

Policy options

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.

Problem definition

The primary immediate causes of Habitat and community modification in the Caspian Sea and its coastal areas include: pollution from oil spills; heavy metals and environmentally harmful pesticides such as DDT; poaching and unsustainable harvesting practices; introduction of alien species; and regulation of stream flow by the construction of dams on the Volga, Kura and Sefid-Rud rivers. A number of root causes were identified as particularly urgent for the Caspian Economic Hinterland (CEH) and therefore prioritised in this policy options analysis. These root causes include: insufficient control of harmful pesticides; old technology and infrastructure for oil extraction; inadequate expert advice on fishing quotas; absence of regional decontaminating facilities for ballast tanks and hulls; insufficient controls for regulating stream flow by dams; and excessive extraction of freshwater from rivers. Possible policy interventions were explored for each of the prioritised root causes.

Policy options

Harmful pesticides

The use of environmentally harmful pesticides in small-scale farming along the Caspian coastline and river deltas has been identified as a serious threat to the aquatic biodiversity in the region. In order to reduce the discharge of toxic and bioaccumulative substances into coastal waters, legislative enforcement must be strengthened. As pointed out in the Causal chain analysis, the sale and use of DDT has been legally prohibited in the former Soviet states for three decades but the supply is still abundant throughout the CEH. To better enforce the ban on DDT, regional control functions need to be strengthened and local officials must be given the necessary resources to control local market supply and sale. The feasibility and effectiveness of improved legislative enforcement are expected to be high since forbidden chemicals are easy enough to identify and confiscate. Responsibility for improved enforcement should be given to local and municipal authorities.

A recommended parallel measure is to provide local farmers with economically viable alternatives to DDT. This could be done by reducing import taxes on modern and less environmentally harmful pesticides. Today modern pesticides are generally more expensive than DDT on the local markets in the CEH, and can therefore not compete with traditional products. Tax reductions could lower the prices on modern pesticides substantially, but it is unlikely that prices can drop enough to compete with the very cheap chemicals currently in use. The short-term effectiveness of a state driven substitution of obsolete pesticides is hence expected to be fairly low. This measure is however still recommended as a long-term policy for all Caspian states.

Since the public awareness of the ecological consequences of DDT use is generally low in the region, educational efforts would complement the two top-down measures suggested above. Special training, lectures

and educational TV programmes need to be developed and offered both to authorities and local communities in the region. A better public understanding of the ecological vulnerability of the Caspian waters can, in the long run, increase local engagement in the regional environment. Educational policies are hence to be recommended on a broad scale in all five littoral countries.

Infrastructure for oil extraction

Old technical equipment used in the extraction and transport of oil is the most important root cause of oil pollution in the Caspian waters. Much of the small but regular leakage from oil wells and pipelines could be effectively reduced if the infrastructure in use is reconstructed or replaced. However, since local authorities in most Caspian states fail to control pollution from point sources and the legal consequences of exceeding pollution limits are generally very limited, the regional oil industry has few economic incentives to modernise its equipment. Improved local control of oil wells and pipelines and more effective taxes or fines on oil pollution are hence central strategies to enforce the “polluter pays principle” in the region.

A parallel strategy would be to stimulate the introduction of “green technologies” and hence support the modernisation of the Caspian oil industry. While the former measure is important, the general effectiveness is expected to be limited since pollution taxes or fines most likely will be lower than costly reconstructions. It is also unlikely that the introduction of “green technologies” would generate immediate effects, but the long-term benefits are expected to be significant.

Expert advice and fishing quotas

Inadequate expert advice has been identified as the primary root cause of overfishing in the Caspian Sea. As suggested in the Causal chain analysis, the regional Commission on Aquatic Bioresources provides the scientific advice for the establishment of annual fishing quotas in the Sea. Since the scientists involved in this process are put under pressure by the littoral governments and the fishing industry, the recommended quotas are often influenced by political and economic considerations. Therefore, it is important to make the Commission politically independent if more ecologically sustainable quotas are to be imposed. A second, and perhaps even more important policy measure is to stimulate research in the Caspian Sea in order to improve the scientific understanding of the decreasing fish stocks. Currently a range of factors such as overfishing, climatic and hydrological changes and local population fluctuations are suggested as possible causes, but their relative importance is still highly uncertain.

However, improved scientific advice is not the only key to effective fishing quotas in the Caspian Sea. Reduced fishing levels in the Sea also require that quotas are respected. This problem refers mostly to the dire economic situation of the small-scale fishermen. The Tacis project, which is a partnership between the EU and the Newly Independent States, has clearly acknowledged this and will address poaching and unsustainable fishing practices by enhancing/improving community livelihoods. Today, small and large-scale poaching is a significant problem that must be better controlled by all littoral states. While local controlling institutions need to be reorganised and strengthened by better equipment and trained staff in order to enforce fishing quotas, the effectiveness of control measures is expected to be relatively low. This is due to the widespread corruption in the region and the high domestic and international market prices on sturgeon that make illegal trade a highly lucrative business.

Decontamination of ship hulls and tanks

As identified in the Causal chain analysis, alien invasive species have been accidentally introduced into Caspian waters via ballast water of visiting ships and as hull fouling. Since all sea transport from outside the Caspian Sea is channelled through the Volga River, a facility for hull cleansing and control of ballast water is currently under construction in the strategically located port of Astrakhan. The Russian Ministries of Ecology and Transport are responsible for the construction in cooperation with the local authorities in the Astrakhan Oblast. While this initiative is expected to effectively reduce the number of alien species in the Caspian Sea, the project is currently in need of additional funding.

A regional organisation devoted to the control of alien invasive species is another longer-term measure that could reduce the habitat and community modification in the Caspian waters. Such an organisation could strengthen the institutional framework necessary to control the currently unregulated aquaculture in the Sea, and support the control facility in Astrakhan port. However, strengthened local control in the five littoral states is expected to be more effective than cooperative efforts.

A more specific measure aimed to control the negative effects generated by the recent invader, the comb-jellyfish *Mnemiopsis leidyi*, is the deliberate introduction of another comb-jellyfish, *Beroe ovata*, which feeds on *Mnemiopsis*. Since the consequences of this measure are not fully understood, scientific studies are currently being undertaken in Russia, Iran and Azerbaijan. However, these studies are also underfunded and hence need support from the international community.

Regulation of stream flow

There are three main groups of stakeholders affected by the construction of dams on the Caspian rivers. These include the power industry, farmers in need of irrigation, and fishermen. Since the interests of these three groups do not coincide, the regulation of stream flow in dammed rivers requires careful management. As suggested in the Causal chain analysis, the construction of large dams, particularly the Volgograd Dam on the Volga River and the Mingechaur Dam on the Kura River, has resulted in a 90% loss of spawning grounds for mature sturgeon and blocked important migratory pathways. To safeguard the sturgeon's continued existence in the Caspian Sea, the remaining spawning grounds need to be protected. Economic instruments such as fines and compensations could be introduced at the national and local level in order to internalise the external costs of damaged bioresources. Water prices that better reflect the ecological consequences of stream flow regulation are likely to stimulate a more sustainable water use in the region. Local and national authorities would be responsible for the implementation of these measures.

Finally, national regulations on dam construction and operation need to be substantially improved and better enforced in all five littoral states, in order to provide for the environmentally sound regulation of stream flows within rivers entering the Caspian Sea.

Recommended policy options

The policy options recommended to reduce habitat and community modification in the Caspian Sea can be grouped under four main headings: Control functions, Infrastructure, Economic instruments and Science and education.

1. Control functions:

- Strengthen local control of prohibited chemicals;
- Strengthen local control of oil wells and oil pipelines; and
- Strengthen local control of poaching.

As suggested by this study, improved local control of chemical use, oil extraction and transport as well as poaching are central in order to reduce habitat and community modification in the Caspian waters. National and local authorities tend to share the cost and responsibility for legal enforcement in the former Soviet states. While strengthened local control is important, the effectiveness is impeded by the ongoing corruption among state officials in these countries.

2. Infrastructure:

- Modernisation of regional oil industry; and
- Facility for ballast water control and hull decontamination.

Modernisation of the equipment used by the regional oil industry and the control of transport vessels in the Astrakhan port are important but expensive measures. As a consequence, it is important to enact the "polluter pays principle" and hence make oil companies share the implementation costs. When implemented, these measures can be very effective since they are expected to drastically reduce oil pollution and the number of alien invasive species in the Caspian Sea.

3. Economic instruments:

- Tax reductions on less harmful pesticides;
- Point taxes and fines on oil pollution;
- State stimulation of "green technologies"; and
- Fines on damaging stream flow regulation.

A range of economic instruments can be used to stimulate more sustainable production and consumption patterns in the region and hence reduce the ongoing Habitat and community modification. While national and local authorities in the littoral states are responsible for developing suitable instruments, international advice will be important in this process.

4. Science and education:

- Environmental training for the public;
- Expert independence from authorities and fishing industry;
- Scientific research on Caspian fish populations;
- Increased public participation; and
- Institutional strengthening of key managerial institutions.

Raising public awareness of the Caspian environment and investment in further research are important long-term measures for reducing Habitat and community modification in the region. While educational and research efforts will not generate direct effects, they may, in time, lead to a more sustainable management of the aquatic resources in the region.

A detailed assessment of performance of the suggested indicators and level of implementation of the suggested policy options are given in Annex IV.

Comparison with existing international programmes

Possible policy measures for the environmental protection of the Caspian Sea and its coastal areas have been explored prior to the GIWA assessment by the Caspian Environment Programme and in the GEF sponsored Transboundary Diagnostic Analysis. CEP Strategic Action Plan highlights four areas of concern, namely: fisheries development, biodiversity protection, pollution monitoring and control, and sustainable development of coastal areas and has further identified five Environmental Quality Objectives (EQO):

1. Conservation and sustainable use of commercial fisheries resources
2. Conservation of biodiversity
3. Improvement of the water quality of the Caspian Sea
4. Sustainable development of the coastal zones
5. Strengthening of stakeholder participation in Caspian environmental stewardship

TDA policy options are comprehensively described in the TDA reports and provide a good basis for environmental management in the Caspian Economic Hinterland. Many of the policy recommendations in this report coincide with these previous studies. These include:

- To reduce the oil pollution from offshore activities in the Caspian Sea;
- To ensure safe transportation of hydrocarbons and other raw materials;
- To achieve sustainable use of aquatic resources with emphasis on fisheries;
- To establish a control system for the import and export of alien species into and from the Caspian Sea;
- To prevent adverse human activities in sensitive areas (including deltas, reed beds, macrophyte habitats);
- To upgrade/renovate existing treatment plants for mechanical and biological treatment (but compatible with future upgrade to nutrient technology, if studies so suggest);
- To develop training and re-skilling programmes taking into account similar efforts being implemented by other organisations and programmes; and
- To agree to a list of banned agro-chemicals and a programme to destroy stored banned products.

At the same time, the present study emphasises the importance of using already existing legal, institutional and public awareness resources under the local, national and international governance in order to enable a rehabilitation of the habitats and communities in the Caspian Sea.