

Improving SAP to synergize the implementation of
international conventions on marine protection and
sustainable uses of marine resources

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Preface

The Yellow Sea Large Marine Ecosystem (YSLME) is one of the 66 large marine ecosystems (LMEs) in the world, with three coastal countries, namely PR China, RO Korea and DPR Korea. The regional efforts promoted by the UNDP/GEF YSLME Project to address environmental challenges in the Yellow Sea (YS) started from the beginning of the 21st century and, as one of the achievements, brought in the Yellow Sea Large Marine Ecosystem Strategic Action Programme (YSLME SAP) adopted by PR China and RO Korea with support of DPR Korea. The YSLME SAP contains management and governance actions that the two countries agreed to implement from 2009 to 2020. To implement the SAP, the UNDP/GEF/UNOPS project entitled 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, or the UNDP/GEF YSLME Phase II Project was launched. After more than ten years of implementation, some regional targets in the SAP have been achieved, while the others still remain unrealized. Meanwhile, due to the changes in transboundary environmental problems, legal and governance structures and social and economic status, there is a need to renew the SAP to set down a future direction for guiding the coastal countries to take concerted governance actions in the YSLME region.

Speaking of the structure of the report, firstly, it reviewed the objective and developing process of SAP suggested by UN's LME programs to show the internal logic of the process and the inter relations among different phases.

Secondly, the current YSLME SAP and NSAP of two countries were examined to learn the management and governance actions adopted by those regional and national documents. Especially, the NSAP Assessment Reports of the two countries were studied in order to clearly find out what actions have been done and whether these actions are sufficient to fulfill the requirements of SAP and NSAP or meet the regional targets.

Thirdly, international conventions, agreements, guidelines or programs which China and ROK are both parties or members were examined to understand the legal approaches adopted by those international legal documents and the obligations of contracting parties. The long-term goal of SAP is to enhance the ecosystem carrying capacity by implementing the management actions. This goal falls in line with the purposes of international legal documents, therefore, SAP should reflect the requirements of international legal documents as well as facilitate their implementations. A comparison between the management actions of SAP and the legal instruments adopted by the international legal documents shows the possible directions for further improvements of SAP. But it should be noted that not all the legal instruments under the international conventions or agreements are suitable for inclusion in the SAP, as some of them have been implemented well at national level, some of them may not be helpful to directly solve the transboundary environmental problems. Therefore, what legal instruments should be

incorporated into the SAP have to be based on the transboundary environmental problems, root causes and regional targets identified by the TDA. The legal instruments under international conventions which are not reflected in the current SAP or NSAP can only be taken as a reference for the renew of SAP. Besides, the international legal documents under review were chosen and categorized based on the four ecosystem services (provisioning, regulating, cultural and supporting services) and regional targets and only those that related to the regional targets were examined.

Finally, some suggestions were provided for the renew of SAP based on the above studies.

1. The developing process of SAP

GEF international waters projects often begin with a transboundary analysis, often referred to as a transboundary diagnostic analysis (TDA), that contains the facts of the actual or likely future dispute, conflict, or problem and its root causes. This collaborative, factual analysis is an essential starting point for determining priorities for action and for diagnosing root causes that produce the stress on the transboundary system. Thus, the TDA can be thought of as the first step in producing a strategic action program (SAP) to address the priorities.

The process of jointly developing a TDA is important as it helps to determine the transboundary nature, magnitude, and significance of the various issues pertaining to water quality, quantity, biology, habitat degradation, or conflict. After the threat is identified, the countries can determine which issue or issues are priorities for action, relative to less significant issues and those of solely national concern. In addition, the root causes of the conflicts or degradation, and relevant social issues, are also included in the analysis so that actions to address them may be determined later. The science community from each country is often involved because the TDA is intended as a factual, technical document, and key stakeholders are expected to participate.

Once one or several priority transboundary concerns—along with their root causes in the sectoral activities of each country—are identified in a TDA, the countries would collaborate in determining the actions they will take to address those priority concerns. Their responses will be expressed in an SAP for the LME and adjacent basins. The actions may consist of policy, legal, and/or institutional reforms and investments on both multi-country and national levels. They are developed by each country, often through national inter-ministerial committees with participation by stakeholders at the national and subnational levels, and are compiled and agreed upon at the multi-country level. In some cases, the development of individual national action plans (NAP), which may incorporate the reforms and investments into national economic development plans, describe the commitments by individual collaborating countries in response to the regional SAPs they have produced.

GEF international water project follows a scientific cycle, in which the TDA/SAP processes are two indispensable taches. The TDA/SAP process can be divided into 5 phases (See Chart

1.), including project development, planning the TDA/SAP, TDA development, SAP formulation and SAP implementation. Those phases and the steps within each phase are interrelated with each other and guarantee the success of the following steps and phases.

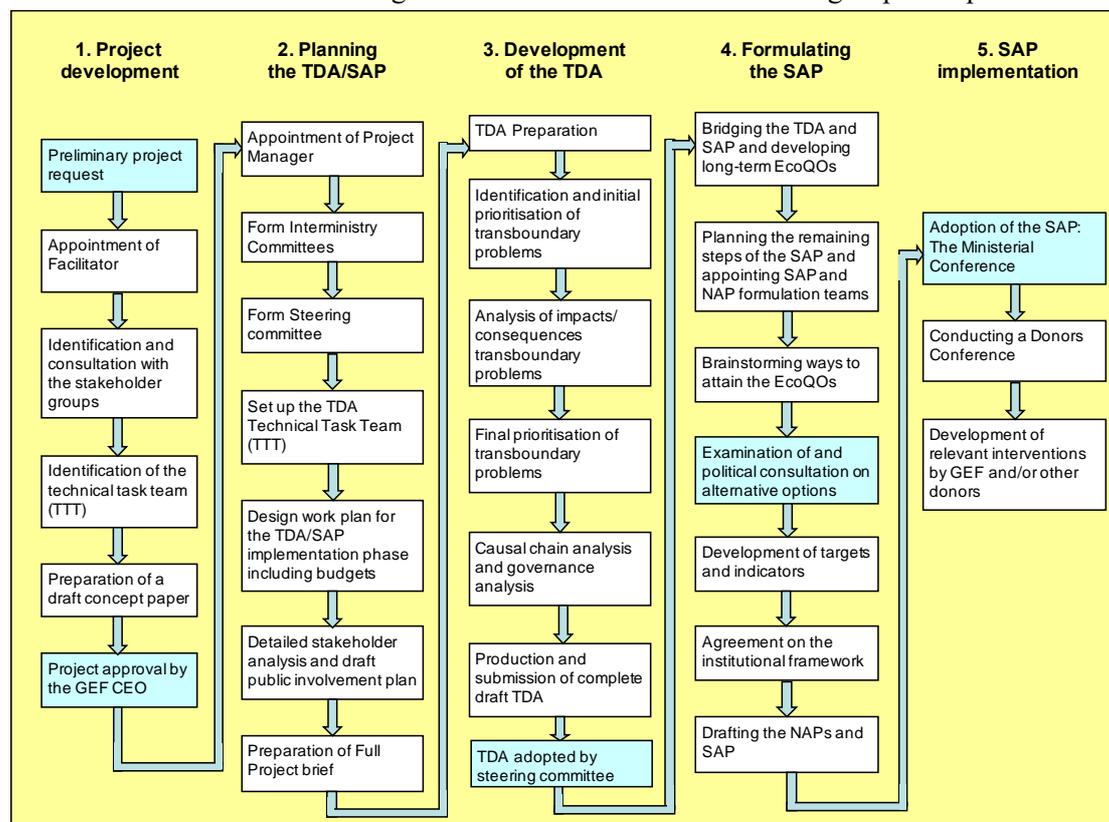


Chart 1. TDA/SAP Process

2. The SAP and NSAP of YSLME

After the problems, impacts, threats and root causes were identified, a regional "Transboundary Diagnostic Analysis" (2005), and a regional "Strategic Action Programme (SAP)" (2008), have been successfully produced through the UNDP/GEF YSLME project and the "National Strategic Action Plans" (2009) were finalized in the Republic of Korea and China.

The YSLME SAP proposes the use of an innovative "ecosystem-based management approach" as advocated in the Millennium Development Goals (MDGs) in order to manage the complicated relationships between the environmental stresses and the resulting problems. This ecosystem-based approach uses scientific knowledge to guide appropriate management actions that preserve the ecosystem functions of the YSLME and its Ecosystem Carrying Capacity (ECC). Based on the scientific knowledge, optimal ecosystem conditions were assumed and regional ecosystem objectives were set down, which formed a basis for developing regional targets and the further management actions. By implementing those management actions, regional targets will be met and environmental stress will be reduced. (See Chart 2.) The SAP identifies 11 tangible regional targets aimed at maintaining the ecosystem's capacity to provide the four ecosystem services (provisioning, regulating, cultural and supporting) to the region and

beyond. (See Chart 3.) It provides adaptive ecosystem-based management actions to reach these targets.

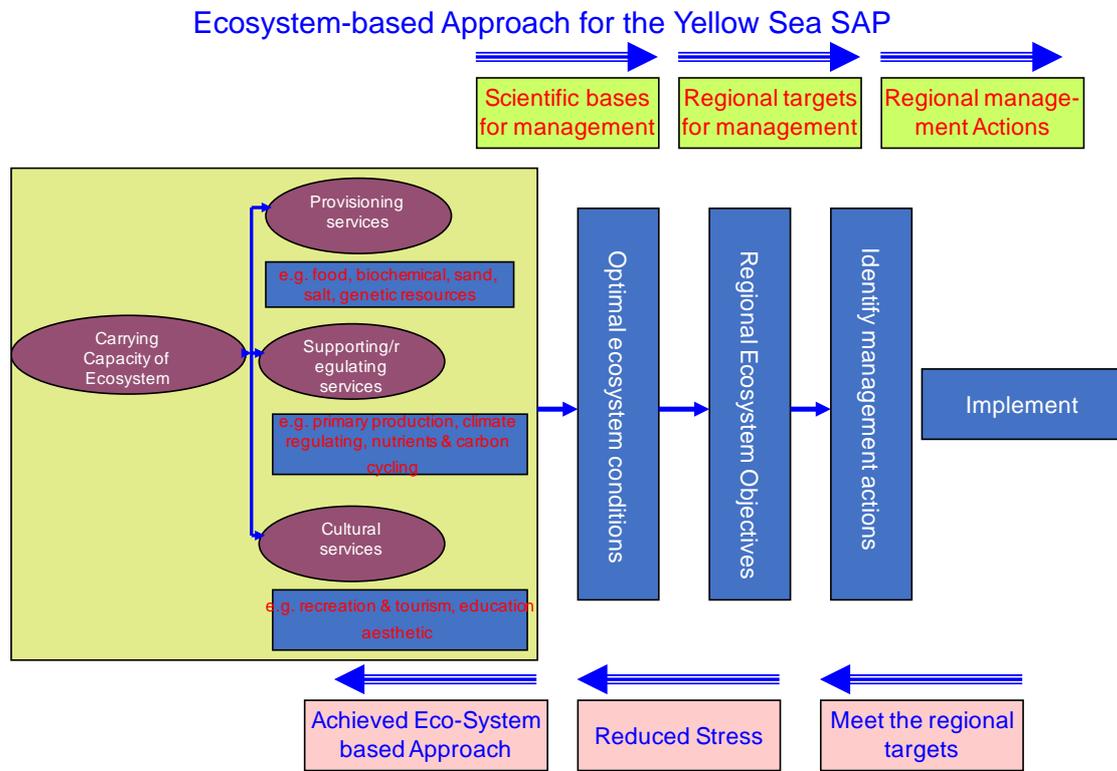
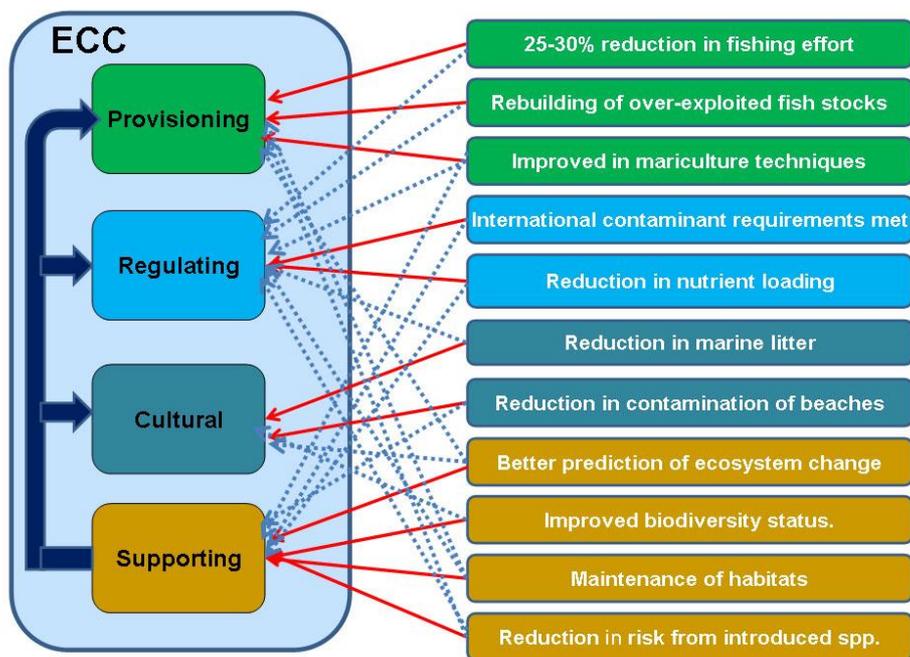


Chart 2. Ecosystem-based approach for the YSLME SAP

YSLME - SAP



From YSLME Strategic Action Programme, Oct. 2008

Chart 3. Regional targets developed by the SAP

Besides, institutional and legislative actions were also developed, including creation of the YSLME commission, improving effectiveness of legal instruments, stakeholder's wide participation and improving national governance.

Based on the SAP, two NSAPs were developed separately in both China and ROK to transform the requirements of regional SAP into more detailed and targeted action plans at the national level for implementation of SAP. Actions listed in the NSAP are generally consistent with SAP with minor changes based on different situations of the two countries.

3. Legal Instruments Adopted by International Legal Documents Related to the Provisioning Services and the Actions of SAP and NSAPs

Provisioning services provide ecosystem goods such as seafood (cultured as well as natural), fuels, bio-products, genetic resources and raw materials (e.g. sand & salt). As identified by the TDA, the transboundary environmental problems in provisioning services mainly lied in depletion of fishery resources and non-environmentally friendly mariculture. Accordingly, the regional targets were set down as “25-30% reduction in fishing effort”, “rebuilding of over-exploited marine living resources” and “improvement of mariculture techniques”. The dominate legal document that provides principles and standards applicable to the conservation, management and development of all fisheries, the FAO Code of Conduct for Responsible Fishing (CCRF) was reviewed to identify the legal instruments that were recommended by the FAO.

3.1 Legal Instruments Adopted by FAO CCRF

FAO Code of Conduct covers the capture, processing and trade of fish and fishery products, fishing operations, aquaculture, fisheries research and the integration of fisheries into coastal area management. This Code is voluntary in nature. However, certain parts of it are based on relevant rules of international law, including those reflected in the United Nations Convention on the Law of the Sea. The Code also contains provisions that may be or have already been given binding effect by means of other obligatory legal instruments amongst the Parties.

The legal instruments that are suggested in the guideline includes:

- Data gathering and management advice (take into account the best scientific evidence available, promote research, collect and maintain complete and reliable statistics) Art. 7.4
- Precautionary approach (States should apply the precautionary approach widely to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment.) Art. 7.5
- License System (ensure that no vessel be allowed to fish unless so authorized) Art. 7.6.2

- Responsible fishing gear, methods and practices Art. 7.6.4
- Recovery of fishery stocks. (They should make every effort to ensure that resources and habitats critical to the well-being of such resources which have been adversely affected by fishing or other human activities are restored) Art. 7.6.10
- Monitoring System (Fishery monitoring, control, surveillance and law enforcement measures including, observer programmes, inspection schemes and vessel monitoring.) Art. 7.7.3
- Education and training programmes Art. 8.1.7
- Record system (records details of the vessels, their ownership and authorization to fish) Art. 8.2
- Artificial reefs and fish aggregation devices. Art. 8.11
- Establish, maintain and develop an appropriate legal and administrative framework for responsible aquaculture Art. 9.1.1
- Produce and regularly update aquaculture development strategies and plans Art. 9.1.3
- Undertake appropriate environmental assessment and monitoring on aquaculture. Art.9.1.5
- Establish databases and information networks to collect, share and disseminate data related to their aquaculture activities 9.2.4
- Minimize the harmful effects of introducing non-native species Art. 9.3.1
- Development of responsible aquaculture management practices. Art. 9.4.2
- Control the use of fertilizer, drugs or chemical inputs. Art. 9.4.3
- Adopt appropriate policy, legal and institutional framework to achieve the sustainable and integrated use of the resources Art. 10.1.1
- Promote the creation of public awareness Art. 10.2.1
- Promote regional cooperation on sustainable use of coastal resources and the conservation of the environment, adverse transboundary environmental effect, and coastal area management. Art. 10.3
- Establish mechanisms for cooperation and coordination among national authorities involved in planning, development, conservation and management of coastal areas. Art. 10.4
- Encourage bilateral and multilateral cooperation in research. Art. 12
- Ensure that decision making processes are transparent and achieve timely solutions to urgent matters. Art.6.1.3

3.2 Management Actions of SAP and NSAP relating to Provisioning Services

The following actions are taken in the SAP and NSAP assessment report aim to make provisioning services of the Yellow Sea ecosystem sustainable. The first goal is to increase fisheries resources by reducing fishing pressure and rebuilding marine living resources. The second goal is to increase the sustainability of mariculture by reducing its impacts on the environment and controlling diseases effectively. Although these actions will primarily improve provisioning services, they will also have pervasive effects on regulating, cultural, and

supporting services as well.

SAP Target 1: 25-30% reduction in fishing effort

SAP Management Action 1-1: Control fishing boat numbers

Optional buy-back of fishing boats from fishermen will continue, a reduction of 25-30% of total marine fishing boats is recommended during 2004-2020 based on the current stock level. In addition, new boat building should be strictly controlled.

- **China:** A total of 30,000 fishing vessels was reduced during 2003-2010; 20,000 fishing vessels will be further reduced during the 13th five-year plan of China; Indirectly reduce fishing vessels by greatly reduced the fuel subsidies.
- **Korea:** In consideration of Korea's long-term plan for reduction of fishing vessels and a number of reduced fishing vessels so far, the country is maintaining its mid- to long-term fishing effort at a moderate level.

SAP Management Action 1-2: Stop fishing in certain areas/seasons

Closed seasons and areas for fishing need to be continued based on improved scientific knowledge.

- **China:** The summer fishing ban was extended to 4-4.5 months since 2017.
- **Korea:** The legally designated closed areas (no-fishing zones) and seasons have been properly revised in consideration of environmental changes, and appropriate measures are being taken to protect spawning stock and recruitment resources.

SAP Management Action 1-3: Monitor and assess stock fluctuations

Joint monitoring and analysis of major stocks, compatible data and assessment methodology need to be undertaken co-operatively as a demonstration of the benefits to the individual country. Establishment of a regional database is recommended.

- **China:** Kickoff the annual survey of fishery resources in China coastal waters during 2014-2019, as well as the survey of spawning ground distribution.
- **Korea:** The surveys of the changes in fishery resources and monitoring systems are being restructured at the national level, making a progress in the assessment and monitoring of the relevant waters.

SAP Target 2: Rebuilding of over-exploited marine living resources

SAP Management Action 2-1: Increase mesh size

Increasing mesh-size can reduce the percentage of juveniles caught. More selective fishing gears and optimum mesh-size based on the studies of gear performance and fish behaviour are recommended to reduce by-catch.

- **China:** China conducted the catchable size of 15 fishery species since August 2018 and limited the juveniles and young fish proportion of 15 fishery species in the catch during 2018-2020.

- **Korea:** The size of net knots has been stipulated by the Enforcement Decree of the Fisheries Act, and the development of fishing gear using eco-friendly materials is still ongoing.

SAP Management Action 2-2: Enhance stocks

To rebuild over-exploited stocks, degraded habitats for fishery resources will be improved by transplanting sea-grass and by controlling pollution and construction. Healthy, genetically diverse fry of high value fish and shellfish species will continue to be released into the sea in order to increase recruitment and help rebuild stocks. Designation of protected areas and building of artificial reefs in appropriate areas of the sea with suitable monitoring is encouraged to conserve and increase marine living resources and improve their environment. Impact of the release of hatchery-raised juveniles and construction of artificial reefs on the ecosystem should be monitored and assessed.

- **China:** Yes
- **Korea:** The fishery resource recovery project began in the 1980s and is still being carried out, and the related budget has been increased.

SAP Management Action 2-3: Improve fisheries management

Introduction of EBFM is suggested based on improved knowledge. Establishment of a self-regulation system by fishermen and community-based management in the coastal areas are recommended. Use of Total Allowable Catch (TAC) and Individual Transfer Quota (ITQ) based on survey and assessment should be encouraged in fisheries management. Fish landings should be substantially reduced to optimal levels to keep biomass at biologically safe levels.

- **China:** China used many ways to improve fisheries management, such as reduce fuel subsidies, strengthen fishery law enforcement during summer fishing ban.
- **Korea:** Launched after 1998, the TAC system has become an established fishery resource management system. The fact that the TAC exhaustion rate has been decreasing means that the efforts made to protect fishery resources are now bearing fruit.

Target 3: Improvement of mariculture techniques to reduce environmental stress

SAP Management Action 3-1: Develop environment-friendly mariculture methods and technology

As an environment-friendly mariculture method, Integrated Multi-trophic Aquaculture (IMTA) is recommended as it will also increase economic benefit. Standard offshore technologies to different conditions should be developed. Good Aquaculture Practice (GAP) should be demonstrated at commercial scales.

- **China:** Inshore IMTA is demonstrated in YS region but land-based IMTA is just at primary stage.
- **Korea:** This management action has not been successfully implemented. Besides the West Sea, where research projects were conducted, projects to verify models were only conducted in other seas, where additional efforts should be made to develop IMTA.

SAP Management Action 3-2: Reduce nutrient discharge

Limited water exchange aquaculture systems, recirculating systems are recommended to be established, and artificial diet improvement should be practiced on a commercial scale.

- **China:** No description.
- **Korea:** This management action can be evaluated as somewhat insufficient. Although the action for development of seawater recirculation aquaculture system was partly achieved through development of a model as a national R&D project, new alternative feed sources using fishery by-products were developed and distributed.

SAP Management Action 3-3: Control diseases effectively

Diagnosis and control techniques for major diseases need to be developed and established. The network for an early warning and diagnosis system of diseases is suggested. New techniques and management measure to control disease should be introduced to the farmers.

- **China:** No description.
- **Korea:** This management action has been successfully implemented. For this action, a broad range of activities were conducted through the project for the development and operation of an epidemic prevention system for fishery organisms, which also led to significant results.

SAP governance Action for Provisioning Services

Governance Actions

- **China:** Strengthening alternative job markets, training, and financial support for retiring fishermen
- **Korea:** No description

3.3 SAP and NSAP's Implementation of International Conventions

The consistence of international legal documents and SAP (NSAP) is shown as the follows:

International Legal Documents	SAP	NSAP Assessment (ROK)	NSAP Assessment (China)
Data gathering and management advice	Yes. SAP Action 1-3 & Action 2-2	Yes.	Yes.
Precautionary approach	Yes. SAP Action 1 & Action 2 & Action 3 & Governance Actions	Yes.	Yes.
License System	Yes. SAP Action 1-2 & Action 2-3 & Governance Actions	Yes.	Yes.
Responsible fishing gear, methods and practices	Yes. SAP Action 2-1 & Governance Actions	Yes.	Yes.

Recovery of fishery stocks	Yes. SAP Action 1 & Action 2 & Governance Actions	Yes.	Yes.
Monitoring System	Yes. SAP Action 1-3 & Action 2-3 & Governance Actions. But incomplete. No requirement on vessel monitoring systems.	Yes.	Yes.
Education and training programmes	Yes. SAP Action 3-3 & Governance Actions	Yes.	Yes.
Record system	No description	Incomplete	Incomplete
Artificial reef's and fish aggregation devices.	Yes. SAP Action 2-2	Yes.	Yes.
Establish, maintain and develop an appropriate legal and administrative framework for responsible aquaculture	Yes. SAP Action 3 & Governance Actions	Yes.	Yes.
Produce and regularly update aquaculture development strategies and plans	Yes. SAP Action 3-1 & Governance Actions	Insufficient. IMTA, as one of the aquaculture development strategies has not been successfully implemented.	Insufficient. China is accelerating mitigating efforts to cope with environmental stress including optimal spatial planning for mariculture to reduce environmental risks. But now the comparatively perfect application is only the IMTA
Undertake appropriate environmental assessment and monitoring on aquaculture.	Yes. SAP Action 3 & Governance Actions	Yes.	Insufficient. Lack of the assessment and monitoring on SAP Action 3-2 (Reduce nutrient discharge) & 3-3(Control diseases effectively)

Establish databases and information networks to collect, share and disseminate data related to their aquaculture activities	Yes. SAP Action 3-3	Yes.	No description.
Minimize the harmful effects of introducing non-native species	No description.	No description.	No description.
Development of responsible aquaculture management practices.	Yes. SAP Action 3 & Governance Actions	Yes.	Insufficient. The legal systems on mariculture should be enhance, such as the EIA system, the mariculture permit system.
Control the use of fertilizer, drugs or chemical inputs.	Yes. SAP Action 3-2	Incomplete	Incomplete
Adopt appropriate policy, legal and institutional framework to achieve the sustainable and integrated use of the resources	Yes.	Yes.	Yes.
Promote the creation of public awareness	Yes. SAP Action 2-3 & Governance Actions	Yes.	Yes.
Promote regional cooperation on sustainable use of coastal resources and the conservation of the environment, adverse transboundary environmental effect, and coastal area management.	Yes.	Yes.	Insufficient. Lack of international cooperation in developing laws and policies.
Establish mechanisms for cooperation and coordination among	Governance Actions	Yes.	Yes.

national authorities involved in planning, development, conservation and management of coastal areas.			
Encourage bilateral and multilateral cooperation in research.	Yes.	Yes.	Yes.
Ensure that decision making processes are transparent and achieve timely solutions to urgent matters.	Incomplete	Yes, but insufficient.	Yes, but insufficient

4. Legal Instruments Adopted by International Legal Documents Related to the Regulating Services and the Actions of SAP and NSAPs

SAP aimed to improve regulating services of the Yellow Sea ecosystem by controlling contaminants discharge according to international standard and by reducing eutrophication by diminishing nutrients.

4.1 Legal Instruments Adopted by International Legal Documents

China and ROK have signed several international agreements and participated into international cooperation process on environmental protection and ocean governance that have gone in line with the aim of SAP in its target 4 and 5. Those include:

- The International Convention for the Prevention of Pollution from Ships(MARPOL 1973/78)
- International Convention on Oil Pollution Preparedness, Response and Co-Operation, 1990 (OPRC and OPRC-HNS)
- The Stockholm Convention on Persistent Organic Pollutants (Stockholm Conventions)
- The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

Generally, the listed international conventions deal with the prevention and reduction of harmful environmental problems from contaminants, wastes and pollutants in marine environments. As described below, with the growing concern on environmental issues, the international conventions continuously discuss new insights specifically in marine environmental protection and strengthen their implementation through specific contracting

parties' obligations.

4.1.1 The International Convention for the Prevention of Pollution from Ships

The International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. The technical requirements of MARPOL are included in six separate annexes.

Recently, they introduced the ship fuel oil consumption data reporting requirements as a mandatory requirement aimed at enhancing the energy efficiency of international shipping. The mandatory requirements were adopted through amendments to chapter 4 of annex VI.

The amendments to regulation 13 of MARPOL Annex VI (NO_x) came with changes mainly of progressive reduction globally in emissions of SO_x, NO_x and particulate matter and the introduction of emission control areas (ECAs) to reduce emissions of those air pollutants further in designated sea areas.

A draft Guidelines for consistent implementation of the 0.50% sulphur limit under MARPOL Annex VI was agreed early 2019, together with other relevant guidelines, forming a comprehensive package of new and updated instruments that will assist industry and Administrations to effectively and uniformly implement the 0.50% sulphur limit.¹

The annexes of the convention require the contracting parties to undertake effect in:

- Regulations for the Prevention of Pollution by Oil
- Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk
- Prevention of Pollution by Harmful Substances Carried in Sea in Packaged Form
- Prevention of Pollution by Sewage from Ships
- Prevention of Pollution by Garbage from Ships
- Prevention of Air Pollution from Ships

4.1.2 International Convention on Oil Pollution Preparedness, Response and Co-Operation, 1990

The International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) (1990), is designed to facilitate international cooperation and mutual assistance in preparing for and responding to a major oil pollution incident and to encourage States to develop and maintain an adequate capability to deal with oil pollution emergencies. Parties to OPRC are required to establish measures for dealing

¹<http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Air-Pollution.aspx>

with pollution incidents, either nationally or in co-operation with other countries. The Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances (OPRC-HNS Protocol) follows the principles of the OPRC Convention and was formally adopted in March 2000.

A draft guidance on practical implementation of the pollution prevention and response treaties (OPRC Convention and the OPRC-HNS Protocol) were agreed early 2019 to: promote understanding of the overall OPRC Convention and OPRC-HNS Protocol concept; explain the benefits of participation in this international regime; provide a step-wise approach for the planning, preparedness and implementation process at national and regional levels; and identify existing publications and support mechanisms to assist with implementation².

The legal instruments adopted by OPRC and OPRC-HNS Protocol are as follows:

- Oil pollution emergency plans
- Oil pollution reporting procedures
- National and regional systems for preparedness and response
- International Co-operation in pollution response
- Technical cooperation.
- Promotion of bilateral and multilateral cooperation in preparedness and response
- A national system for responding to HNS
- Shipboard pollution incident emergency plan
- Providing assistance to other States in the event of a pollution emergency, with a provision for the reimbursement of any assistance provided.

4.1.3 The Stockholm Convention on Persistent Organic Pollutants

The Stockholm Convention on Persistent Organic Pollutants requires parties to implement measures to protect human health and the environment from persistent organic pollutants by eliminating or reducing production use and release of these chemicals. It involves politics and economics but also science and technology to resolve global environmental problems. The legal instruments adopted by the Stockholm Convention are as follows:

- Developing legal and necessary measures to reduce and eliminate releases from both intentional and unintentional production and use of chemicals
- Develop strategies to identify stockpiles consisting or containing listed releases

² Report of the Drafting Group on OPRC Guideline

- Develop and implement a plan in accordance with the implementation of its obligation

4.1.4 The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

The 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal was designed to eliminate the risks arising from the transboundary movements of hazardous and other wastes. These risks include those arising from the transportation, handling, disposal and recycling of waste.

Since the COP 12 in 2015, technical guidelines on POPs wastes and e-waste and updated technical guidelines on mercury wastes were adopted. Participants on COP 13 agreed to include marine litter in the programme of work of the Basel Convention’s Open-ended Working Group. COP 14 addressed issues related to microplastics, waste containing nanomaterials, and legal, compliance and governance matters.³ The legal instruments adopted by the Basel Convention are as follows:

- Notification to the authorities of the prospective States of import and transit
- Exchange of information on issues relevant to the implementation of the Convention to technical assistance, particularly to developing countries
- Ensure safe disposal, either by re-import into the State of generation or otherwise
- Establish regional or sub-regional centres for training and technology transfers

4.2 Management Actions of SAP and NSAP relating to Regulating Services

The following actions are taken in the SAP and NSAP assessment report aim to make regulating services of the Yellow Sea ecosystem sustainable.

TARGET 4: Meeting international requirements on contaminants

SAP Management Action 4-1: Conduct intensive monitoring and assessment

- **China:** The SOA implements the national marine environment survey, monitoring and surveillance annually. SOA established a comprehensive network, which includes regional centers, branch stations and local agents, to conduct marine environmental monitoring, using the same technical guideline and QA/QC methodology. The annually monitoring data reached up to 2 million items. Ministry of Environment Protection (MEP) has established an “Environmental quality monitoring network” to monitor the quality of coastal waters. In addition, coastal provinces and cities also have their own monitoring system.⁴

³ Ibid

⁴ 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

- **Korea:** Korea has been operating a stable and continuous marine environment surveys since the 1980s. The surveys have been operated in a practical manner through the adjustment of the survey items, regions, and subjects of intensive surveys under the circumstances and demands. Korea also considers to building an open-access database system in order to facilitate and maximize data use and transparency. The Marine Environment Monitoring Network has been continuously adding and expanding survey stations (or areas), items, and objects and thus supporting actual environmental assessments based on analysis and monitoring of previous survey results. Since 2010, the National Institute of Fisheries Science has been conducted the environmental monitoring of fishing grounds for six times per year (February, April, June, August, and October), as a result of which 12 sets of data (water temperature, salinity, dissolved oxygen, pH, transparency, suspended matter, chlorophyll a, and five types of dissolved nutrients) have been disclosed⁵.

SAP Management Action4-2: Control contaminants discharge with reference to Codex alimentarius and Stockholm Convention

- **China:** In 2015, the Ministry of Agriculture (MOA) formulated the “Action Plan for the zero-growth of pesticide use by 2020”. In April 2007, the State Council of China approved the “National Implementation Plan of the Stockholm Convention” of China. China has formulated several management policies and technical standards, eliminated a large number of POPs production, developed alternative technologies, and carried out various forms of propaganda and training courses. From May 17, 2009, China declared that the production, circulation, use and import and export of DDT and chlordane and mirex and hexachlorobenzene are prohibited (except for vector control of DDT emergency use). MEP, cooperated with the U.S. EPA, carried out POPs and other toxic substances reduction projects in the cement industry, antifouling ship DDT substitute project, pesticides remobilized safe disposal of waste and soil restoration demonstration project in China. In the Yellow Sea area, Weihai City is recorded as one of the DDT replacement projects in the National Yellow Sea & Bohai sea area. Two demonstration projects were conducted for safe disposal and restoration of contaminated soil contaminated by DDT in Shandong province⁶.
- **Korea:** Korea has implemented the same POP management criteria set out in the Convention. The criteria proposed in the Stockholm Convention have been incorporated into the POPs Control Act and Marine Environment Management Act to provide the basis for POPs management efforts. Korea created the Basic Plan for the Management of POPs and established basic goals, a direction, promotion plan, and cooperative plans with international organizations and domestic and overseas institutions. Korea has reformed its domestic laws regarding POPs in order to comply with international criteria and strengthened international regulations, such as the addition of new POPs subject to the Stockholm Convention⁷.

⁵ 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

⁶ Ibid, report China

⁷ Ibid, report Korea

SAP Management Action 4-3: Implementing MARPOL 1973/78 effectively

- **China:** China has conducted actively management about ship-source pollution to marine environment, strengthened environmental standards of ships and their facilities and equipment. The “Regulations on the Prevention of Marine Pollution from Ships of the People's Republic of China” was amended in 2009 in accordance with the requirements of MARPOL 73/78 and relevant international convention on prevention and control of marine environmental pollution by ship and related activities. The Bureau of Maritime of the Ministry of Transport (MOT) has compiled and implemented pollution prevention and control plans for national ports, wharfs and loading and unloading stations. The construction of waste reception, transport and disposal facilities will be sped up, and the capacity for handling of pollution accidents, such as oily wastewater, chemical washing water, etc., will be improved⁸.
- **Korea:** Since the OPRC went into effect in the 2000s, Korea has regulated and managed the management standards and system under the Marine Environment Management Act in order to ensure compliance with this convention. In 2000, Korea enacted the OPRC, provided contingency plans regarding oil pollution for vessels and marine facilities, issued reports and notifications regarding oil spills, and established national and regional systems to respond to and address oil spills as part of its efforts to implement the Convention. In particular, the Korean government included the mandatory clauses for countries directly concerned that are stipulated in the OPRC-HNS 2000 in the Marine Environment Management Act, which focuses on managing the overall marine environment. For now, the Korea Coast Guard and the Korea Marine Environment Management Corporation are carrying out related tasks⁹.

SAP TARGET 5: Reduction of Total Loading of Nutrients from 2006 Levels.

SAP Management Action 1: Control total loading from point sources

- **China:** The total loading from point sources has been controlled in recent decades. The continuation of the strict control of pollution loading from point sources is encouraged. Local government has done a lot of work, however, under pressure of rapid economic increase, the actual effectiveness may not be very significant from 2010 to 2016.
- **Korea:** Korea has been pursuing a project to expand wastewater treatment facilities as a means of reducing point pollution load. The number of treatment facilities has been increased every year. Korea has carried out a project to install the separated sewerage system, which separates wastewater from storm water.

SAP Management Action 2: Control total loading from non-point sources and sea-based sources

- **China:** SOA set up marine atmosphere monitoring station to monitor heavy metals as well as some new organic pollutants. In 2015, the Ministry of Agriculture (MOA) formulated the “Action Plan for the zero-growth of pesticide use by 2020” to strictly control the use of chemical fertilizers. In the Yellow Sea Region, the rules of fertilization are: reducing nitrogen; controlling phosphorus; stabilizing potassium; and supplementing trace elements (sulfur, zinc, iron,

⁸ Ibid. Report china

⁹ Ibid, report Korea

manganese, boron, etc.)¹⁰. But emission of N, P, and COD from mariculture, beyond the nearshore marine environmental capacity and self-purification ability, causing eutrophication and the marine ecological environment destruction and exception. In addition, mariculture may produce large amounts of self-pollutants, including particulate matter and dissolved metabolic wastes.

- **Korea:** The Ministry of Environment and the Ministry of Oceans and Fisheries have been carrying out intensive management of the four major river basins and coastal areas under special management, respectively. A monitoring network has been established to help manage atmosphere-based pollution, showing that the management of pollution from all sources is being faithfully carried out. The Ministry of Environment established the Second Comprehensive Plan for the Management of Nonpoint Pollution Sources (2012-2020), a long-term measure for managing nonpoint source pollutants, and has been monitoring and installing management facilities on land and along roads with high nonpoint pollution loads¹¹.

SAP Management Action 3: Apply new approaches for nutrient treatment

- **China:** In 2015, China issued “Water Pollution Control Action Plan”, which is an ambitious plan. WPCAP will strengthen pollution control in industrial agglomeration areas. Industrial effluent must be pretreated to meet the requirement of centralized treatment before entering the centralized sewage treatment facility. New and upgraded industrial agglomeration areas should be planned, including construction of sewage and garbage centralized treatment and other pollution treatment facilities. It is significant to study coastal wetland changes and its effects on the eco-environment to better understand the regional eco-environment under global changes¹².
- **Korea:** Advance wastewater treatment facilities through the application of new technologies for removing nutrients have been established. The Ministry of Environment has continuously promoted the development of related technology and equipment for removing nutrients that flow in from point pollution sources. The Ministry of Environment is continuing to develop technologies and equipment for removing nutrients that flow into the Yellow Sea from point pollution sources using secondary treatment and tertiary advanced treatment methods, which are biological and chemical treatment methods.¹³

4.3 SAP and NSAP’s Implementation of International Conventions

International Conventions	SAP	NSAP Assessment (ROK)	NSAP Assessment (China)
Regulation for the prevention of pollution from ships	Yes	Yes	Yes
Oil pollution and ship-board pollution (emergency plan,	Yes	Yes, inadequate (no regional system)	No description

¹⁰ Ibid, Report China

¹¹ Ibid, report Korea

¹² Ibid, report China

¹³Ibid , report Korea

reporting procedure, national and regional system for preparedness and response, multilateral cooperation)			
POP (legal and necessary measures, strategies and implementation plan)	Yes	Yes	Yes
Transboundary movements of hazardous waste and dumping (notification, exchange of info. Safe disposal, training)	No description	No description	No description
Regulation of land-based pollution (monitoring and assessment, review of environmental quality standards, share of info., nutrient control,)	Yes	Yes, but inadequate	Yes, but inadequate (non-point source, nutrient from mariculture)

5. Legal Instruments Adopted by International Legal Documents Related to the Culture Services and the Actions of SAP and NSAPs

Marine litter and the contamination of recreational waters have been identified as major problems threatening the cultural services of the Yellow Sea ecosystem. The goal of SAP is to reduce contaminants and litter around bathing beaches and other recreational marine areas. To achieve this, control and monitoring of contaminants as well as public participation is important. Although these actions will primarily improve cultural services, they will also have pervasive effects on provisioning, regulating, and supporting services as well.

5.1 Legal Instruments Adopted by International Legal Documents

China and ROK have signed several international agreements and participated into international cooperation process on environmental protection and ocean governance that have gone in line with the aim of SAP in its target 6 and 7. Those include:

- UNCLOS
- The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention)
- The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA)

5.1.1 UNCLOS

The UN's groundbreaking work in adopting the 1982 Law of the Sea Convention stands as a defining moment in the extension of international law to the vast, shared water resources of our

planet. The UNCLOS is the international agreement that defines the rights and responsibilities of nations with respect to their use of the world's oceans. It specified the parties' obligation on living resources and marine environment protection. The legal instruments adopted by the UNCLOS are as follows:

- Develop national law and policy to prevent, reduce and control pollution of the marine environment from land-based sources. (Art. 201&209)
- Develop regional rules, practice and procedures to prevent, reduce and control pollution of the marine environment from land-based sources. (Art. 207)
- Exchange of information, data and publication (Art. 197&200&242)
- Take measures to prevent, reduce and control pollution of the marine environment (Art. 194);
- Develop and promote contingency plans for responding to pollution incidents in the marine environment (Art. 199);
- Monitor the risks or effects of pollution (Art.204);
- Harmonize their policies in this connection at the appropriate regional level (Art.207);
- Promote the development and transfer of marine technology (Art.266)

Although the UNCLOS is a more framework convention in the area of living resources and marine environment protection, it manages to address the new problems in regularly published reports. The report "Oceans and the law of the sea" published in 2015 provided an overview of main developments and issues in ocean affairs and the Law of the Sea and gave emphasis on the following issues that need attention:

- The importance of the implementation of Part XII of UNCLOS in order to protect and preserve the marine environment and its living marine resources against pollution and physical degradation has been addressed. Actions to prevent and control of land based and sea based pollution and pollution caused by marine debris have been taken. The negative effect of ocean noise has been noted as well.
- Many management tools which could facilitate the integrated management of the oceans and seas have been addressed, such as environmental impact assessment, strategic environmental assessment, ecosystem approach, area-based management tool etc.
- The importance of monitoring, assessment and scientific knowledge to decision making and adaptive management has been addressed.
- Building the capacity of States to implement the legal regime for the oceans and seas has been emphasized

5.1.2 The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter

The "Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972", the "London Convention " is one of the first global conventions to protect the marine environment from human activities. It envisages to promote the effective control of all

sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter. In 1996, the "London Protocol" was agreed to further modernize the Convention and, eventually, replace it. Under the Protocol, all dumping is prohibited, except for possibly acceptable wastes on the so-called "reverse list". The legal instruments adopted by the London Convention are as follows:

- Effective control of all sources of pollution of the marine environment (Art.3&5)
- Take effective measures to prevent marine pollution caused by dumping (Art.3&5&9)
- Prohibit the dumping of listed wastes or other matter
- Designate authorities to issue special permits (Art.9)
- Consider regional features to enter into regional agreements consistent with this Convention (Art.12&17)
- Develop procedures for the assessment of liability and the settlement of disputes regarding dumping.

5.1.3 The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities

The GPA is the only global intergovernmental mechanism directly addressing the connectivity between terrestrial, freshwater, coastal and marine ecosystems. It aims to be a source of conceptual and practical guidance to be drawn upon by national and/or regional authorities for devising and implementing sustained action to prevent, reduce, control and/or eliminate marine degradation from land-based activities.

In the Fourth session of United Nations Environment Assembly of the United Nations Environment Programme, it is emphasized that GPA should focus on the following points:

- Enhance the mainstreaming of the protection of coastal and marine ecosystems
- Enhance capacity-building
- Improve the coordination, engagement and support of the work with member states on land-based pollution; and foster the linkages to the Regional Seas, other relevant platforms and international initiatives for effective delivery in an integrated manner
- Encourage exchange of information, practical experience and scientific and technical expertise cooperative and collaborative action and partnership among governmental institutions and organization, communities, the private sectors and non-governmental organizations which have relevant responsibilities and/or experience.

5.2 Management Actions of SAP and NSAP relating to Cultural Services

The following actions are adopted in the SAP and are described in the NSAP assessment report aim to make cultural services of the Yellow Sea ecosystem sustainable.

Target 6: Reduced standing stock of marine litter from current level

SAP Management Action 6-1: Control source of litters and solid wastes

Management of waste from coastal cities, counties and watershed should be encouraged. The technologies for waste reduction, re-use, recovery, and disposal should be implemented and the clean production and development of re-cycling economy be promoted.

- **China:** From 2016, SOA launched a pilot monitoring program of marine microplastics in marine environment. In May 2017, the first marine microplastics survey was conducted in the Yellow Sea. As a result, the overall densities of floating, beach and marine litters were lower than in previous years.
- **Korea:** Korean government has implemented a series of measures to minimize the occurrence of marine litter, such as intensive management of used Styrofoam, supply of biodegradable fishing gear and distribution of used Styrofoam buoy compactors and promotion of education and consultations for fishers. There is preventive management of the inflow of land-based litter from rivers and estuaries.

SAP Management Action 6-2: Improve removal of marine litter

Development and implementation of a monitoring programme for marine litter is encouraged, in conjunction with the assessment and dissemination of information, and exchange of data and information in the region. It is also recommended that the local governments and NGOs develop and implement programmes for cleaning marine litter in YSLME coastal waters.

- **China:** Weihai City issued the implementation work plan of the "Marine Debris Program Participates in U.S./China Sister Cities" in 2016. Plastic debris in the marine surface and beach was salvaged and cleaned normally, and salvaging of the plastic debris on the seabed was exploratory, and environmental governance and ecological restoration of river channels and beaches were carried out in Weihai City.
- **Korea:** By operating a series of systems and facilities for the collection and disposal of marine litter, Korea has been reinforcing its marine litter collection and disposal capability.

SAP Management Action 6-3: Increase public awareness of marine litter

The development and implementation of environmental awareness and education programmes, especially for primary, middle and high schools are recommended. The opportunities for NGOs participation should be created and/or provided. Educational information packages should be produced for use in schools.

- **China:** China actively encourages local governments or NGOs to organize clean beach activities. Propaganda and education were carried out by celebrating World Environment Day, Earth Day, World Oceans Day, International Coastal Cleanup Day and China Ocean Day.
- **Korea:** The Korean government is performing various activities to elicit public participation in marine litter collection and management as well as engaging in international cooperation activities with NOWPAP.

SAP Target 7: Reduce contaminants, particularly in bathing beaches and other marine recreational waters, to nationally acceptable levels

SAP Management Action 7-1: Conduct regular monitoring, assessment and information dissemination particularly in bathing beaches and other recreational waters

Agreed measurement techniques for bathing water quality should be developed with a common quality assurance support mechanism. The intensive monitoring, early-warning, assessment in the seasons and the information dissemination for bathing waters and other marine recreational waters should be conducted. The national acceptable criteria or guidelines on water quality for those areas should be developed and/or improved.

- **China:** The local government established intensive monitoring, early-warning, assessment system for bathing waters and other marine recreational waters, when the water quality is not suitable for swimming, the administrative department will make control measures at different levels, until it closes the beach.
- **Korea:** Since the implementation of the Act on the Use and Management of Bathing Beaches in 2014, Korea has been making efforts to install bathing beach facilities and manage the environment by planning to establish Master Plans for Bathing Beaches every 10 years, in accordance with the law.

SAP Management Action 7-2: Control pollution in bathing beaches and other marine recreational waters

The emergency response system for human health in these areas should be improved and/or developed.

- **China:** China issued "The Implementation Plan of Garbage Sorting" in 2017. Dalian City and Qingdao City, the coastal cities of the YS, began to carry out mandatory garbage sorting within the urban district, setting a goal for the recycling rate in cities where household garbage is sorted to reach 35 percent by 2020. The garbage treatment system for sorted collection, transportation and disposal was established.
- **Korea:** The installation of sewage treatment facilities at major bathing beaches has been scheduled on an annual basis, in accordance with the Sewerage Act. However, not many facilities have been constructed and put into operation.

SAP Governance Action for Cultural Services: More funding opportunities for recycling enterprises should be provided; The operational approach or system for litter removal should be developed; The environmental awareness and education programmes should be mainstreamed into national plans; Network for government-issued public announcements on beach closures should be established. The reporting network, especially the public participation and reporting system should be established; More regular and stricter enforcement of marine litter laws should be carried out, and compliance with waste management laws and regulations be improved; Clear national & regional guidelines on marine litter monitoring and assessment should be established.

- **China:** Control source of litters and solid wastes; Improve removal of marine litter; Increase public awareness of marine litter; Conduct regular monitoring, assessment and information dissemination particularly in bathing beaches and other recreational waters; and Control pollution in bathing beaches and other marine recreational waters.

- **Korea:** Monitor hazards and pollution in the waters of marine tourism areas by conducting regular water quality tests at bathing beaches and marine tourist attractions; Disclose and disseminate information, such as survey and monitoring results; Install and manage discharge facilities to control the inflow of pollutants into the waters of bathing beaches and recreational areas

5.3 SAP and NSAP's Implementation of International Conventions

International Conventions	SAP	NSAP Assessment (ROK)	NSAP Assessment (China)
Guidelines for monitoring plastics and microplastics	No detailed guidelines	Marine Litter: Yes Microplastics: not found	Marine Litter: Yes Microplastics: On going.
Establishment of operational mechanism for beach cleaning	Yes	Yes	Yes
Improved legislation on waste and litter management	Yes	Yes, but the regulation of marine litter hasn't been well established	Yes, but the regulation of marine litter hasn't been well established
Promote public participation and international cooperation	Yes	Yes, need to become a normal requirement	Yes, need to become a normal requirement
Take necessary measures to prevent land-based pollution	Yes	Yes, inadequate in non-point source pollution.	Yes, inadequate in non-point source pollution.
Pollution from dumping (permits, regional agreement, procedure for assessment)	No description	No description	No description
Prohibit incineration at sea of waste	Not mentioned	Not mentioned	Not mentioned
Coordination and collaboration among organizations	Not mentioned	Yes, inadequate	Not mentioned
Enhance capacity building	In the governance action part.	Not mentioned	Yes but limited

6. Legal Instruments Adopted by International Legal Documents Related to the Supporting Services and the Actions of SAP and NSAPs

Improving provisioning, regulating, and cultural services is impossible without improving supporting services as well. This is because ecosystem functions rely on complex physical, chemical, and biological processes. Therefore, adaptive ecosystem managements are crucial to improve ECC of the Yellow Sea ecosystem. The following actions primarily aim to improve supporting services of the Yellow Sea ecosystem. These include maintaining habitats and biodiversity, and providing relevant information of current status and forecasts on the Yellow Sea ecosystem for adaptive, scientific, ecosystem-based management.

6.1 Legal Instruments Adopted by International Legal Documents

China and ROK have signed several international agreements and participated into international cooperation process on environmental protection and ocean governance that have gone in line with the aim of SAP in its target 8 to 11. Those include:

- United Nation Framework Convention on Climate Change and its Kyoto and Paris Agreement (UNFCCC)
- Convention on Biological Diversity
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)

6.1.1 UNFCCC

UNFCCC is an international environmental treaty to “stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.” The treaty itself set no binding limits on greenhouse gas emissions for individual countries and contains no enforcement mechanisms. But it provides a framework for negotiating specific protocols that may set binding limits on greenhouse gases. The legal instruments adopted by the UNFCCC are as follows:

- Formulate, implement, publish and regularly update national and regional programme. (UNFCCC Art. 4)
- Take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. (UNFCCC Art. 3)
- Cooperate in scientific, technological, technical, socio-economic and other research (UNFCCC Art. 3&Art. 5)
- Enhance public participation in addressing climate change and its effects and developing adequate responses; and training of scientific, technical and managerial personnel; (UNFCCC Art. 6) etc.

Kyoto Protocol

The Kyoto Protocol commits its Parties by setting internationally binding emission reduction targets. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial

activity, the Protocol places a heavier burden on developed nations under the principle of “common but differentiated responsibilities.” The legal instruments adopted by the Kyoto Protocol are as follows:

- Formulate, implement, publish and regularly update national and regional programmes containing measures to mitigate climate change and measures to facilitate adequate adaptation to climate change;
- Promote and cooperate in the development, application and diffusion of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases;
- Promote sustainable management, and promote and cooperate in the conservation and enhancement of sinks and reservoirs including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems;
- Cooperate in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal zone management;
- Take climate change considerations into account, in their relevant social, economic and environmental policies and actions, and employ appropriate methods to mitigate or adapt to climate change;
- Promote and cooperate in research, exchange of information, education, training and public awareness.

Paris Agreement

At COP 21 in Paris, on 12 December 2015, Parties to the UNFCCC reached a landmark agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future. Paris Agreement gives a special emphasis on adaptation of climate change, by encouraging parties to enhance adaptive capacity, develop adaptive plans and policies. It also recognizes the importance of addressing loss and damage associated with the adverse effects of climate change and the role of sustainable development in reducing the risk of loss and damage.

The legal instruments adopted by the Paris Agreement are as follows:

- Early warning systems
- Emergency preparedness
- Comprehensive risk assessment and management
- Adopt mitigation measures.
- Coordinate across instruments and relevant institutional arrangements.
- Exchange and Sharing of information and data

During the 23rd session of the COP, parties all agreed to give priority to the following works to facilitate the implementation of Paris Agreement. The works include: 1) Review of adaptation-related institutional arrangements under the Convention; 2) Develop methodologies for assessing adaptation needs and modalities for the recognition of adaptation efforts of

developing country Parties; 3) Develop methodologies to facilitate the mobilization of support for adaptation in developing countries and methodologies on reviewing the adequacy and effectiveness of adaptation and support; 4) Make institutional arrangements on capacity-building to support the Paris Agreement; 5) Enhance the implementation of education, training, public awareness, public participation and public access to information; 6) Develop modalities, procedures and guidelines for the enhanced transparency framework for action and support.

6.1.2 Convention on Biological Diversity

The Convention has three main goals including: the conservation of biological diversity; the sustainable use of its components; and the fair and equitable sharing of benefits arising from genetic resources. It also covers the rapidly expanding field of biotechnology through its Cartagena Protocol on Biosafety, addressing technology development and transfer, benefit-sharing and biosafety issues. The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization is a supplementary agreement to the Convention. It provides a transparent legal framework for the effective implementation of one of the three objectives of the CBD: the fair and equitable sharing of benefits arising out of the utilization of genetic resources. The legal instruments adopted by the CBD and its protocols are as follows:

- Develop National Strategies, Plans or Programmes for the conservation and sustainable use of biological diversity and integrate the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies. (CBD, Art. 6)
- In-situ Conservation and Ex-situ Conservation, including (a) establish a system of protected areas and develop guidelines for the selection, establishment and management of protected areas; (b) regulate or manage biological resources important within or outside protected areas; (c) promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings; (d) rehabilitate and restore degraded ecosystems and promote the recovery of threatened species; (e) regulate, manage or control the risks associated with the use and release of living modified organisms resulting from biotechnology which are likely to have adverse environmental impacts; (f) prevent the introduction of, control or eradicate those alien species; (g) develop or maintain necessary legislation for the protection of threatened species and populations. (CBD, Art. 8)
- Impact Assessment and Minimizing Adverse Impacts. Each Contracting Party shall (a) impact assessment on biological diversity; (b) reciprocity, notification, exchange of information and consultation on activities (c) promote national arrangements for emergency responses to imminent or grave danger or damage, or activities, or events. (CBD, Art. 14)
- transfer of technology and safe use of biotechnology (CBD, Art. 16)

- Establish and maintain programmes for scientific and technical education and training; promote and encourage research (CBD, Art. 12) ;
- Increase public education and awareness of the importance of and the measures required for the conservation of biological diversity (CBD, Art. 13) ;
- Facilitate the exchange of information from all publicly available sources (CBD, Art. 17) ;
- Cooperatively establish a clearing-house mechanism (CBD, Art. 18) etc.

The Second Conference of Parties (COP) formally included marine and coastal biological diversity into the meeting agenda in 1995 and encouraged all parties to take integrated marine and coastal area management (IMCAM) as a tool to promote the conservation and utilization of marine and coastal biodiversity.

On COP 4, ecosystem approach and precautionary approach were introduced to deal with the activities that have negative effect on marine and coastal biodiversity.

On COP 10, issues of unsustainable fishing, ocean fertilization, ocean acidification and anthropogenic underwater noise and their negative effects were discussed. IMCAM, Marine Spatial Planning (MSP) and Environmental Impact Assessment (EIA) were recommended as the tools to manage marine biodiversity. The Voluntary Guidelines for the Consideration of Biodiversity in Environmental Impact Assessments and Strategic Environmental Assessments in Marine and Coastal Areas was issued.

On COP 14, parties were invited to identify the Ecologically or Biologically Significant Marine Areas (EBSAs) within their jurisdictions and implement assessment on those areas. Parties shall promote the implementation of MSP.¹⁴

6.1.3 Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)

Signed in 1971, Ramsar Convention is an international treaty for the conservation and sustainable use of wetlands. The legal instruments adopted by the CBD and its protocols are as follows:

- Designation of Wetland and Establishment of Nature Reserves (Ramsar Convention, Art. 2 and Art. 4)
- Encourage research and the exchange of data and publications regarding wetlands and their flora and fauna, as well as promote the training of personnel competent in the fields of wetland research, management and wardening. (Ramsar Convention, Art. 4)

¹⁴ Yin Senlu. *Negotiation focus, impacts, and China's implementation strategies of Marine and Coastal Biodiversity in the Convention on Biological Diversity*. Biodiversity. 2016, 24 (7): 855–860

The 4th Strategic Plan (2016 – 2024) of the RAMSAR Convention set the priority areas of focus in the next nine years. Of them, preventing, stopping and reversing the loss and degradation of wetlands is of top priority. Regarding the implementation of the Convention, the following aspects are emphasized: 1) improving compliance with Ramsar provisions concerning Ramsar Site updates, inventories of all wetlands and Wetlands of International Importance, 2) maintenance of ecological character and management of sites, improving the ecological character where not good enough, especially on the Montreux Record, 3) the preparation of management planning processes for all Ramsar Sites, and implementation of such management planning on the ground through the presence of staff, appropriate infrastructure and other resources.

Except these, other issues of priority includes: 1) science-based advice and guidance; 2) climate change and wetlands; 3) information about ecosystem functions and the ecosystem services they provide to people and nature; 4) communicating ecosystem functions and the ecosystem services they provide to people and nature; 5) enhancing cooperation; 6) identifying and designating wetlands as Ramsar Sites and transboundary Ramsar Sites; 7) wise use of wetlands; 8) invasive alien species; 9) strengthening and supporting the full and effective participation and the collective actions of stakeholders.¹⁵

6.1.4 Ballast Water Management Convention

The Ballast Water Management Convention aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments. The legal instruments adopted by the BWM Convention are as follows:

- Control of the transfer of harmful aquatic organisms and pathogens through ships' ballast water and sediments
- Promote scientific and technical research and monitoring
- Ensure the inspection of ships

6.2 Management Actions of SAP and NSAP relating to Supporting Services

SAP Target 8: Better understanding and prediction of ecosystem changes for adaptive management

SAP Management Action 8-1: Assess and monitor the impacts of N/P/Si ratio change

- **China:** China has primarily built the marine ecology environmental monitoring network, covering the sea area under Chinese jurisdiction. National level and local (provincial, city,

¹⁵ <https://www.ramsar.org/document/the-fourth-ramsar-strategic-plan-2016-2024>

county) level monitoring institutions carry the responsibility of marine environmental quality monitoring, marine ecological monitoring, marine ecological risk monitoring and forecasting.

- **Korea:** In accordance with the guidelines on the establishment and operation of marine environment monitoring networks stipulated in the Marine Environment Management Act, the Korea Marine Environment Management Corporation operates marine environment monitoring networks including nutrient monitoring. In the respect of monitoring and evaluating the effects of the ratio of nitrogen, phosphoric acid, and silicon, Korea's regular monitoring and assessment of the ratio of nutrients remain insufficient.

SAP Management Action 8-2: Assess and monitor the impacts of climate change

- **China:** A Work Plan for Controlling Greenhouse Gas Emissions has been formulated and implemented during the 13th FYP Period. Regional governments formulated and decomposed greenhouse gases (GHG) controlling targets. In 2013, China published the National Strategy for Adapting Climate Change to assess and monitor the impacts of climate change. In 2016, SOA carried out the pilot monitoring of ecosystem response to climate change in the north Yellow Sea and the sea area of south Dalian, which laid the foundation for monitoring and evaluating the response of marine ecosystems to climate change in the country.
- **Korea:** Although monitoring and assessment for the impact of climate change on the lower trophic levels have been conducted at the national level, no projects have targeted the Yellow Sea.

SAP Management Action 8-3: Forecast ecosystem changes in the long-term scale

Regional efforts should be focused on integrating models and developing scenario-based projections for the future ecosystem changes.

- **China:** In 2007, China published the National Climate Change Programme, in which the current status and forecasting of climate change in China were included.
- **Korea:** The project for predicting long-term changes in the Yellow Sea was carried out through institutional research projects. However, as the projects were one-off, a continuous research program is now recommended to pursue the effects of climate changes.

SAP Management Action 8-4: Monitor the transboundary impact of jellyfish blooms

An international co-operation is required for proper monitoring and mitigation of jellyfish blooms on regional scale. This includes developing national and regional monitoring methodologies of jellyfish blooms

- **China:** A National Basic Research Program on Giant Jellyfish Blooms in Chinese Seas was established for 2011–2015 by China's Ministry of Science and Technology. Chinese seas principally affected are the Yellow Sea (YS), the East China Sea, and the Bohai Sea, which are where the National Program has been concentrated.
- **Korea:** Monitoring, assessment, and ecological research on and against the transboundary effects of jellyfish blooms have been continuously carried out.

SAP Management Action 8-5: Monitor HAB occurrences

Monitoring these nuisance blooms should be continued for potential impacts to aquaculture, fisheries and public health. In addition the regional capability for HAB monitoring and mitigation needs to be improved.

- **China:** China started the research on HAB in the 1970s. A monitoring network on HAB was also established by SOA.
- **Korea:** NIFS is conducting various activities such as regular monitoring, assessment and information service.

SAP Target 9: Maintenance and improvement of current populations/distributions and genetic diversity of the living organisms including endangered and endemic species

SAP Management Action 9-1: Establish and implement regional conservation plan to preserve biodiversity

The regional conservation plan that would include: the establishment of new regional nature reserves/MPAs needed to maintain the population structure, distribution and genetic diversity of the living organisms and endangered and endemic species; regular regional biodiversity monitoring to assess the effectiveness of the conservation plan; and the promotion of the concept of sustainable use.

- **China:** The Government of China launched on 17 September 2010 the National Biodiversity Strategy and Action Plan (2011-2030) (abbreviated as "NBSAP") which has provided a relatively comprehensive set of national targets for biodiversity conservation.
- **Korea:** In 2006, Korea established the Marine Ecology Division within the Ministry of Land, Transport and Maritime Affairs (currently the Ministry of Oceans and Fisheries) and actively began focusing on preserving the diversity of marine life and managing related protected species. To this end, various laws and long-term plans were established, and related activities were conducted based on such laws and plans. However, this management action focused on the biological populations with high mobility that needed to be addressed as a transboundary issue, and therefore required the development of guidelines for managing regional cooperation. Efforts toward that end, however, were insufficient.

SAP Target 10: Maintenance of habitats according to standards and regulations of 2007

SAP Management Action 10-1: Develop regional guidelines for coastal habitat management

- **China:** China has launched several activities to adapt to climate change, such as improvement of the adaptation capacity in coastal zones and related sea areas. The SOA strengthened the planning and examination of sea use by construction projects and regions, and strictly restricted the occupation of important marine eco-spaces, including key eco-redlined areas such as key bays and important coastal wetlands and natural shorelines. In Shandong, Liaoning and Jiangsu provinces, the Yellow Sea Marine Ecological Redline Plan were also set up.

- **Korea:** Korea has been making efforts to manage reclamation activities and prevent the destruction of natural coastlines, notably through the enactment and revision of the Coast Management Act and other related laws. In addition, by reflecting current conditions and environmental changes, Korea has been supplementing regional plans when necessary and enacting and implementing various plans and regulations to function as guidelines.

SAP Management Action 10-2: Establish network of MPAs

A national and regional system of representative nature reserves/MPAs should be established. Moreover, enforcement should be strengthened and management improved through annual assessments.

- **China:** In 2012, the State Council authorized the National Marine Functional Zoning (2011–2020), setting a goal to improve the marine environment with an expansion of the MPA coverage in the sea areas under national jurisdiction to 5%.
- **Korea:** Korea designates areas with high ecological value and that require resource protection as MPAs, and has established a system for managing the tasks involved in making such designations.

SAP Management Action 10-3: Control new coastal reclamation

- **China:** China launched several wetland conservation projects to mitigate the impact of reclamation. In Yellow Sea area, great effects have been made to prevent natural habitat loss. According to the redline design in Shandong, Jiangsu and Liaoning provinces, the development prohibited redline areas banned all construction activities. The development restricted redline areas strictly control construction activities, reclamation is prohibited. This regulation will help prevent habitat loss in the YSLME.
- **Korea:** Korea has enacted various laws that are directly or indirectly related to wetland reclamation, clearly stipulating the sustainable use of public waters and efficient use of reclaimed land. Reclamation activities are restricted in Korea, which has been made possible through means such as the improvement of legal systems in accordance with environmental changes.

SAP Management Action 10-4: Promote public awareness of the benefits of biodiversity conservation

- **China:** In recent years, China has been implementing a number of actions to protect its biodiversity, public participation and increasing public awareness of biodiversity conservation have been focused.
- **Korea:** Since 2006, Korea has been consistently carrying out projects to increase public awareness of the management of MPAs and developing various programs to elicit the general public's interest. In addition, with the opening of the National Marine Biodiversity Institute of Korea in 2015, Korea has been widely promoting permanent and special exhibitions and various events to help people become more aware of marine biodiversity.

SAP Target 11: Reduction of the risk of introduced species

SAP Management Action 11-1: Control and monitor ballast water discharge

- **China:** No description
- **Korea:** Since 2012, Korea has developed various devices and systems for monitoring and controlling the inflow of introduced species from ballast water discharge through KIOST's "Development of Ballast Water Discharge Regulation and Response Techniques" project. Large-scale national research and development projects, technology development and monitoring, and systems and policies applicable to control and management have all been implemented.

SAP Management Action 11-2: Introduce precautionary approach and strict control of introduction of non-native species

The precautionary principle should be employed when assessing the risk of introducing a non-native species, and once introduced strict monitoring of the organism should continue until the risk of ecosystem modification is negligible.

- **China:** In 2003, 2010, 2014 and 2018, China published four batches of invasive species with severe impact to the ecosystem.
- **Korea:** Korea has revised various regulations and systems in order to define the risk assessment, standards, management methods, and related procedures necessary for the management of harmful marine organisms. In addition, Korea has been promoting the development of technologies for managing harmful organisms in an effort to prevent the mass-generation of and remove non-native species and harmful organisms. Moreover, it has conducted activities to raise awareness of harmful organisms and engaged in international cooperation activities.

SAP Governance Action for Supporting Services: Create a regional mechanism for co-operation and strengthen national mechanisms to share information on biodiversity and biodiversity management; Improve legislation and enforcement to ensure that vulnerable and endemic species and critical habitats are protected; Encourage public involvement through educational programmes; Develop regional conservation plan and strengthen national legislation on coastal habitat management (including MPAs); Clear national and regional guidelines on biodiversity monitoring and assessments of the benefit of biodiversity to the local economy and the effectiveness of management should be identified; Strengthening of national legislation on species introductions and the use of risk assessment procedures is recommended.

- **China:** China has been implementing several actions to conserve its biodiversity: Improving legal and regulatory system and institutional mechanisms; Launching and implementing a series of plans for biodiversity conservation; Strengthening conservation systems; Promoting sustainable use of biological resources; Conserving and restoring habitats; Developing and implementing incentives favorable for biodiversity conservation; Enhancing establishment of biosafety management system; Controlling environmental pollution; and Promoting public participation.
- **Korea:** The Korean government promoted various projects, including: rescuing sea turtles, securing the basis for marine life to reproduce indoors, protecting the habitat of marine species under protection, establishing measures to restore the population of each species of marine organism under protection, and raising public awareness of the protection and management of

marine life. Local governments are currently revising the regional plans for coastal management to reflect the main revisions and key directions of the revised plan.

6.3 SAP and NSAP's Implementation of International Conventions

UNFCCC and its protocols	SAP	NSAP Assessment (ROK)	NSAP Assessment (China)
National and regional programmes on climate change	Yes. Develop regional monitoring strategy	Yes	Yes
Precautionary measures (Early warning system, Emergency Preparedness)	Yes	Yes, but insufficient. No special program targeted at the YSLME. The other projects need long-term plans.	Yes, but insufficient.
Develop integrated plan for coastal zone management	No description	Yes, insufficient	Yes, insufficient.
Mitigation measures	No description	No description	No description
Make institutional arrangements on capacity-building	No description	No description	No description
Develop modalities, procedures and guidelines for the enhanced transparency framework for action and support	incorporate the assessment and forecast activities into management policies	No description.	No description.
Comprehensive risk assessment and management	No description	No description.	No description.
Coordinate across instruments and relevant institutional arrangements	Yes. Create regional committee to co-ordinate monitoring and assessment	No description.	No description.
Cooperation in research, exchange of information, education, training and public participation	Yes. Conduct joint assessment	Insufficient	Insufficient

CBD, RAMSA, BWM and GPA	SAP	NSAP Assessment (ROK)	NSAP Assessment (China)
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Develop National Strategies, Plans or Programmes on biological diversity	SAP Action 9-1	NSAP Action 9-1, but insufficient	NSAP Action 9-1, relatively comprehensive, but lack of an ecosystem-based point of view
In-situ Conservation and Ex-situ Conservation	SAP Action 9-1, 10-1, 10-2	NSAP Action 10-1, 10-2, but insufficient	NSAP Action 10-2, insufficient
Impact Assessment and Minimizing Adverse Impacts	SAP Action 9-1, 11-2	NSAP Action 11-2	NSAP Action 11-2, but insufficient
facilitate access to genetic resources	SAP Action 9-1	No description	No description
transfer of technology and safe use of biotechnology	No description	No description	No description
scientific and technical education, training and research	SAP Governance Action	NSAP Action 10-4, 11-2	NSAP Action 10-4
increase public education and awareness	SAP Action 10-4	NSAP Action 10-4	NSAP Action 10-4 NSAP Governance Action
facilitate the exchange of information	SAP Governance Action	NSAP Action 11-1	YES, but insufficient
cooperatively establish a clearing-house mechanism	SAP Governance Action	NSAP Action 11-1, 11-2, but insufficient	NSAP Action 10-4, but insufficient
identify the Ecologically or Biologically Significant Marine Areas (EBSAs)	No description	No description	No description
Integrated marine and coastal area management, Marine Spatial Planning (MSP) were recommended as the tools to manage marine biodiversity	No description	No description	No description
invasive alien species	Yes. SAP management action 11-2	Yes	Yes
Ballast Water Management (effective measures, scientific and technical research, inspection of ships)	Yes. Sap management Action 11-1	Yes	No description

Develop a clean development mechanism	No description	No description	Yes, but insufficient
Designation of Wetland and Establishment of Nature Reserves	SAP Action 10-3	Yes	Yes
research and the exchange of data and publications	SAP Governance Action, but insufficient	Yes, but insufficient	Yes, but insufficient
promote the training of personnel competent in the fields of wetland	No description	No description	No description

7. Legislative Actions of SAP and Their Implementation

The SAP has adopted some actions that can improve effectiveness of legal instruments.

SAP: Improving the implementation of international & regional treaties and guidelines, including but not limited to ensuring full ratification of the treaties; strengthening co-ordination between the bilateral Fisheries Agreement between China and ROK in the YSLME Commission Context; Developing regional guidelines in order to incorporate suggested guidelines of the FAO Code of Conduct for Responsible Fisheries into the YSLME Commission's Context; and Developing guidelines on matters not covered in detail by the United Nations Convention on the Law of the Sea, Convention on Biological Diversity and Ramsar Convention.

- The implementation of international and regional treaties and guideline has been greatly improved in both countries. Almost all the international conventions or agreements or treaties that related to marine environment protection and sustainable use of marine resources have been ratified and under implementation. Regular dialogues on bilateral fishery agreement have been carried out between China and ROK governments. However, none of the regional guidelines have been developed on FAO CCRF or other matters not covered in detail by UNCLOS, CBD, Ramsar Convention and other conventions.

SAP: Developing guidelines for periodic review of the implementation of treaties by each of the participating countries

- Many international conventions or treaties require contracting parties to submit periodic review to reflect the implementation status, such as CBD, UNFCCC, Ramsar Convention etc. However, no guidelines have been developed within the YSLME context for periodic review of the implementation of treaties.

SAP: Exchange of information on relevant domestic legislation

- This action has been fully implemented, as YSLME Phase II project has organized several projects to exchange information on relevant domestic legislations.

SAP: Developing projects to harmonize domestic legislation according to the regional standards and guidelines to be developed through YSLME Commission

- As no regional standards or guidelines have been developed through YSLME Commission, no projects have been launched to harmonize domestic legislation in order to bring the domestic legislation in line with the regional ones.

8. Suggestions to Renew the SAP

Restricted by the research scope of law, limited by the inadequate information and relatively short time, and affected by the subjective evaluation in the NSAP Assessment Report, the above research can't fully reflect the implementation of international legal documents by SAP and NSAP. It may become a reference to the SAP drafting group by offering some information on the aspect of law besides their rich knowledge in marine science. Despite the shortcomings, some suggestions can still be extracted from the above research.

First, define regional transboundary environmental problems.

The final goal of UN's international water project is to solve regional transboundary environmental problems and reduce environmental stress in the regional seas through jointly implementation of the management actions adopted in the SAP. SAP, in a more straightforward expression, is a governance framework or arrangement which targets at solving the problems. Therefore, to draft an effective SAP, the first step is to define the regional transboundary environmental problems in the YSLME region through conducting a TDA. A TDA has been carried out before the first SAP about more than ten years ago. Considering the dramatic changes in environmental status, it is highly suggested to redo a TDA to identify the current regional problems.

Second, find out the root causes for these transboundary environmental problems.

Dramatic changes not only happened in environmental problems, but also took place in the social and economic field and further affected the root causes of these problems. If SAP actions can go straight to the heart of the matter, better efficiency will be achieved. Therefore, a root causes analysis is needed to discover the causes of these problems, the relation among different causes and the priority ranking of the causes.

Third, consider issues or areas that attract international attention.

There are issues or areas that are becoming important global policy issues in recent years, such as climate change, marine debris and micro plastics, or issues or areas that are increasingly

receiving political attention at the international level, such as nitrogen and other nutrients, MPA network etc. International conventions, treaties or agreements tried to include these issues or areas within the established framework through Conference of Parties Resolution, strategic plan or guidelines. When revising the management actions of SAP, it is recommended that these issues or areas be taken into consideration under the YSLME context.

Fourth, actions with a regional feature should be given priority to.

According to the first SAP and two NSAP assessment reports, it is founded that actions such as develop regional guidelines, regional standards, regional methodologies are not implemented well. For revision of SAP, these actions should be given priority as before, because the actions to develop regional policies and guidelines are the fundamental and most significant part in regional ocean governance. It is the regional policy that demonstrate the irreplaceability and value of regional governance as a separate layer of governance other than the international and national ones.

Fifth, list synergizing implementation of international conventions, treaties and agreements as a legal action.

Many actions have been taken to implement international conventions, treaties and agreements, however many of them have not been taken synergistically. By this way, lots of resources were wasted and the ecosystem-based approach hasn't been used. While renewing the SAP, it is suggested that synergizing implementation of international conventions, treaties and agreements be adopted as a regional legal action to emphasize the inter-relation within different actions.

Renewing the SAP requires a close effort from scientists and social scientists from both countries, as well as contributions from government and other stakeholders. It is a task that brings together the wisdom of all of you.