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PROCEEDINGS

Water Security – Opportunity for Development and Cooperation in the Aral Sea Area

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FORMULATION AND ANALYSIS OF REGIONAL STRATEGY ON LAND AND WATER RESOURCES MANAGEMENT IN THE ARAL SEA BASIN

by Vadim Sokolov

Introduction

The Aral Sea Basin includes territory within the five countries: Kazakhstan, Kyrgyz Republic, Tadjikistan, Turkmenistan and Uzbekistan. This is a region of ancient irrigation, where fresh water has been vital to life since the earliest human occupation. The large-scale irrigation development in the second half of the XX centure has changed the hydrological cycle in the region and this has created serious environmental problems here. The actual irrigated area now covers 7,948,100 ha (or 5.1% of total territory). The unexpected collapse of the Soviet Union in 1991 added socio-economic problems. The countries are now in a phase of deep socio-economic transition, absorbing the effects of the collapse of the Soviet Union and the shift from a centrally planned to a market-oriented economy.

The Current Situation

The common aspiration of the Central Asian states to adopt new forms of economic development has been accompanied by changes in government priorities. In the past, most attention was paid to irrigated agriculture, but now each country has selected its own course for survival.

Kazakhstan has used a "shock therapy" to transition by removing subsidies to agriculture, and by creating the possibility for all new farmers to openly compete in the world market. The majority of industrial enterprises were privatized, many of them with the participation of foreign investors. The oil sector became the principal sphere of governmental interest.

The Kyrgyz Republic, with almost a total absence of sources of fossil fuel, identified hydropower production as a first priority for ensuring self-sufficiency. In agriculture, the approach has also been to privatize farming and minimize the support from the government. Political instability has delayed government regulation in agriculture and industry, but even under the current conditions agriculture did not decline significantly.

Turkmenistan and Uzbekistan followed a path of a much more gradual transfer to privatization in agriculture and industry, but economic weakness reduced attention for the water sector.

Tadjikistan has been threatened until recently by political instability. The transition process began only one year ago but suffers from a very difficult economic situation.

Towards the New Water Resources Strategy

The water management requires a new legal basis because the rivers in the region have become transboundary. The new inter-state agreements and procedures are to be developed in accordance with international law as well as taking into account local traditions and experience. The five Central Asian nations have taken the first steps to respond to this need and overcome the inter-regional water problems and minimize ethnic tensions. On September 12, 1991, the Water Resources Ministers of these countries declared that henceforth joint water resources management would be established on the basis of equity and mutual benefit, which is consistent with modern legal approaches in international water affairs as enunciated, for example, in the Dublin Principles (1992 International Conference on Water and the Environment) and the 1997 UN Convention on Non-navigational Uses of International Watercourses.

On February 18, 1992, the countries signed a second inter-state agreement stipulating that water allocation should respect the historical uses and that the two technical river basin authorities (BWOs) should continue to operate but now under the control of the newly established Interstate Commission for Water Coordination (ICWC). All the water resources of the region (surface, underground, drainage) are divided into either transboundary courses which are located on the territory of two or more countries, or national ones, located on the territory of one country and not interacting with the transboundary waters.

Each country has the right to manage its own national resources as well as part of the transboundary water within limits agreed with the other countries, and based on the principle that no damage should be caused. In addition, the Aral Sea and its deltas were defined as an independent sixth riparian with their own water rights. All transboundary water was declared the object of common ownership by all riparians, and its development, protection and use should be carried out on the basis of inter-state agreements by the inter-regional bodies, according to the national requests and regional interests.

A legal framework emerging

Nonetheless, the existing documents do not yet ensure proper water use and control. This is due to the fact that the existing framework agreements do not comprehensively cover all the important technical and financial issues and eventualities that emerge from this transboundary water management. For instance, water flows to the Aral Sea are not yet ensured, emergency conditions are often allowed to occur, and, overall, water use is still inefficient. Therefore, the legal documents must be further expanded upon. They should elaborate the mechanisms for their fulfillment with due regard for regional traditions as well as international standards. Legal support should include a system of normative technical documents that specify all technical aspects of water use and consumption, and what are deemed permissible impacts of human activity on the environment. They should develop rules for the preparation, adoption and

implementation of decisions. In 1996, a first start was made for the establishment of this codex.

Besides the legal framework, a vision and strategy at the regional level are crucial to identify and resolve conflicts over water issues. Major conflicts can develop between (i) the zones of flow formation and deltas; (ii) the water users and the environment; and (iii) irrigation and hydropower. The following basic matters in particular require further study and clear definition in the international documents:

- The principle of *equity* in the use of water, and how to operationalize this principle.
- The criterion of *efficiency* in the use of the common water resources.
- The principle that the *regional interests have priority over national ones*, and how to ensure this principle is effectuated.

Policy provisions to prevent conflict over water resources management

Among the key solutions to the basin problems the legal documents to regulate the water resources management and their use have priority. Such legal documents should specify the countries' obligations that can be enforced through a court of law. The legal framework that should support the water management strategy should comprise policy provisions that clearly and unambiguously regulate both phases of the development and the implementation of the water strategy, thus serving as guidelines to prevent or minimize conflict in all eventualities that may arise in the water resources management. These documents should preferably cover the following issues:

- Inclusion of all waters of transboundary nature (surface, groundwater and return flow) under the authority of the ICWC.
- Specification of the BWOs' functions and structure with due regard for the concept, currently being developed, that aims at embracing the entire channel of each river by its BWO.
- Rules for joint use of common water resources.
- Legislation and standards on water quality, and qualitative and quantitative standards restricting discharges.
- Procedures for the decision-making by inter-state bodies.
- Procedures for settling disputes and arbitration.
- Specification and accountability for violating abstraction limits, flow regimes, water pollution and for failure to feed water into the Aral Sea.
- Protection of structures and waterways which are of international importance.
- Assigning responsibility for information exchange.
- Technical and operational procedures for the collaboration on transboundary rivers, lakes and waterways.
- Procedures for the determination of damages and for their compensation, including compensation for flooding, water pollution, etc.

This is a large agenda that inevitably will require much technical work and negotiation. However, the foundation for this work was laid by the *Fundamental Provisions of the Strategy*, which has been agreed upon by ICWC, and the Governments of Kazakhstan, Tadjikistan and Uzbekistan, as well as, with some comments, by the Kyrgyz Republic and Turkmenistan.

As follow-up, the International Fund for the Aral Sea Saving (IFAS) and ICWC, assisted by legal advisers from the European Union, drafted a set of basic agreements:

- Agreement on the status of the organizations within the IFAS.
- Draft agreement on institutional strengthening of the ICWC organizations.
- Draft agreement on the formation of regional, national and basin-based information systems and the exchange of information.
- Draft agreement on "Water use from transboundary waters".
- Draft agreement on "Planning of joint interventions on the transboundary rivers".
- Draft agreement on "Water quality and the ecological sustainability of the rivers".

The first text was approved by the Board of IFAS in 1997 and confirmed by the Head of States on April 9, 1999. The second and third drafts have gone through a long process of negotiation, and the final versions will be submitted for endorsement to the next meeting of ICWC mid-2000. On the water use agreement, it was decided after five unsuccessful negotiation rounds to prepare separate agreements for each basin, and these are now only in a preliminary stage.

Tools for Water Resources Management Strategy Analysis

The Water Resources Management Information System (WARMIS) was created in 1995 by Scientific-Information Center of ICWC (SIC ICWC), the BWOs and foreign specialists, sponsored by the European Union TACIS Program. This system consists of three regional (SIC ICWC and BWOs) and five national nodes within the common network and permit permanently exchange information related to water resources use in an agreed format. The system covers:

- historical data for all rivers for a period of about 90 years;
- annual and monthly water allocations and use since 1986;
- administrative sub-divisions, land use, and irrigation and drainage data since 1986;
- socio-economic data; and
- GIS covering the most parts of the irrigated area in the region.

In WARMIS version 1.0, the sub-databases contain primary as well as secondary information. Grouped according to subject, the following sub-databases are present:
- Administration; containing basic data and reference codes on administrative and political boundaries, planning zones.
- Land; containing periodical data on land capability, groundwater level, mineralisation of soil and groundwater.

- Water; containing basic data and reference codes on rivers, lakes, reservoirs, hydrological objects, irrigation and drainage networks; periodical (monthly) information on water flow/distribution and reservoir volumes.
- Water Quality; containing periodical (monthly) information on quality of water in rivers and outfalls (in future will contain water quality data for intakes, transboundary transfers, collectors, wells and escapes).
- Climate; containing basic and periodical (monthly) data on weather and climate.
- Industry; containing basic data on non-irrigation water users and periodical (monthly) data on water use.
- Economy; containing information on economic indicators, market prices for agriculture, and water management costs.
- Hydropower; containing basic information on hydropower and thermal power plants, power generation and consumption.

Other sub-databases under development are:
- System, containing information on the WARMIS database version, on clients and contracts, and on authorisation levels for users.
- Planning Zone Water and Salt Balance Model; containing input/output data.
- Planning Zone Economic Optimisation Model and River Basin Model; containing user defined input parameters and secondary input/output data for these models.
- Meta Database;
- Agriculture; containing secondary data based on analysis results and output from WUFMAS and agricultural models, to provide information on water productivity in irrigated agriculture.

All sub-databases within WARMIS are linked with each other by the common unit: planning zone.

The Water Use and Farm Management System (WUFMAS) was organized with the assistance of the same donors. It comprises a unique system of observations and analysis of the irrigated agriculture at farm level. Initially, WUFMAS covered 36 representative farms in the five countries. All observations were carried out by national groups of specialists, who collected the technical, biological, agricultural, hydrological, managerial, economic and social data related to agricultural production at the farm level. Also, the water and land use, the efficiency and finances, and the contents of the work are observed. The regional team prepares the analytical reports on the basis of this data. These reports then are disseminated annually among the five states. In 1999 the observations were changed to include indicators for the improvements in productivity of water and land covered only 9 representative farms in the five countries.

System of Models

The program for development of system model's was elaborated by SIC ICWC (V.A. Dukhovny and others). This program consists of a set of models:

- Three river basin models (Amu Darya, Syr Darya and Zeravshan);

- Model of planning zone, typically adopted for each planning zone in the Aral Sea Basin;
- Models for national water policy, which satisfy water demands of each State, depending on their socio-economic development.

This set of models can be adopted to assist in the creation of a methodology and data on an interconnected base which will support the next phase of modelling:

- for future development at the regional level as a tool in the preparation of Regional Water Strategy;
- for future development at the national level as a tool in the preparation of National Water Strategy;
- for multiyear flow regulation by ICWC and for BWO multiyear planning;
- for annual planning of water allocation and correction of this planning in interests of BWO;
- for operational tasks of water management by each BWO.

The elaboration of basin modeling system for future development at the regional level, and modeling of planning zone and operation work for BWO, was began by SIC ICWC together with the Ministry of Agriculture and Water Resources (MAWR) of all states during the WARMAP-2 Project. In addition, modeling of the basin for annual planning purposes was carried out by SIC ICWC, BWOs, national teams and Energy Dispatch Center under the USAID EPIC Program.

National and regional planning modeling for water resources development in each country was worked out by a team from SIC ICWC with use of the "Globesight" methodology (Prof. Messarovich) with incorporation of some corrections. On the basis of this tool the different options of the regional development were prepared within the framework of "21 Century World Water Vision ".

The completion of these as a tools for ICWC and BWO will permit to organize the proper water management and operations in real time and, in the future, for priorities definition of the national planning for water resources development.

Future Outlook

Under current trends and conditions the region will have not more then 1500 m^3 per capita by 2030, in comparison with 2700 m^3 at the present time. From this fact the region could be characterized as a region undergoing gradual degradation. This may give the impression that it is hopeless to expect future improvements in the region. However, it is not hopeless and a possible action program could be based on the following:

- Ancient water use was based on the valid use of water for the benefit of the whole society. Unfortunately, the traditions and customs in water allocation, use and conservation have been partially lost. Now in the irrigated agriculture a strict control

should be established ensuring equal access to water for everybody and proper operation and maintenance of the infrastructure.

- Historically water use was based on water saving and the prevention of pollution.
- Water use in the region could be improved with orientation to the best methods of water use and management under similar conditions abroad (Israel, Jordan, western states of the USA, Spain), or regional experience in some advanced irrigation schemes. The analysis of water allocation and water losses on different levels of management shows that it is possible to set a strict limitation of water use for all the countries in accordance with the 'criterion level of the best water use'. This guide is very high, but it is required for the benefit of future generations in the region.

The "Globesight" Model

Using the modified "Globesight" model there were tasted three prospective scenarios of water resources development: (a) optimistic; (b) intermediate; (c) no change future.
The optimistic scenario includes the following:

- Region will develop on the base of integration processes which are being elaborated by the governments of all countries;
- Mutually beneficial use of transboundary water resources on base of water saving and common environmental approach;
- Mutually beneficial development of agricultural sector with maximum stress on beneficial crops specialization;
- Agreed processing of agricultural production;
- Economic growth will be provided by development of industry and services.

Intermediate scenario foresees the following:

- Integration processes in transboundary water resources management will be developed slowly;
- There will not be crop specialization and agreed processing of agricultural production.

No change future scenario includes the following vision:

- Regional development will continue under current tendencies in joint transboundary water resources management and integration of agricultural sector;
- Main efforts of the countries will be directed to local water resources conservation.

The following table presents results of those three scenarios testing.

Table. Total Water Demands in the Aral Sea Basin (Billion cub. m)

Scenario	Time Horizon					
	2000	2005	2010	2015	2020	2025
Optimistic	119.1	106.5	94.5	93.1	92.1	92.0
Intermediate	119.1	111.0	102.8	101.6	100.6	100.2
No change	119.1	120.6	121.8	123.3	125.0	126.8

Conclusions

From the above mentioned scenario analyses it is clear, that only the following main principles could ensure future progress in the water sector and irrigated agriculture:

- Improve co-operation of governmental and non-governmental organizations on the management of trans-boundary river basins. In this context, rules and financial conditions for common water use and conservation should be adapted.
- Develop common political approaches and measures for preventing transboundary water pollution. Water quality improvement is needed for effluent from urban, industrial and agricultural users.
- Develop and implement (inter-state) regional investment projects, attract funds from international and bilateral donors for a well balanced use of water in the Aral Sea basin.
- Gradually reduce surface water diversion and increase the water demand of the environment of trans-boundary rivers and the Aral Sea zone as natural consumers (water user).
- Develop and implement measures for creation of a sustainable ecological profile around the Aral Sea.
- Develop a plan for a common agricultural market in Central Asia. This plan should include the regulation of custom procedures, import tax, etc.

Literature

Dukhovny V., and Sokolov V. 1997. Inter-state Water Legislation in the Aral Sea Basin. *Proc. IX World Water Congress*. International Water Resources Association, Canada, September 1997, 2:655-657.

Dukhovny V., and Sokolov V. 1998. Water and Salt Management Strategies in the Aral Sea Basin. In: L.S. Pereira and J.W. Gowing (eds.) *Water and the Environment: Innovation Issues in Irrigation and Drainage*, E & FN Spon, London, 415-421.

Dukhovny V., and Kindler J. 1999. Developing Regional Collaboration to Manage the Aral Sea Basin Water under International and Inter-Sectoral Competition. In: G.J. Alaerts, F.J.A. Hartvelt and F.-M. Patorni (eds.) *Water Sector Capacity Building: Concepts and Instruments*. A.A. Balkema, Rotterdam/Brookfield.

Dukhovny V., and Ruziev U. 1999. River Basin Management in the Aral Sea Basin. *Technical Documents in Hydrology*. Int.Hydrological Progr., No.31, UNESCO, Paris.

FAO. 1997. *Irrigation in the Countries of the Former Soviet Union in Figures*. Water Report # 15. Rome, 226 p.

International Fund for the Aral Sea, and World Bank. 1997. *Fundamental Provisions of Water Resources Management Strategy in the Aral Sea Basin*. Tashkent, 214 p.

Interstate Commission for Water Coordination ICWC. TACIS WARMAP-2 Project - Water Use and Farm Management Survey – Improvement in Water Productivity – Annual Report 1999. Tashkent.

UNESCO-SABAS. 2000. Water Related Vision for the Aral Sea Basin for the Year 2025. Paris, 23:7 p.

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