

Policy options

BOHAI SEA

This section aims to identify feasible policy options that target key components identified in the Causal chain analysis in order to minimise future impacts on the transboundary aquatic environment. Recommended policy options were identified through a pragmatic process that evaluated a wide range of potential policy options proposed by regional experts and key political actors according to a number of criteria that were appropriate for the institutional context, such as political and social acceptability, costs and benefits and capacity for implementation. The policy options presented in the report require additional detailed analysis that is beyond the scope of the GIWA and, as a consequence, they are not formal recommendations to governments but rather contributions to broader policy processes in the region.

Definition of the problem

The impact assessment and causal chain analysis have shown that the priority environmental problems in the Bohai Sea region are freshwater shortage, habitat and community modification, and unsustainable exploitation of living resources. Increased discharges of untreated or partially treated industrial and domestic wastewater have resulted in that more than one third of the major water bodies in the region are polluted, with the quality of their surface water below World Health Organization's drinking water standards. Increased population growth and urbanisation have burdened sewage treatment facilities but also increased the demand for food which has increased agricultural activities. Stream flow in the large river basins such as Liao, Luan, Hai and Yellow have been severely reduced, mainly due to agricultural and industrial activities, as well as building of dams for hydropower generation.

Over the past few decades, many critical ecosystems and habitats in the region have been lost mainly as a result of human activities. As a result of this loss, more than 50% of employment opportunities in aquatic product processing industries have been lost. There have also been losses of freshwater and brackish habitats as well as seasonal drying up of for example the Yellow River. Modifications of the ecosystems in the region, in terms of changes in species population structure and biodiversity, are also relatively severe. Lack of adequate land and water use policies, laws and regulations for land use conversion and use of water resources for agricultural activities have exaggerated the situation.

Economic values of the fisheries sector have greatly decreased over the past decades due to decreased catch per unit effort (CPUE) and reduction in the total catches of some commercially important fish species. The introduction of new fishing technologies and increases in the number of fleets are among the causes for overexploitation. The extended aquaculture industry has contributed to the change of genetic diversity of wild populations.

Policy options and strategic action programmes

Suggested policy options and their associated Strategic action Programmes (SAP) to address the key root causes as identified above were formulated and reviewed by a panel of experts who had been previously involved in the GIWA studies. The policy options and their associated strategic action programmes for each of the key root causes in each of the environmental problem areas are formulated and listed below:

Freshwater shortage

Legal: Insufficient policies and inadequate enforcement of laws and regulations

Options:

- Adoption of policies, laws, regulations and enforcement mechanisms to (i) control and promote the efficient use of river water for agricultural and industrial uses; (ii) control discharge of polluted wastewater from agricultural run-off and by the industry sector; and (iii) indiscriminate extraction of ground water for agricultural and industrial uses.
- Adoption of the introduction of green production technologies for agricultural and industry sectors to reduce discharge of polluted wastewater.
- Adoption and integration of the management of river water use in integrated river basin management programmes.

Strategic Action Programme (SAP):

- Strengthening the enforcement of policies, laws, regulations and enforcement mechanisms to, (i) control and promote the efficient use of river water for agricultural and industrial uses; (ii) control the discharge of polluted wastewater from agricultural run-off and by the industry sector; and (iii) indiscriminate extraction of ground water for agricultural and industrial uses.
- Promotion of the use of green production technologies in the industry and agricultural sectors.
- Implementation of the management of river water use with integrated river basin management programmes.

Knowledge: Lack of public awareness and deficiencies in stakeholder participation in environmental protection

Options:

- Adoption of public awareness campaign programmes on environmental and the social consequences of the uncontrolled discharge of polluted wastewater into river systems.
- Adoption of stakeholder participation and consultation programmes in association with environmental management.

Strategic Action Programme (SAP):

- Development and implementation of public awareness campaign programmes on the environmental and social consequences of uncontrolled discharge of polluted wastewater into river systems.
- Development and implementation of stakeholder participation and consultation programmes in association with environmental management.

Demographic: Mass migration to urban areas

Options:

- Adoption of policies, laws and regulations to restrict migration.
- Adoption of the development of small, rural-oriented urban centres in rural areas to cope with population migration.

Strategic Action Programme (SAP):

- Strengthening the enforcement of laws and regulations to restrict mass migration of population from rural to urban areas.
- Implementation of the development of small, rural-oriented urban centres in rural areas to cope with population migration.

Natural causes: Lack of alternative water supplies and decreases in rainfall

Options:

- Adoption of promotional programmes on the use of green technologies in the industry sector to reduce the use of groundwater.
- Adoption of the introduction of water-saving crop irrigation technologies in agriculture to reduce the use of groundwater for irrigation.

Strategic Action Programme (SAP):

- Development and implementation of promotional programmes on the use of green technologies in the industry sector to reduce the use of groundwater.
- Promotion of water-saving crop irrigation technologies in agriculture to reduce the use of groundwater for irrigation.

Habitat and community modification

Knowledge: Profit-oriented attitudes that disregard environmental impacts

Options:

- Adoption of policies, laws, regulations and enforcement mechanisms to restrict the conversion of coastal wetlands for industrial development.
- Adoption of public awareness campaign programmes on the environmental and social consequences of uncontrolled conversion of coastal wetlands for industrial uses.

Strategic Action Programme (SAP):

- Strengthening the enforcement of policies, laws, regulations and enforcement mechanisms to restrict the conversion of coastal wetlands for industrial development.
- Development and implementation of public awareness campaign programmes on the environmental and social consequences of uncontrolled conversion of coastal wetlands for industrial uses.

Economic: Increased energy demand by domestic and industrial use

Option:

- Adoption of policies, laws, regulations and enforcement mechanisms for regulating the exploration and exploitation of oil and mineral resources.
- Adoption of the programmes seeking alternative energy sources.
- Adoption of the introduction of technologies in the industry sector to reduce the use of petroleum.

Strategic Action Programme (SAP):

- Strengthening the enforcement of policies, laws, regulations and enforcement mechanisms for regulating the exploration and exploitation of oil and mineral resources.
- Development and implementation of the programmes to seek alternative energy sources.
- Promotion of efficient technologies in the industry sector to reduce the use of petroleum.

Legal: Lack of adequate government land and water use policies, laws and regulations

Options:

- Adoption and development of government land and water use policies, laws, regulations and enforcement mechanisms.

Strategic Action Programme (SAP):

- Strengthening the enforcement of government land and water use policies, laws, regulations and enforcement mechanisms.

Economic: Low investment in waste treatment facilities.

Options:

- Promotion of market incentive systems to encourage the industry sector to use green production technologies.
- Enhancement of policies and laws for pollution prevention and wastewater treatment practices.

Strategic Action Programme (SAP):

- Development and implementation of market incentive programmes to encourage the use of green production technologies to reduce discharge of polluting wastes.
- Strengthening the enforcement of policies and laws for pollution prevention and wastewater treatment practices.

Unsustainable exploitation of living resources

Demographic: Shift in livelihoods of fishermen

Option:

- Adoption of relocation programmes for fishermen to the aquaculture sector in line with sustainable aquaculture development strategies.

- Adoption of training programmes on sustainable aquaculture production technologies to educate fishermen entering the aquaculture sector.

Strategic Action Programme (SAP):

- Development and implementation of relocation programmes for fishermen to the aquaculture sector in line with sustainable aquaculture development strategies.

Knowledge: Insufficient awareness of the consequences of the uncontrolled release of hatchery-produced juveniles and over-exploitation of spawning fish.

Option:

- Adoption of public awareness programmes on the environmental and biotic consequences of the mass release of hatchery-produced juveniles for wild fisheries stocks.

- Adoption of biotechnological research programmes (e.g. development of a gene bank; species selection and hybridisation) to sustain biological and genetic diversity in aquaculture and wild fisheries stocks.

- Adoption of programmes that promote good practices in aquaculture.

Strategic Action Programme (SAP):

- Development of public awareness programmes on the environmental and biotic consequences of mass release of hatchery-produced juveniles for wild fish stocks.

- Development and implementation of biotechnological research programmes to sustain biological and genetic diversity of aquaculture and wild fish stocks.

Knowledge: Profit-driven attitudes of fisheries operators

Option:

- Adoption of alternative livelihood programmes to reduce the entry of excessive number of fishermen into the fisheries sector.

- Adoption of fisheries capacity reduction programmes to mitigate excessive fishing efforts and to reduce the entry of excessive number of fishermen into the fisheries sector.

Strategic Action Programme (SAP):

- Development and implementation of alternative livelihood programmes to reduce the entry of excessive number of fishermen into the fisheries sector.

- Development and implementation of fisheries capacity reduction programmes to mitigate excessive fishing efforts and to limit the entry of fishermen into the fisheries sector.