotted seal population in Bohai Sea and Yellow Sea declining dramatically. In establishing the MPAs, tracking the migration routes

and distribution patterns could strengthen the protection effectiveness and promote the connectivity among these MPAs by considering high mobility with seasonal migratory characteristics of the spotted seal. Also, through the study of management plan for the conservation of spotted seals, 14 key actions including conservation of habitats and scientific investigation to understand distribution patterns were suggested and all key actions are for the protection of spotted seal population in a systematic way in the Yellow Sea. As part of the Yellow Sea Grant Program (YSGP), the project supported China Biodiversity Conservation and Green Development Foundation (CBCGDF) to strengthen the Yellow-Bohai Sea Spotted Seals Protected Area Network, a community-based network with four sites dedicated for conservation of the species.

- The RO Korea has also led efforts to establish a domestic and international network of MPAs. The KOEM of RO Korea has been working to expand the domestic Mudflat Center Network more broadly to a Regional MPA Network.

Outcome 4.3 Adaptive management mainstreamed to enhance the resilience of the YSLME and reduce the vulnerability of coastal communities to climate change impacts on ecosystem processes and other threats identified in the TDA and SAP

Indicator 15: Status of incorporation of adaptive management of climate change regional strategies and in ICM plans for selected coastal communities
Baseline: Inadequate considerations are being given to the impacts of climate change
End of project targets: 1) CC adaptation strategies incorporated in regional strategies such as YSCWM and plankton communities; 2) ICM plans in (specify number) coastal communities incorporate CC adaptation to improve climate resilience
Up-to-date overall assessment: ***Overall, the likelihood of project intervention in achieving this outcome is unclear.*** In Project has failed to understand the relationships between the changes of the YSCWM and structure of the plankton communities due to lack of quantitative analysis and the need for in situ observations at multiple scales and the high-resolution biological-physical modelling. The regional adaptive management strategy to climate change lack data-supported vulnerability analysis to base adaption strategies. In the Dandong adaption plan, local governments have not been actively involved to address local needs and subsequent buy-in.

Cumulative progress since project starts:
Project interventions and progress are summarized below:

- The project supported a desk review of relationships between the changes of Yellow Sea Cold Water Mass (YSCWM) and structure of plankton communities to support the development of climate change adaptive management strategy. The reviews indicate that structure of plankton communities should be based on the analysis of taxonomy data from plankton samples. Yet in this region, there are no enough cruise data to support this topic, especially in the long-term effect of climate change. Moreover, there are large errors of plankton taxonomy data among different sources, and it will exceed the changes driven by climate. Therefore, it is difficult to give a quantitative analysis on this topic. The interannual variability of plankton community and their relationships to physical forcing are less clear and warrant further investigation. Future studies will require long-term and intensive in situ observations at multiple sites in this spatially heterogeneous system. Moreover, high resolution biological-physical modeling focusing on plankton dynamics is highly recommended to clearly understand the underlying mechanisms in this dynamically complex and socioeconomically important ecosystem.

- Study on the impact of sea ice to Dandong was also studied. The maximum sea ice coverage in Liaodong Bay of Bohai Sea is
  comparable with the past half century. The rise of sea ice area is conducive to the survival and reproduction of spotted seals, thus creating an objective condition for the increase of the number of spotted seals which overlaps with abundance of the species in the corresponding years.

- The coastal sea level of the Yellow Sea is anticipated to rise about 70-165mm in next 30 years. Vulnerability of Dandong to seal level rise was assessed as a part of the adaptation planning and completed in April 2020 through PCA by the FIO. The results show that the largest proportion covered by the moderately vulnerable area (4,167.45 km^2) and severely vulnerable area (3,875.33 km^2) accounts for 28.64% and 26.63% of the total area of Dandong, followed by the vulnerable area (2,912.45 km^2 and extremely vulnerable area (2,505.63 km^2), accounting for 20.01% and 17.22% of the total area of Dandong.

Based on these studies, the Project supported to develop climate change adaptation plan for integration into local ICM plan. The impact of climate change in YS is mainly manifested as rising sea level and higher frequency and severity of various marine disasters, such as storm surge and sea ice. The objective of this consultancy is to develop climate change adaptation strategy of Dandong via vulnerability assessment of coastal communities and impact assessment of sea level rising. Dandong city locates the north coast of YS, facing DPR Korea across the Yalu river which is also critical spot for migratory birds. In the study, major challenges in Dandong caused by the climate change were addressed to the: 1) existing economic development; 2) coal-led energy structure; 3) agriculture; 4) protection of forests and wetlands; 5) water resources and 6) capability of coastal areas to adapt. Additionally, adaptive strategies and actions through integrated coastal management (ICM) was also proposed to cope with climate change through adaptive management mechanism. In the report, detailed actions to reduce greenhouse gas emission were also suggested: 1) transforming the growth model and promoting industrial restructuring; 2) strengthening technological innovation and improving energy efficiency; 3) developing clean and renewable energy; 4) developing circular economy and improving the efficiency of resource utilization; 5) reducing agricultural greenhouse gas emissions. Also, actions to adapt to climate change were also suggested: 1) improving agriculture's ability; 2) improving capability of forests and wetlands; 3) improving the capability of water resources; 4) improving the capability of coastal areas; 5) strengthening the capacity of early warning and response and 6) optimizing the spatial distribution of the population.

Outcome 4.4 Application of Ecosystem-based Community Management (EBCM) in preparing risk management plans to address climate variability and coastal disasters

Indicator 16: Status of Regional Monitoring Network for application of ECBM
Baseline: National Monitoring will continue without regional linkages and harmonization making regional analyses difficult or impossible
End of project targets: 1) Agreed number of cruises & parameters for the regional monitoring network established and data shared regionally via the project web site. 2) Regular LME-wide assessments; enhanced information exchange; periodic scenarios of ecosystem change
Up-to-date overall assessment: The project facilitated the development and consensus building among the two countries on the Regional Jellyfish Monitoring Program, and A Comprehensive Regional Monitoring System: Monitoring Strategies for Climate Change, N/P/Si Changes, HABs (Harmful algal blooms), and Jellyfish Blooms. Data from the two countries are also shared in the development of the monitoring programs and harmful marine organism workshops. With implementation of the two programs, data sharing will become more regular using agreed methodologies to collect data from the

agreed monitoring network. In this sense, ***the target is partially achieved but the implementation of the two regional programs are yet to be fully implemented.***

Cumulative progress since project starts:

Regional jellyfish monitoring program

To monitor jellyfish populations and evaluate their impacts on the YS, China undertook the National Basic Research Program on Giant Jellyfish Blooms in Chinese Seas from 2011 to 2015. The main task of the projects was to understand the controlling factors, key processes and driving mechanisms in jellyfish blooms in Chinese coastal waters; to discover how jellyfish blooms influence the marine ecosystem and their mechanisms of causing harm; and evaluating ecological disasters and how to put into place mitigating measures. In the RO Korea, the NIFS and the KOEM have been developing measures to reduce damage caused by jellyfish blooms through the Study on the Causes of and Countermeasures against Jellyfish Blooms (by NIFS) and polyps' habitat mapping and removal undertaking (by KOEM). This study reiterated the needs for having joint research and data sharing between two countries to verify the sources and mechanism of the blooms, and also suggested to organize joint jellyfish monitoring cruise and expand into multidisciplinary research cruise at a later stage. The issue of the need for the joint monitoring program was further discussed during the *ad hoc* expert meeting of RWG-A which was held on Qingdao, PRC in May 10, 2019. The meeting discussed the possibility of future joint monitoring activities to study jellyfish distribution and abundance in the YS and the meeting participants discussed possible methodologies for monitoring systems including sampling sites and frequency of sampling and information sharing. RWG-A agreed to the monitoring program developed on a regional scale and look forward to implementing joint research in the future.

Comprehensive Regional Monitoring of Climate Change, N/P/Si Changes, HABs (Harmful algal blooms), and Jellyfish Blooms

The National Marine Environmental Monitoring Center (NMEMC) of PR China prepared and submitted the draft monitoring programs of jellyfish, HAB and drifting macroalgal blooms and N/P/Si which were reviewed and recommended for adoption by RWG-A meeting held on June 29, 2018. In the plan, surveys are suggested to conduct 3 times at sampling locations, Donggang and Haizhou Bay. Detailed methodologies on sampling and analysis are described for clarification at the meeting. As for Jellyfish monitoring study, detailed methodologies with sampling and stations are described which as in line with the approach prepared by the previous study (refer to above activity). As for monitoring, it was suggested to set 3 sections with 5 sections for each section and recommended to have monitoring from July to August every year. The plan was received and reviewed by NWG-A of RO Korea.

An assessment study on ecosystem change in YSLME and policy recommendation was conducted by the FIO. This study emphasized the significance of joint activities to be made by both countries to protect and manage the ecosystems of YSLME in a systematic way, by assessing the changes and influencing factors of the Yellow Sea ecosystem, and also finding out root causes of environmental problems being occurred in the Yellow Sea in order to propose strategies to deal the problems. Considering several factors affecting ecosystems in the Yellow Sea, this study suggested five key policy recommendations -1) enhancing joint research; 2) enhancing cooperation in protecting the Yellow Sea Ecological Important Zones; 3) establishing an ecosystem-based Yellow Sea management System; 4) cooperating in legislation of marine environment and biodiversity conservation and 5) developing master strategy for conservation and sustainable use of the Yellow Sea. In the conclusion remark of this study, it was suggested to establish a sound marine environmental monitoring system for the protection and management of the ecosystems in the Yellow Sea.

Two regional workshops on harmful marine organisms

The Project organized two workshops on harmful marine organisms in partnership with KOEM, IOCAS, FIO and NMEMC, including jellyfish and HABs: 1st workshop in Kunming, China in June 2018; and 2nd in Jeju, RO Korea in June 2019. During the 2nd workshop on harmful marine organisms (HMOs) in the YS which was held in Jeju, ROK on June 17-18, 2019, a total of 19 scientists and managers from 11 academic institutions of PR China and RO Korea discussed the status, trends, methodologies, research plans, management measures, multiple use and mitigation of harmful species of jellyfish, *Spartina alterniflora* and algae. *Sargassum sp*. was also discussed as of its origin and developments following the catastrophic outbreak with significant economic loss to tourism in Jeju Island of RO Korea and mariculture in Northern Jiangsu of PR China in 2017. The workshop helped exchange information on new projects, progress and results of latest studies on the three HMOs and *Sargassum spp*.

Seasonal variations of Sargassum

In May to July 2017, green and golden tides occurred along the southern coast of the Shandong Peninsula, consisting of *Ulva* and *Sargassum*. Of economic importance, in December 2016, a seaweed farming area of *Poryphyra yezoensis* in the Jiangsu Shoal of the eastern YS was severely affected by *S. horneri*. This caused the largest direct economic loss caused by floating *Sargassum* in China, with estimated losses of 500 million CNY (about USD 73 million). Based on project study by FIO, two blooms affect the YS, with the winter bloom being initiated from the southeastern coast of Shandong Province, drifting southward to the southeastern coast of Jiangsu Province, and the spring bloom being initiated along the coasts of Zhejiang Province, drifting offshore and northward, intruding into the Yellow Sea and southwestern of Korean Peninsula. Various environmental factors, such as seawater temperature, light availability, water circulation and nutrients, could regulate or influence the blooming dynamics. Further research is needed to identify the exact biomass source for the winter Sargassum bloom and clarify the outbreak mechanism of both winter and spring blooms.

ANNEX II: List of Meetings, Workshops, and Study Visits with gender-segregated data

1. List of Meetings

Outcome	Event	Category	Type	Date	Partners	Attended by	Male	Female	Total	Gender Ratio (Female)
OUTCOME 1.1	4th meeting of the interim commission council (ICC-4) of the UNDP/GEF YSLME phase II project	ICC	Meeting	11/29/2019	MOFA and MOF, RO Korea	UNDP, UNOPS, PMO, Government representatives of ROK and PR China, RWG Chairs, International organizations, etc.	22	15	37	41%
	The 1st ad-hoc meeting of the interim commission council of the UNDP/GEF YSLME phase II project	ICC	Meeting	7/15/2019	MNR and FIO of PR China	UNDP, PMO, Government representatives of ROK and PR China, RWG Chairs, International organizations, etc.	16	10	26	38%
	3rd meetings of the interim commission council (ICC-3)	ICC	Meeting	3/12/2019	MNR and FIO of PR China	UNDP, UNOPS, PMO, Government representatives of ROK and PR China, RWG Chairs, International organizations, etc.	29	29	58	50%
	2nd interim commission council meeting	ICC	Meeting	3/28/2018	MNR of PR China	UNDP, UNOPS, PMO, Government representatives of ROK and PR China, RWG Chairs, International organizations, etc.	26	17	43	40%
	1st meeting of the management, science and technical panel (MSTP) and inception ceremony of UNDP/GEF YSLME II project	ICC	Meeting	7/11/2017	MOFA and MOF, RO Korea	UNDP, UNOPS, PMO, Government representatives of ROK and PR China, RWG Chairs, International organizations, etc.	30	18	48	38%
	2017 1st RWG-A Meeting in Incheon, ROK	RWG-A	Meetings	21-22 Nov 2017	PMO, YSFRI/CAFS of PRC, KIOST, NIFS/MOF of ROK	PMO staffs, RWG-A members and Experts	11	3	14	21%
	2017 1st RWG-G Meeting in Seoul, ROK	RWG-G	Meetings	14-15 Dec 2017	PMO, Korean and Chinese Government	PMO staffs, RWG-G members and Experts	12	12	24	50%
	2019 ROG Review Workshop, Shenyang, PRC	RWG-G	Meetings	6/2/2019	PMO and Grandview	PMO staff, RWG-G members and experts	8	2	10	20%
	2017 1st RWG-F meeting in Yantai, PRC	RWG-F	Meetings	17-18 Oct 2017	PMO, NMEMC and FIO of PRC, KIOST, NIFS, KMI, and KOEM of ROK	PMO staffs, RWG-F members and Experts	14	7	21	33%
	2017 1st RWG-H Meeting, Incheon, ROK	RWG-H	Meetings	4-5 Sep 2017	PMO, FIO/SOA of PRC, Anyang University, KOEM, and Korea	PMO staffs, RWG-H members and Experts	8	5	13	38%

					Institute of Environment Ecology of ROK					
	2017 1st RWG-M meeting in Weihai, PRC	RWG-M	Meetings	26-27 Oct 2017	PMO, Bureau of Fishery Management, Ministry of Agriculture of PRC, and KOEM of ROK	PMO staffs, RWG-M members and Experts	10	4	14	29%
	2018-2nd meeting in Jeju, ROK	RWG-M	Meetings	8-9 Nov 2018	PMO, Bureau of Fishery Management, Ministry of Agriculture of PRC, and KOEM of ROK	PMO staffs, RWG-M members and Experts	15	7	22	32%
	2017 1st RWG-P meeting in Dalian, PRC	RWG-P	Meetings	10-12 Oct 2017	PMO, NCSEMC of PRC, KIOST of ROK	PMO staff, RWG-P members and Experts	15	5	20	25%
	2019 RWG-P meeting in Busan, ROK	RWG-P	Meetings	4-5 Jun 2019	PMO, NMEMC of PRC, KOEM and KIOST of ROK	PMO staff, RWG-P members and Experts	15	5	20	25%
	2019 TDA/SAP Natinoal Consultation Meeting in Wuhan, PR China	RWG-G	Meetings	12-13 August 2019	PMO, MNR, YSFRI, NMEMC and FIO of PRC	PMO staff, RWG-G members and experts	8	3	11	27%
OUTCOME 1.2	2019 NWG meeting to review TDA in Yancheng	RWG-G	Meetings	14-15 June 2019	PMO, MNR, YSFRI, NMEMC and FIO of PRC	PMO staff, NWG-chairs and experts	8	2	10	20%
	2019 NWG Meeting to review TDA in Nanchang	RWG-G	Meetings	27-29 Dec 2019	PMO, MNR, YSFRI, NMEMC and FIO of PRC	PMO staff, NWG-chairs and experts	9	2	11	18%
OUTCOME 1.4	2019-Training Module Meeting, Qingdao, PRC	RWG-G	Meetings	1/17/2019	PMO, Ocean University of PRC and Korea University of ROK	PMO staff and experts	6	3	9	33%
OUTCOME 4.1	Fishermen training by Institute of Geographical Sciences and Natural Resources Research, Chinses Academy of Sciences of PRC QingkouRiver Estuary community	RWG-H	Meetings	6/22/2019	IGSNRR of PRC	Experts from IGSNRR and fishermen from Qingkou River Estuary community	14	2	16	13%
	Meeting on Conservation Actions of Endangered Waterbirds and Their Habitats in the Yellow Sea Ecosystem	RWG-H	Meetings	6/21/2019	Institute of Geographical Sciences and Natural Resources Research (IGSNRR), Chinese Academy of Sciences of PRC and US eBird database project	Researchers from IGSNRR and 5 NGOs and experts from National Forestry and Pairie Bureau GEF Project, Paulson Institute, Heibei Agricultural University, Institute of Software; CAS, and Harbin Institute of Technology of PRC	9	12	21	57%
OUTCOME 4.4	2019-Ad-Hoc Expert Meeting in Qingdao, PRC	RWG-A	Meetings	5/10/2019	NMEMC and FIO of PRC, KIOST, NIFS and KOEM of ROK	RWG-A members and Experts on Jellyfish, HAB	11	3	14	21%
Total							**296**	**166**	**462**	**36%**

2. List of Workshops

Outcome	Event	Category	Type	Date	Partners	Attended by	Male	Female	Total	Gender Ratio (Female)
OUTCOME 1.1	2018 2nd RWG-A Meeting in Kunming, PRC	RWG-A	Workshop	6/26/2018	PMO, NMEMC and FIO of PRC, KIOST, NIFS and KOEM of ROK	PMO staffs, RWG-A members and Experts	18	7	25	28%
OUTCOME 1.1	2019 TDA-SAP Regional Consultation Workshop (July)	RWG-G	Workshop	7/17/2019	PMO, MNR, YSFRI, NMEMC and FIO of PRC and MOFA, MOF and KOEM of RO Korea	PMO staff and RWG-G members and experts	14	11	25	44%
OUTCOME 1.1	2018 2nd RWG-F in Jeju, ROK	RWG-F	Workshop	10/11/2018	PMO and NIFS	PMO staffs, RWG-F members and Experts	18	6	24	25%
OUTCOME 1.1	2019 TDA-SAP Regional Consultation Workshop (November)	RWG-G	Workshop	11/27/2019	PMO, MOFA and MOF of RO Korea	PMO staff, RWG-G members and experts	15	9	24	38%
OUTCOME 1.3	3rd YSLME science conference (Plenary)	RWG-G	Workshop	15-19 July 2019	MARA, MNR, FIO, NMEMC, and YSFRI of PRC and KOEM, KIOST, Anyang University, NIFS of RO Korea, IUCN, NOWPAP of UNEP, EAAFP etc.	Delegates of UNDP, experts and officers from 50 institutes of 13 countries including PRC, and ROK	60	46	106	43%
OUTCOME 1.3	3rd YSLME Science Conference (Fishery)	RWG-F	Workshop	7/15/2019	PMO, YSFRI, CAFS, MARA of PR China and WSFRI, NIFS, MOF of ROK	PMO Staff, RWG-F members and experts	20	12	32	38%
OUTCOME 1.3	3rd YSLME Science Conference (Biodiversity)	RWG-H	Workshop	15-17 July 2019	MARA, MNR, FIO, NMEMC, and YSFRI of PRC and KOEM, KIOST, Anyang University, NIFS of RO Korea, IUCN, NOWPAP of UNEP, EAAFP etc.	PMO Staff, RWG-H members and experts, NGOs	22	11	33	33%
OUTCOME 1.3	3rd YSLME Science Conference (Marine Litter)	RWG-P	Workshop	18-19 July 2019	PMO, MEE, NMEMC, Shandong Marine Research Institute of PRC and MOF, KIOST of ROK	PMO Staff, RWG-P members and Experts, NGOs	10	9	19	47%
OUTCOME 1.3	3rd YSLME Science Conference (Nutrient Management in YS)	RWG-A	Workshop	18-19 July 2019	PMO, NMEMC of PRC, KOEM and KIOST of ROK	PMO Staff, RWG-A members and Experts, NGOs	16	4	20	20%
OUTCOME 1.4	2018 Regional Ocean Governance WS in Qingdao, PRC - International Seminar	RWG-G	Workshop	17-18 Nov 2018	Marine Development Studies Institute of Ocean University of China, Center for Global Climate and Marine Governance of	Experts from both countries including Shandong Province of PRC	34	15	49	31%

					Korea University, KOEM of ROK and NMEMC of PRC					
OUTCOME 2.2	Tongyeong fish stock assessment workshop	RWG-F	Workshop	30-31 July 2018	PMO, YSFRI of PRC, KIOST, NIFS, KMI and KOEM of ROK	PMO staffs, RWG-F members and Experts	9	8	17	47%
OUTCOME 2.3	2019 IMTA visit by Caribbean Regional Fisheries Mechanism to Chudao	RWG-M	Workshop	10-15 Dec 2019	PMO, YSFRI of PRC	PMO staff, Experts from YSFRI, Executive of CRFM, Government officer from Jamaica	6	0	6	0%
OUTCOME 2.3	International Symposium on IMTA	RWG-M	Workshop	14-15 Sept 2017	NIFS/MOF of RO Korea	International experts on IMTA, mariculture practionners, industry representatives, academia, etc	27	9	36	25%
OUTCOME 2.3	YSLME Responsible Mariculture Initiative in Qingdao	RWG-M	Workshop	10/30/2019	China Aquatic Products Processing and Marketing Alliance and Qingdao Marine Conservation Society of PRC	Members from CAPPMA and QMCS, Members from Hema, Pencheng Group and other enterprises	35	18	53	34%
OUTCOME 3.4	2019 microplastic monitoring training	RWG-P	Workshop	30-31 Jul 2019	PMO, YSFRI and Yantai University of PRC	PMO staff, RWG-P members and Experts, academia	17	8	25	32%
OUTCOME 3.4	2019-Weihai Meeting on December 14-16	RWG-P	Workshop	14-16 Dec 2019	PMO, Shandong Marine Resources and Environment Institute, Weihai Local Government, BROCA, Rendu, and NMEMC of PR China	PMO staff, NGOs, Academia, Government Officials, and Experts	8	2	10	20%
OUTCOME 4.2	YSLME Webinar: Management Planning for Spotted Seals in the YSLME	RWG-H	Workshop	5/22/2020	PMO, FIO of PR China, KOEM and KIOST of ROK	PMO Staff, NGOs, experts and RWG-H Members	13	10	23	43%
OUTCOME 4.2	2018 MPA connectivity WS, Seocheon, ROK	RWG-H	Workshop	23-27 Jul 2018	KOEM and MABIK of RO Korea	Experts from research institutes including FIO of PRC, NIFS and KIOST of ROK; academia from three countries including USA, PRC, and ROK; NGOs of both PRC and ROK; international NGO, EAAFP	17	12	29	41%
OUTCOME 4.2	2020 MPA Networking WS, Dalian, PRC	RWG-H	Workshop	14-16 Jan 2020	PMO, FIO/SOA of PR China and KOEM and KIOST of ROK	PMO staff, Academia, NGOs, RWG-H members and experts	20	13	33	39%
OUTCOME 4.2	International Seminar on MPAs in YSLME	RWG-H	Workshop	7/14/2017	NEAMPAN/UNESCAP and KOEM, Ganghwa County of RO Korea	Governmental officers of ROK, delegates from UNDP, UNESCAP, UNOPS, experts from academia and NGOs	58	12	70	17%

OUTCOME 4.2	Webinar on the Results of Population Census of Spoon-billed Sandpipers in China and Launching of the Spoon-billed Sandpiper and Wetland Protection Video	RWG-H	Workshop	5/8/2020	PMO, EAAFP	PMO staff, Academia, NGOs, EAAFP, and experts	17	13	30	43%
OUTCOME 4.3	2019 YSCWM WS in Penglai, PRC	RWG-A	Workshop	10-11 Jun 2019	FIO of PRC; KIOST and KOEM of ROK	FIO of PRC; KOEM, KIOST, NIFS of ROK	16	3	19	16%
OUTCOME 4.4	2019 2nd HMO WS in Jeju, ROK	RWG-A	Workshop	17-18 Jun 2019	MOF and KOEM of ROK; NMEMC of PRC	Experts and officers from MOF of ROK and 10 academic institutes in both PRC and ROK	31	9	40	23%
OUTCOME 4.4	2018 HMO Workshop in Kunming, PRC	RWG-A	Workshop	25-26 Jun 2018	SOA, IOCAS, NMEMC of PRC and MOF, KOEM of ROK	Experts on jellyfish, HAB and Sargassum sp. from both countries	24	8	32	25%
Total							**475**	**231**	**706**	**33%**

3, List of Trainings

Outcome	Event	Category	Type	Date	Partners	Attended by	Male	Female	Total	Gender Ratio (Female)
OUTCOME 2.1	3 Training of 150 displaced fishermen on alternate employment	RWG-F	Training	12/1/2019	Yantai University	fishermen joining the fishing vessel buy-back scheme	151	9	160	6%
OUTCOME 2.3	Physiological Energy Measurement Technique of Bivalves	RWG-M	Training	17-18 Sep 2018	PMO and YSFRI of PRC	PMO staff, University faculty, students, IMTA operators, and etc.	89	30	119	25%
OUTCOME 2.3	2018 AIT training	RWG-F	Training	1-2 Dec 2018	Asian Institute of Technology (AIT)	YSFRI of PRC, NIFS and INU of ROK, Aquaculture practionners in Asia and the Pacific	17	8	25	32%
OUTCOME 3.4	Reducing Marine Litter in the Coastal Cities of the YS	RWG-P	Training	7/27/2019	BROCA of PRC	Members from BROCA, Public participants	15	6	21	29%
OUTCOME 3.4	Training on Marine Debris Survery	RWG-P	Training	18-19 May 2019	RENDU of PRC and OSEAN of ROK	Members from RENDU, OSEAN	6	6	12	50%
OUTCOME 4.2	Training on NAGRR	RWG-H	Training	8/8/2019	CAFS of PRC	the Ministry of Agricultural villages, the Agricultural and Rural Department of Yunnan Province, the China Academy of Fishery Sciences of PRC	92	20	112	18%
OUTCOME 4.4	Community training in PR China by GEI	RWG-A	Training	9-10 Oct 2019	GEI of PRC	Villagers from Dadingzi Village, Shanjiajing; Village, Dandong Donggang City	11	4	15	27%
Total							**381**	**83**	**464**	**18%**

4, List of Study Visits

Outcome	Event	Category	Type	Date	Partners	Attended by	Male	Female	Total	Gender Ratio (Female)
OUTCOME 2.2	2019 marine ranching visit to PRC (Haiyang and Qingdao, PR China)	RWG-F	Study Visit	6-9 May 2019	PMO, NMEMC and FIO of PRC, KIOST, NIFS, KMI, and KOEM of ROK	PMO staffs, RWG-F members and Experts	23	17	40	43%
OUTCOME 2.2	2019 visit of Marine ranching in ROK	RWG-M	Study Visit	14-17 Oct 2019	PMO, KOEM, FIRA, and KIOST of ROK	PMO Staff, Government Officers (MARA, Shandong Local Government), Academia, and Experts	14	7	21	33%
OUTCOME 2.3	IMTA Study Visit to Rizhao and Lianyungang	RWG-M	Study Visit	13-16 August 2019	CAPPMA and QMCS of PRC	Members from CAPPMA and QMCS, YSFRI, and IMTA operators	17	12	29	41%
OUTCOME 3.1	2019 Lab Visit to China	RWG-P	Study Visit	27-31 Oct 2019	NMEMC, FIO, NCSB of PR China, China-Korea Joint Marine Cooperation Center (CKJMCC), KOEM of ROK	PMO staff, RWG-P members and Experts	18	13	31	42%
OUTCOME 3.1	2018-Shandong and Chungnam visit	RWG-P	Study Visit	12-16 Dec 2018	Shandong Research Institute and Shandong Local Government of PRC and KIOST, KOEM and Chungnam Local Government of ROK, PMO	PMO staff, Academia, Local Government Officials, Experts	14	4	18	22%
Total							**86**	**53**	**139**	**38%**

Annex III: YSLME Bibliography

Project Objective & Outcome As outlined in the Prodoc	**Indicator & Target** As outlined in the Prodoc	**Output/Deliverables**	**Country**	**Consultant/Subcontract/ Partner**	**Language**	**Input**	**Year the document or report was published**
OUTCOME 1.1 Regional governance structure, the YSLME Commission established and functional, based on strengthened partnerships & regional co-ordination; wider stakeholder participation and enhanced public awareness. (Strengthening regional coordination and partnerships)	Status of YSLME Commission and subsidiary bodies at regional level	Architecture of Interim YSLME Commission	Regional	PMO	English	Report	2017
		Guidelines for Strengthening Yellow Sea Partnership	Regional	PMO	English	Report	2017
		BASIC INSTRUMENTS FOR THE ESTABLISHMENT OF THE YELLOW SEA LME COMMISSION	Regional	Chris HEDLEY	English	Consultancy	2019
		Roadmap towards a sustainable regional environmental cooperation framework	Regional	Suh-Yong CHUNG	English	Consultancy	2017
		consolidated TDA update report	Regional	Paul T. Gremillion	English	Consultancy	2020
		SAP update	Regional	Paul T. Gremillion	English	Consultancy	
		Assessment of the Opportunities and Options for a Regional Ocean Governance Mechanism for the YSLME	Regional	Grandview	English	Subcontract	2019
OUTCOME 1.2 Improved intersector coordination and collaboration at national level based on more effective IMCCs;	Status of Inter-Ministerial Coordinating Committee (IMCC)	NSAP review report (PR China)	China	Yellow Sea Fisheries Research Institute (YSFRI) National Marine Environment Monitoring Center (NMEMC) First Institute of Oceanography (FIO)	English	Cooperation Agreement	2019
		NSAP review report (RO Korea)	Korea	KIOST	English	Report	2019
OUTCOME 1.3 Wider participation in SAP implementation fostered through capacity building and public awareness, based on strengthenin	Number of the YS partnerships: Number of activities on capacity building and public awareness; Number of participants in capacity	Configuration of the YSLME Website	Regional	CGTae	English	Subcontract	2019
		Project videos 1) YSLME Marine Litter 2) YSLME Fish Stock 3) YSLME Marine Protected Areas 4) YSLME Integrated Multi-trophic Aquaculture 5) YSLME Spoon-billed Sandpiper 6) YSLME Spoon-billed sandpiper info vid KOREAN VERSION (short version) 7) YSLME Spoon-billed sandpiper infor video Chinese VERSION (short version)	Regional	Beijing Baixin Move & TV Cultural Communication Co., LTD & John Christian Castillo	English Korean Chinese	Subcontract	2020

	building activities	8) YSLME Spoon-billed sandpiper infor video English VERSION (short version)			English		
		Fact Sheet - Marine Litter		PMO	English		2020
		Communication Strategy		Lisa Benedetti	English	Consultancy	2018
OUTCOME 1.4 Improved compliance with regional and international treaties, agreements and guidelines (Improving compliance with international conventions)	Status of recognition and compliance to regional and international treaties and agreements	The Assessment Report on China's Legal Framework in Compliance with the International and Regional Legal Instruments for the Implementation of SAP in the YSLME Project II	China	Ming YU	English	Consultancy	2018
		The Assessment Report of China's National and Local Capacity for Implementation of International Legal Documents in the YSLME Project II	China	Ming YU	English	Consultancy	2018
		Improving SAP to synergize the implementation of international conventions on marine protection and sustainable uses of marine resources	China	Ming YU	English	Consultancy	2019
		Regional guidelines for responsible fisheries in YSLME	Regional	YSFRI	English	Cooperation Agreement	2020
		Responsible fisheries certification in China Capture fisheries	National	YSFRI	English	Cooperation Agreement	2019
OUTCOME 1.5 Sustainable financing for regional collaboration on ecosystem-based management secured, based on cost-efficient and ecologically-effective actions (sustaining finance for regional coordination)	Agreement on the financial arrangement for the YSLME Commission	Proposal on YSLME Trust Fund	Regional	Elisabeth Carrio	English	Consultancy	2019
OUTCOME 2.1 Recovery of depleted fish stocks as shown by increasing mean trophic level (reducing fishing efforts)	Number of fishing boats decommissioned from the fleet in YSLME waters	Assessment report of effectiveness of license system and recommendations for improvement of licensing system	Regional	Yellow Sea Fisheries Research Institute (YSFRI)	English	Cooperation Agreement	2018
		Governance and Socio-economic Assessment of Fishing Vessel Buy-back Scheme and Fish Restocking, Mariculture and Climate Change Impact Adaptation Measures in Dalian, Weihai and Dandong of PR China	China	Nanjing University	English	Subcontract	2019
		reemployment training report	China	Yellow Sea Fisheries Research Institute (YSFRI)	English	Cooperation Agreement	2019

		Report of survey of impact of COVID-19 on re-employment of trained fishermen	China	Yanan Cao (intern)	Chinese		2020
OUTCOME 2.2 enhanced fish stocks through re-stocking and habitat improvement (Enhancing fish stocks through restocking and habitat improvements)	Status of major commercially important fish stock from restocking and habitat improvement	Seagrass transplanting report and establishment of improved techniques of replanting seagrass	China	YSFRI	English	Cooperation Agreement	2018
		Reports of Fuhan marine ranching and Pingkou artificial reef demonstration in Haiyang, Shandong 1) reports of Fuhan marine ranching 2) Pingkou artificial reef demonstration in Haiyang, Shandong	China	Yellow Sea Fisheries Research Institute (YSFRI)	English	Cooperation Agreement	2018
		Joint assessment report of the effectiveness of closure	China	Yellow Sea Fisheries Research Institute (YSFRI)	English	Cooperation Agreement	2018
		Joint assessment report of the effectiveness of buy-back scheme	Regional	Yellow Sea Fisheries Research Institute (YSFRI)	English		2019
		Implementation of the Fishing Vessel Buyback Program in the Yellow Sea of Korea and its Effectiveness analysis	Korea			Report	
		Limited access by a fishing permit system in RO Korea	Korea			Report	
OUTCOME 2.3: Enhanced and sustainable mariculture production, by increasing production per unit area as means to ease pressure on capture fisheries (scaling up integrated multitrophic aquaculture)	Type of mariculture production technology Level of pollutant discharge from mariculture operations	Draft GAP of IMTA	Regional	Yellow Sea Fisheries Research Institute (YSFRI)	English	Cooperation Agreement	2018
		Good Aquaculture Practice Integrated multi-trophic aquaculture (IMTA) of fish, bivalve and seaweed in coastal ecosystem	Regional	Jihong Zhang	English	Consultancy	2018
		Survey report of coastal areas suitable for operation of IMTA, and economic analysis of benefits from replication of IMTA across Shandong Province, PR China	China	Yellow Sea Fisheries Research Institute (YSFRI)	English	Cooperation Agreement	2018
		promotion plan of IMTA in Shandong	Regional	Yellow Sea Fisheries Research Institute (YSFRI)	English	Cooperation Agreement	2019
		Training Module of IMTA in PR China	China	Jianguang FANG	English	Consultancy	2018
		YSGP CAPPMA report on establishing responsible mariculture initiative and alliance	China	China Aquatic Products Processing and Marketing Alliance (CAPPMA)	English	Grants	2019
		YSGP CAPPMA Three ASC standards brochures in Chinese (Abalone, Bivalve, Flatfish), Korean (Abalone, Bivalve, Sea Weed) and English (Abalone, Bivalve, Flatfish) 1) Chinese - Abalone, Bivalve, Flatfish	Regional	China Aquatic Products Processing and Marketing Alliance (CAPPMA)	English, Korean, Chinese		

		2) Korean - Abalone, 3) English - Abalone,	Bivalve, Bivalve,	Sea Weed Flatfish				
		Agreements with Jiayuan Group and Nanhuangcheng to purchase seafood from mariculture enterprises alliance members 1) Agreements with Jiayuan Group 2) Agreements with Nanhuangcheng			China	China Aquatic Products Processing and Marketing Alliance (CAPPMA)	Chinese	Grants 2019
		Signed responsible mariculture initiative			China	China Aquatic Products Processing and Marketing Alliance (CAPPMA)	English	
		Technical report of IMTA demonstration in two sites			China	Yellow Sea Fisheries Research Institute (YSFRI)	English	Cooperation Agreement 2019
OUTCOME 3.1 Ecosystem health improved through a reduction in pollutant discharge (e.g. nutrients) from land-based sources (reducing nutrient loading from land-based sources)	Level of pollutant discharges particularly Nitrogen in YSLME tributaries	Proposal of regional pollution monitoring network in the Yellow Sea			Regional	Zhen Wang	English	Consultancy 2019
		Report on the status and trends of marine environments in the Yellow Sea			Regional	Zhen Wang	English	Consultancy 2019
		Final report of nutrient loading in the Haizhou Bay			Regional	National Marine Environment Monitoring Center (NMEMC) -	English	Cooperation Agreement 2019
		Final assessment reports of 1) nutrients from atmosphere-based source; 2) fertilizer use; and 3) sea-based mariculture pollution and ship-based pollution in coastal areas of Yellow Sea			Regional	National Marine Environment Monitoring Center (NMEMC) -	English	Cooperation Agreement 2019
		1) Nutrients from atmosphere-based source	2) Fertilizer use; and	3) Sea-based mariculture pollution and ship-based pollution				
		Estimation of Land-Based Pollution Loads to the Yellow Sea from the Han River			Korea	Korea Marine Management Corporation (KOEM) and HydroCore	English	Report 2019
OUTCOME 3.2 Wider application of pollution-reduction techniques piloted at demonstration sites (Offsetting nutrients	Types of technologies applied for pollution reduction	Review report on the regional strategy for using wetland as nutrient sink			Regional	Guoxiang LIAO	English	Consultancy 2018
		Report of demonstration zone of integrated ecosystem-based investigation of wetland of Jiaozhou bay of Qingdao			Regional	Guoxiang LIAO	English	Consultancy 2019

through constructed wetlands)		Atlas of Demonstration zone of Integrated Ecosystem-based Investigation on Wetland of Jiaozhou Bay of Qingdao	China	North China Sea Environmental Monitoring Center (NCSEMC)	English	Cooperation Agreement	2020
		Suggestions and Countermeasures for the Protection of the Ecosystem of Jiaozhou Bay	China	North China Sea Environmental Monitoring Center (NCSEMC)	English		2020
		proposed monitoring framework of wetland ecosystem of Jiaozhou Bay of Qingdao	China	North China Sea Environmental Monitoring Center (NCSEMC)	English		2020
OUTCOME 3.3 Strengthened legal and regulatory processes to control pollution (Strengthening legal and regulatory process to control pollution)	Status of legal and regulatory process to control pollution	Report on the legal review of PR China and RO Korea regarding marine pollution control and compliance assessment with international ocean-related environmental agreements	Regional	Ruijun SUN	English	Consultancy	2019
		Annex-Inventory of domestic and international legal documents of the People's Republic of China and the Republic of Korea related to marine environmental protection	Regional	Ruijun SUN	English	Consultancy	2018
		training module for marine microplastics (CN)	Regional	Zhen Wang	English & Chinese	Consultancy	2019
		training module for marine microplastics (EN)					2019
OUTCOME 3.4 Marine litter controlled at selected locations (Reducing marine litter)	Status of the control of marine litter at selected locations	Final report of regional baseline survey of marine litter	Regional	National Marine Environment Monitoring Center (NMEMC) -	English	Cooperation Agreement	2019
		Status of Marine Litter Pollution and Management in the Republic of Korea	Korea	Our Sea of East Asia Network (OSEAN)	English	Report	2020
		Policies and Regulations regarding solid waste disposal in PR China	China	National Marine Environment Monitoring Center (NMEMC) -	English	Cooperation Agreement	2019
		Fishery and Aquaculture Marine Debris Survey Report -- in the Yellow Sea Area of China	China	Rendu	English	Grants	2019
		Condominium Program of Fisheries Community (Waste Reduction) in Jingzi Village of Shandong Province Project	China	Blue Ribbon Ocean Conservation Association (BROCA)	English		2019
		Present Situation and Countermeasures of Marine Litter Treatment in Weihai	China	Shandong Marine Resource and Environment Research Institute	English	Subcontract	2018
		Weihai Marine Litter Management Incentive Policies and Suggestions	China				2019
		consolidated report on status and trends of marine litter, gaps in regulatory and policy measures and proposals for improvements in Weihai city	China				2019

OUTCOME 4.1 Maintenance of current habitats and the monitoring and mitigation of the impacts of reclamation (maintaining globally significant coastal wetlands)	Areas of critical habitats Status of mitigation of reclamation impacts	YSLME Biodiversity Conservation Plan in PR China, 2018-2030	Regional	Zhaohui ZHANG	English	Consultancy	2019
		The consolidated YSLME Biodiversity Conservation Plan (2018-2030)	Regional	Zhaohui ZHANG	English	Consultancy	2019
		3. YSLME MPA Network Concept Paper	Regional	Rocio LOZANO-KNOWLTON	English	Consultancy	2019
		4. MPA connectivity training program and modules	Regional	Rocio LOZANO-KNOWLTON	English	Consultancy	2019
		FRAMEWORK PLAN FOR THE YSLME BIODIVERSITY CONSERVATION IN RO KOREA (2018-2030)	Regional	Won Tae SHIN	English	Consultancy	2018
		6. Coastal Reclamation and Impact to Critical Coastal Habitats of Yellow Sea Large Marine Ecosystem	Regional	Yu LIU	English	Consultancy	2019
		7. Evaluation methodologies, standards and guidelines for evaluation of the effectiveness and impact of ecosystem-based restoration projects	Regional	Chaolun LI	English	Consultancy	2019
		YSGP-IGSNRR Progress Reports on Conservation Actions of Endangered Waterbirds and Their Habitats in the Yellow Sea Ecosystem - Phase 1, 2 and 3 Phase 1 / Phase 2 / Phase 3	China	Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences (IGSNRR)	English	Grants	2019
		8. Two management plans including monitoring programs and capacity development program	Regional	First Institute of Oceanography (FIO)	English	Cooperation Agreement	2019
		9. Final report on implementation of CBD and RAMSAR with recommendations for integration of SDG14, CBD and RAMSAR targets into YSLME SAP	Regional	First Institute of Oceanography (FIO)	English	Cooperation Agreement	2019
OUTCOME 4.2: MPA Network strengthened in the Yellow Sea (Developing a network of regional MPAs with functional connectivity)	Level of ecological connectivity in expansion of the Yellow Sea MPA system. Change in MPA area coverage	1. Stocktaking report of biological and ecological significance of YSCWM and existing and potential threats using ecological connectivity as key criteria	Regional	First Institute of Oceanography (FIO)	English	Cooperation Agreement	2019
		2. The map of priority areas for designation as conservation areas in YS and identify opportunities for improvements in connectivity with existing and new MPAs	Regional	First Institute of Oceanography (FIO)	English		2019
		3. A zoning plan including coordination mechanism in line with the master plan of local land use and sea use	China	First Institute of Oceanography (FIO)	English	Cooperation Agreement	2019
		4. The feasibility report for designating YSCWM a new MPA	Regional	First Institute of Oceanography (FIO)	English		2019
		5. Report on the migratory route of spotted seals based on satellite tracking in the Yellow Sea	Regional	First Institute of Oceanography (FIO)	English	Cooperation Agreement	2019
		6. Report on the assessment of genetic diversity, population structure and effective population size based on environmental DNA of spotted seals in the Yellow Sea	Regional	First Institute of Oceanography (FIO)	English		2019

		7. YSLME Spotted Seal Management Plan.	Regional	First Institute of Oceanography (FIO)	English		2019
		Technical Proposal to establish Xiaoyangkou of Rudong, Jiangsu Province of PR China, as a National Marine Protected Area	China	Zhaohui ZHANG	English	Consultancy	2017
		Proposals for designating or enlarging new MPAs for endangered mammals or habitats of endangered waterbirds	Regional	National Marine Environment Monitoring Center (NMEMC) -	English	Cooperation Agreement	2019
		Survey report with overlays to analyze gaps and conservation needs of critical nursery and spawning sites of priority fish species and make recommendations on new MPAs	Regional	Yellow Sea Fisheries Research Institute (YSFRI)	English	Cooperation Agreement	2020
		YSGP-CBCGDF final report on Construction of the Yellow-Bohai Sea Spotted Seals Protected Area Network (English)	China	China Biodiversity Conservation and Green Development Foundation	English	Grants	2019
		YSGP-CBCGDF The Spotted Seals on the Broken Ice (pdf version)	China	China Biodiversity Conservation and Green Development Foundation	Chinese		2019
		YSGP CAFS enhancing capacity of NAGRR	China	Chinese Academy of Fishery Science (CAFS)	English		2019
		YSGP CAFS Management Regulations and Index System for Assessing the Performance of NAGRRs	China	Chinese Academy of Fishery Science (CAFS)	English		2019
		YSGP GEI CCCA implementation report in Dandong	China	Beijing Chaoyang District Yongxu Global Environmental Institute (GEI)	English		2019
OUTCOME 4.3: Adaptive Management mainstreamed to enhance the resilience of the YSLME and reduce the vulnerability of coastal communities to climate change impacts on ecosystem processes and other threats identified in the TDA and SAP (Enhancing ecosystem and community resilience to climate change)	Status of incorporation of adaptive management of climate change regional strategies and in ICM plans for selected coastal communities	Stocktaking report for the relationships between the sea surface temperature changes of YSCWM and structure of plankton communities	Regional	First Institute of Oceanography (FIO)	English	Cooperation Agreement	2019
		Dandong Vulnerability Assessment Report of Sea Level Rising	Regional	First Institute of Oceanography (FIO)	English	Cooperation Agreement	2019
		Impact Assessment of Sea Level Rising for Wading Birds in Dandong	Regional	First Institute of Oceanography (FIO)	English		2019
		Effects of Sea Ice on the Development of Dandong Coastal Zone and Marine Species	Regional	First Institute of Oceanography (FIO)	English		2019
		Adaptation plans of Dandong for Climate Change	Regional	First Institute of Oceanography (FIO)	English		2019

OUTCOME 4.4: Application of ecosystem-based community management (EBCM) preparing risk management plans to address climate variability and coastal disasters	Status of Regional Monitoring Network for application of ECBM	Regional Jellyfish Monitoring Program	Regional	National Marine Environment Monitoring Center (NMEMC) -	English	Cooperation Agreement	2019
		A comprehensive regional monitoring system: monitoring strategies for climate change, N/P/Si changes, HABs (Harmful algal blooms), and jellyfish blooms	Regional	National Marine Environment Monitoring Center (NMEMC) -	English	Cooperation Agreement	2019
		Overall report of the Yellow Sea Grant Program	China	Jiajie FANG (intern)	English		2020
		Progress report on genetic diversity of both benthic and floating populations of *Sargassum horneri* in western Yellow Sea	Regional	First Institute of Oceanography (FIO)	English	Cooperation Agreement	2019
		Final report on progress of drifting *Sargassum horneri* in Yellow Sea (Seasonality and inter-annual variability of the floating *Sargassum horneri* in western Yellow Sea and the environmental drivers for the increasing blooms in recent years)	Regional	First Institute of Oceanography (FIO)	English	Cooperation Agreement	2019
		Regional assessment report and policy recommendations on ecosystem change	Regional	First Institute of Oceanography (FIO)	English	Cooperation Agreement	2019

Annex IV. Special Issue of *Acta Oceanologica Sinica* – Carrying Capacity of the YSLME

Description of the Special Issue

Over 80 percent of fisheries occur within 200 nautical miles in the world. Dr. Shermen (NOAA) classified these coastal areas under most intensive human interferences into 66 large marine ecosystems in the 1990s which have successfully leveraged support by the Global Environment Facility to strengthen good regional ocean governance to address depletion of fish stocks, loss of biodiversity, eutrophication and ecosystem changes. Funded by the UNDP and the Global Environment Facility (the GEF), the transboundary diagnostic analysis (TDA) and the Strategic Action Programme (SAP) of the Yellow Sea Large Marine Ecosystem (YSLME) were developed and implemented from 2005 to 2020 using science and ecosystem-based adaptive management approach. Approaches of and results of the practical application of science in adaptive management of coastal and marine ecosystems of the Yellow Sea funded by the UNDP/GEF YSLME Phase II Project from 2017-2019 and other sources in PR China and RO Korea in the past decade are synthesized. The special issue gives audience a holistic view of the strategic planning approach to addressing challenges to the marine ecosystem and case studies of on-the-ground applications for better governance of LMEs in the future in the areas of governance, fish stocks and mariculture, ecosystem health and habitat and biodiversity.

Keywords:

Transboundary diagnostic analysis (TDA), Strategic action programme (SAP), Yellow Sea Large Marine Ecosystem (YSLME), ecosystem-based management (EBM), eutrophication, ecosystem changes, fish restocking, carrying capacity, reclamation, marine protected areas (MPA), nature-based solutions (NbS)

Features of the Special Issue:

- Featuring UNDP/GEF YSLME Project results in both Phase I and Phase II
- Demonstrate how LME planning and implementation approach was implemented in Yellow Sea and lessons learnt
- Review the effectiveness and sustainability of regional approach to addressing interconnected challenges in coastal and marine environment management
- Provide a series of case studies and in-depth examination of how ecosystem-based approach and nature-based solutions are operationalized on the ground in reducing fishing efforts, restocking, sustainable mariculture, migratory species conservation, and joint monitoring of harmful marine organisms;
- Focus on both natural and social sciences and adopt an inter-disciplinary approach towards governance of the Yellow Sea

Expected date of submission: December 31, 2020

Guest Editors: Prof. **Kyung Soo Park** of Anyang University, ROK; Dr. **Bing Wang**, Ministry of Natural Resources, PR China; Mr. **Yinfeng Guo**, UNOPS; Prof. **Jun Sun**, Tianjin Science and Technology University

list of papers included in the Special Issue (20)

I. Enhancing governance of the Yellow Sea Large marine ecosystem

1. Overview of the carrying capacity of the YSLME, Kyung Soo Park, Bin Wang, Yinfeng Guo & Jun Sun
2. Evolution of governance of the Yellow Sea using science-based approach – the

experience of YSLME. Yinfeng Guo, et al

II. Restoring fish stocks in the YSLME

3. Data-limited stock assessment for Chinese fish species without catch statistic data: cases study for Silver pomfret (*Pampus argenteus*) and Scaly hairfin anchovy (*Setipinna taty*). Qingpeng Han, Xiujuan Shan, Tao Yang, Xianshi Jin.
4. Spatial Distributions and Seasonal Variations of *Setipinna tenuifilis* in the Bohai Sea and Yellow Sea. Yunlong Chen; Xiujuan Shan; Xianshi Jin; Fangqun Dai, Qiang Wu
5. Environmental effects of mariculture in China: a case study of carbon, nitrogen and phosphorus loading. Jihong Zhang

III. Ecosystem quality

6. Case study on the total loading of Nitrogen and phosphorus in Haizhou Bay, a demonstration activity in YSLME region. Lijun Wang, Dong Yu, Zizhou Xu, Bin Liang, Zhongsheng Lin, Ziwei Yao
7. Distribution and invasion monitoring of *Spartina alterniflora* within Jiaozhou Bay by remote sensing imagery. Jianbu Wang, Zhaoyang Lin, Guangbo Ren, Zijun Xu, Yi Ma.
8. Dry deposition flues of particulate nitrogen and phosphorus in the marine atmosphere based on particle size distribution characteristics. Limin Yu, NMEMC
9. Long-term changes of nutrient and possible impacts on phytoplankton in Yellow Sea. Yan Wang, Yongjian Liu, Hao Guo, Ziwei Yao, Xiaocheng Wang & Chuan Jia

IV. Habitat and biodiversity

10. Satellite tracking on the migration bahavoir and Mt-DNA analysis on the genetic status of Spotted Seals- Dr. Zhao Linin, FIO, Lu Zhichuang, Liaoning Marine Science Research Institute
11. Effectiveness and Connectivity of MPA on the West Coast of Korea within the YSLME. RO Korea
12. Migration ecology of coastal bird in the west coast area of Korea. RO Korea
13. Overview of the internationally important areas for shorebirds in the west coast of DPR Korea. David Melville.
14. Distribution of floating marine debris along the north coast of the Yellow Sea

V. Ecosystem changes

15. Tracking the spring Sargassum bloom in the Yellow and East China Sea based on high resolution images. Dr. Yuan Chao et al.
16. Vulnerabilities of ecosystems to Climate change in the YS – Shouqiang WANG, FIO, PR China
17. Long-term trends of the primary productivity in the Yellow Sea Large Marine Ecosystem. Dr. Fu Mingzhu, et al.
18. Research on the jellyfish monitoring technology based on extending the traditional net fishing gear. Xiaocheng Wang, Chuan Jia, Chunjiang Guan, Hao Guo
19. Typhoon effect on the summer planktonic ecosystem in the southeastern Yellow Sea. RO Korea
20. Spatiotemporal distribution of jellyfish in the Yellow and Bohai Seas, monitored using ships of opportunity. RO Korea

ANNEX V: Financial Audit Report

INTERNAL AUDIT AND INVESTIGATIONS GROUP

UNITED NATIONS OFFICE FOR PROJECT SERVICES (UNOPS)

FINANCIAL AUDIT REPORT

14 May 2020

PROJECT NAME:	YSLME PHASE 2
PROJECT NUMBER:	91007
COUNTRY:	REPUBLIC OF KOREA
AUDITOR:	BDO LLP
PERIOD SUBJECT TO AUDIT:	3 JULY 2014 TO 31 DECEMBER 2019

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INTERNAL AUDIT AND INVESTIGATIONS GROUP

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INTERNAL AUDIT AND INVESTIGATIONS GROUP

Acronyms and abbreviations

IAIG	Internal Audit and Investigations Group
IESBA	International Ethics Standards Board for Accountants
ISA	International Standards on Auditing
UNOPS	United Nations Office for Project Services
US$	United States Dollars

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INTERNAL AUDIT AND INVESTIGATIONS GROUP

Financial audit report

Audit opinion on the project financial statement

Unmodified opinion

We have audited the accompanying project financial statement for the project 'YSLME Phase 2' ("the project") (oneUNOPS project ID 91007), which is implemented and managed by the UNOPS Office in Republic of Korea, for the period from 3 July 2014 to 31 December 2019.

In our opinion, the financial statement gives a true and fair view of, in all material respects, the expenditure of the project 'YSLME Phase 2' ("the project") (oneUNOPS project ID 91007), for the period from 3 July 2014 to 31 December 2019 in conformity with the terms of the agreements and in accordance with International Public Sector Accounting Standards.

Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (ISAs). Our responsibilities under those provisions and standards are further described in the 'Auditor's responsibility for the audit of the project financial statement' section of this report.

We are independent of UNOPS and the implementing partner in accordance with the IESBA Code of Ethics for Professional Accountants. We have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Management responsibility for the financial statement

Management is responsible for the preparation and fair presentation of the financial statement in accordance with International Public Sector Accounting Standards, and for such internal control as management determines is necessary to enable the preparation of a financial statement that is free from material misstatement, whether due to fraud or error.

Auditor's responsibility for the audit of the project financial statement

The objectives of our audit are set out in the terms of reference for the audits of UNOPS projects, as issued by the Internal Audit and Investigations Group (IAIG) of UNOPS, and include obtaining reasonable assurance about whether the project financial statement is free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the decisions of users taken on the basis of the project financial statement.

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INTERNAL AUDIT AND INVESTIGATIONS GROUP

As part of an audit in accordance with ISAs, we exercise professional judgement and maintain professional scepticism throughout the audit. We also identify and assess the risks of material misstatement of the project financial statement, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Project financial statement

This is attached as Annex I to this report.

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INTERNAL AUDIT AND INVESTIGATIONS GROUP

Audit opinion on the statement of non-expendable property

Unmodified opinion

We have audited the accompanying statement of non-expendable property of the project 'YSLME Phase 2' (oneUNOPS project ID 91007) of UNOPS as at 31 December 2019.

In our opinion, the statement of non-expendable property presents fairly, in all material respects, the status of non-expendable property of the project 'YSLME Phase 2' (oneUNOPS project ID 91007), as at 31 December 2019, in conformity with the terms of the agreements and in accordance with International Public Sector Accounting Standards.

Statement of non-expendable property

This is attached as Annex II to this report.

Robert Waters

Partner

BDO LLP
55 Baker Street
London
W1U 7EU

14 May 2020

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INTERNAL AUDIT AND INVESTIGATIONS GROUP

Responsibility statement by management

This is attached as Annex III to this report.

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INTERNAL AUDIT AND INVESTIGATIONS GROUP

Annex I – Project financial statement

UNOPS Internal Audit and Investigations Group
Financial audit report
YSLME Phase 2, 91007, Republic of Korea
3 July 2014 to 31 December 2019

Expenditure report

Reporting Period: 201401-201912

COUNTRY	PROJECT	PROJECT_DESCR	WORKPACKAGE_DESCR	2014	2015	2016	2017	2018	2019	Grand Total
91007	YSLME Phase	91007-ACTIVITY 1	Sust. Reg. & Nat. Cooperation		220,113	126,251	339,691	611,068	906,645	2,203,768
		91007-ACTIVITY 2	Provisioning services		1,594		66,030	339,758	473,903	881,285
		91007-ACTIVITY 3	Regulating and cultural servic		1,472		58,650	258,156	359,762	678,041
		91007-ACTIVITY 4	Supporting services		5,076		86,714	495,228	1,350,700	1,937,718
		91007-ACTIVITY 5	Project Management	33,392	8,623	33,497	85,355	91,279	127,201	379,348
Grand Total				**33,392**	**236,878**	**159,748**	**636,442**	**1,795,489**	**3,218,210**	**6,080,160**

Certified by:

Meron MEKURIAW
Finance Specialist
IPAS Finance, UNOPS

Date:16 January 2020

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INTERNAL AUDIT AND INVESTIGATIONS GROUP

Annex II – Statement of non-expendable property

UNOPS Internal Audit and Investigations Group
Financial audit report
YSLME Phase 2, 91007, Republic of Korea
3 July 2014 to 31 December 2019

Date: 15.01.2020

ECR
VIEMCO WEC
Project ID 91007 YSLME Phase 2

Implementing the Strategic Action Programme for the Yellow Sea Large Marine Ecosystem: restoring ecosystem goods and services and consolidation of a long-term regional environmental governance framework

Statement of Inventory of Non-Expendable Equipment as of 31 December 2019

This is to certify that 91007 Project's balance of the Non-Expendable Equipment procured during the period from 03 July 2014 to 31 Dec 2019 amounts to US$ 95.50.

Asset ID	Asset Descr	Asset Period From	Asset Amount	Net Book Value
102670	Audioconferencing systems	201702	$3,437.97	$95.50

ECR WEC
Finance Associate: Boris Baduyev

ECR VIEMCO WEC
Head of support services: Gurel Gurkan

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INTERNAL AUDIT AND INVESTIGATIONS GROUP

Annex III – Responsibility Statement by Management

UNOPS Internal Audit and Investigations Group
Financial audit report
YSLME Phase 2, 91007, Republic of Korea
3 July 2014 to 31 December 2019

UNOPS

RFP Ref No: 2019/11415

Appendix C – Responsibility Statement by Management

UNITED NATIONS OFFICE FOR PROJECT SERVICES

oneUNOPS Project ID: **91007**, Name of the Project: **YSLME Phase 2**

Responsibility Statement by Management

The United Nations Office for Project Services (UNOPS) management is responsible for the preparation, integrity and fair presentation of the Financial Statement of the UNOPS Project ID 91007, YSLME Phase 2. The Statement presented has been prepared in accordance with the requirements of the applicable UNOPS regulations and rules.

We do hereby state that, in our opinion:

Financial Statement

The Financial Statement presents fairly in all material aspects, the expenditure of US$ 6,080,160 incurred by the UNOPS office for the period from 03 July 2014 to 31 December 2019 in accordance with the accounting policies set out in the Notes to the Statement and in conformity with approved activities and budgets of UNOPS Project ID 91007, YSLME phase 2.

Statement of Inventory of Non-Expendable Equipment

The Statement of Non-Expendable Equipment presents fairly, in all material respects, the Non-Expendable Equipment balance procured during the period from 03 July 2014 to 31 December 2019 of the project amounting to US$ 96 in accordance with the Non-Expendable equipment listing certified by project management.

(Signature)	(Signature)	(Signature)
Name: Meron Mekuriaw	Name: Moin Karim	Name: Gurel Gurkan
Title: Regional Financial Management Officer	Title: Regional Director	Title: Head of Support Services
Unit: IPAS Finance	Region: ECR	Office: VIEMCO
Place: Copenhagen	Place: Geneva	Place: Copenhagen
Date: 06 April 2020	Date: 07 April 2020	Date: April 06, 2020

Annex VI. List of Assets

1) Asset used by First Institute of Oceanography under PCA

No	Item Description	Brand and Model	Asset Class Description	Acquisition Date	Acquisition Value ($)	Current Netbook Value($)	Serial No.	Tag No.	Location	Disposal modality	Recipient
1	Global Beam Communications Trading LLC	Satellite Tracking Device: F6G 276D Divce Fast GPS Argos	Specific equipment	8-1-2019	3,075.00	0	182160-P05081	YS-PCA-2017-001	Dalian, LOFSRI	Donation	First Institute of Oceanography (FIO)
2	Global Beam Communications Trading LLC	Satellite Tracking Device: F6G 277D Divce Fast GPS Argos	Specific equipment	8-1-2019	3,075.00	0	182161-P05081	YS-PCA-2017-002	Dalian, LOFSRI	Donation	FIO
3	Global Beam Communications Trading LLC	Satellite Tracking Device: F6G 278D Divce Fast GPS Argos	Specific equipment	8-1-2019	3,075.00	0	182162-P05081	YS-PCA-2017-003	Dalian, LOFSRI	Donation	FIO
4	Global Beam Communications Trading LLC	Satellite Tracking Device: F6G 279D Divce Fast GPS Argos	Specific equipment	8-1-2019	3,075.00	0	182163-P05081	YS-PCA-2017-004	Dalian, LOFSRI	Donation	FIO
5	Global Beam Communications Trading LLC	Satellite Tracking Device: F6G 280D Divce Fast GPS Argos	Specific equipment	8-1-2019	3,075.00	0	182164-P05081	YS-PCA-2017-005	Dalian, LOFSRI	Donation	FIO
6	Global Beam Communications Trading LLC	Satellite Tracking Device: F6G	Specific equipment	8-1-2019	3,075.00	0	182165-P05081	YS-PCA-2017-006	Dalian, LOFSRI	Donation	FIO

		281D Divce Fast GPS Argos									
7	Global Beam Communications Trading LLC	Satellite Tracking Device: F6G 282D Divce Fast GPS Argos	Specific equipment	8-1-2019	3,075.00	0	182166-P05081	YS-PCA-2017-007	Dalian, LOFSRI	Donation	FIO
8	Global Beam Communications Trading LLC	Satellite Tracking Device: F6G 283D Divce Fast GPS Argos	Specific equipment	8-1-2019	3,075.00	0	182167-P05081	YS-PCA-2017-008	Dalian, LOFSRI	Donation	FIO
9	Global Beam Communications Trading LLC	Satellite Tracking Device: F6G 284D Divce Fast GPS Argos	Specific equipment	8-1-2019	3,075.00	0	182168-P05081	YS-PCA-2017-009	Dalian, LOFSRI	Donation	FIO
10	Global Beam Communications Trading LLC	Satellite Tracking Device: F6G 285D Divce Fast GPS Argos	Specific equipment	8-1-2019	3,075.00	0	182169-P05081	YS-PCA-2017-010	Dalian, LOFSRI	Donation	FIO
11	Global Beam Communications Trading LLC	Fastgps reset user guide	Intangibles-Developed software	8-1-2019	-		——	YS-PCA-2017-011	Dalian, LOFSRI	Donation	FIO
12	Global Beam Communications Trading LLC	Fastgps data logger USB software & user guide	Intangibles-Developed software	8-1-2019	-		——	YS-PCA-2017-012	Dalian, LOFSRI	Donation	FIO
13	Global Beam Communications Trading LLC	Argos test beepder	Specific equipment	8-1-2019	-		——	YS-PCA-2017-013	Dalian, LOFSRI	Donation	FIO

14	Global Beam Communications Trading LLC	Fastgps quick user guide	Intangibles-Developed software	8-1-2019	-		——	YS-PCA-2017-014	Dalian, LOFSRI	Donation	FIO
Total Acquisition Value ($)	**30,750.00**										

2) Asset used by Yellow Sea Fisheries Research Institute under PCA

No	Item Description	Brand and Model	Asset Class Description	Acquisition Date	Acquisition Value ($)	Current Netbook Value ($)	Serial No.	Tag No.	Location	Disposal modality	Recipient
1	Researchers use the self-contained sensors to monitor dissolved oxygen	U26-001 Dissolved Oxygen Recorder Including: BASE-U-4 base station HOBO ware	Specific equipment	01-28-2019	2,300.00	0	20535961	YS-PCA-2017-015	Yellow Sea Fisheries Research Institute, Qingdao (YSFRI), China	Donation	Yellow Sea Fisheries Research Institute (YSFRI)
2	Researchers use the self-contained sensors to monitor turbidity and chlorophyll	Chlorrophyll and turbidity sensor	ITC-Audio & Visual Equipment	01-28-2019	11,200.00	0	450	YS-PCA-2017-016	YSFRI, Qingdao, China	Donation	YSFRI
3	Researchers use the self-contained sensors to monitor turbidity and chlorophyll	Chlorrophy ll and turbidity sensor	ITC-Audio & Visual Equipment	01-28-2019	11,200.00	0	447	YS-PCA-2017-017	YSFRI, Qingdao, China	Donation	YSFRI
Total Acquisition Value ($)	**24,700.00**										

3) Asset used by Chinese Academy of Fishery Sciences under GSA

No	Item Description	Brand and Model	Asset Class Description	Acquisition Date	Acquisition Value ($)	Current Netbook Value ($)	Serial No.	Tag No.	Location	Disposal modality	Recipient
1	Reserve cruise	unmanned aerial vehicle	Specific equipment	01/11/2019	2,833.26	0	Jingling Phantom 4 Pro + V2.0	YS-PCA-2017-018	Shandong, Roncheng	Donation	Chinese Academy of Fishery Sciences (CAFS)
2	Distant watching	Telescope	ITC-Projectors	01/11/2019	708.32	0	TERRA ED 10 × 42	YS-PCA-2017-019	Shandong, Roncheng	Donation	CAFS
3	Distant watching	Telescope	ITC-Projectors	01/11/2019	708.32	0	(25 - 75 ×100)	YS-PCA-2017-020	Shandong, Roncheng	Donation	CAFS
4	Live demonstration, Data processing	Tablet Personal Computer	ITC-Laptop	01/11/2019	708.32	0	MIIX 700	YS-PCA-2017-021	Shandong, Roncheng	Donation	CAFS
5	Live demonstration, Data processing	Tablet Personal Computer	ITC-Laptop	01/11/2019	708.32	0	MIIX 700	YS-PCA-2017-022	Shandong, Roncheng	Donation	CAFS
6	Water quality monitoring	Portable Water Quality Analyzer	Specific equipment	01/11/2019	4,816.55	0	SD150D	YS-PCA-2017-023	Shandong, Roncheng	Donation	CAFS
7	In situ law enforcement activity recording	Body Worn Camera	ITC-Audio & Visual Equipments	01/11/2019	283.33	0	Q1	YS-PCA-2017-024	Shandong, Roncheng	Donation	CAFS
8	Comprehensive Analysis, processing and	GIS Pro System	Specific equipment	01/07/2019	17,648.76	0	-	YS-PCA-2017-025	Beijing, CAFS	Donation	CAFS

	Mapping of GIS remote Sensing										
9	Boundary sign for the reserves	Billboard	Specific equipment	01/11/2019	2,833.26	0	-	YS-PCA-2017-026	Shandong, Roncheng	Donation	CAFS
10	Publicity for the reserves		Furniture-General	01/11/2019	708.32		-	YS-PCA-2017-027	Shandong, Roncheng	Donation	CAFS
Total Acquisition Value ($)		**31,956.76**									

4) Full PMO Asset List

NO.	Item Description	Unit	Brand and Model	Purchase Date	Acquisition Value (KRW)	Current Netbook Value (US$)	Serial No.	Tag No.	Location/ Department	Disposal modality	Recipient Organization
1	56101703 Desks	1	Desk for chief of office 2000×1900×750	2-8-2017	634,320	269.7	ACEO-706	YS-F-2017-001	Incheon, Korea / PMO	Donation	Ministry of Oceans and Fisheries (MOF)
2	56101706 Conferencing tables	1	Conference table 1800×900×720	2-8-2017	337,350	0	AASR-601	YS-F-2017-002	Incheon, Korea / PMO	Donation	MOF
3	56101507 Bookcases	1	Bookcase (half glass door) 800×420×1950	2-8-2017	176,850	0	AEC-872G	YS-F-2017-003	Incheon, Korea / PMO	Donation	MOF
4	56101702 Filing cabinets or accessories	1	Cabinet (locker, w/ wooden door) 800×420×1950	2-8-2017	151,200	0	AEC-572	YS-F-2017-004	Incheon, Korea / PMO	Donation	MOF
5	56101504 Chairs	31	Office chair 670×600×1144 (9) Conference Chair 615x550x835 (22)	2-8-2017	201,060 93,600 (Total: 3,868,740)	0	ACH-746	YS-F-2017-005	Incheon, Korea / PMO	Donation	MOF
6	56101703 Desks	8	Desk for chief of team 1800×1200×720	2-8-2017	285,120 (Total: 2,280,960)	0	AMPD-18123	YS-F-2017-036	Incheon, Korea / PMO	Donation	MOF
7	56101702 Filing cabinets or accesories	2	2-tier cabinet w/ woodendoor (cylinder type key) 600×430×720	2-8-2017	93,600 (Total: 187,200)	0	AEC-622S	YS-F-2017-044	Incheon, Korea / PMO	Donation	MOF

8	56101706 Conferencing tables	1	Conference table 2400×1200×720	2-8-2017	325,470	0	AEMT-2412	YS-F-2017-046	Incheon, Korea / PMO	Donation	MOF
9	56101702 Filing cabinets or accesories	6	3-tier cabinet, (cylinder type key) 800×430×1160	2-8-2017	131,040 (Total: 786,240)	0	AMCK-211	YS-F-2017-047	Incheon, Korea / PMO	Donation	MOF
10	56101706 Conferencing tables	7	Conference table 1600×600×720	2-8-2017	175,518 (Total: 1,228,626)	0	AASR-108	YS-F-2017-053	Incheon, Korea / PMO	Donation	MOF
11	56101706 Conferencing tables	2	Conference table (for 2 people)	2-8-2017	111,780 (Total: 223,560)	0	AAST-102	YS-F-2017-060	Incheon, Korea / PMO	Donation	MOF
12	56101504 Chairs	3	Fixed chair 468×487×791	2-8-2017	45,360 (Total: 136,080)	0	ACH-460	YS-F-2017-062	Incheon, Korea / PMO	Donation	MOF
13	56101706 Conferencing tables	2	Conference table(for corner) 600×600×720	2-8-2017	102,600 (Total: 205,200)	0	AASR-106	YS-F-2017-065	Incheon, Korea / PMO	Donation	MOF
14	56101519 Tables	1	Round table Ø1050×H720	2-8-2017	171,900	0	AASR-605	YS-F-2017-067	Incheon, Korea / PMO	Donation	MOF
15	44101501 Photocopiers	1	Photocopiers SL-K3300NR	2-15-2017	2,031,300	0	0A6WBJPHC0002ZD SL-K3300NR	YS-O-2017-001	Incheon, Korea / PMO	Donation	MOF
16	43211503 Notebook computers	2	Mac#A1534	2-15-2017	1,864,800 (Total: 3,729,600)	0	C02SR0HCH3QY	YS-C-2017-001	Incheon, Korea / PMO	Donation	MOF
17	43211503 Notebook computers	1	Mac#A1534	2-15-2017	1,864,800	0	C02ST1JLH3QY	YS-C-2017-002	Incheon, Korea / PMO	Donation	MOF

18	43211503 Notebook computers	1	MacPro A#1708	2-15-2017	1,942,500	0	C02ST3JYGVC1	YS-C-2017-003	Incheon, Korea / PMO	Donation	MOF
19	43211508 Personal computers	5	HP 400G3PD MT i56500 1TB 4.0G 50 PC	2-15-2017	1,048,950 (Total: 5,244,750)	0	6CR62944J5 Product#T6U15PT#AB1	YS-C-2017-004	Incheon, Korea / PMO	Donation	MOF
20	43211508 Personal computers	1	HP280 G4 MT i3-8100 128SSD PC	9-18-2019	699,000	355.99	HP280 G4	YS-C-2019-029	Incheon, Korea / PMO	Donation	MOF
21	43212001 Computer display glare screens	1	LG Monitor 22M47D	9-18-2019	156,000	0	LG Monitor	YS-O-2019-029	Incheon, Korea / PMO	Donation	MOF
22	43212001 Computer display glare screens	4	LG Monitor 22M47D-PA BKRSJPN	2-15-2017	173,160 (Total: 692,640)	0	701NTXR3D898	YS-O-2017-002	Incheon, Korea / PMO	Donation	MOF
23	43212001 Computer display glare screens	1	Dell Monitor P2416Db	2-15-2017	323,000	0	CN-043C7Y-74261-6CF-04CS-A01	YS-O-2017-006	Incheon, Korea / PMO	Donation	MOF
24	45111600 Projectors and supplies	1	EPSON LCD Projector EB-W31	2-15-2017	856,920	0	Model: H730C sn: wfmk6800036	YS-O-2017-007	Incheon, Korea / PMO	Donation	MOF
25	45111600 Projectors and supplies	1	EPSON EB-W31	2-15-2017				YS-O-2017-007	Incheon, Korea / PMO	Donation	MOF
26	45121504 Digital cameras	1	Cannon EOS 70D EOS 70D(W)18-135 IS STM	2-15-2017	850,260	0	418059003827(Body) 4442018218 (Lens)	YS-O-2017-008	Incheon, Korea / PMO	Donation	MOF

27	45111901 Audio conferencing systems	1	SAMSON S Curve 215-230V	2-15-2017	4,043,100	0	213C0256E(Equalizer)88RA4HA556(Mispad)1446G1555	YS-O-2017-009	Incheon, Korea / PMO	Donation	MOF
28	43211508 Personal computers	1	Dell Latitude E7470 I5/2.4 14 8GB ($1,420) & Dell E-Port Replicator	11-1-2016	1,801,800	0	DR6YN-7J24Y-HWG49-9R7HJ-82PWQ		Incheon, Korea / PMO	Donation	MOF
29	Printer	1	Cannon PIXMA iP110 (KCC-CRM-CIN-K30357)	6-28-2017	330,650	0	AEXL00068	YS-O-2017-013	Incheon, Korea / PMO	Donation	MOF
30	Refrigerator	1	Refrigerator for Office_Model: LG R-B261GBW	9-22-2017	368,000	0	R-B261GBW	YS-O-2017-011	Incheon, Korea / PMO	Donation	MOF
31	coffee machine	1	Nespresso Coffee Machine	9-15-2018	699,000	0	18057ZN0z027878K02C	YS-E-2018-001	Incheon, Korea / PMO	Donation	MOF
32	43211614 Bluetooth universal serial bus USB adapter	3		4-10-2017	26,800 (Total: 80,400)	0			Incheon, Korea / PMO	Donation	MOF
33	43231513 Office suite software	9	Microsoft Office Home & Business (Windows-6/ Mac-3)	4-10-2017	Total: 3,799,900	467.62			Incheon, Korea / PMO	Donation	MOF
34	43222602 Cable head end equipment	1		4-10-2017	10,000	0			Incheon, Korea / PMO	Discard	N/A

35	43222602 Cable head end equipment	1		4-10-2017	7,800	0			Incheon, Korea / PMO	Discard	N/A
36	56101510 Partitions	56	Partition (upper glass type), 1000*60*1800 Partition (upper glass type), 1000*60*1500 Partition (standard type),800*60*1100 Finishing bar (steel), 66*18*1140 Finishing bar (steel), 66*18*1539	2-15-2017	97,650 86,130 53,100 57,240 14,760 16,760 22,950 24,660 (Total: 2,813,580)	0	AAGPA-506 AAGPA-406 AAPA-204 PAS-6604 PAS-6631 PAS-6641 PAS-6603 PAS-6632 PAS-6642	YS-F-2017-068 - 100	Incheon, Korea / PMO	Discard	N/A
Total Acquisition Value (KRW)			**27,855,658**								
Total Acquisition Value ($)			**35,376.39**								

ANNEX VII: Management responses to MTR recommendations and status of implementation

	Recommendation	Key Actions	Party Responsible for Action	Due Date	Status	Recommendation	Management responses and status of implementation (updated as of October 9, 2020)
1	**TE Arrangements**	Schedule in ICC to include an agenda item on planning for terminal evaluation to allow earlier and better planning and contracting for evaluation by PMO and governments in the second half of 2019.	UNDP & UNOPS.	Nov-19	Completed	In order to avoid the limitations experienced with the MTR, it is recommended that for the Terminal Evaluation (TE), UNDP and UNOPS should: - Plan well in advance, and commence the contracting process for the TE consultant in ample time to allow award of contract and commencement of work well before (at least 2 months) the relevant ICC meeting and/or other critical TE milestone(s). - Organize detailed meeting schedule with stakeholders well in advance, so as to ensure that consultations are representative of the full range of key project stakeholders (as required by the UNDP TE Guidelines). - Provide private space for TE consultation meetings (as required by the UNDP TE Guidelines). - Provide an 'independent' interpreter when needed (as required by the UNDP TE Guidelines). Desist from recording consultation meetings (as required by the UNDP TE Guidelines). - Avoid having any PMO (or UNDP) staff present during consultations (as required by the UNDP TE Guidelines).	UNDP/UNOPS: agree. Following actions have been taken to implement the recommendations: - A total of $5,000 was budgeted for interpretation for the Terminal Evaluation in the closure stage plan. - recruitment of consultants was scheduled Q1 of 2020 and all were on board in February, 2020. - TE schedule was prepared in consultation with TE mission team and national partners in Q2 of 2020. - An Independent interpreter was also hired.
2	**Delays to Project start**	N/A	parties to future projects			It is recommended that in order to avoid project-threatening major delays to the remainder of the Project, the start of any potential future phases of this Project or any new projects (anywhere), the relevant Implementing and Executing Agencies and the participating countries should always ensure that: - all staffing and PMO logistical arrangements are fully agreed by all parties before the ProDoc is signed and the time-line clock starts ticking, - the Executing Agency consults closely with the participating countries on staff recruitment; and - the UNDP standard of a maximum of three months to	Agree and will consider these recommendations if with a third phase of the project.

						establish the PMO office, recruit staff etc is complied with by the Executing Agency.	
3	**Need for Project extension**	Extend the project for about 18 months, the maximum duration of extension, and have UNDP and UNOPS approve the extension of the project until December 31, 2019.	PRC to apply	30-Jun-18	Completed	Given the three-year delay to operational start of the Project, if anything is to be salvaged from the Project, it is strongly recommended that the maximum extension available under UNDP-GEF rules should be applied for and approved, ASAP	Agree. In accordance with decision of the ICC-2 the project was extended for about 18 months, the maximum duration of extension, until December 31, 2019. UNDP and UNOPS approved the extension of the project. Considering it is physically impossible to complete all the activities in the revised workplan during the extension period, the ad hoc ICC (July 15-16, 2019) decided to extend the project until December 31, 2020 which was approved by UNDP in Nov, 2019.
4	**Project Design and need for prioritization**	Reduce the number of activities while maintaining those that have been covered in the three signed PCAs, and those activities with TORs being cleared by the RWGs.	UNOPS and the 2 countries.	1-Jun-18	Completed	• Given the extreme three-year delay to Project commencement, and the limited time remaining to complete full Project implementation, it is recommended that it would be highly disruptive to propose any significant changes to the Project-design at this stage. It is recommended that despite some issues as identified in section 3.1 of the MTR Report, the Project-design should be generally accepted as it is, and that highest priority should be given to implementing Project activities in order to achieve Project Outcomes and Objectives by the (extended) Project-end. • It is further recommended that for the remaining Project duration, absolute highest priority should be given to focusing on completing all Outcomes and Outputs in Component 1 (the most strategically important Component), followed by those that have the highest likelihood of being achieved by Project-end (Outcomes 2.1, 2.2, 2.3, 3.4, 4.1, 4.2 and 4.3). • The other Project Outcomes (3.1, 3.2, 3.3 and 4.4) may well have to be left aside as lower priorities, and picked-up by the YSLME Commission post-Project (refer Tables 8 and 9).	The project ICC-2 meeting agreed to reduce the number of activities while maintaining those that have been covered in the three signed PCAs and those activities with TORs being cleared by the RWGs. The prioritized activities were approved in the extension plan attached with the amendment of the project document.

5	**UNOPS Project support**	Strengthen its project delivering support system with integration of weekly project meeting with PMO, and monthly meeting with UNDP.	PMO & UNOPS	Sep-18	Completed	It is strongly recommended that UNOPS should urgently review and reform its project-support functions to absolutely ensure that no further delays and blockages occur. Urgent reforms that are specific to accelerating the YSLME Phase II Project should be implemented immediately.	Agree. UNOPS has strengthened its project delivering support system with integration of weekly project meeting with PMO, monthly meeting with UNDP. In addition, UNOPS conducted management review of its systems, policies, procedures, resources and best practices, based on which management recommendations are made and response measures are proposed by YSLME.
		Conduct management review of UNOPS systems for each project	UNOPS	10-Oct-18	Completed		
6	**PMO staffing**	hire an environmental specialist to assist the project to oversee the YSGP and implementation of the project at demonstration sites in China in the areas of climate change adaptation	PMO, UNOPS and two countries.	30-Jun-19	Completed	To address the significant imbalance between PMO workload and staff resourcing, it is strongly recommended that the two countries look at seconding a Government officer each to the PMO, at national Government cost, and at Project Officer level with at last 3 years experience in international projects, to supplement PMO staffing for the remaining duration of the Project.	Disagree. Instead with endorsement of UNDP and UNOPS and project recruited the environmental specialist Dr. Dirk Lamberts to PM to manage the YSGP and implementation of the project at demonstration sites in China. Based on the assessment of the UNOPS, MNR was also requested to strengthen the implementation support to National Coordinator. In response, MNR designated the senior official Dr. Bin Wang to serve as the team leader and Chair of NWG-G in China to coordinate the technical review and update of the TDA and SAP.
7	**Work planning**	Give CTA/PM and Operations Associate trainings in Copenhagen on communication, procurement, workplanning and competency-based interview.	PMO and broader UNOPS.	8-May-18	Completed	It is recommended that: • The PMO and UNOPS make greater use of whole-of-project / whole-of-timeline work plans, such as the Gantt charts in Annex 7, to identify and prepare well in advance for all key milestones that require timely action by the PMO / UNOPS, to assist in preventing further Project delays. The PMO should make greater efforts to:	Agree. - The CTA/PM and Operations Associate received trainings in Copenhagen on communication, procurement, workplanning and competency-based interview. - UNOPS/PMO introduced the Microsoft in project management to allow more detailed planning of project

		Introduce the Microsoft in project management to allow more detailed planning of project activities.	PMO and broader UNOPS	10-Oct-18	Completed	• take a more strategic approach to work planning and workload management, • focus on implementation of high priority activities (e.g. Component 1), • stick to and comply with structured workplans; and • avoid going off on tangents and pursing low-priority activities that may be driven more by personal interest than vital project needs.	activities. - The project will continue to use the RWG meetings and ICC as the mechanism to review and approve annual work plan to ensure alignment with priorities and strategic approach.
8	**Adaptive Management**	Allocate at least $300,000 to YSGP, and a maximum of $100,000 for each project.	PMO and broader UNOPS with approval by UNDP	1-Oct-18	Completed	It is recommended that given the significant work-tasks required to achieve completion of the Project within the remaining time available, that in order to urgently accelerate technical implementation: • Additional opportunities to use accelerated modalities such as PCAs and sub-contracts should be explored urgently (subject to concerns and checks outlined in section 3.2.5). • If budget rules allow, and subject to application of stringent accountability procedures, increasing the Yellow Sea Grants Program (for projects by NGOs) from a total of US$200K to US$1M, with individual grants increased from up to $50K to up to $250K.	Agree. • The project expanded the PCA with FIO by including more activities and budget to conduct monitoring through satellite tracking of spotted seal for connectivity analysis, climate change adaptation in Dandong, study on *Sargassium horineii*. PCA with YSFRI was also amended to include training for displaced fishermen joining the fishing vessel buy-back scheme for re-employment. One more PCA was signed with NCSEMC to monitor the wetland ecosystem of Jiaozhou Bay of Qingdao. • A total of US$480,000 were allocated to 7 grantees under YSGP, and a maximum of $100,000 for each project. All GSAs were completed in February 2020.
		Expand the PCA with FIO by including more activities and budget, with possible inclusion of satellite tracking of spotted seal for connectivity analysis, climate change adaptation in Dandong, study on *Sargassium horineii* and wetland restoration for nutrient reduction.	PMO, UNDP, UNOPS and ICC members	28-Feb-19	Completed		
9	**Rationalizing the ICC, MSTP & RWGs**	Consult China and RO Korea as to the feasibility of amalgamating the ICC and MSTP, and consolidation of 6 RWGs to 4.	PMO and two countries.	22-Jan-19	Initiated	• It is recommended that the ICC and MSTP be amalgamated. In line with this simplification it is also recommended that the ICC should meet twice per year rather than just annually – so that delays are not caused in review and approval of proposals put forward by the RWGs and PMO. • It is strongly recommended that the total number of RWGs be reduced to four, by amalgamating RWG-F / RWG-M and RWG-P / RWG-A (as these cover technically related issues).	The MSTP and ICC were combined at ICC-2 and ICC-3. Both China and RO Korea reviewed the feasibility of consolidation of 6 RWGs to 4 after the MOU on the regional coordination arrangement is agreed before July 2020.

10	**Budget & Financial Management**	Include audit into the work plan of 2019 and review and discuss at the ICC-3.	UNOPS and PMO	22-Jan-19	Completed	It is strongly recommended that: • a detailed, external, independent audit of overall Project expenditure and financial management, disbursements and flows should be undertaken at an appropriate time, • UNOPS should exercise its contractual right to undertake financial audit of funds disbursement and flows under all three PCAs, at an appropriate time, • every effort should be made to ensure that the costing basis of each sub-contract is fully justified and transparent, that the selection and contract award process is truly competitive and transparent, in accordance with relevant UNOPS procedures, and that the financial disbursements and flows under each sub-contract are externally audited at an appropriate time; and • UNOPS should take urgent action to avoid the non-trivial delays and mistakes in the payment of bills and fees, reimbursement of personal expenditures by PMO staff on Project activities and disbursement of funds as outlined in section 3.2.1.	Agree. • Audit was completed through LTA with UNOPS and report will be submitted in May 2020. • There are regular checks on implementation of financial and procurement rules of the UNOPS for PCAs. Financial management section of the General Conditions of GSAs was also introduced in the meeting with grantees immediately signing of the GSAs. • Costing of project activities were reflected in the new and amended PCAs by adding special section on cost breakdown and budget description.
		Consult with UNOPS on the conduct of financial audits of fund disbursement and flows under the three PCAs, which may include the possibility of conducting the audit by PMO.	PMO and PCAs	22-Jan-19	Completed		
11	**Project Level MER**	N/A	N/A			It is recommended that Project-level MER be improved for the remainder of the Project duration through the following: • Requiring the PMO to focus more on clearly reporting "actual" implementation (and expenditure) against "planned" implementation (and expenditure). • Revising and clarifying the April 2018 version of the GEF-IW Tracking Tool to address the points made in section 3.2.7. • Providing the PMO with formal training in the use of PRFs as a project planning, management and monitoring tool. • Requiring the PMO to begin and continue collecting the necessary data to allow the TE to properly assess achievement of Project Objectives, Outcomes and Outputs against the indicators specified in the PRF.	Agree.

12	**Project Communication & Visibility**	Prepare a project communication strategy with indication of communication products. Develop and implement the plan based on the strategy.	PMO	1-Sep-18	Completed	It is recommended that the PMO should act to rapidly commence development, followed by implementation, of the Project Communication Plan. This Plan should:• Clearly identify the Project's strategic communication objectives, target audiences and key messages.• Give priority to targeting in-country audiences, with all communication products and mediums, including the permanent Project website, being not only in English but also in Chinese and Korean.• Use the full range of social media platforms, including those that are specific to PRC, to target the younger generation.• Seek partnerships with national television producers and broadcasters in both PRC and ROK, and invite them to produce and broadcast TV news items and also documentaries both about the Project and the Yellow Sea generally (TV is still considered to be the most effective form of mass-media for reaching large audiences).• Seek partnerships with NGOs, including the large international NGOs like WWF, CI and IUCN, who are already very active on communication activities in the Yellow Sea region, to leverage co-financing for communication efforts.It is also recommended that the PMO, UNOPS Copenhagen Office, UNDP and the two National Coordinators should work towards improved and more regular communication, including a monthly Progress Meeting on Skype.	Agreed. Measures taken include: • The project communication strategy was prepared with indication of communication products to be prepared. Based on the strategy, a plan is being developed and partially implemented, and further reviewed, revised and approved at the ICC-3. • To develop the Chinese and Korean versions of the website and social media, an Intern with Chinese language background is being recruited. Chinese web pages are not yet available but is still under planning. • Partnership with regional organizations and NGOs were pursued through support of YS grant program to leverage co-financing. • PMO and UNOPS will resume weekly review meeting to address problems and solutions, and monthly review meeting between UNDP and UNOPS on project implementation issues.
		Recruit interns with Chinese and Korean language backgrounds to help develop the Chinese and Korean versions of the website and social media	PMO	10-Oct-18	Initiated		

13	**Risks to Establishment of YS Commission**	N/A			Completed	It is strongly recommended that: • Once the current restructure of the PRC Government is complete, that UNDP, PMO and ROK MOFA & MOF seek a ministerial-level meeting with new PRC Minister for Natural Resources, to brief them on the Project and seek high-level support in PRC for the Project, for SAP implementation and for the establishment of a permanent, sustainably financed Yellow Sea Commission. Without this, this Project Objective may not be achieved by end of Project in December 2019. • The MoU on bilateral cooperation on environmental matters signed by the Environment Ministers of both PRC and ROK, be used as a model and template for a similar MoU to be signed between the PRC Minister for Natural Resources and the ROK Minister for Oceans & Fisheries, specifically relating to cooperation in implementing the YSLME-SAP and establishing the Commission. Such MoU might be structured so as to allow for future signing-in by DPRK as a tri-lateral MoU.	Agree. All matters related with coordination mechanism for the YSLME are escalated in both countries to the senior policy makers of the national focal points. UNOPS and UNDP also sent a letter to Administrator of SOA on progress of the project and priorities in strengthening the institutional arrangement after the restructuring and establishing the coordination mechanism. - MOU on post-YSLME Project coordination arrangement drafted by RO Korea was discussed at a side meeting at the ICC-4 held in November 2019. Rounds of comments were exchanged between the two countries with respect to the specific scope of collaborative activities. Will be further reviewed at the ICC-5.

14	**Involving DPRK**	N/A	N/A	N/A	Completed	• It is recommended that in addition to continuing to work through the Hanns Siedel Foundation to try and involve DPRK in the biodiversity and MPA-network planning activities, the Project should also work towards more complete participation of DPRK, including progressively in the regional governance framework. • In doing so, given recent diplomatic progress, this effort might be led by ROK MOF and Ministry of Reunification through direct bilateral dealings with DPRK, in consultation with PRC and with support from PMO. • As a UN program, it is also vital to ensure that relevant UN Resolutions and rules, and GEF rules and procedures, are fully complied with.	• Attempts were made by UNOPS, UNDP China and Resident Coordinator Office of UN in DPRK on the engagement of DPR Korea representatives to participate in the Science Conference in July 2019, but were unsuccessful. • Engaging DPR Korea is not within the results framework of the current project and that prioritization should be given to implementation of project activities. With this in mind, PRC and ROK finally agreed not to involve DPRK at the stage of establishing the regional coordination mechanism as agreed in the ad hoc ICC held in July 2019.

ANNEX VIII Management Reponses to TE Recommendations and Status of Implementation

(to be completed after ICC-5 at the end of October and before project operational closure at the end of December, 2020)