

**The Regional Environmental Center for Central Asia**

**A. Jailoobaev, T. Neronova,  
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**WATER QUALITY  
STANDARDS AND NORMS  
IN KYRGYZ REPUBLIC**



**European  
Union**



**United Nations  
Economic Commission  
for Europe**



**The Regional  
Environmental Center  
for Central Asia**

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This Report has been prepared by a group of national experts within the EU Project "Harmonization and Approximation of Water Quality Standards and Norms in Central Asia" and UNECE Project «Water Quality in Central Asia». The problems of contemporary surface waters quality management and the draft Report have been reviewed at the regional and national workshops held in Bishkek, Almaty, Dushanbe and Ashgabat in the period from 2008-2009 attended by the related governmental agencies, representatives of scientific, production and non-governmental organizations.

The main goal of this Report is to review the existing situation in relation to water resources conditions, water use and water quality management, the regulatory and legal base to support the governmental agencies authorized for said activities, and to review the procedure, methods and techniques of water quality control and monitoring of quality parameters.

The Report comprises Introduction, the body containing four sections and conclusions and recommendations. The main sections provide the review of the country's hydrographic features; present the qualitative and quantitative parameters of water resources and preliminary assessments of the climate change impact of the qualitative and quantitative parameters of water resources.

They also cover the main problems of waterworks and water facilities of interstate use; review the legislative base and institutional frameworks of water resources management in relation to the qualitative and quantitative parameters; raise the issues of standard setting and assurance of water quality; provide detailed analysis of the existing methods of water quality control and monitoring of qualitative parameters based on the approved standards and regulatory documents. Each section is supported by the relevant conclusions and recommendations.

The Report is ended by the completed Questionnaire serving an actual basis of the Report. The Questionnaire is structured according to the nature of the problem raised and the plan of the problem survey. The questions are linked to the international and national regulatory and legal documents pertaining to the protection and use of water resources.

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The content of this publication is the subject of responsibility of the experts and does not reflect the views of the European Union and United Nations Economic Commission for Europe.

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# THE LIST OF ABBREVIATIONS

WB	Water Body
AUCS	All-Union Construction Standards
WF	Water Fund
GOST	State Industry Standard
P	Pollutant (pollutants)
WPI	Water Pollution Index
CDW	Collector and Drainage Waters
CWR	Committee on Water Resources
MoH	The Ministry of Health
ICS	Interstate Construction Standards
MEP	The Ministry of Environmental Protection
MES	The Ministry of Emergency Situations
RD	Regulatory Documents
TSEL	Tentative Safe Exposure Level
E	Environment
OST	Industry Standard
MPC	Maximum Permissible Concentration
MPD	Maximum Permissible Discharge
RSE	Republican State Enterprise
KR	Kyrgyz Republic
RRD	Republican Regulatory Document
SanRS	Sanitary Rules and Standards
CRS	Construction Rules and Standards
CP	Code of Practice
TS	Technical Specifications
CA	Central Asia

## **INTRODUCTION**

Under present-day conditions, water is the main factor that determines economic sustainability of any country. Depletion of mineral raw resources is the matter of more or less distant future; water is a different issue, day by day its deficit becomes more sensible. Given the growing population - by the end of quarter of century XXI, the population in the region is assumed to double - and under the existing management conditions the task of water supply to the industries is of special topicality and urgency.

From everlasting, water has played an exclusively important role in Central Asia supporting the life, well-being, and enabled the supply of food and livelihoods.

Water is the most significant component of natural environment and is a renewable yet vulnerable natural resource. Water ensures life activities of a human being, his economic, social and environmental welfare, the existence of flora and fauna as well as the country's interests in the field of international and national water policy.

For centuries water problems of Central Asia traditionally represented an essential factor of various processes inside the region. They remain relevant nowadays. For the population of Central Asia water and water distribution have been and are among the main tools that maintain relationships between the countries.

The problems of Central Asia pertaining to the rational use and management of water resources are determined mainly by the deficit of water. The region has considerable water reserves. Serious problems, however, arise from the environmentally unsound irrigation techniques, shortcomings of waterworks facilities management system and pollution of water bodies. Specific water consumption rates in the populated areas and water consumption per a production unit in CA many times exceed those existing in the other countries. The ministries work on

developing the concepts assuming the increase of water consumption within the region.

Water resources of the region are mainly used in agriculture, primarily for irrigation purposes (80-90%). The area of irrigated lands in the region contains 7.95 million ha. But due to low efficiency of most of waterworks facilities losses of water are huge and irrecoverable. The result is the reduction of water consumption in the lower reaches of the rivers, drying up of deltas of many water bodies of the region, the Aral Sea above all.

Water resources of the region show the trend of water quality degradation and increase of volumes of fresh water consumption. The degradation of water quality resulting from the discharge of collector and drainage waters affect the health of people who use water from rivers for drinking water supply.

A positive starting point to build the new international relationships in the field of consumption, restoration and protection of water resources was Dublin Conference (1992) to adopt the Statement of Water Resources and Sustainable Development. Dublin Principles have retained their relevance up to now and serve a basis to develop water resources management policy all over the world. Some of them are provided here below:

- Fresh water is the final and vulnerable resource that plays a crucial role to sustain the life, ensure the development and conservation of natural environment;

- Water resources development and management should be based on an approach that assumes a broad participation on all levels of the users and those responsible for planning and decision making;

- Water has an economic value in all competing forms of water use and needs to be viewed as an economic good.

Water bodies and their natural resources in CA countries are under steadily increasing load as a result of continuously growing demand for sufficient water of good quality required to cover various needs.

The impelling need of taking into account the governmental interests connected with the use and protection of water bodies as well as the aggravating problem of water pollution and degradation of ecosystems associated with water bodies, proves the necessity of creating and (or) strengthening the international legal, normative and institutional frameworks capable of setting the regime of sustainable use and protection of water bodies from both qualitative and quantitative perspective and the joint actions to ensure their good quality conditions.

The conditions of water bodies, the existing ways, methods and conditions of water use, the demand for water and a number of legal standards and requirements in the field of water consumption, specifically those pertaining to the transboundary water bodies are different across Central Asian countries and require specific decisions and measures to be focused on the sustainable water use.

The main goal of this report is to review the existing situation of water resources conditions, the management of water quality and consumption, the regulatory base supporting the governmental agencies authorized for such activities; to review the procedure, ways and methods of controlling water quality and monitoring its qualitative parameters. The report comprises Introduction, the body consisting of the main four sections, and recommendations and conclusions. The main sections provide an outlook of hydrographic features of the country; reviews the quantitative parameters of water resources; provides provisional assessments of the impact of climate change on the qualitative and quantitative parameters of water resources; describes the existing problems of international-use water bodies and waterworks facilities; reviews the legislative base and institutional frameworks of water resources management with reference to qualitative and quantitative parameters; views in detail the issues of rationing and quality assurance in respect of waters existing in the country. The report provides a detailed analysis of the existing quality control practices and monitoring process in respect of qualitative parameters on the basis of the effective standards and regulatory documents. Each section is supported by the relevant conclusions and recommendations.



# 1. HYDROGRAPHIC FEATURES

## 1.1. Water Resources of Kyrgyz Republic

Kyrgyzstan accommodates considerable reserves of water resources represented by the river flow, underground waters and waters accumulated in the glaciers and lakes. In a year of average water content the total water resources make 2458 km<sup>3</sup> including the surface river flow of 47,23 km<sup>3</sup> (the figures of average river flow for many years are different in different sources, varying from 44,509 to 51,9 km<sup>3</sup>), potential underground reserves of 13 km<sup>3</sup>, lakes — 1745 km<sup>3</sup> and glaciers — 650 km<sup>3</sup>.

**Glaciers:** There are 8208 glaciers in Kyrgyzstan; all of them are different in size. The glacierization area contains 8169,4 km<sup>2</sup> i.e. 4,2% of the country territory. The main centers of glacierization are located in the most easterly parts, in the basin of Sary-Dzhaz accommodating the largest valley glaciers, and in the southern part of the country in Zaalaisky Mountain Range. The fresh water reserves preserved in the mountain glaciers are estimated at 650 billion cubic meters i.e. more than 12 times in excess of the river flow of Kyrgyzstan.

The climate warming trends result in persistent intensive shrinkage of the area of glaciers. Glacierization is projected to reduce by 30-40% by the year of 2025 bringing about the decrease of water content by 25-35%.

**Lakes:** Kyrgyzstan has 1923 lakes covering 6836 square kilometers. The largest are Lake Issyk-Kul containing 6236 km<sup>2</sup>, Lake Son-Kul (275 km<sup>2</sup>), Lake Chatyr-Kul (175 km<sup>2</sup>).

**Rivers:** The longest rivers are Naryn (535 km), Chatkal (205 km) and Chu (221 km) making the annual flow of 5.83 m<sup>3</sup>. The flow of Talas and Assa amount to 2 km<sup>3</sup>. More than 3500 rivers found in Kyrgyzstan supply water to the neighboring countries, Kazakhstan, Uzbekistan, Tajikistan and Xinjiang Uygur Autonomous Region in China.

**Bogs:** The bogs occupy 0.5% of the territory in the places of groundwater occurrences (the basin of lakes Issyk-Kul, Son-Kul, river valleys of Chu, Talas, Naryn).

**Water Reservoirs:** There are 12 man-made reservoirs (exceeding 10 million m<sup>3</sup>) containing in total 378,2 km<sup>2</sup> and 23.41 km<sup>2</sup>.

Over the recent years Kyrgyzstan has been consuming about 8,0-9,0 km<sup>3</sup> per year for the in-house needs, primarily for irrigation; the remaining flow, except for the inland basin of lake Issyk-Kul, outflows to the neighboring countries exceeding 30,0 km<sup>3</sup> in a year of average water content.

## **2. KYRGYZ REPUBLIC WATER RESOURCES MANAGEMENT**

The main water protection requirements as stipulated by water legislation include prohibition of pollution, littering and depletion of waters; the obligations of rational use of water resources. Water legislation shall set up the responsibilities of water users and other enterprises and institutions to meet the main water protection requirements:

a) To envisage the construction of the buildings and facilities latin letters providing for efficient water treatment and protection of fish reserves when designing, locating, constructing and putting into operation the commercial and cultural and general facilities that may impact water conditions;

b) To continuously reduce irrational use of waters, establish low-waste or zero-waste water use systems and closed cycles;

c) To implement the activities focused on the improvement of water conditions, water protection from littering and depletion, building favorable habitat for flora and fauna;

d) To establish where necessary the sanitary, protection and water protection areas, zones, belts that prevent harmful impact of environment as well as economic and recreational activities on the conditions of water sources.

The legislation emphasizes the responsibility to protect the surface water catchment and riverbeds as well as the ice cover of water bodies and glaciers. Water protection shall be achieved by establishing the account, planning the use, regulating water use procedure, standard setting of the wastewaters discharge and prevention of harmful water impact.

Waters and water use record shall be the governmental objective and shall be carried out to establish the quantity and quality of waters, water use data connected with the public needs and national economy. The qualitative and quantitative parameters of waters, the use of waters and water use registration shall form water cadastre. In Kyrgyzstan there are several departments that maintain water cadastre: the bodies of hydrometeorology, water management, geology and environmental protection. Normally the data are consolidated by the bodies of hydrometeorology. The cadastre data serve the basis to develop water balances. Those are focused on the rational use and protection of waters and shall be the precondition for granting, amendment or cancellation

of water use permits, for making, amending or annulment of agreements on water supply or disposal of sewage. In addition to water balances reflecting the availability and the use of waters within the basins and territorial areas, the arrangements of complex water use and protection are also envisaged. But due to the lack of funds said activities on arranging the complex water use have been suspended and practically stopped.

Before 2001 the right of water use in Kyrgyzstan was exercised under the licenses issued pursuant to the Regulation of Water Use Licensing as approved by the Government of Kyrgyz Republic. Said procedure existed before amendments to the Law of Kyrgyz Republic on Licensing dated 18 January 2001 whereby the licensing for water use has been abolished. Now the issue of reestablishment of the user licensing is under discussion. So, Water Code provides for the system of water use permits.

The basin authorities objectively reflect the interests of all water users acting in the capacity of the basin representative water management and protection body and performing the control and regulation functions. On the basin level it is important to broadly represent public interests, involve public in the feasible projects and programs of sanitary improvement, conservation of natural water bodies and water courses, and establishment of sustainable water supply systems.

The basin integrated management principle was not properly developed in the country. The departmental disunity of the water management system, the lack of a unified management body in the river basins with sufficient authorities hamper the efficient resolution of the tasks of complex use and protection of water resources in the river basins. The river basins have not yet been made the subject of planning and integrated management of the use and protection of water resources.

Key water management link shall be represented by the industrial pattern of basin management. Its goal is to supply water to public and industries of good quality and adequate quantities.

The most efficient functioning of the basin authorities may be within the basin of a large watercourse or a group of small river basins to be integrated based on the territorial principle.

The basin authorities should have under jurisdiction the relevant water sources, the facilities regulating the river flow, water protection facilities, large water inlet structures and pump stations, the main water pipelines etc.

Water management system shall be based on the economic methods. Above all, they envision the use fee in respect of surface and ground waters, wastewater discharge and the ultimate transition of basin authorities to the economic operation principles.

In the river basins it is essential to identify key water management requirements of industries (water consumers and users) including hydraulic power industry, fishery, agriculture and transport etc. In view of the changes of water use nature (reuse, consumptive use etc.), the forecast of water resources quality needs to be provided with due regard to all water management activities to be planned; key activities need to be developed for the national action plan of water protection from pollution and depletion and cleaning and sanitation of sewage; the priority areas need to be identified for water saving policy and the action plan needs to be prepared for reduction of water consumption by the industries and rehabilitation of sustainability of the river ecosystems.

## **2.1. Legislative Base**

To date water fund management of Kyrgyzstan is built on the sectoral principle whereby the functions and responsibilities in the field of water relations are segregated between various ministries and departments. The main state policy principles pertaining to the use and protection of water resources are set out in articles 4, 9, 12, 19, 35, 38 of the Constitution of Kyrgyz Republic, Water Code (2005) and the Law on Environmental Protection (1999). Certain aspects of water relations are also regulated by the special effective laws including the law on licensing; the law on tariffs for water supply services; the law on drinking water; the law on subsoil reserves; the Land Code, the Law on WUA etc.

The rights and responsibilities of the participants of water relations are regulated by the civil, administrative and criminal laws of Kyrgyz Republic, and segregation of functions, rights and responsibilities pertaining to water relations between various government authorities is set out in the relevant Regulations of such authorities as approved by the Government of Kyrgyz Republic.

From 1991 Kyrgyzstan has been implementing the reform of legislative system to ensure the executive market-oriented base for environmental improvement.

About 150 laws and bylaws are effective in Kyrgyzstan to regulate the legal relations in the field of environmental protection and rational use of natural resources.

The main normative and legal base in the field of environmental protection has been developed in the period between 1997 and 2001. The analysis has been made of the previous legal instruments and the new documents have been developed including the Concept of Environmental Safety (1997), The Strategy of Sustainable Human

Development (1997) along with a number of laws that have been adopted including the Law on Environmental Protection (1999), the Law on Protection of Atmospheric Air (1999), the Law on Environmental Appraisal (1999), the Law on Biospheric Territories of Kyrgyz Republic (1999), the Law on Fauna (1999), the Law on Production and Consumption Wastes (2001) and the Law on Protection and Use of Flora (2010 etc.

The main regulatory-legal base in the field of environmental protection is in place. The Ministry of Ecology and Emergency Situations of Kyrgyz Republic is working to improve and harmonize the legislative base in line with the requirements of international treaties. The guidelines and procedures have been developed to establish pollution fees. The document was approved by Governmental Decree dated 10 November 2004 ref. No.823 and put into force from the date of signature.

The guidelines and procedures have also been developed for small and medium-size businesses to prepare the environmental passports. The Regulation of the Ministry of Ecology and Emergency Situations concerning the Supernumerary Public Inspectors on Environmental Protection was put in place along with the Guidelines and Procedures on the Execution and Content of the Draft Standards of Maximum Permissible Emissions (MPE) for Industries.

The purpose of Water Code was to establish a unified legal base regulating water relations in the area of use and protection of water resources for the purposes of guaranteed and adequate supply of good quality water to public and industries. The Code has incorporated the majority of split legal rules into one logically bracketed text. At the same time, the Code is aimed at setting the balance between water resources protection pursuant to paragraph 2 article 4 of KR Constitution and the continuously growing economic activities of legal entities and individuals.

Water Code reflects the hydraulic cycle of natural water circulation. Total water concentrated on the surface of the earth or underground, in glaciers, snowfields, in the rivers and courses, when flowing out, through or infiltrating through such systems, shall be and is seen in Water Code as part of one and the same resource.

The state body responsible for water resources management and implementation of Water Code is the State Water Commission which competences are described in detail. The competences of the other government authorities related to the regulation of water use and protection of water resources are also clearly detailed.

One of the primary goals of Water Code is to establish the official mechanisms of coordination and information sharing between

the related parties. To this end, Water Code provides for the establishment of the National Water Council. The management of water resources use and protection shall be on the basis of the main basin of the hydrographic territory to be established by the national government on the suggestion of the National Water Council. The basin council to be established for each main basin (river of Lake Issyk-Kul) shall coordinate water sector activities on the level of the main basin. The Basin Council's activities shall be coordinated by the Regulation to be approved by the National Government.

For the first time ever in the history of water legislation of Kyrgyzstan, Water Code provides for the minimal ecological river flow. This requirement is set out in Article 64 as follows: «Based on the agreed proposals of the authorized governmental agency for environmental protection and the State Water Authorities, the Government shall set out the minimal requirements of ecological water flow for certain rivers and water bodies in order to conserve fish reserves and water ecosystems».

Water Code shall provide for the establishment of the consultative National Commission of Dyke Safety and the consultative commissions for irrigation and drainage on the national, basin and district levels to identify the technical conditions of irrigation systems.

Following the world experiences of water resources management, the Code includes the provisions to establish the system of water use permits. The establishment of such permit system was necessitated by the unreasoned and premature abolishment of water use licensing pursuant to the Law on Amendments to the Law on Licensing as adopted in January 2001. Efficient water resources management is ensured by the system of various regulatory mechanisms of which the main one is to identify the activities that may be implemented under water use permits to be issued pursuant to the terms and conditions of Water Code. The terms and conditions of the permit system are detailed in Water Code; they establish long-term water use guaranteed rights and responsibilities of the permit holders. Such terms and provisions are focused on the efficient use of water resources in line with the requirements of environmental protection. They diminish the corruption associated with water apportioning and rural poverty and enhance the opportunities of guaranteed irrigation water supply and increase in crop productivity.

Water Code provides for public involvement in the decision-making to manage the use and protection of water resources and grants the

access to the relevant information through the registration system of water rights.

The Code reflects the scope of authority of Zhogorku Kenesh of Kyrgyzstan, the Government and the other governmental agencies managing water resources in view of expansion of their powers as provided for in the new edition of the Constitution. The sphere of interstate use of water resources is not detailed in Water Code as long as such issues are to be regulated by the bilateral and multilateral interstate treaties and agreements and the other rules of international water law as acknowledged by Kyrgyz Republic.

## **2.2. International Cooperation**

All large rivers of Central Asia shall be interstate and such status shall define the parties' international and legal relationships subject to specific conditions of the shared use of water resources. In this connection, a development of water-use efficient legal mechanism of cooperation and strengthening its institutional frameworks enabling to pursue the consistent policy of water resources management within the region, to ensure equal access to good quality water and sustainable water use are viewed as the regional priority task.

The effective limits of water apportioning between the countries of Central-Asian region have been developed in 1975-80 based on the Arrangements of Complex Use and Protection of Water Resources compiled for all water basins. The appraisal of potential water reserves was based on the estimated river flow of 90% water supply available including the ground and return waters. The distribution of water resources was based primarily on the principle of equal water supply of the existing irrigated lands with due account of water supply to domestic needs based on the number of population. Water distribution limits for the 4 CA countries have been estimated based on the land fund in view of prospective development and the scientifically justified irrigation conditions for agricultural crops. The share (quota) allocated for each country was established as a percentage of estimated reserves and the volumes of water apportioning have been adjusted on a regular basis subject to the actual water supply.

In February 1992, the heads of water management agencies of five CA countries have come to an agreement that water apportioning «shall be based on the existing water use» i.e. the previous water apportioning quotas shall be preserved. This decision was confirmed by the heads of states at Nukus Summit held in September 1995 and

Kyzylorda Summit held in April 1996, subject to provision «pending the approval of the regional water strategy».

The main bilateral and multilateral treaties in respect of transboundary waters in CA region are provided in Table 1.

**Table 1. Bilateral and Multilateral Treaties in Respect of Transboundary Waters in CA Region**

	<b>Treaty</b>	<b>Signatory Countries and/or Parties to the Treaty</b>
1	Agreement between the Republic of Kazakhstan, Kyrgyz Republic, Republic of Uzbekistan, Republic of Tajikistan and Turkmenistan On Cooperation in the Sphere of Shared Management of Use and Protection of Water Resources of International Sources	Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan and Turkmenistan
2	Charter of Basin Water Management Association «Amudarya»	Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan and Turkmenistan
3	Charter of Basin Water Management Association «Syrdarya»	Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan and Turkmenistan
4	Agreement between the Government of the Republic of Kazakhstan and the Government of Kyrgyz Republic on the Use of Waterworks Facilities of Interstate Use on the Rivers of Chu and Talas	Kazakhstan, Kyrgyzstan
5	Resolution of Heads of Central Asian Countries Concerning Key Areas of the Program of Specific Actions to Improve the Environmental and Socio-Economic Situation in the Aral Sea Basin for the period of 2003-2010	Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan and Turkmenistan



On interdepartmental level, starting from 1996, Kyrgyzstan and Kazakhstan make annual decisions on Kazakhstan's share participation in the operation of waterworks facilities in the basins of Chu, Talas under the Protocols setting out the required work scope to repair the waterworks facilities in the basins. For the period of cooperation Kazakhstan has accomplished the works on the waterworks facilities of Kyrgyzstan for the amount exceeding 112 million soms.

### **2.3. Institutional Frameworks of Management, Government Authorities and Structures**

The management system in the field of use and protection of water resources includes a large number of ministries, departments and agencies. The system is very complex and extremely decentralized thus raising difficulties in the system formation and development of management. It's complexity is seen in uneven hierarchy of water management which aggravates the traditional deficiencies such as duplication or gaps in the functions to be implemented by the ministries and departments.

The state control over water use and protection is provided by both the local authorities and special authorized state bodies.

The Ministry of Emergency Situations shall be assigned a number of functions to manage and control the protection and rational use of waters. In addition, the Ministry of Agriculture, Water and Processing Industry is in the list of special authorized bodies to control the use and protection of waters. A number of functions to enforce the requirements of water protection and protection zones of water sources; sanitary-hygienic standards and MPC of water pollutants are assigned to the Ministry of Health. MoH shall establish the limits of permissible pollution, the necessary measures of sanitary protection of sources and drinking water supply facilities.

The bodies of sanitary supervision of the Ministry of Health shall establish the standards of maximum permissible concentrations (MPC) of harmful substances, take part in the approval of permit issuance for special water use including the discharge of waste waters, expertise the allocation and construction of the projects affecting water conditions, take part in the acceptance of accomplished construction projects, bring to administrative responsibility for the violation of sanitary standards and rules of water sources protection.

In Kyrgyzstan the body to manage and dispose of water resources is the Ministry of Agriculture, Waters and Processing Industry (represented by the Department of Water with its territorial divisions in all

districts and provinces). The body to control the protection of water resources is the State Agency of Environmental Protection and Forestry with its provincial subdivisions of control. Hydrometeorological Service under the jurisdiction of the Ministry of Emergency Situations makes observations where possible of water pollution and its consequences in the lakes, rivers, reservoirs and other water bodies and provides the necessary information to the related ministries and departments.

The geological bodies of subsoil reserves protection issue hydro-geological opinions for water well drilling to the water users; approve water use conditions for the use of ground waters; approve the location of construction designs and projects that may be the sources of water pollution and the designs of disposal sites for the underground burial of wastewaters; approve the designs of location of the observation network at water inlets; investigate the quality of ground waters including at the locations of construction projects being the sources of water pollution and provide the related parties with the information on the conditions and level of ground water pollution and projections of changes in the level of pollution under the influence of economic activities.

The economic mechanism of water use, which is based on the compensation of costs by water user entities (agriculture, industries etc.) for water supply services and on water use fees, plays a significant role in the rational use and protection of water resources. The existing water payment system and the level of fees are still inadequate to cover the actual cost and do not stimulate the rational attitude to water and water saving practices. Under the market conditions where economic mechanisms play the main role, water use efficiency and water saving indicators will overwhelmingly depend upon the fees for water resources and water use, and economic mechanisms of water saving and efficient water use will prevail.

In spite of the organizational and structural reforms, water economy and water resources management are still determined by economic interests with no regard to the social and ecological factors envisioning the economically sound rational water use. The existing organizational structure of water management does not yet address the problems of water quality conservation in water sources, the rational use and regeneration of water resources. The involvement of multiple departments in addressing the problems of water resources management, water protection and water supply do not ensure economic responsibility for water use outcomes.

Water resources management as such makes no reckoning of specific peculiarities of water resources such as spatial interdependence, the absence of local borders, variability of flow with time.

The existing water sector management structure is provided here below.

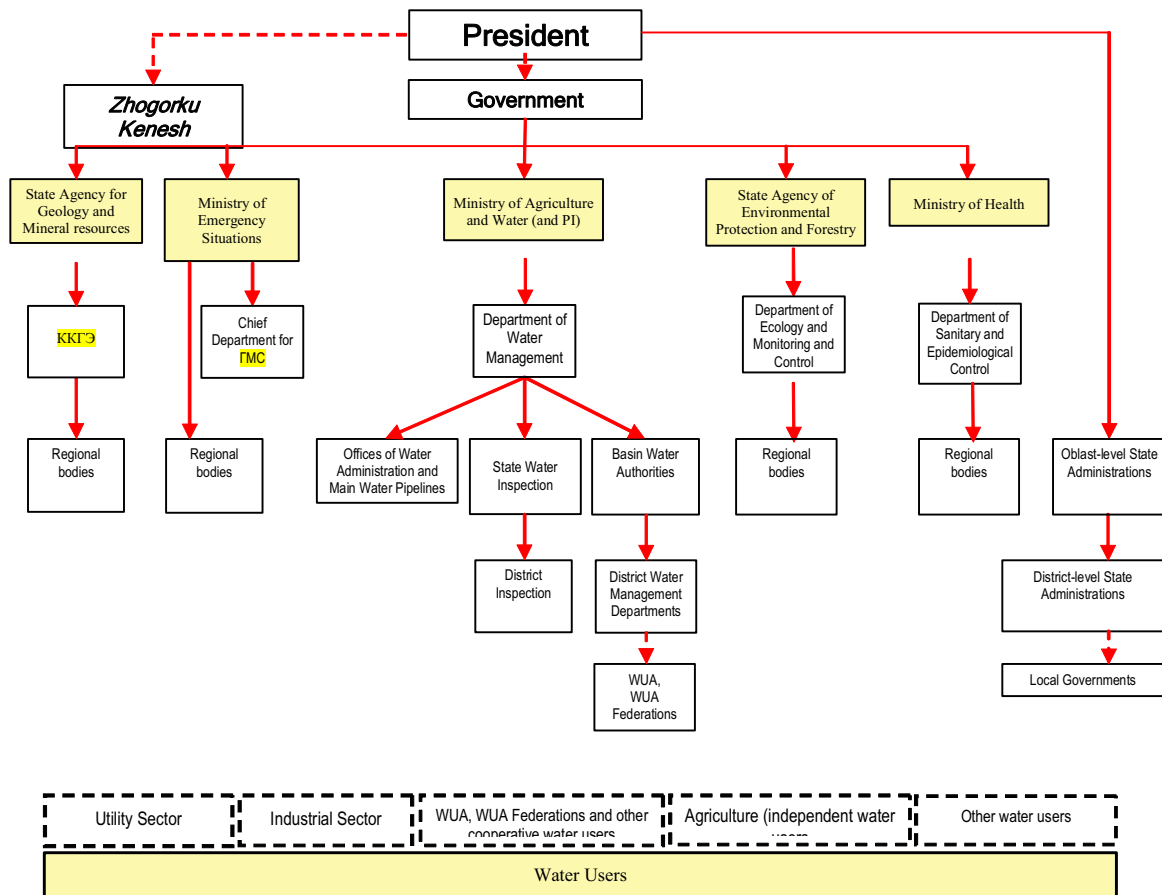


Figure 1: Effective Water Sector Management Structure of Kyrgyz Republic

## 2.4. Types of Water Use and Water Users

Pursuant to Article 21 of Water Code, the use of water resources shall include as follows:

- Water intake from the surface or ground water bodies;
- Transportation of water withdrawn to supply to other parties;
- The use of water for drinking and utility purposes;
- The use of water for irrigation of household plots;
- The use of water for irrigation and cattle watering;
- The use of waste waters for irrigation;
- The use of water for electric power generation;
- The use of water for industrial and agri-industrial purposes;
- The use of water for fishing and fish farming;

- The use of water for sports and health improvement purposes;
- Water ponding and accumulation downstream of dykes or other waterworks facilities;
- Diversion, restriction or changing the flow of water body;
- Changing the bottom, floodplain, banks, stream or other parameters of water body including extraction of gravel and other materials from such water bodies;
- The use of water for washing saline soils.

Water Users shall:

- Use water sparingly avoiding pollution;
- Meet the conditions and obligations as established by water use rights including all the terms and conditions of this Code and those contained in the water use permit, special water use permit or water supply contract;
- Respect the rights of the other eligible users.

Water users shall have the rights as follows:

- To use water in compliance with Water Code provisions;
- To participate in the decision-making concerning water resources management;
- To compensation in the cases where their water use rights have been restricted or canceled as per the provisions contained in this Code;
- To information about the quality, quantity and use of water resources pursuant to the provisions of this Code;
- To use water bodies for recreation, tourism, sports and health-improvement activities.

As per Water Code, the use of water resources may be within or without water use permit (Articles 22-23).

### **3. STANDARD SETTING AND ASSURANCE OF WATER QUALITY**

Water quality standard setting involves the establishment of a set of permissible values for a water body in respect of the parameters of water composition and properties in which limits good health of people, favorable water use conditions and ecological well-being of the water body are ensured.

To ensure protection of waters a system of measures needs to be identified that would include as follows:

- 1) To set water quality standards for a water body;
- 2) To regulate the discharge of rated substances based on the conditions of adherence to the water quality standards at the control stations of water bodies and water courses or prevent from degradation of water composition or properties where the standards are exceeded;
- 3) To regulate various types of economic activities that impact the condition of waters;
- 4) To plan, develop and implement water protection activities that ensure the observance of the established discharge rates of the pollutants and water protection requirements in respect of various types of economic activities, gradual reduction of the quantity of pollutants up to the full stop of discharge into water bodies;
- 5) To establish coastal water protection belts and exclusion forest belts protecting the breeding sites of valuable fish species;
- 6) To appraise the new equipment, technologies, materials and substances as well as construction (reconstruction) projects of the enterprises and other facilities;
- 7) To develop and implement the activities on prevention and liquidation of water bodies pollution resulting from the major or emergency discharge of pollutants.
- 8) To control the observance of the discharge of regulated substances as established and the fulfillment of water protection requirements as applied to various economic activities;
- 9) To control water composition and properties of water courses and water bodies;
- 10) To account, generalize and process the information pertaining to protection and use of water resources for the purposes of water quality management and regulation of the use of water resources;
- 11) To hold liable for non-observance of the requirements and rules of protection of water bodies.

All the measures focused on water resources protection are for the purposes of the primary satisfaction of domestic-drinking and utility needs of the population.

Water users on the basis of the established discharge conditions of rated substances and the requirements as set in respect of various types of economic activities need to ensure the development and implementation of water management activities, departmental control over the use and protection of waters, need to undertake the measures to prevent and liquidate the pollution of water bodies as a result of major or emergency discharge.

State control is one of the crucial steps focused on the observance of water quality standards. The State control over the observance of water quality requirements shall be by the state authorized bodies within the limits of their competence and in the procedure as established by the laws of Kyrgyzstan.

Water protection laws also set the requirements of the surface waters protection that are incorporated in the standards, departmental regulatory and working documents.

### **3.1. Water Quality**

The existing system of standards has the main two elements as follows:

- Environmental standards as expressed in maximum permissible concentrations (MPC) to be determined as the concentration of substances in water which exceedance makes water unusable in respect of one or several water use categories; and
- Discharge standards that are expressed in maximum permissible discharge (MPD). It is the maximal mass of the substance contained in waste waters which may be discharged on an approved basis at a certain place of a water body in a certain period of time, to ensure the adherence to water quality standards at the points of monitoring.

The ingredients to be determined through the monitoring of surface waters shall include as follows: dissolved oxygen, BOD<sub>5</sub>, nitrogen ammonia, nitrites, nitrates, oil products, phenols, synthetic surfactants, Fe(+3), Cu, Zn, F, DDT, Ca, Mg, SO<sub>4</sub>, Cl, mineralization, Cr<sup>3+</sup>, Cr<sup>6+</sup> hexochlorane.

Water quality standards for water bodies shall include as follows:

- General requirements as applied to water composition and properties of water courses and water bodies for various types of water use;

- The list of maximum permissible concentrations (MPC) of rated substances in water bodies to be used for household-drinking and utility needs of public;
- The list of maximum permissible concentrations (MPC) of rated substances in water bodies to be used for fishery purposes;

The lists of rated substances and their MPC in water bodies to be used for household-drinking and utility needs of public shall be established by the Ministry of Health of Kyrgyz Republic; as far as the water bodies used for fishery purposes are concerned, the relevant lists are to be established by the State Committee for Nature Protection of Kyrgyz Republic. Said lists, as developed and clarified, are published in the form of annex hereto.

The methodologies of analysis (determination) in respect of the substances contained in surface and waste waters shall be developed by the competent authorities and approved and recommended for use by, respectively, the bodies of sanitary-epidemiological supervision and environmental protection of Kyrgyz Republic.

### **3.2. Water Classification Based on Integral Quality Parameters**

For the purposes of a unified criteria basis of water protection in Kyrgyzstan and provision of environmental well-being of water bodies, as per Decree of the Cabinet of Ministers of Kyrgyz Republic Concerning the Assignment of Water Bodies to Various Water Use Categories, all water bodies existing in the country are divided in 3 water use categories; household and drinking, utility and fishery.

The system of water use classification is the basis of setting water quality standards. Almost all waters in Kyrgyzstan are designed for fishing use, the categories subject to the most stringent rules.

- The household and drinking water use shall include the use of water bodies or parts of them as the source of household and drinking water supply and water supply to food processing industries.

- The utility water use shall include the use of water bodies for public swimming, sports and recreation. Water quality requirements as established for the utility water use shall apply to all sections of water bodies located within the boundaries of populated areas irrespective of the type of use.

- Fishery water use shall include the use of water bodies for dwelling, reproduction and migration of fish and other aquatic life.

The fishery water bodies or their parts may refer to one of the three categories as listed below:

- The prime category shall include the breeding grounds, nursery grounds and wintering basins of significant fish species and other harvested aquatic species, and protection zones of any types of farms for artificial breeding and farming of fish and other aquatic animals;
- The first category shall include the water bodies used for conservation and propagation of significant fish species highly sensible to the content of oxygen;
- The second category shall include the water bodies used for other fishery purposes.

### **Water Pollution Index**

Water pollution index (WPI) is used for integral water quality assessment in Kyrgyzstan. WPI is calculated as the arithmetic mean of the fraction figures of efficiency ratio of six hydro-chemical parameters: the content of dissolved oxygen, biological oxygen demand and four pollutants with the highest concentrations in relation to the normative value. According to the classification acceptable in Kyrgyzstan the surface water bodies shall be divided in 7 classes:

I — very clean (WPI < 0.3)

II — clean (WPI ranges from 0.31 to 1.0)

III — moderately polluted (WPI ranges from 1.1 to 2.5)

IV — polluted (WPI ranges from 2.51 to 4.0)

V — dirty (WPI ranges from 4.1 to 6.0)

VI — highly dirty (WPI ranges from 6.1 to 10.0)

VII — extremely dirty (WPI > 10.0)

### **3.3. Legislative Base**

In Kyrgyzstan, water quality standard setting is regulated by a number of laws, bylaws, GOST's and SanRS.

The main law focused on the conservation of environmental quality as a whole is the Constitution of Kyrgyz Republic. It is stated in Article 35: «Citizens of Kyrgyz Republic shall have the right of favorable for living and health natural environment and to indemnity as a result of damage inflicted to health and property by the actions related to the use of natural resources». Along with the right of favorable natural environment the Constitution obliges each citizen to behave friendly to the natural environment: «Environmental friendliness to the natural



environment, natural resources and historical monuments shall be the sacred duty of each citizen».

Pursuant to Water Code the National Water Council at the suggestion of the State Water Administration subject to approval by the authorized state sanitary-epidemiological body and state body on environmental protection shall organize the development of water classification with regard to the quality and type of use for each water body.

The authorized state body on environmental protection shall, at the suggestion of the authorized state sanitary-epidemiological body, set up water quality standards for each water body falling under the existing water classification.

Based on the agreed suggestions of the authorized state body of environmental protection and the State Water Administration the Government shall establish the minimal requirements of environmental water flow for certain rivers and water bodies for the purpose of protecting fish reserves and water ecosystems.

The Rules of Protection of Surface Waters of Kyrgyz Republic as adopted in 1993 году have been developed in line with the environmental and water laws of Kyrgyz Republic, the Law on Public Sanitary-Epidemiological Well-being, Regulation on Protection of Fish Reserves and Regulation of Fishery in the Water Bodies of Kyrgyz Republic. The Rules shall regulate the discharge of all waste waters into water courses and water bodies including domestic, industrial, rainfall and snow-melt waters, road washings, waters of buildup areas, discharge waters of ameliorative systems, drain and mine waters and the other wastewaters. The Rules shall also regulate various types of economic activities including water engineering that cause or may cause an adverse impact on the surface waters. The Rules shall apply to all water courses and water bodies including lakes and reservoirs.

The Sanitary Rules and Standards of Surface Waters Protection from Pollution (SanRS 4630-88) are aimed at prevention and liquidation of the existing pollution of water bodies that may cause pollution of household and drinking waters, infectious and parasitic diseases spread by water and violations of recreation conditions as a result of offensive odor, stains, foams and films in the water.

Below are the hygienic standards as approved by the Decree of Chief State Sanitary Officer and registered with the Ministry of Justice:

- Maximum Permissible Concentrations (MPC) for Chemical Substances in Waters of Household and Drinking, Cultural and General Water Bodies;

- Approximate Permissible Levels (APL) for Chemical Substances in Waters of Household and Drinking, Cultural and General Water Bodies;
- Maximum Permissible Concentrations (MPC) for Chemical Substances in Waters of Household and Drinking, Cultural and General Water Bodies in the Areas of Protective Activities of the Chemical Weapon Storage and Destruction Sites.

Surface waters monitoring is subject to 15 GOST's and regulatory documents.

### **3.4. State Bodies and Agencies to Ensure Water Control and Safety**

- Setting the standards of maximum permissible discharge (MPD) for wastewater discharge in water bodies at the permits;
- State control over the terms and conditions as established by the discharge permits and adherence to water and environmental laws;
- Monitoring of operational efficiency of treatment plants and observance of established MPD as well as qualitative conditions of water bodies.

The legal basis of the regulatory approval system, state control and monitoring of water fund shall be the Water Code, the Law on Environmental Protection, the Law on Water, Regulation Concerning Water Fund Monitoring in Kyrgyz Republic as approved by Decree of the Government of Kyrgyz Republic dated 25 January 1995 ref. No.19, Regulation Concerning State Account and Control of Water Use, the State Water Cadastre and the regulations concerning state authorities involved in water resources management.

## **4. WATER QUALITY MANAGEMENT**

Water quality management in Kyrgyz Republic is regulated by state standards that have been adopted in the soviet period; some standards have been put in effect in the period of independence.

GOST 17.1.3.07-82 The Rules of Water Quality Control of Water Bodies and Water Courses as effective from 1982

GOST P 51592-2000 Water: General Sampling Requirements as effective as GOST of Kyrgyz Republic from 01.01.2003 ref. No.34-CT dated 28.05.02

In addition to the GOST's as mentioned above, the Instruction of Sampling for Wastewater Testing BH 33-5,3,01-85 is in effect that has been developed and approved by the Ministry Amelioration and Water Management of the USSR in 1985.

### **4.1. Organization and Methods of Water Quality Control**

Surface water monitoring is performed for 10 rivers, samples are taken maximum 4 times a year. Hydro-chemical network has reduced more than 5 times. From the year of 1992 monitoring has been performed for 54 water bodies.

The main indicators of control are normally the consumption and quantity of waters as well as water quality parameters in terms of the major pollution components. The additional parameters may be the velocity, temperature, hardness, micro-components which control is foreseen by the standards for drinking and mineral waters etc. Specific parameters may include the content of dissolved gases, pesticides, radionuclides, oil products etc. The composition of additional and specific parameters defining the conditions of water fund shall be set out by the standards of Kyrgyz Republic in view of the requirements established by the international treaties and conventions.

The monitoring is performed on both the national and territorial levels. On the territorial level the information is collected, exposed to primary processing, stored and provided to related parties upon request. On the national level the information is consolidated, stored in a systematized form on the basis of the consolidated data bank and published. The diagnosis and projection functions as well as state supervision functions in respect to the conditions and use of water fund are performed on the national level. The organizational and

regulatory-methodological provision of the water fund monitoring is also tackled on the national level.

## **4.2. Monitoring of Quality Parameters**

GOST P 51592-2000 Water: The General Sampling Requirements shall apply to any types of waters and set out the general requirements of sampling, transport and preparation for storage of water samples designed for determination of water composition and properties.

Subject to the purpose and subject of research the program of research shall be developed and, where necessary, the statistics data processing shall be performed on water samples. The structure and content depend upon the subject of research under GOST 17.1.5.05, GOST 17.1.3.08.

### **Sampling Methods**

The sampling method shall be selected based on the type of water, depth of sampling, purpose of research and the list of parameters to be determined so as to exclude (minimize) potential variations of the parameter to be determined by sampling.

Sampling procedure in respect of surface waters shall be guided by the GOST standards as listed below:

- GOST 17.1.5.05-85 Nature Protection. Hydrosphere. General provisions of sampling surface and sea waters, ice and atmospheric precipitation
- GOST 17.1.5.01-80 Nature Protection. Hydrosphere. General provisions of sampling benthic sediments of water bodies for pollution analysis
- GOST 17.1.5.04-81 Nature Protection. Hydrosphere. Samples and equipment for sampling, primary processing and storage of samples of natural waters. General Specifications.

### **Monitoring Parameters, Sites and Frequency**

#### **Sampling Sites**

- *Quality control of water in water bodies and water courses*

As per GOST 17.1.3.07-82, quality control stations in respect of water bodies and water courses shall be divided in 4 categories. The station category and its location shall be determined according to the established procedure subject to economic purpose of the water body, water quality, size and capacity of the body, size and water content of the watercourse and the other factors.

When performing control of a water body at least three dam sites shall be established and, where possible, evenly distributed across water area adjusted for the coastline pattern.

The control stations shall include one or more dam sites. The dam sites shall be established in view of hydrometeorological and morphometric features of a water body, the location of pollution sources, the volume and composition of wastewaters discharged, water users' interests subject to the rules of surface waters protection from pollution.

One dam site shall be established on watercourses wanting the organized wastewaters discharge in the outfalls of polluted tributaries, at non-polluted sections, pre-dam river sections and the closing sections of the rivers.

Where there are several branches on the watercourse, the dam sites shall be established on those where the largest water consumption and violations of water quality standards are observed.

Systematic monitoring of surface water pollution is limited to Chu Oblast only. The details of surface water control stations are provided in Table 1.

- *Wastewater discharge into water bodies*

In accordance with the Rules of Surface Water Protection, the sampling sites, frequency of sampling and the list of parameters controlled shall be established by the bodies of environmental protection and specified in the permits of special water use (use of natural resources).

The sampling sites and sampling frequency shall be in line with the research program depending on the water body.

Control dam sites shall be established according to the Rules of Surface Water Protection for wastewater discharge subject to water use category. When it comes to the discharge of wastewaters or other economic activities affecting the conditions of water bodies used for drinking-household and utility purposes, the standards of water quality in respect of water bodies or watercourses or their natural composition and properties in case of exceedance of such standards shall be maintained in water courses at the sections 1 km upstream to the nearest water use location (water inlet for household and drinking purposes, bathing sites, the places of organized tourism, populated area etc.), and in water bodies such standards need to be maintained on aquatic area within 1km range from the water use location.

When it comes to the discharge of wastewaters or other economic activities affecting the conditions of fishery water bodies and watercourses, the standards of water quality in respect of water bodies

or watercourses or their natural composition and properties, in case of exceedance of such standards, shall be maintained within the entire fishery section, starting from control dam site to be identified by the bodies on environmental protection on a case-by-case basis but not more than 500m from the discharge point or the location of other pollution sources affecting water quality (the sites of mining operations, works on a water body etc.).

At the control dam sites and points of discharge the bodies of environmental protection shall control the observance of standards as established for discharge and wastewater impact on the water bodies.

The sampling stations shall be established at the control dam sites and water disposal systems including outside of the enterprises and shall be accessible for controlling bodies.

### **Control Program and Frequency**

The list of quality parameters to be determined for a water body or watercourse shall be established by GOST 17.1.3.07-82 in view of as follows:

- Intended use of a water body or watercourse;
- Composition of wastewaters discharged;
- Demands of information users.

As per the provisions of the Regulation Concerning Water Fund Monitoring in Kyrgyz Republic, as approved by Governmental Decree dated 25 January 1995 ref. No.19 the controlled parameters of water fund shall be divided into:

- Key parameters to be observed on a regular basis at all monitoring stations;
- Additional parameters to be controlled at some monitoring stations with due regard to the peculiarities of specific sites;
- Specific parameters to be controlled at certain areas, facilities or observation stations.

As a rule, key parameters of control are the pressure of water-bearing formations, consumption and quantity of water as well as the parameters of water quality inclusive of the most important pollution components.

The additional parameters may include water velocity and temperature, hardness, micro-components to be controlled under the standards applying for drinking and mineral waters etc.

The specific parameters may include the content of dissolved gases, pesticides, radionuclides, oil products etc.

The list of additional and specific parameters showing the state of water fund shall be established by the standards of Kyrgyz Republic subject to the requirements of international conventions and treaties.

The frequency of control of hydrological and hydro-chemical parameters shall be established subject to the category of control stations.

In Kyrgyzstan the mandatory monitoring program shall be implemented in the main phases of hydrological regime, maximum 4 times a year at the established observation stations.

## **GENERAL CONCLUSIONS AND RECOMMENDATIONS**

### **Conclusions for Chapter 1**

Kyrgyzstan is the only Central Asian country which water resources are fully formed internally thus making its hydrological peculiarity and advantages. Kyrgyzstan has considerable water and hydro-energy resources that are the main of its assets. There exist 3,5 thousand rivers which water resources belong to the main seven basins, the Syrdarya, the Amudarya, the Chu, the Talas, the Ile, the Tarim, lake Issyk-Kul.

Kyrgyz Republic is located in the area of flow formation of the Central Asian water resources. So, the quality composition of the country's water resources is generated under the influence of natural factors and in the flow transit and dispersion - under the influence of anthropogenous factors. The quality of water in the rivers at the outlet from the flow formation zone basically meets the regulatory requirements applying for various types of water use. Further the degradation of water quality is connected with the discharge of waste and return waters from the fields into the rivers, practically without any treatment.

A considerable factor affecting the quality of water resources is the unregulated economic activity within the water protection zones and belts of the surface water bodies and unsatisfactory conditions of the sanitary protection zones of ground water deposits. Said factors determine the growing pollution of drinking water supply sources by toxic substances and pathogenic microorganisms.

The loss of efficiency of the use of water resources is a logical consequence of the social-economic crisis, weakened state control in

the course of market reforms and inadequate measures stimulating water-saving technologies to be implemented by economic entities and public water-saving behavior.

### **Conclusions for Chapter 2**

The main gaps of the existing water resources management system are as follows:

Key regulatory body, Department for Water Management (DWM), is subordinate to the Ministry of Agriculture, Water and Processing Industry of Kyrgyz Republic. In consequence, for many years DWM activities have not been focused on the needs of all categories of water users; instead the Department for Water Management has been serving the interests of irrigated land farming only, thus violating the basic principle of equality of rights between all water relations participants.

Despite the internationally recognized ideology based on hydrographic (basin) principle of water resources management whereby the ground, surface, return etc. waters are viewed as the organic whole, in Kyrgyzstan the management functions in the sphere of water relations are assigned to a number of national ministries and departments without any efficient coordination, with the duplication of authorities and the lack of specific scope of responsibilities for the final outcomes.

Unacceptable is the overlap of regulatory, control-inspective and administrative management functions and authorities assigned to the same officials and structural subdivisions of the national management authorities.

Excessive concentration of operational management and economic activities functions within the national management authorities lacking sufficient staff and resources in defiance of the principles of state policy focused on the decentralization of management decisions and gradual reduction of the government's participation in the sphere of entrepreneurship.

For many years the focus of activities of the national and local authorities has been made essentially on the sphere of water infrastructure. Inadequate attention has been paid to the strategic problems of water protection from pollution and depletion, regulation of the balance between demand and supply of water resources, stimulation of water saving and efficient use of water resources, development of market water use mechanisms, involvement of public and users of natural resources to address the above problems etc.

The prevalence of departmental interests over the national ones, typical of all the existing management system in respect of the use of



natural resources, determined by the lack of efficient motivation and specific sanctions against the officials of management authorities.

It is apparent that most of the gaps specified are subjective in nature and are determined by the inconsistent institutional reforms in the past period. In particular, the reforms have often been limited by mechanic merger of the management authorities, head cutting or formal replication of foreign management models adequate for the Western Europe environment without being tailored to the traditions and peculiarities of water relations in Central Asia including Kyrgyzstan.

### **Conclusions for Chapter 3**

The lack of long-term environmental policy and strategy to be adapted to the market conditions; the low institutional capacities as seen in weakness and disunity of the government authorities; inadequate legislative and regulatory base, inefficient use of economic tools and control levers including state control and enforcement measures, are the basis of a challenging situation existing within water sector.

Water Code adopted in Kyrgyz Republic in 2005 is still not implemented giving rise to the contradictions between Water Code and the Law on Water which has not been superseded by Water Code, duplication and contravention of functions assigned to the government authorities, the problems of classifying water bodies and the rates of maximum permissible concentrations (MPC), maximum permissible discharge (MPD) and water quality standards.

More importantly, the disunity and lack of interaction and coordination between the government authorities of water resources complicate information sharing on water resources between them.

The outcomes of inter-departmental interests and contradictions and inadequate state funding are that the state water cadastre is not maintained, the data base on water resources quality has practically been lost, the reporting data to be provided to the National Statistics Committee are incomplete as far as reports are provided by the major water users only.

### **Conclusions for Chapter 4**

#### **The Problem of Water Resources Monitoring**

The country is lacking a uniform monitoring system. In this connection, the consolidation of data collected by various monitoring services is complicated due to inadequate coordination between the government authorities and economic entities.

Due to the deficit of the national budget the activities of monitoring services are limited; the number of monitoring stations has reduced within the recent 15 years. It mainly concerns the hydro-chemical stations dealing with the quality observations of the surface water bodies. The surface waters monitoring was carried out for 10 rivers. The hydro-chemical network has reduced more than 5 times.

Technical conditions of the hydrological and hydro-chemical observation network at the trans-boundary rivers has considerably degraded for the recent years, and its degradation starts to be irrecoverable. Monitoring of Syrdarya basin has not been carried out from 1995 due to the lack of financing.

Inadequate or lack of information concerning some river basins and their qualitative conditions is one of the main reasons of inefficient transboundary cooperation.

### **The Problems of Water Quality Standardization**

Hygienic Standards of Water Quality of 2004 including for the household-drinking and utility water use, have not resolved the problem of quality standards for the surface water bodies as far as the Sanitary Rules and Standards of Surface Waters Protection from Pollution dated 1988 have not been abolished yet thus raising uncertainty in applying the standards of water quality for the household-drinking and utility water use. It also needs to be noted that the standards of maximum permissible concentrations for the water bodies of household-drinking and utility purposes are those adopted from MPC of the Russian Federation.

The rates of maximum permissible concentrations for fishery water bodies have not been revised yet due to the absence of certain institutes, methodologies and scientific capacities.

### **Transboundary Aspect**

The level of pollution of subsurface and ground water sources is estimated in different ways subject to geographical setting. Those are less polluted in the area of flow formation and are more polluted in the areas of intensive flow consumption. It is known that the major volume of natural river flow is generated in Kyrgyzstan, Tajikistan and Afghanistan, and the maximum consumption of water resources accounts for Kazakhstan, Uzbekistan and Turkmenistan. So, the highest anthropogenous impact on water courses comes to middle and lower reaches.

A serious problem for Central Asia is seen in the degraded system of monitoring in respect of water quality and quantity. Since disintegration of the Soviet Union, the technical conditions of hydrological

and hydro-chemical observation network at the trans-boundary rivers have degraded considerably. No account is maintained for the quantity and chemical composition of KDW.

The lack of unified monitoring system for water quality in Central Asian countries does not allow any reliable evaluation of the existing situation of the Transboundary water courses pollution.

The existing variations of approaches to water quality standardization in Central Asia, specifically, the potential transition of certain countries to ISO standards, may to a certain extent complicate the processes of agreed assessment of the quality of water resources.

Due to the existing situation the priority problem is seen in re-establishment of the number and technical conditions of the observation network. A special attention needs to be paid to the construction and fitting the stationary monitoring stations at the frontier dam sites of the trans-boundary rivers with modern equipment and communications facilities.

The legislative basis to address the above problems may be the Agreement of Cooperation in the Field of Environmental Monitoring between the members of Commonwealth of Independent States (CIS) that has been signed by all the 12 CIS countries. In Kyrgyzstan said Agreement was approved by Governmental Decree of 27 July 2001 ref. 78.

## **The General Conclusions**

Taking into account the above circumstances, the national regulation system of water relations needs to be radically improved. So, a set of reforms as stipulated in Water Code is rather broad; it will take a long term and considerable financial and other resources to implement them.

In this connection there is a need to implement a number of priority measures that do not assume considerable investments from the national budget but enable to more efficiently address the most pressing water problems in Kyrgyzstan.

The list of proposed priority steps is provided below:

- I. To establish an independent national body, the State Water Administration, on the basis of Department of Water Management (the measure of temporary assigning SWA responsibilities to DWM is short-term and this point needs to be finally regulated). This will enable as follows.
- II. To establish the national and basin water councils.
- III. To establish the national, basin and district commissions for irrigation and drainage.
- IV. To establish the Commission for Dyke Safety Assurance.

V. To strengthen the state supervision of the conditions and use of water resources.

VI. To strengthen economic potential of water relations, water management and water protection activities.

The priority problems of water resources and water use management system shall include as follows:

- Deficiency of the national water policy
- Underdeveloped organizational environment and sectoral disunity of the management system
- Inefficient mechanisms of enforcement of the existing water legislation
- Limited application of the modern management tools
- Disregard of ecosystem limitations within water management activities
- Weakness of civil society and NGO's
- Inadequate responsibility for the operation of water infrastructure
- Underdeveloped national information system
- Management problems faced by the trans-boundary water bodies and international cooperation

## **Recommendations**

- 1) To revise on the national level the bylaws in the field of water resources protection and bring them in conformity with the Water Code of Kyrgyz Republic
- 2) To bring the functions of the state water resources management authorities in conformity with the effective legislation and exclude legislative duplication
- 3) Public involvement in the discharge licensing process
- 4) To revise water quality standards on the national level and harmonize the same on the regional level
- 5) The self-monitoring requirements need to be specified in the discharge permits
- 6) Economic mechanism to stimulate water users' reduction of discharge and adherence to the environmental legislation
- 7) To develop a unified water information system

Proposals pertaining to water resources monitoring:

In order to store, process, consolidate and analyze the data and make forecast, the state authorities involved in the monitoring shall set up special departmental information system that need to provide as follows:

- Data processing in view of specific tasks of various levels of monitoring and peculiarities of observations of different parameters;

- Information sharing between various levels and systems involved in the monitoring as well as various data banks including monitoring of other elements of natural environment;
- Prompt provision of the observation data;
- Diagnostic and prognostic functions pertaining to water fund conditions and use;
- Preparation of data for the State Water Cadastre and state statistics reporting pertaining to the use and protection of water fund.

The structure and layout of the observation network should ensure as follows:

- Collection of reliable information characterizing the conditions and use of water fund;
- Long-term operation of the observation points, observation stations, laboratories and other facilities to identify the long-term trends of changes in the water fund conditions;
- Interaction with the observation points to study the other elements of natural environment;
- Compatibility of the observation data of various departmental observation networks used for the monitoring;
- Normative accuracy of the observation data;
- Necessary promptness of the data collection and processing

The controllable parameters of water fund are divided into:

Key parameters exposed to regular observations for all items of monitoring;

- Additional parameters controlled by the observation points with due regard to the peculiarities of specific items;
- Specific parameters observed in certain areas, items or observation stations.

To obtain the objective assessment of the trans-boundary pollution it is necessary to:

- Revise the existing location of hydrological stations and hydro-chemical dam sites to move them towards the national boundaries of CA countries to the extent of establishing the joint station to control the hydrological and hydro-chemical parameters of transit flow;
- To agree the methods of metering and testing the hydrological and hydro-chemical parameters to arrive at identical data
- To develop the mechanism of implementing the effective agreements between CA countries in the area of protection and rational use of the trans-boundary water courses;
- To rehabilitate the national monitoring systems of surface water quality of the trans-boundary rivers; to enable information sharing

- pertaining to the environmental conditions of the trans-boundary water bodies;
- To develop and use the uniform regulatory and methodological documentation on water quality in line with the international requirements;
  - To harmonize the provisions of shared water protection zones (belts) of the trans-boundary water courses and observe their regime;
  - To develop and agree upon the rates of environmental flow between CA countries;
  - To identify the formation zones of the trans-boundary ground waters and assign them the status of specially protected areas.

Annex

## Questionnaire for The NATIONAL REPORT Preparation

Country — Kyrgyz Republic City — Bishkek Experts: Abdybai Jailoobayev/ Kyrgyzstan National Water Partnership Taisiya Neronova/ State Agency for Environmental Protection and Forestry of KR. February 2009			
<b>1. Management of water resources and water quality</b>			
<b>1. The main document regulating water legislation in the country</b>			
1a	In place Yes	Title of the document: Water Code of Kyrgyz Republic	Date of issue 12.01.2005
<b>2. Water legislation of Kyrgyz Republic is based on the legislative documents such as:</b>			
	<b>Document</b>	<b>Date of issue</b>	
2a	Constitution	5 May 1993	
2b	Water Code	12 January 2005	
2c	The Law on Environmental Protection	16 June 1999	
2d	The Law on Water	14 January 1994	
2e	The Law on Drinking Water	25 March 1999	
2f	The Law on Environmental Assessment	16 June 1999	
2g	Land Code	2 June 1999	
2h	Administrative Code	4 August 1998	

2i	Criminal Code	October 1997
2j	The Law on Sanitary-Epidemiological Wellbeing of Public	26 June 2001
2k	The Law of Kyrgyz Republic on Interstate Use of Water Bodies, Water Resources and Waterworks Facilities of Kyrgyz Republic	21 July 2001
2l	Environmental Code	16 January 2009
2m	Regulation Concerning Water Protection Zones and Belts of Water Bodies of Kyrgyz Republic as approved by Governmental Decree	7 July 1995, No.271
2n	Regulation Concerning Water Fund Monitoring in Kyrgyz Republic as Approved by Decree of the Government of Kyrgyz Republic	7 July 1995, No.271
2o	The Rules of Protection of Surface Waters of Kyrgyz Republic as approved by the State Committee for Nature Protection of Kyrgyz Republic	MJ No.136 of 13.10.93
<b>3. The aim of water legislation of Kyrgyz Republic</b>		
3a	Management of qualitative/ quantitative water and environmental parameters	Yes
3b	Achievement and maintaining the environmental safety and economically efficient level of water use and protection of water fund in order to conserve and enhance the living conditions of public and environment	Yes
3c	Achievement of optimal water use level between the neighboring countries	Yes
3d	Maintaining the environmentally safe water level	Yes
3e	Payment for water use	Yes
<b>4. State management in the field of water fund use and protection is provided by:</b>		
4a	Zhogorku Kenesh of Kyrgyz Republic	Yes

4b	The Government of Kyrgyz Republic	Yes
4c	The National Water Council	Yes
4d	The Department for Water Management (DWM) under the jurisdiction of the Ministry of Agriculture, Water and Processing Industry of Kyrgyz Republic	Yes
4e	The Ministry of Industry, Energy and Fuel Resources	Yes
4f	The State Agency for Environmental Management and Forestry (SAEMF) under the jurisdiction of the Government of Kyrgyz Republic	Yes
4g	The Department of Rural Water Supply under the jurisdiction of the National Agency for Local Self-Government of Kyrgyz Republic	Yes
4h	The Department of Sanitary-Epidemiological Supervision of the Ministry of Health of Kyrgyz Republic	Yes
4i	The Main Department for Hydrometeorology (KyrgyzHydromet) under the jurisdiction of the Ministry of Emergency Situations of Kyrgyz Republic	Yes
4j	The State Agency for Geology and Mineral Resources under the jurisdiction of the Government of Kyrgyz Republic	Yes
4k	Local authorities within the scope of their competences as established by the laws of Kyrgyz Republic	Yes
4n	Other ministries and departments: MES, MFA	Yes
<b>5. Management structure in the field of use and protection of water fund</b>		
5a	Interstate	Yes
5b	State	Yes
5c	Basin	Yes
5d	Territorial	Yes
<b>6. General requirements of the composition and properties of the surface waters for various types of water use are regulated by the document</b>		
6a	Water Code	
6b	ГН 2.1.5.1315-03 MPC of Chemical Substances in Waters of Water Bodies of the Household-Drinking and Utility Use	



6c	The Rules of Surface Waters Protection of KR, MJ ref. No.136, Bishkek, 1993	Yes
6d	Hygienic Standards (HS) 2.1.5.1316-03 Approximate Permissible Levels (APL) of Chemical Substances in Water of Water Bodies of Household-Drinking and Amenity-Cultural Use (reg. No.64-04 of 10.06.2004)	Yes
6e	HS 2.1.5.1373-03 Hygienic Standards of Maximum Permissible Concentrations (MPC) of Chemical Substances in Water of Water Bodies of Household-Drinking and Amenity-Cultural Use in the Areas of Protective Activities of the Storage and Chemical Weapon Destruction Facilities (reg. No.64-04 of 10.06.2004)	Yes
6f	Decree of the Cabinet of Ministers of Kyrgyz Republic Concerning the Assignment of Water Bodies to Various Water Use Categories dated 23 September 1991, ref. No.472	Yes
6h	The Sanitary Rules and Standards of Surface Waters Protection from Pollution (SanRS 4630-88)	Yes
6k	The Law on Environmental Protection	Yes
<b>8. Types of water use</b>		
8a	Household and General	Yes
8b	Cultural and General	Yes
8c	Fishery	Yes
<b>9. Water Quality Criteria</b>		
9a	The indicator whereby water quality is assessed based on the water use types	Yes
<b>10. Frequently used integral indicators to evaluate water quality in water bodies</b>		
10c	Hydro-chemical index of water pollution (IWP) and Hydro-chemical saprobity index (S)	Yes
<b>11. Mandatory elements to calculate the index of water pollution (IWP):</b>		
11d	Dissolved oxygen, hydrogen ion exponent pH, Biochemical oxygen demand (BOD)	Yes
<b>12. GOST's establishing the general requirements of sampling, transportation and preparation for storage of water samples designed for the analysis of water composition and properties</b>		

12d	GOST 17.1.5.05-85 Nature Protection. Hydrosphere. General provisions of sampling surface and sea waters, ice and atmospheric precipitation	Yes
12f	GOST 17.1.3.07-82 Nature Protection. Hydrosphere. The Rules of Water Quality Control of Water Bodies and Water Courses	Yes
<b>16. General Requirements of Quality Control Organization and Methods are Regulated by</b>		
16a	GOST P ISO/MEK 17025-2000. The General Requirements of the Competence of Test and Calibration Laboratories GOST P ISO 5725-2002. Precision (correctness and precision) of the measurement methods and data, parts 1-6 GOST P 50779.42-99 (ISO 8258-91). Statistical Methods: Shewhart Control Charts GOST 27384-2002. Error rates for the Measurements of Composition and Properties Parameters P 50.4.006-2002. Inter-laboratory Comparative Tests for Accrediting and Inspection Control РД Methodology of Laboratory Quality Control in Respect of Measurements of Wastewaters Composition, Kharkov, 1988 PMГ 59-2003 ГСИ Serviceability Laboratory Test of Expired Agents by Way of In-house Control of Measurement Precision	Yes
<b>17. Pursuant to Water Code, the use and protection of water fund is controlled on the levels as follows</b>		
17a	On the level of ministries and departments	Yes
17b	International, territorial, local	Yes
17d	State, industrial and public	Yes
<b>18. Which governmental agency controls water quality of water bodies?</b>		
18a	KyrgyzHydromet	Yes
18b	The State Agency for Environmental Protection and Forestry under the jurisdiction of KR Government	Yes
18c	Department for Sanitary-Epidemiological Supervision of the Ministry of Health of Kyrgyz Republic (at water intake sites for drinking purposes)	Yes

<b>19. Which document provides the official data of water quality in water bodies? Please specify the title</b>		
19a	Annual Data of Surface Water Quality of Kyrgyz Republic	Yes
<b>20. Are the official data on water quality in water bodies available for the public?</b>		Yes
<p>1. Water quality data are placed at the web site of the Main Department for Hydrometeorology under the jurisdiction of the Ministry of Emergency Situations.</p> <p>2. KyrgyzHydromet publishes the yearbook of surface waters quality.</p> <p>3. The data on water quality may be requested from KyrgyzHydromet; the National Report on Environmental Conditions may be requested from the body of environmental protection.</p>		
<b>21. Who else controls the quality of water in water bodies in accordance with the water legislation</b>		
21a	Water using enterprisers	Yes
<b>22. Do the water user enterprises control water quality in water bodies?</b>		
22b	Yes, in accordance with Water Code and in line with the program of ecological control (PEC); in the cases where the projects envisage waste water discharges - maximum permissible discharge (MPD)	Yes
<b>23. Which agencies analyze the monitoring reports provided by the user enterprises?</b>		
23c	Authorized bodies of the State Agency for Environmental Protection and Forestry under the jurisdiction of KR Government	Yes
<b>24. As per GOST the place and frequency of sampling are established in accordance with:</b>		
24c	Research program subject to the water body	Yes
<b>25. The general requirements of sampling equipment are provided in</b>		
25c	GOST 17.1.5.05-85 Nature Protection. Hydrosphere. The General Requirements of Water Sampling from Surface and Sea Waters, Ice and Atmospheric Precipitation	Yes
<b>27. Water quality is determined (by testing) by the laboratories</b>		
27c	Certified irrespective of the type of ownership	Yes
<b>28. Safety of water quality</b>		
28a	Sanitary Rules and Standards 2.1.4.002-03 Drinking Water: Hygienic Requirements of Water Quality of the Centralized Drinking Water Supply Systems. Quality Control, Sanitary-Epidemiological Rules and Standards. 19 March 2004 Reg. 34-04	Yes

28b	Sanitary Rules and Standards 4630-88 Sanitary-Epidemiological Requirements of the Surface Waters Protection from Pollution	Yes
<b>29. Can the standards of water quality be amended?</b>		
29a	Yes, sanitary-epidemiological rules and standards on water quality shall be adopted by the order of the Minister of Health to be registered with the Ministry of Justice	Yes
<b>30. Which document determines the list of substances to be tested?</b>		
30a	GOST 17.1.3.07-82. Nature Protection. Hydrosphere. The Rules of Water Quality Control of Water Bodies and Courses Yes	Yes
30b	GOST 17.1.1.02-77. Nature Protection. Hydrosphere. Water Bodies Classification	Yes
30c	GOST 17.1.3.05-82 (CT CЭB 3078-81) Nature Protection. Hydrosphere. The General Requirements to Protect Surface and Underground Waters from Oil and Oil Products Pollution.	Yes
30d	Sanitary-Epidemiological Requirements of the Surface Waters Protection from Pollution (SanR&S 4630-88)	Yes
30e	Maximum Permissible Concentrations (MPC) of Chemical Substances in Water of Water Bodies of Household-Drinking and Amenity-Cultural Use (reg. 64-04 of 10.06.2004)	Yes
30f	The Rules of Protection of Surface Waters of KR, MJ 136 Bishkek, 1993	Yes
30g	Hygienic Standards (HS) 2.1.5.1316-03 Approximate Permissible Levels (APL) of Chemical Substances in Water of Water Bodies of Household-Drinking and Amenity-Cultural Use (reg. No.64-04 of 10.06.2004)	Yes
30h	HS 2.1.5.1373-03 Hygienic Standards of Maximum Permissible Concentrations (MPC) of Chemical Substances in Water of Water Bodies of Household-Drinking and Amenity-Cultural Use in the Areas of Protective Activities of the Storage and Chemical Weapon Destruction Facilities (reg. No.64-04 of 10.06.2004)	Yes
<b>31. The list of tested substances is determined for the purposes as follows:</b>		
31a	The list of water quality parameters for water bodies and water courses is determined in view of:	Yes

	<ul style="list-style-type: none"> <li>— intended use of water bodies and water courses;</li> <li>— the composition of waste waters discharged;</li> <li>— requirements of the information consumers</li> </ul>	Yes
<b>32. Who is entitled to amend the list of substances to be tested?</b>		
32a	The authorized body in the field of use and protection of water fund	Yes
<b>33. Can GOST's be amended? Which is the mechanism of such procedure? Which agency is to approve, review and implement?</b>		
33a	GOST's are amended in accordance with the legislation. GOST's are established for a certain period of time and may be abolished upon expiry or subject to issue/adoption of the new standards. The review, approval, amendment and implementation are carried out by the authorized bodies.	Yes
<b>35. The government authorities may involve the public and public associations in the development of programs and implementation of activities on the rational use and protection of water fund</b>		
35a	As provided by Water Code, the Law on Environmental Protection and the Law on Environmental Assessment	Yes
<b>37. Ministries/ committees have the regional offices, the basin inspectorates on regulation fo the use and protection of water resources in oblasts/towns:</b>		
	<p>Department for Water Management of the Ministry of Agriculture, Water and Processing Industry of Kyrgyz Republic has the basin authorities as follows:</p> <ol style="list-style-type: none"> <li>1. Chu, Naryn, Talas, Issyk-Kul, Jalalabad, Osh and Batken basin authorities (7 in total).</li> <li>2. District departments for water management (in 40 districts).</li> <li>3. State Water Inspectorate represented in all oblasts under BWMD.</li> <li>4. As per Governmental Decree the work is under way to establish the Ameliorative-Hydro-Geological Expedition that will incorporate the Southern and Northern Departments</li> </ol>	Yes
<b>38. In accordance with the law (Water Code etc.) the control tasks in the field of use and protection of water fund are as follows:</b>		
38a	Observations of qualitative and quantitative conditions of water resources	Yes
38b	Observations of water conditions and changes under the influence of economic and other activities; check of the accomplishment of water protection activities.	Yes
38c	Observations of hydro-chemical and hydro-biological water quality indices	Yes

<b>39. Individuals may apply to the government authorities and agencies with requests, complaints, petitions and proposals regarding the use and protection of water bodies and may require administration thereof</b>	Yes	
<b>40. Individuals may require the abolishment in either administrative procedure or by court of the decisions concerning the location, construction, reconstruction and commissioning of the enterprises and other facilities being inconsistent with the requirements of the use and protection of water fund; and concerning the restriction and suspension of economic activities of the individuals and legal entities having the adverse impact on water bodies</b>	Yes	
<b>41. <i>Representatives of public associations (PA) may take part in the activities of the basin councils</i></b>	Yes	
<b>42. <i>Public associations on their own initiative may carry out public control in the field of use and protection of WF</i></b>	Yes	
<b>43. <i>The procedure of public control in the field of use and protection of WF is being established by:</i></b>		
43b	By public associations in line with their charters upon consent of the authorized state bodies providing state control in the field of the use and protection of water fund.	Yes
<b>44. <i>Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, 17 March 1992)</i></b>		
44a	The country is a party to the Convention. The date of accession/ ratification, decree number	No

**For marks**

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**For marks**

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