

EXECUTIVE SUMMARY

The aim of the report is to review and analyse the information gathered in the process of preparing an inventory of potential pollution sources in the Syr Darya basin of Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan) and to propose joint measures to prevent and respond to pollution in emergency situations. The report looks at water as well as industrial pollution risks, including from tailings dams, and procedures for transboundary contingency planning, considering also technological accidents triggered by natural hazards (so-called Natech accidents).

National experts, from the authorities in charge of water/environmental management and industrial safety, identified by respective government agencies of the four countries were engaged to provide data and carry out desk research for the report. The report was drafted by a team of international and national experts. The staff from secretariats of UNECE Water Convention and Industrial Accidents Convention and from the International Water Assessment Centre (IWAC) provided inputs and oversight to the process. The work was carried out during the period 2021–2022 under the National Policy Dialogues on Integrated Water Resources Management in Central Asia project, funded by the EU in the framework of the UNECE Water Convention. Significant in-kind contributions were provided from the secretariat of Industrial Accidents Convention thanks to the support of Switzerland and other donors to its Assistance and Cooperation Programme.

The report assesses industrial and water pollution sources in the Syr Darya river basin, aiming to take a multi-hazard, multi-risk approach. It presents the results of the first mapping of industrial facilities in the Syr Darya river basin which could in case of accidents lead to transboundary water pollution. It also comprises the results of the first mapping done of mine tailings in the Syr Darya river basin. The report also discusses the risks of Natech accidents in the Syr Darya river basin. It presents recommendations on industrial and water pollution prevention, preparedness and response. The implementation of these recommendations will strengthen disaster risk reduction in the Syr Darya river basin.

Main challenges identified

Integrated Water Resources Management (IWRM) requires reliable data. Compared to Soviet times in 1980s, only a limited number of water quality indicators are unfortunately being regularly monitored in the Syr Darya basin. In total, just 9 water quality monitoring stations operate in the basin, and the frequency of observations is low.

Based on available data, agriculture is by far the biggest source of water pollution as the untreated waste waters from the fields account for up to 90% of the pollution of water bodies. Even with reduced use of mineral fertilizers, herbicides and pesticides compared with 1980s, mineralization of the return flow of irrigation waters remains high. In the middle and lower parts of the Syr Darya river, the maximum allowable concentration of nitrates is exceeded by two times and of sulphates by four times.

Industrial effluents are much smaller in volume, but they are more dangerous and harmful due to their level of toxicity. Industrial production is considered the main water pollutant with heavy metals, phenols and oil products. The situation is most problematic in areas with a high concentration of industrial facilities, such as in the industrial zones of larger Uzbek cities. Poor-quality municipal wastewater treatment usually exists in cities but is not common in rural areas. This report allows to better understand the technological hazards and disaster risks in the Syr Darya river basin: there are 61 mine tailings in the basin (9 in Kazakhstan, 30 in Kyrgyzstan, 12 in Uzbekistan, and 10 in Tajikistan). More than half of them (33) can have a transboundary impact in case of an accident. Releases from these sites could be triggered by either natural disasters such as earthquakes or flash floods (Natech accidents) or be caused by technological or human failures during operating of facilities. Potential accidents and releases from these facilities as a result of leaks or dust of radioactive waste and

radon from open tailings can cause serious damage to the environment and more than 24 million people living in the basin. The most hazardous and dangerous tailings, assessed by the Methodology for improving the safety of tailings management facilities (hereinafter “Methodology for Tailings Management Facilities”)², are located mostly in Uzbekistan and Tajikistan, although some of them are in Kazakhstan and Kyrgyzstan. The danger of transboundary radioactive contamination is posed by former uranium facilities requiring environmental remediation in Mailuu-Suu, Min Kush and Shekaftar (Kyrgyzstan), Digmai and Taboshar (Tajikistan).

The report assesses the interlinkages between technological and natural hazards and risks. It has found a high risk of Natechs (natural-hazard triggered technological accidents). Such accidents in particular in the upstream countries Kyrgyzstan, due to landslides, mudflows, as well as Tajikistan, have the potential to cause wide-spread transboundary pollution across the Syr Darya river basin.

The Governments of the countries located in the Syr Darya basin are taking measures to prevent pollution of the river. Measures include funding for the rehabilitation of irrigation systems, reconstruction and construction of treatment facilities. Significant support in the implementation of such investments is provided by international donor organizations. Despite these efforts, the region still faces serious risks, mainly associated with tailings. Crucially, there are no harmonized procedures for accident preparedness and response. A joint system of information exchange, notification, monitoring, coordination and early warning for the Syr Darya basin is missing. As a result, there is also no joint contingency plan.

Recommendations

The report presents a number of recommendations for consideration by riparian countries. The recommendations range from strengthening national coordination to developing coordinated emergency prevention and response plans and ensuring implementation of uranium legacy remediation activities. Recommendations are grouped, targeting specifically the issues linked to (a) tailings and pollution risk assessment, (b) measures to prevent pollution of the Syr Darya river basin, and (c) cooperation between countries, including in case of accidental transboundary water pollution. A summary of key recommendations is provided below.

Tailings and Pollution risk assessment:

- For the safe operation and maintenance of hazardous waste storage facilities, it is necessary to establish constructive interaction between the countries of the region, including the formation of specific mechanisms for exchange in the field of ensuring the safety of tailings facilities.
- Governments should ensure the implementation of measures for the rehabilitation of uranium legacy sites – in Mailuu-Suu and Min-Kush (Kyrgyzstan), in Digmai and Istiklol (Tajikistan), in Charkesar and Yangiabad (Uzbekistan). Without appropriate action, the release of radioactive and toxic waste into the rivers of the Syr Darya basin is inevitable.
- Since tailings are often located near rivers and settlements, it creates risks for the environment and the local population. It is necessary to develop coordinated measures and plans to prevent and respond to emergencies, including for potential cases of accidental water pollution from tailings and other industrial facilities.
- Competent authorities should have complete information on the mining activities of the countries in the basin. GIS technology should be used as a platform for integrating spatially distributed data. The use of maps based on such technology allows for a quick overview of the high-risk objects in the Syr Darya Basin, in order to subsequently take additional security measures.
- It is necessary to significantly increase the level of awareness of tailings operators, state inspectors and representatives of other competent authorities about possible shortcomings and violations in the safety systems of tailings and hazardous industrial facilities.

² Developed by the German Federal Agency for the Environment (German UBA), see <https://unece.org/ru/info/Environment-Policy/Industrial-accidents/pub/369164>

Prevention of pollution of the Syr Darya river basin:

- Work should continue on the identification of industrial hazardous activities in the Syr Darya river basin, taking into account the relevant criteria of the Convention on Industrial Accidents, which will allow assessing transboundary effects of accidents.
- When modernizing existing hazardous industrial facilities or choosing sites for new ones, countries of the basin should be guided by the goals of minimizing the risks of spreading the consequences of possible accidents to neighboring countries.
- The Inter-institutional Working Group on the safety of tailings and the prevention of accidental water pollution between Kazakhstan and Uzbekistan shall be maintained and strengthened while the creation of a similar group for Kyrgyzstan and Tajikistan is recommended. These Groups as well as the National Policy Dialogues on IWRM under the UNECE Water Convention should discuss risk assessment and mitigation in the Syr Darya river basin.
- Harmonization of national legislation with the requirements of the UNECE Industrial Accidents Convention in the field of industrial safety and in related areas (including disaster risk reduction) remains one of the priority tasks for all four riparian countries.

Cooperation between countries:

- Countries that are not Parties to the UNECE Water Convention and Industrial Accidents Convention are invited to consider the possibility of joining these treaties to enhance cooperation for prevention of pollution of the Syr Darya river basin.
- Cross-border cooperation in the field of prevention and response to man-made emergencies should be strengthened, including taking into account Natech risks.
- It is necessary to develop a Joint Action/Contingency Plan for the prevention and response to industrial pollution of the Syr Darya basin in case of emergency situations at tailings, as well as procedures for joint planning of actions. Taking action soon will be important given the high risks of accidents and the wide-ranging devastations they can cause, including wide-spread accidental water pollution.
- Countries of the Syr Darya basin are encouraged to fully use the potential of the Industrial Accident Notification System (IAN) for warnings about hazardous industrial facilities and for sending requests for mutual assistance. Organization of sub-regional tests of the system with the development of an accident scenario in the Syr Darya basin is welcome.