

# Conclusions and recommendations

The Aral Sea Basin contains the territories of six countries, Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan, Turkmenistan, and Afghanistan. The priority concern of the region is that of freshwater shortage. The water deficiency became apparent in the early 1960s when the population in five countries of the region (excluding Afghanistan and Iran) was approximately 15 million. In this period more than 50% of the annual water yield of the Syrdarya and Amudarya river basins was used for human activities. However, since the beginning of the 1980s practically all renewable water resources are being used, predominantly for irrigation, and the regional economy is developing under conditions of increasing freshwater shortages. This scenario has arisen from two main factors, firstly, the rapid increase in the region's population and, secondly, by the orientation of the regional economy towards irrigated agriculture.

Accordingly, GIWA experts selected freshwater shortage as the priority concern, and specifically the issue of modification of stream flow. Pollution, and most importantly pollution of existing water supplies, was identified as the second most significant concern.

The Causal chain analysis (CCA) aimed to identify the root causes behind freshwater shortage to serve as a foundation for the selection of policy options. The immediate causes of the modification of Stream flow were defined as the following:

- Increased diversion;
- Decreased ice resources;
- Inter-annual climatic variability.

The root causes behind freshwater shortages were identified to serve as a foundation for the selection of policy options. The collapse of the USSR led to the fragmentation of the previously integrated economic system, which was followed by social and economic turmoil. Investment in the agricultural sector reduced due to economic recession in the region, which led to a decline in agro-productivity and the water efficiency

of irrigation systems. Outmoded and inefficient irrigation technology continues to be employed, and the continued economic difficulties and the lack of fiscal incentives for farmers to save water prevents the adoption of water saving technologies.

Water use is controlled by weak legislation and the region lacks a mutually acceptable legislative framework for interstate sharing of transboundary water resources. The current water legislation was formulated during the Soviet period and is not appropriate under the present-day conditions. The transboundary nature of the major watershed basins in the region makes it impossible to solve the Freshwater shortage concern without inter-state agreements. Many past agreements have not been implemented or the countries have not fulfilled their obligations. Governments lack clearly formulated national water strategies and management is not integrated at the regional level. Contrary to governmental efforts to resolve the water management problems, all of the countries in the region intend to increase their irrigated areas.

Freshwater shortage may become even more acute over the next few decades if, as is predicted, water resources in the region's major river basins reduce by 20-40%. However, some predictions show that anthropogenic induced climate change may play a less significant role than was previously thought due to evidence of a compensating mechanism in the formation of run-off which is maintaining the total volume of renewable water resources. Thus, further research is needed regarding the dynamics of the region's water resources, primarily in the run-off formation zone, as policy makers cannot make informed decisions without accurate predictions of future renewable water resources.

Experience of the countries in the region cooperating in the management of transboundary water resources in the post-Soviet

period has revealed essential differences in their approaches to resolving key issues. This is particularly true for the equitable use of regional water resources, in defining the principles and criteria for interstate water sharing, and in establishing legal and economic mechanisms for water use. Economic pressures experienced during the transitional period from Soviet rule, common to all countries in the region, has predetermined not only difficulties in achieving coordinated solutions, but has led to failures in the implementation of accepted interstate agreements and obligations at the national level. Despite the efforts of the region's governments and the international community, the situation of water supply in Central Asia remains critical and is anticipated to increase in severity. The tendencies of nations in the region to take unilateral decisions and actions is provoking political conflicts, and thus complicating and hindering the resolution of the situation to the mutual benefit of all states.

By the year 2010, the escalating water abstraction in the region is predicted to result in an ecological disaster. The situation is so critical that the situation could escalate to a crisis if only one of the countries increases water abstraction from surface supplies. Thus the equitable use of transboundary water resources in Central Asia remains problematic and is likely to worsen in future.

Progress in this area can be achieved through political rather than solely technical means and requires development of a package of legal agreements at the national, regional and international level. The following policy options are recommended as a priority:

- Reconstruction and more efficient operation of irrigation systems;
- Development of legislative principles and mechanisms for water use;
- Support of research projects to develop monitoring databases, water saving technologies and techniques to rehabilitate salinised lands;
- Development of a central water supply system and medical service for the population, especially in ecological crisis zones;
- Institutional and legislative support for water user associations and the creation of a legislative framework which facilitates participation of stakeholders in water management at all levels - from regional to local;
- Consideration of the specific environmental conditions of the region in the adoption of progressive water technologies for irrigated farming.