The Regional Environmental Center for Central Asia

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WATER QUALITY STANDARDS AND NORMS IN THE REPUBLIC OF TAJIKISTAN

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Almaty, 2009

ББК 26.326
УДК 628
Т 98

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Water quality standards and norms in the Republic of Tajikistan. —Almaty: ОО «OST-XXI век», 2009. — 52 p.

ISBN 9965-659-90-7

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.

The material was developed and published by the Central Asia Regional Environmental Center under the support of the European Union and United Nations Economic Commission for Europe.

ББК 26.326
УДК 628

Т $\frac{3802000000}{00\ (05)\ -\ 09}$

ISBN 9965-659-90-7

CONTENTS

THE LIST OF ABBREVIATIONS

WB	Water Body
WC	Water Code
AUCS All	Union Construction Standards
WF	Water Fund
SCEP&FM	State Committee of Environmental Protection and Forestry Management
SIST	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
MAWR	The Ministry of Amelioration and Water Resources
ICWMC	Interstate Coordination Water Management Commission
RD	Regulatory Documents
TSEL	Tentative Safe Exposure Level
E	Environment
GOST	Industry Standard
MPC	Maximum Permissible Concentration
MPD	Maximum Permissible Discharge
RSE	Republican State Enterprise
RT	Republic of Tajikistan
RRD	Republican Regulatory Document
SanRS	Sanitary Standards and Rules
CS&R	Construction Standards and Rules
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 supports 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 are 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 tend to degrade in quality with increased 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.

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 a steadily increasing load as a result of the 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; review the quantitative parameters of water resources; provide tentative assessments of the impact of climate change on the qualitative and quantitative parameters of water resources; describe the existing problems of the international-use water bodies and waterworks facilities; review the legislative base and institutional frameworks of water resources management with reference to qualitative and quantitative parameters; view 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 Tajikistan

Glaciers give rise to practically all large rivers of the country which waters are intensively used in economy. There are 14,509 glaciers in Tajikistan which glacierization area contains 11,146 km^2, thus making about 8% of the country's territory. The major part of glacierization is found on the territory adjacent to the highest peaks of Pamir and Altai - Ismoili Somoni and Lenin. The basins of Vanu, Muksu, Obikhongou, Vakhsh and Yazgulem contain more than 5,000 km^2 of glacierization that is more than two thirds of the total area. The outlying areas located westward and eastward of this center are characterized by the low extent of glacierization. The glaciers account for one third of the annual and up to half of the summer river flow.

Within the last decades the glaciers show variations of size (area, volume) with the prevalence of negative balance of the glacier mass. Under the current climate conditions Pamir-Altai glaciers tend to shrink by 1,2 km^2 per year.

The total glacier water reserve amounts to 845 km^3 being 13 times in excess of the total annual river flow and 7 times of the average annual flow of the Aral Sea Basin. The glaciers exceeding 1 km^2 make only 20% of total number of glaciers, although they contain about 85% of total ice volumes.

Formation Area of River Flows in Tajikistan makes 90% of the country territory. Deglaciation accounts for up to 25% of total water resources thus making a considerable part of summer basis flow reaching 50% in low water years.

The abundance of feeding sources, high absolute elevations and mountain landscape determine the dense river network. The density of river network has considerable variations, from zero in the outlets to 2 km/km^2 in the upper reaches. On average for Tajikistan, the density of river network makes about 0,6 km/km^2.

The country's **Hydrographic River Network** belongs to the basins of the two rivers, Amudarya and Syrdarya, whereby the majority of rivers make part of Amudarya basin covering the vast mountain areas inside Tajikistan where the main part of flow is formed. The Tajikistan section of Amudarya basin comprises several characteristic parts. The Pyandzh River that forms Amudarya is divided into two different areas

from hydrological standpoint, a comparatively high-water Tajik Pamir and the low-water Afghani part of the basin. The largest tributaries of Pyandzh are Kzylsu, Vakhsh, and Kafirnigan. In terms of orohydrography and hydrology Zerafshan belongs to Amudarya basin; since it stops short of Amudarya being fully withdrawn for irrigation, it may be viewed as an independent body. It runs across Tajikistan covering the length of 300 km and then passes over to Uzbekistan.

Syrdarya is in the north of Tajikistan. Essentially, this is a comparatively small transit part of the river, since most of its tributaries in Fergana Valley stop short of Syrdarya and are fully withdrawn for irrigation.

The features of the river flow formation in Tajikistan are determined by high-altitude of their basins. The landscape influence on the flow is indirectly determined by the main meteorological elements that are leading in the flow formation. The higher is the altitude the level of precipitation increases, the air temperature drops and the irrigation loss of moisture reduces. In addition, the volume of flow is conditioned by the mountain ranges position in relation to the moisture-laden air masses and accessibility of those masses. The highest specific water content is typical of the rivers which water intakes are located on the southern slopes of Gissar, Zaravshan and partially Allay ranges. Given the average 3,8 km altitude of the river basins, the flow rate may reach 50l/s per 1 km^2. The rivers which water catchments are located on the peripheral ranges of Pamir-Altai mountains and have a broad variation of the basin altitudes ranging from 1 to 3,6 km, are characterized by a high difference of flow rates, from 1 to 40 l/s per 1 km^2. The flow rates associated with the main rivers of the West Pamir range between 7 and 20 l/s per 1 km^2, and in the eastward direction the moisture conditions dramatically decline along with the flow rates decreasing to 1 l/s per 1 km^2. The lowest specific water content is observed on the rivers of inland Karakul basin. In Zeravshan and Syrdarya basins the specific water rate varies within 10-25 l/s per 1 km^2 depending on the catchment elevation. In piedmont valleys, water content of the rivers decreases dramatically due to high evaporation, infiltration and mostly due to irrigation. The flow level in the basins varies from 20 to 1000 mm.

The surface water resources are unevenly distributed across the country. About 50% of the annual flow are formed in Central Tajikistan characterized by the highest water supply of the local flow, making 861 thousand m^3 per 1 km^2. The lowest local flow per unit area is recorded in Khatlon oblast (117 thousand m^3), but water inflow is considerable from the neighboring regions and thus water supply per 1 km^2 is the

highest. The highest annual water supply per capita by the general river flow resources in Mountain-Badakhshan is 109 thousand m^3, the lowest is 14,5 thousand m^3 in the areas of republican subordination (Central Tajikistan).

Pamir Mountains and the northern adjacent ranges of Altai and Zaalai are the sources of the highest river systems of Tajikistan, Pyandzh and Vakhsh, accounting for about 90% of total flow of Amudarya.

Thick mountain walls and their branches divide the territory of Tajikistan into several hydrographic regions comprising the largest 2 river systems of Central Asia, Syrdarya and Amudarya. The northern parts of Tajikistan embrace part of Syrdarya basin in the middle reach covering 13,4 thousand km^2. The remaining territory is in the basin of Amudarya that is orographically split into the river basins differentiated by the absolute average catchment altitudes, the level of glacierization, uneven accessibility of moisture-laden masses etc., and thus uneven moisture content, different river network development, water content of rivers and the seasonal flow patterns. These are the basins of Zeravshan, Surkhandarya (Karatak, Shirkent), Kafirnigan, Vaksh, Pyandzh, and the inland lakes of East Pamir.

2. TAJIKISTAN WATER RESOURCES MANAGEMENT

Water legislation contains the main requirements in respect of water resources protection that refer to prohibition of pollution, littering and depletion of waters. It provides for the responsibilities of water users, other enterprises and organizations to fulfill the main water protection requirements:

— When designing and constructing the buildings and facilities the efficient water purification systems need to be provided;

— To continuously reduce irrational water use; establish low-waste and zero-waste water use systems;

— To undertake the measures focused on the enhancement of regime, protection from pollution and depletion of waters; to ensure favorable environment for flora and fauna;

— To create where necessary the sanitary, protective and water protection zones and belts that would ensure prevention of harmful effect of environment, economic and recreational activities on the condition of water sources.

Water protection is secured by establishing planning and account of water use, by regulating the procedure of water utilization, by setting standards for water discharge and prevention of harmful impact on waters.

The government's task is to account waters and their use. Said measures are performed in order to determine the quality and quantity of waters, and collect the data on water use for the needs of people and economy. The qualitative and quantitative data of waters and their use are established in water cadastre.

In Tajikistan the water cadastre is maintained by TajikHydroMet, the Ministry of Amelioration and Water Resources and TajikGeology. The water cadastre data are used to develop the water balances.

In Tajikistan the rights of water use are exercised by the executive authorities (of oblast, district and city) upon agreement with the special government authorities on regulation of the use and protection of waters.

Unfortunately, the basin integrated management principle has not yet been properly developed in Tajikistan. Hence, the departmental disunity of water management, the absence of a unified management body in the river basins to be vested with sufficient authority hamper efficient dealing with the problems of the complex use and protection of water resources. The river basins have not yet been exposed to planning and integrated management of water resources use and protection.

Water management should be built upon the economic methods that would provide for a use fee in respect of surface and underground waters and the discharge of waste waters. In the long run, management needs to be based on the economic work principles.

2.1. Legislative Base

Water resources management in Tajikistan is based on the sectoral principle whereby the functions and responsibilities in the field of water relationships are distributed between various ministries (please refer to Governmental Decree «On Segregation of Authorities Among Special Authorized Governmental Bodies for Regulation of Water Use and Protection»).

The main state policy principles for the use and protection of water resources are provided for by the articles of the Constitution of Tajikistan, Water Code and the Law «On Nature Protection» etc.

The rights and responsibilities of the participants of water relationships are provided for by the civil, administrative and criminal laws of the Republic of Tajikistan.

The legislative base of water relationships is updated and enhanced on a regular bases. However, a large number of bylaws such as instructions, guidelines, standards, provisions etc. developed as far back as in soviet times are still in effect in Tajikistan that do not meet the present-day conditions (e.g. the transition to information technologies of database on water fund conditions, use fees etc.). The effective bylaws contain a number of contradictions connected with the duplication of functions of various executive authorities, inconformity of the normative documents with the legislative standards etc.

Therefore enhancement of the regulatory-legal base of water relationships shall be a vital problem for the nearest future since the emerging contradictions give rise to the conflicts between the regulatory bodies related to various departments and water users and have a negative effect on the procedure of water fund management.

The goal of adopting Water Code (10 November 2000) is to establish a uniform legal base on the regulation of water relationships in the field of water resources protection and use for the purposes of secured and sufficient water supply to the population and industries in adequate quantity and quality. The objectives of Water Code are to regulate water relationships for the purposes of securing the rational use of water for the needs of population, industries and natural environment; water protection from pollution, littering and depletion; prevention and liquidation of the harmful effect; enhancement of the conditions and protection of water bodies; strengthening the rule of law and protecting the rights of individuals and legal entities in the field of water relationships. The system of management, use and protection of water resources is based on Water Code. In particular, the other related bylaws that may not contradict to Water Code and international treaties are adopted on the basis of Water Code.

The overriding principles being the basis for management, use and protection of water resources are set on the grounds of WC provisions. Such principles are mandatory and failing the observance the point of responsibility arises in line with the laws. It needs to be noted that the above provisions of Water Code contain the principles of legality, justice, equality, competition and other. Water Code strengthens economic mechanisms of water use and determines the organizational system of regulation of the use and protection of waters. The economic instruments have been updated and clarified in Water

Code. For example, it clearly sets the service fees for water supply and defines the water user rights and obligations.

Those legislative frameworks, however, are insufficient as was stated in the «Concept of Rational Use and Protection of Water Resources». The Concept calls on to develop instructions on the revision of water use tariffs, water monitoring, drinking water and protection of drinking water. The other laws on issuance of water intake permits and establishment of the inspectorate have not been developed yet. The legislative base is still lacking in respect of water intake and the use of underground waters.

Water Code does not reflect the modern principles. It provides the sphere of highly centralized water resources management system, does not stipulate complex management of hydrographic river basins, does not coordinate the issues of policy and actions among all agencies responsible and omits the monitoring being the fundamental management tool. At present water legislation does not include the concept of catchment basins management that would assume radical changes in water relationships towards decentralization of both decision-making and financing. Water Code is still lacking such principle and needs to be amended. For example, Water Code contains the sanctions to prevent water pollution by the users (i.e. waste water discharge fees), but it does not suggest any positive actions that would encourage and assist water users and polluters to improve the protection of waters.

The sphere of interstate use of water resources is not detailed in Water Code since such issues are regulated by the bilateral and multilateral interstate treaties and agreements and other provisions of international water law as acknowledged by the Republic of Tajikistan.

Water Code establishes the institutes that regulate water relationships including:

- Water resources management;
- Strategic use and protection of water resources;
- Economic incentives and payment systems of water relationships;
- Protection of water resources;
- Settlement of disputes arising in water management relationships;
- Responsibilities for violations of water legislation;
- Regulation and use of transboundary water resources etc.

2.2. International Cooperation

Under the new political and economic conditions the Central Asian countries faced the problems of water resources management on the national and international level that need to be addressed in an expedited manner. The region is located in the arid climate zone and mainly refers the basins of the transboundary rivers Syrdarya and Amudarya being part of the Aral Sea Basin.

The growing deficit of clean water has also reached Central Asia. In February 1992 in Almaty the heads of water management agencies of the Central Asian countries have signed the Agreement of Establishing Interstate Coordination Water Management Commission (ICWMC) to deal with water issues that has been approved by the governments of all CA countries. The cooperation was set thereby in the matter of joint management, use and protection of waters of the international water sources.

From that moment, ICWMC as the institute of interstate water use is qualified to coordinate the use of water resources of Syrdarya and Amudarya basins. Those rivers, along with Zerafshan and Isfara, are interstate and such legal status predetermines the need of building the relationships between the parties based on the international law provisions.

In 1993 The International Aral Sea Rehabilitation Fund (IASRF) has been established by the decision passed by the heads of Central Asian states. The problem of protection and use of water resources and sustainable development of the economy of Central Asian countries shall be based on the principles of international law, mutually beneficial cooperation with the foreign countries, the overall environmental safety and development of international cooperation.

The Program of Concrete Actions to Improve the Environmental Situation in the Aral Sea Basin was adopted at the conference of the heads of CA countries held in Nukus. Guided by the principles of international water law and the agreements reached, the heads of CA countries have signed a number of treaties, protocols and provisions that have underlain the current management of water resources in the Aral Sea Basin.

In 1996 the governments of the Republic of Kazakhstan, Kyrgyz Republic and Republic of Uzbekistan have entered into the agreement of using the fuel, energy and water resources, constructing and operating the gas pipeline in the Central Asian region. In 1999 said countries have signed the agreement of using water and energy resources of Syrdarya basin; a few months later Tajikistan has acceded thereto.

In April 1999 in Ashgabat the heads of CA countries have signed the agreement regulating IASRF management structure. As a result, a number of legal barriers have been removed and ICWC has been incorporated in IASRF as its major subdivision. The annual bilateral and multilateral treaties between CA countries have become a normal feature of international water relationships.

For several years Tajikistan and Uzbekistan have been signing the treaties on the use of water and energy resources of Kairakkum Water Reservoir that envisage the scheduled supply of water during the irrigation season, the joint bank protection activities at the reservoir in order to maintain the maximal water level, and maintaining the operational mode of the pump stations Makhram-0 and Chumchuk-Jar in case of sudden lack of water. The Republic of Kazakhstan also shows interest in such arrangements initiating 1 km^3 increase of the volume of Kairakkum Water Reservoir. At present the countries discuss the issue of participatory interests in addressing this problem.

With strengthening IASRF and building cooperation with the international agencies, primarily UN, World Bank and Asian Development Bank, Tajikistan has been involved in a number of international projects associated with the rational use and protection of water resources. Tajikistan is a stakeholder of the project «Water Resources and Environmental Management in the Aral Sea Basin» and a member of IASRF Executive Board funded by GEF (Global Environment Facility). In this project, Tajikistan proposed to revise the existing water division arrangements and set up an economically mutually beneficial water use mechanism in Central Asia.

Tajikistan is also a stakeholder of the project «Rational and Efficient Use of Energy and Water Resources of Central Asia» developed under the Specific UNDP Program for Economy of Central Asia (SPECA). Both areas of cooperation have a universal goal: to reach the agreements on the regional strategy of the use and protection and water resources satisfying all CA countries.

The agreement of cooperation in the field of shared management of the use and protection of water resources associated with international water sources (as adopted on 18 February 1992 in Almaty) has a number of gaps. Specifically, it lacks the observance of water quality standards; the development and adoption of water quality standards in consultation with the neighboring countries; the issues of international water quality monitoring network.

The history of water resources management of the recent twenty years, notably the recent 8 years, has shown that Tajikistan endeavors, sometimes to detriment of itself, to manage water resources to the benefit of all neighboring countries of the region. A perfect example is the schedule of operations of Kairakkum and Nurek water reservoirs in low-water periods of 2000-2001 and 2008.

2.3. Institutional Frameworks of Management, Government Authorities and Structures

According to the Constitution, The Republic of Tajikistan is a democratic, law-governed, secular and unitary state. The President is the head of the state and the Chairman of the Government. Majlisi Oli is a two-chamber legislative body.

The Parliament (Majlisi Oli) plays a key role in making the policy, strategy and guidelines pertaining to water sector by adopting the relevant laws. The executive authorities represented by the President and the Government, also play a considerable part in making the environmental and water laws by passing decrees, regulations and orders to put in effect or apply the regulatory documents setting specific requirements. On the local level the executive authorities play a significant role to ensure the enforcement of water and related environmental legislation.

Tajikistan has a fairly well developed legislative frameworks of the main laws in the field of environmental protection and the relevant range of problems, but without relation to the bylaws. The standards pertaining to environment have been set in a number of general laws and specific laws related to certain environmental problems, procedures or types of natural resources. The current legislation including the area of environmental protection has been developed on the basis of the laws and regulatory documents adopted in soviet times.

The technical assistance of foreign countries, active international cooperation, accedence to a number of conventions and regional treaties had an effect on the environmental laws that is being harmonized with the model legislation recommended by such conventions or treaties.

The executive branch represented by the President and the Government also plays an important role in setting the guidelines since the Government has the authority to issue the executive orders on putting into effect or applying the regulatory documents. The executive powers play a very important role in enforcing the environmental laws as far as all the local (oblast, city and district) departments of the State Committee on Environmental Protection and Forestry Management

are also subordinate to Khukumats, the local bodies of executive authorities (the principle of double subordination).

The competences of state bodies on water resources management are provided in Table 1.

Table 1: Competences of State Bodies on Water Resources Management

Governmental agency, organization; Regulation of activities; Level of subordination	Competence
1. Majlisi Oli	1. To develop, approve and amend water legislation; to ratify and denounce international treaties in the field of water relationships; 2. To approve the annual subsidies for irrigation and drainage; 3. To set the size of user fee for water being the natural resource.
2.The Government of the Republic of Tajikistan	1. To coordinate the activities of ministries, departments, associations, executive authorities on the local level in connection with the complex use and protection of waters; 2. To develop, adopt and implement the target state programs pertaining to the use and protection of water resources and development of drinking water supply systems; 3. To develop and regulate international relations in the field of water use and protection; 4. To develop the draft National Water Strategy; 5. To appoint special authorized state bodies on management and use of water resources and water protection; 6. To set up the monitoring system for water resources 7. To invest and fund the state water management programs 8. To issue specific water use permits.
3. The State Committee on Environmental Protection and Forestry Management. Special	1. State control over correct account of the use of water resources and discharge of pollutants into natural environment by the ministries, departments, enterprises and institutions; 2. State control over the permits for discharge of pollutants;

authorized body on regulation of water use and protection. The Government of Tajikistan	3. State control over the observance of standards for maximum permitted discharge of pollutants into natural environment and the existing procedure and conditions of discharge of pollutants in waste waters; 4. State control over the observance of measures for water resources protection from depletion and pollution; 5. State control over the adherence to the environmental rules of waterworks systems, water reservoirs and lakes; 6. Issuance of special water use permits except for irrigation purposes; 7. Analysis of the conditions of water resources, projections for environmental changes and defining the strategic lines of water management activities; 8. To develop and adopt the general environmental requirements in respect of economic and other activities, the rates of pollution fees, the rates, rules and standards in the field of rational use and protection of water resources; 9. To impose penalties on individuals and officials for the violation of water protection legislation; 10. To maintain the state water cadastre (specifically pertaining to the surface waters); 11. To agree upon the proposals of setting water protection zones; 12. Monitoring of surface waters.
4. Ministry of Amelioration and Water Resources Special authorized body on regulation of water use and protection. The Government of Tajikistan	1. Departmental control over the rational use of water for irrigation purposes, setting the standards and limits of water consumption; 2. To develop water balances, the prospective arrangements of the complex use of water resources across the country; 3. To issue the certificates of the volumes of water resources in water sources and agree the specifications of design and construction of the new and reconstruction of the existing facilities using water resources; 4. To organize the activities in order to improve the water area of small rivers and water reservoirs; 5. To establish the limits of water consumption by the users within the volumes allocated by MAWR; 6. To control the adherence to the rates and rules of established water consumption arrangements by water users as well as the proper maintenance of the primary use of water resources; 7. To develop the draft annual and prospective plans and projections of the rational use of water resources;

	8. To maintain the state account of quantity and quality of water resources; to develop and issue the state water cadastre (as it pertains to water use); 9. Monitoring of water resources; 10. Free inspections of water use by the users within MAWR's waterworks systems; 11. Involvement in the development of draft international treaties and other international legal documents pertaining to the Ministry's authorities; 12. To issue water use permits.
5. Committee of State Supervision of Safe Works in Industry and Mountain Supervision Special authorized body on regulation of water use and protection. The Government of Tajikistan	1. Control over the rational use of medicinal, mineral, thermal and industrial underground waters; 2. To agree upon the permit of special use of medicinal, mineral and thermal waters; 3. To agree upon the construction projects of tail dumps, storage ponds and other facilities of discharge of industrial wastes; 4. Control over the account of flowing wells; 5. Involvement in the development of draft international treaties and other international legal documents pertaining to the rational use and protection of underground waters.
6. TajikGeologiya Special authorized body on regulation of water use and protection. The Government of Tajikistan	1. State registration of the subsoil use licenses including extraction of underground waters (domestic and drinking, industrial, thermal and irrigation waters); 2. State registration of contracts of the right of use the subsoil reserves (including underground waters); 3. To issue the permits of re-equipment of exploration and production wells, drilling of absorption wells to collect waste waters; 4. To agree upon the permits of special water use (underground waters); 5. To agree upon the projects of prospecting, exploration and construction of new water intakes; 6. To agree upon the operating mode of intakes of the underground waters; 7. Control over the use and protection of underground water bodies from depletion and pollution; 8. To maintain the state water cadastre of underground waters.

7. The Ministry of Health Protection Actions pursuant to the regulations The Government of Tajikistan	1. To agree upon the classification of waters and approve the standards; 2. To agree upon the permits for discharge of pollutants and wastes into water bodies, waterworks facilities and the lands of water fund; 3. To develop the sanitary standards and rules of protection of surface and underground waters from pollution; 4. To determine the suitability of the surface waters for industrial, drinking and domestic purposes in accordance with the sanitary and hygienic standards; 5. To agree upon the boundaries of sanitary protection in respect of water bodies used for drinking and domestic purposes; 6 To agree upon the conditions of discharging waste waters into water bodies; 7. Quality monitoring of drinking water.
8. The Ministry of Emergency Actions pursuant to the regulations The Government of Tajikistan	1. To agree upon the proposals for setting a national information system related to floods, mudflows and draughts; 2. To prepare in cooperation with the ministries related and periodically update the flood, mudflow and draught response plans.
9. Local authorities (khukumats) Actions pursuant to the regulations The Government of Tajikistan	1. To agree upon the issues related to the approval and implementation of the rules pertaining to water protection zones; 2. To approve the location, size and protection order of the sanitary protection zones; 3. To adopt the normative documents regulating the activities and works performed in the areas exposed to floods and mudflows.

2.4. Types of Water Use and Water Users

Types of Water Use (in terms of water quality)

Pursuant to Water Code (Article 23), the following two types of water use are differentiated: the **general** use is exercised without any facilities or technical devices; the **special** use is exercised within economic sectors under the permits to be issued by the special authorized state bodies regulating the use and protection of waters.

Water bodies are dedicated for use (water consumption) primarily to satisfy drinking and domestic needs of public.

Water bodies may be dedicated for common or separate use (Article 24).

The common use arrangements may exist in respect of the water bodies non-dedicated for separate use.

Water bodies are dedicated for use subject to the statutory requirements and terms and conditions to satisfy the drinking, domestic, medicinal, resort, health-improving and other public needs; agricultural, industrial, energy, transport, fishery and other state needs as well as dedicated for several purposes simultaneously. The actually existing water intake in Tajikistan accounts for about 20% of the volume of flow formed inside the country and 11% of the average flow of the Aral Sea basin for many years. Over 37% of water taken from the sources are returned to water receivers in the form of discharge and collector and drainage waters.

In the period between 1990-2004 water consumption has decreased from 13,7 km^3 to 12,6 km^3 due to decline in production volumes, changes in the structure of allocation of lands under agricultural crops, deterioration of ameliorative condition of lands, the existence of idle unused irrigated lands, malfunction of part of irrigation systems, setting up water supply fee and other reasons. In 2004 water consumption in Tajikistan to cover all needs amounted to 1972 m^3 per capita i.e. below the average world figure estimated at 2600 m^3 per capita per year according to AQUASTAT/ Food and Agriculture Organization (UN FAO).

The discharge of waste and collector and drainage waters amounted to 4,6 km^3 in 1990, 3,6 km^3 in 2000 and 4,7 km^3 in 2004. Due to the crisis the discharge of industrial effluents was reduced from 138,6 million m^3 in 1990 to 108,2 million m^3 in 2004; the untreated discharge amounted to 2,86 million m^3 in 2004 and was reduced by 59% as compared to 1990.

Water Code and the Law on Nature Protection set an economic mechanism of assigning water bodies for use. The special use shall be on a fee paid basis. The fee shall be collected from all water users (except for the cases of common use) regardless of the departmental subordination, citizenship, types of ownership and the form of economic management unless otherwise provided by the law.

The fee shall be collected for as follows:

- The use of water resources within the limits established (as for the natural resource); the exemption from payment is granted to agricultural irrigation and forestry;
- Above-limit and irrational use of water resources; the increasing above-limit ratios are established for irrigation (1.2) and unauthorized water use (3);
- The services connected with storage, transportation to the consumer, distribution and treatment;
- Granting the right of use of water resources (license).

Agriculture (irrigation) is one of the major water users in Tajikistan. 85% of the average annual consumption are used for irrigation; 6-7% - for industrial purposes; 8-9% - for public water supply; and 2-3% - for other purposes.

3. STANDARD SETTING AND ASSURANCE OF WATER QUALITY

Standard setting and assurance of water quality are provided for the purposes of protecting water objects from pollution, littering and depletion as well as assuring favorable conditions of water use and ecological well-being. All water bodies located in Tajikistan are under protection.

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 need to be identified that would include as follows:

- To set water quality standards for a water body;
- 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;
- To regulate various types of economic activities that impact the condition of waters;
- To implement water protection activities that ensure the observance of the established discharge rates of the pollutants;
- To develop water protection requirements in respect of various economic activities, to reduce gradually the volume of pollutants until the full termination of their discharge into water bodies;
- To appraise the new equipment, technologies, materials and substances as well as construction projects (reconstruction) of the enterprises and other facilities;
- To account, consolidate 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;
- 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. To meet those purposes 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.

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 law.

When protecting water bodies exposed to the discharge of waste waters and various types of economic activities the following requirements need to be met:
- The established conditions of waste water discharge and water protection requirements in respect of various types of economic activities need to ensure the rated quality of water at the control stations of a water body or in the event of exceedance the composition and properties of water existing under the influence of natural processes need to be preserved;

- It is prohibited to discharge into water bodies waste waters containing the substances for which MPC or APL are not established; and substances for which the methods of test control are lacking;
- The waste waters that, based on their composition and local conditions, may, subject to the relevant feasibility study, be directed to the recycling or reuse water supply system for agricultural irrigation subject to the agronomic, sanitary and other requirements, as well as for the other purposes of public economy;
- It is prohibited to discharge industrial and domestic waste waters, rainfall and melted waste waters drained off from industrial sites and populated areas without treatment to reach the established requirements;
- It is prohibited to discharge waste waters that are toxic for living organisms;
- It is prohibited to discharge waste waters containing agents of infection as well as the substances exceeding MPC;
- The leaks to water bodies are not allowed from the oil products, oil fields as well as discharge of litter, untreated waste, ballast waters and other discharges from floating crafts of water transport;
- When dealing with construction, explosion works, mining operations and other types of works into water bodies, the standards and requirements as set by the Rules of Surface Waters Protection need to be observed.

It needs to be noted that the discharge of wastewaters into water bodies shall be viewed as one of the types of water use and shall be done under the permits to be issued by the special authorized state within the established procedure and upon agreement with the State Sanitary Epidemiological Services.

The drain off conditions for the wastewaters discharged to water bodies shall be determined based on as follows:

- Water use category in respect of a water body or water course;
- The level of waste blending before the nearest control station;
- Each discharge of wastewaters shall be supported by the calculated maximum permissible discharge (MPD) for a certain period of time that would ensure the rated water quality at the control stations of water bodies;
- When MPD is established the estimated volume of wastewaters discharged shall be the maximum average hourly volume for the actual period of discharge;

The water user enterprises that discharge waste waters in excess of MPD as established are obliged to develop and agree upon with the

local authorities and environmental protection agencies the plans of activities focused on reaching MPD that need to be supported by the material and material-technical resources;

«The point of wastewater discharge from a populated area shall be located downstream of its boundary at the distance that would exclude the influence of surging».

When draining wastewaters off into water bodies the standards and requirements shall apply that reflect such issues as protection of water bodies and courses from pollution and littering by soil erosion products, the substances drained off from the surface flows from agricultural lands etc.

3.1. Water Quality

The protection of waters shall be arranged for the purpose of protection of public health, ensuring the favorable water use conditions and ecological well being of water bodies. The system of measures focused on achievement of water protection goals shall include the standard setting in respect of water quality of a water body.

For the purposes of ecological well-being of water bodies they are divided into 3 categories of water use: domestic and drinking; utility; and fishery.

The system of water use classification is necessary for the water quality standard setting. The most stringent rules shall apply to waters designed for fish farming. The water bodies (or their sections) used as the sources of domestic and drinking water supply as well as water supply of food industries shall refer to the domestic and drinking water use category.

The use of water bodies for public swimming, sports and recreation shall refer to the utility water use category. Water quality requirements as set for this water use category shall apply to all sections of water bodies located within the populated areas irrespective of the type of water use. The use of water bodies for dwelling, breeding and migration of fish and other water organisms shall refer to the fishery water use category.

3.2. Water Classification Based on Integral Quality Parameters

7 water quality classes are set in Tajikistan with regard to pollutants (Please refer to Table 2).

Table 2. Water Pollution Criteria based on Pollution Source for the Surface Waters

Water Quality Class	Description	PS Value
I	Very clean	Below or equal to 0,3
II	Clean	Above 0.3 to 1
III	Moderately polluted	Above 1 to 2.5
IV	Polluted	Above 2.5 to 4
V	Muddy water	Above 4 to 6
VI	Very polluted	Above 6 to 10
VII	Extremely polluted	Above 10

The surface water pollution criteria are established in Tajikistan pursuant to the Rules of Surface Water Protection (Please refer to Table 3).

Table 3. Evaluation Criteria for the Surface Water Pollution

Ingredients and Indicators	Limiting Harmful Index	Maximum Permissible Concentration (mg/l)
1	2	3
Dissolved oxygen	General Requirements	At least 4.0 in winter period under ice; at least 6.0 in summer (open) period
BOD, total	General Requirements	3,0 mgO/l
Ammonium, salt	Toxicological	0,39
Nitrate-ion (NO_3)	Sanitary-Toxicological	9,1
Nitrite-ion (NO_2)	Toxicological	0,02
Oil and oil products	Fishery	0,05
Phenols	-"-	0,001

Synthetic surfactants	Toxicological	0,5
Fe, trivalent	Organoleptic	0,5
Copper	Toxicological	0,001
Zinc	-"-	0,01
Chrome, trivalent	Organoleptic	0,5
Chrome, hexavalent	Sanitary-Toxicological	0,001
Nickel	Toxicological	0,01
Cobalt	-"-	0,01
Lead	-"-	0,1
Arsenic	-"-	0,05
Mercury	-"-	0,0005
Cadmium	-"-	0,005
Fluorides	-"-	0,75
Cianides (CN)	-"-	0,05
DDT	-"-	No
HCCH	-"-	No
Rhodanates	Sanitary-Toxicological	0,1
Methylmercaptans	Organoleptic	0,0002
Benzol	Toxicological	0,5
Furfurol	Organoleptic	1,0
Methanol	Toxicological	0,1
Formaldehyde	Sanitary-Toxicological	0,01
Xanthogenate, propyl carbinol	Organoleptic	0,001
Dithiophosphate, cresol	-"-	0,001
Kalium (cation)	Sanitary-Toxicological	50,0
Calcium	-"-	180,0
Magnesium (cation)	-"-	40,0
Natrium (cation)	-"-	120,0
Sulfates (axid ion)	-"-	100,0
Chlorides (axid ion)	-"-	300,0
Mineralization	General Requirements	1000,0
Suspended substances	-"-	The content of SS vs natural may not exceed 0,75mg/l
Phosphates	-"-	0,1

High pollution (HP) and extremely high pollution (EHP) criteria are provided in Table 4.

Table 4. Classification Criteria for High Pollution (HP) and Extremely High Pollution (EHP)

Ingredients	**NPC,** mg/l	**HP,** mg/l	**EHP,** mg/l
Oil Products	0,05	>1,50	>5,00
Phenols	0,001	>0,030	>0,100
Copper	0,001	>0,30	>0,100
BOD	Conditioned 3	>15,0	>60,0
Dissolved oxygen: Winter Summer	 4 6	 <3 <3	 <2 <2
DDT, HCCH and other ingredients to be absent in water as per MPC standards	No	>0,001	>0,01
Other		>10 MPC	>100 MPC

It needs to be noted that the above rating of water quality is to establish a set of permissible values for a water body in respect of water composition and properties that ensure the human health, favorable water use conditions and ecological well-being of the water body.

3.3. Legislative Base

The standards of water quality in water bodies are established by a number of laws, bylaws, State Industry Standards and SanR&S. The Constitution of the Republic of Tajikistan stipulates the conservation of environmental quality in general: «... citizens of Tajikistan shall have the right to environment, favorable for life and health, and to indemnity of the damage inflicted to health or property as a result of the actions in the field of use of natural resources».

Water Code is focused on the conservation of the quality of water resources in water bodies within the limits whereby public health, favorable water use conditions and ecological well-being of water bodies are assured in a reliable manner.

The Law on Nature Protection (1993) stipulates setting of standards in respect of environmental quality in order to establish the maximum permissible rates of environmental impact.

The system of standards and rates of environmental quality includes also the standards of maximum permissible concentrations of hazardous substances in water and the standards of maximum permissible discharges of hazardous substances into water bodies. The sets of permissible values pertaining to water composition and properties as established for water in water bodies in which limits the public health, favorable water use conditions and ecological well-being of water bodies are secured in a reliable manner, make the basis of the standard-setting of water quality.

The assurance of public sanitary-epidemiological well-being and the state guaranties in respect of exercising the citizens' constitutional rights to health protection and favorable environment are reflected in the Law on Sanitary-Epidemiological Well-Being of Public. Said law regulates the relationships in the field of assurance of the sanitary-epidemiological well-being of public as one of the main conditions of exercising the rights to health protection and favorable environment. The document imposes the requirements of water bodies, sets the standards of maximum permissible harmful impacts on water bodies and the standards of maximum permissible discharge of chemical, biological substances and microorganisms to protect water bodies from pollution and littering.

Legal relations in the field of environmental appraisal and exercising the citizens' constitutional rights to favorable environment by preventing the adverse environmental effects arising from economic and other activities are regulated by the Law on Environmental Appraisal.

The Rules of Surface Waters Protection (2005) regulate the discharge into water courses and water bodies of all waste waters including utility and industrial, rainfall and melted waters, waters from built-over lands, wastes from amelioration systems, drainage and mining waters and other effluents. The Rules regulate various types of economic activities including water engineering that adversely affects or may affect the conditions of surface waters.

The surface waters monitoring is still governed by the standards and regulatory documents adopted in the soviet times.

Below is the list of the main standards and regulatory documents:

- GOST 17.1.1.01.-77 Nature Protection. Hydrosphere. The Use and Protection of Waters. The Main Terms and Definitions.
- Guidance for the Chemical Test of Surface Waters (Leningrad, Gidrometeoizdat, 1977).

- GOST 17.1.5.04.-81 Nature Protection. Hydrosphere. Instruments and Devices for Selection, Primary Processing and Storage of Samples of Natural Waters. General Technical Specifications.
- GOST 17.1.3.07.-82 Nature Protection. Hydrosphere. The Rules of Water Quality Control of Water Bodies and Water Courses.
- GOST 17.1.3.04.-82 Nature Protection. Hydrosphere. General Requirement of Protection of Surface and Underground Waters from Pesticide Contamination.
- Provisional Methodological Instructions to Hydrometeorological Stations and Sampling Stations to Take and Prepare Samples of Water and Ground for Chemical and Hydro-biological Test and Perform the First Day Testing (Moscow, Hydrometeoizdat, 1983).
- The system of accuracy control in respect of the pollution measurements of the environment under control. РД 52.24.66-86 (Leningrad, hydrometeoizdat, 1986).
- Methodological Recommendations for the Analysis of Causes of Extremely High Pollution of Natural Environment (Moscow, Hydrometeoizdat, 1988).
- Generalized List of Maximum Permissible Concentrations (MPC) and safe reference levels of impact (SRLI) of hazardous substances for the waters of fishery water bodies (Moscow, 1990).
- Methodological Instructions Concerning the Principles of Establishing the Observation System and Quality Control of Waters in the Water Bodies and Water Courses of Goskomhydromet Network within USSOCNE (Leningrad, Hydrometeoizdat, 1984).
- РД 52.24.309-92 Organization and Performance of the Monitoring Observations of the Surface Water Pollution within Roskomhydromet Network (Saint-Petersburg 1992).
- Methodological Instructions. Organization and Functioning of Monitoring Subsystem in Respect of the Transboundary Surface Continental Waters. РД 52.24.508-96, Moscow 1999
- РД Guidance for Sampling of Waters and Benthal Deposits at the Stations of the Regional Water Quality Monitoring Network of the Aral Sea Basin (SANIGMI, Tashkent, 1996).

State Bodies and Agencies to Ensure Water Control and Safety

Water Code, the Law on Nature Protection and the provisions on the government authorities involved in water resources management

are the legal basis of the regulatory approval system and state control and monitoring of water fund.

The Law on Nature Protection (1993) and Water Code of the Republic of Tajikistan (2000) regulate the issues of standard setting of environmental quality, maximum permissible discharges of hazardous substances, standards of sanitary-protection and water protection zones for water bodies and other water supply sources; the procedure of use of water bodies, the acceptability conditions in respect to waste waters discharge and imposition of charges for the use of water resources.

In Tajikistan the issues of water quality control are addressed by as follows:

- The State Committee of Environmental Protection and Forestry Management pursues the uniform policy in the field of the national use and protection of water resources. The State Institution «Agency for Hydrometeorology», a special inspectorate for state control over the use and protection of water resources, the oblast, district and city environmental protection committees as well as the Central Analytical Control Service operate under SCEPFM.
- The Ministry of Amelioration and Water Resources
- The Ministry of Health (the centers of state sanitary-epidemiological supervisions) deals with drinking water
- Chief Geological Department (underground waters)
- State Unitary Enterprise «Khochagii Manziliyu-Comunali» (Department for Water Treatment Plants) - drinking and sewage waters.

Please refer to paragraph 2.3. for more details on the functions of state authorities that ensure control and safety of waters.

4. WATER QUALITY MANAGEMENT

In Tajikistan water quality management is regulated by the state standards that have been adopted in the soviet period; some standards have been put into effect in the period of independence:

- GOST 17.1.3.07-82 The Rules of Water Quality Control in Water Bodies and Water Courses as effective from 1982
- GOST 2874-82 Drinking Water.

In addition to said GOST's there exists the Instruction on Sampling for Waste Water Testing BH 33-5.3.01-85 as approved by the USSR Ministry of Amelioration and Water Management (1985) etc.

4.1. Organization and Methods of Water Quality Control

Monitoring is provided on the national and local levels. On the local level the information is collected, preprocessed, 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.

The main indicators of control normally include the consumption and quantity of waters, water quality ratings by key pollution components. The additional indicators may include the stream velocity, water temperature, total hardness, micro-components which control is stipulated by the standards of drinking and mineral waters. The specific indicators may include the content of dissolved gases, pesticides, oil products etc. The composition of additional and specific indicators that characterize the state of water fund is established by the National Standards of Tajikistan with due regard of the requirements as apply to the international conventions and treaties.

The monitoring of surface and underground waters is provided by the two agencies:

1. The State Institution «Agency for Hydrometeorology» SCEPFM deals with the monitoring of the quality of surface waters. Before 90th there existed 147 reference hydrological stations located in the river basins. For the time being the number of hydrological stations has

reduced to 97 with only 82 operational. The quality of surface waters is evaluated based on 25-30 indices for the main rivers, lakes and reservoirs.

2. Chief Geological Department under the Government of the Republic of Tajikistan deals wit the monitoring of underground waters. The Department controls more than 270 underground water intake wells and has an observation network on water deposits. The quality of water is evaluated based on 25 parameters.

The section «Underground Waters» of the State Water Cadastre is developed on the basis of the information on the underground waters quality.

A special attention in paid to water protection from pollution. The State Environmental Program of the Republic of Tajikistan for 1998-2008 was approved by the Decree of RT Government dated 04.08.1977 Ref. 344 stipulating the determination of principles of water resources formation in the regions (qualitative and quantitative parameters), bringing the quality of drinking water and sewage treatment in conformity with the standards of purification.

In Tajikistan the quality of drinking water is regulated by the Ministry of Health (The Republican Center of State Sanitary and Epidemiological Supervision).

The methods of quality control of the natural drinking and domestic waters are mainly regulated by the standards as effective in Tajikistan that have been All-Union in soviet times.

4.2. Monitoring of Quality Parameters

One of the topical problems of the surface water quality monitoring is the lack of material and technical capacities of the test laboratories operating under SCEPFM. Although chemical test laboratories exist in each regional subdivision of the State Committee, they all to a certain extent need additional equipment and instruments as well as chemical agents for testing. For the time being the laboratories are capable of making the first-day test only (dissolved oxygen, BOD5, carbonate-ion, odor, toC) and conserve water samples for further testing in the laboratory of Dushanbe. Should the laboratories be provided with the chemical agents they will be able to perform a short-cut analysis of water quality based on the parameters as follows:

— pH factor; dry residues; COD; suspended substances; nitrogen ammonium; nitrates; nitrites; sulfates; chlorides; BOD_5; oil products;

— hardness.

One of the problems of quality monitoring of the surface waters is the lack of personnel. The activities are needed to strengthen the workforce capacity and train the personnel of the test laboratories in all subdivisions of the Committee.

A special attention should be paid to database development for which purpose it is necessary to adequately equip the test laboratories with computers and train the specialist in database operation and the methods of processing the test data.

The problem of data reliability of micro-biological testing is seen in the need of raising the frequency of sampling which testing needs to be performed directly on the spot; expanding the range of tests to be performed and their conformity with the international standards.

The problem of incapability to perform certain types of testing lies in the lack of funding; inadequate equipment of the laboratories with modern instrumentation and devices; the qualification level of manpower and the needs of staff training in modern methods and technologies of water quality testing.

It needs to be noted that the chemical-testing services at various ministries and departments dealing with the quality of surface waters are focused to address their narrow-departmental problems. None of the subdivision had eve performed any comprehensive monitoring.

One of the topical problems pertaining to monitoring is the lack of information sharing with respect to water quality.

When selecting the reference hydrological stations (as specified in paragraph 4.1) the conditions as follows were taken into account: accessibility of the sampling point; remoteness from the laboratory; labor intensity of sampling. In addition, the number and location of the bservation stations was determined in view of the existing use of water body or water course for the needs of public economy. The places and frequency of sampling and the list of water quality parameters to be controlled pursuant to the Rules of Surface Waters Protection are determined by the environmental protection agencies and specified in the permit for special water use.

According to the Rules of Surface Waters Protection the control stations shall be established for waste waters discharge subject to water use category. The discharge of waste waters or other types of economic activities affecting the state of water bodies used for domestic, drinking and utility purposes shall meet water quality standards of water bodies and water courses or the natural water composition and properties in case of exceedance of such standards at the sections located one km upstream of the nearest water use station (water intake for domestic

and drinking water supply; swimming and recreation sites; populated areas etc.) and in respect to the water bodies - in water areas located 1 km from the water use station.

At the control stations and discharge points the environmental protection bodies control the observance of the standards pertaining to the discharge and impact of wastewaters on the water bodies.

The control reference stations of water bodies and drain off systems should be equipped with sampling sites (including outside the territory of the discharging facility) accessible for the personnel of the controlling bodies.

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 benthal 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.

In Tajikistan series of single tests are normally used for water quality monitoring. Due to the low technical support and low financing sampling from the surface water sources is made on monthly basis.

The list of water quality parameters to be defined shall be in accordance with GOST 17.1.3.07-82.

Many laboratories are practically lacking the special sampling equipment, so the sampling is performed using primitive techniques or manually thus knowingly without any guaranteed reliability of the results.

The test methods are obsolete as well.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

Conclusions for Chapter 1

The Republic of Tajikistan has enormous reserves of water and hydro-energy resources of regional significance. Water factor is a vitally important component in addressing the problems of poverty and increase in employment.

Under the current climate conditions the area of glacierization is annually reduced by 1-1.2 km^2 that will certainly affect the water level of the surface flow. According to the projections, by the year of 2025 water content of the surface waters will reduce by 25-30%.

The Republic of Tajikistan is in the area of flow formation of Central Asian water resources. The qualitative composition of the country's water resources is formed under the influence of the natural factors; in the flow transit and dispersal area - under the influence of man-induced factors. Water quality in the flow formation zone meets the standard requirements for various types of water use. Qualitative deterioration of water resources conditions is connected with the discharge of practically untreated waste and return waters.

One of the main factors affecting the quality of water resources is the uncontrolled economic activities in water protection areas of surface and underground waters.

Weakening of the state control, the lack of incentives and water-saving technologies have resulted in low efficiency of using water resources (WR).

Conclusions for Chapter 2

The existing water quality management system in Tajikistan does not encourage the reduction of pollution, conservation and improvement of water ecosystems. The industrial, utility and agricultural organizations discharge untreated effluents in the river basins.

The functions of government authorities ensuring control and safety of water resources are duplicated and contradicted.

The ministries and department dealing with water quality have no adequate organizational, financial and technical resources for the radical

improvement of the regulatory base (the effective standards are those adopted in soviet period).

The transboundary problems in the field of water resources management are aggravating. Those include the differences in water quality standards between the countries, different levels of monitoring and methods of water quality measurement in water courses thus raising certain disagreements between the countries in respect of the conditions of water bodies.

Tajikistan is lacking a uniform information system of water resources.

Conclusions for Chapter 3

The existing standard-setting mechanism of water quality in Tajikistan has a number of deficiencies:

1. Underdeveloped system of bylaws in the field of water quality rating.
2. Low material and technical base for scientific-research activities in the field of assurance of environmental safety including the environmental standard setting for water quality.
3. Water users have no financial, technological and technical capacities that would ensure the observance of established requirements and reduce the discharge.
4. The lists of MPC include a number of substances that essentially may not be determined by testing.
5. Inadequate validity of the standards for pollutants discharge into water bodies etc.

Conclusions for Chapter 4

Water resources management and the relevant legal base have a number of deficiencies as listed below:

1. Complicated hierarchical structure with numerous functions in the field of use and protection of water resources; multi-industry nature of water use and diverse requirements of the quality, quantity and conditions of water resources.
2. The departmental approaches to water resources management are still prevalent leading to non-coordinated water resources management which inefficiency is increasingly evident.
3. The system of water resources development needs to be seriously improved since the state system of management has retained the

state ownership of water systems thereby notably loosing the economic levers of management.

4. As opposed to the world practices that are based on the hydrographic (basin) principle of water resources management whereby all types (surface, underground, return etc.) of waters are viewed as an organic whole, in Tajikistan the management functions in the field of water relationships are assigned to a number of ministries and departments without any efficient coordination between them.
5. The activities of the republican and local authorities are primarily focused on the management of water infrastructure. The strategic problems of water protection from pollution and depletion, regulation of the balance between supply and demand for water resources, stimulation of economy and efficient use of water resources, development of water use market mechanisms etc. have not been adequately addressed.
6. The preemption of departmental interests over the state ones typical of the existing system of natural resources management is reasoned by the lack of efficient motivation and specific measures of responsibility of the government officials.

General Conclusions

The problems existing on the national level are as follows:

1. Shrinkage of the glacier area
2. Qualitative deterioration of the state of water resources
3. Weakening of state control, reduction of efficiency of the use of water resources.

The problems of water quality standard setting remain unresolved. The standards established by the Sanitary Rules and Standards of Surface Waters Protection from Pollution of 1998 remain in effect thus posing an uncertainty in applying water quality standards for the water bodies of domestic, drinking and recreational-household purposes. It needs to be noted that Tajikistan uses MPC of the Russian Federation as the standard for the water bodies of domestic, drinking and utility purposes. As far as the MPC standards for the fishery water bodies are concerned, due to the lack of scientific capacities the methodology has not been revised as from the soviet times.

The problems existing on the transboundary level are as follows:

- In the event of retention of the existing water division quotas for the regional water reserves, the national water needs (in view of the climate changes) may be covered only through water-saving consumption

and efficient use of fresh water subject to the expansion of water protection activities.

The existing problems of using water resources may be characterized as follows:

- Inadequate investigation of water resources, the process of their formation and the man-induced impacts on water quality
- The lack of economic justification of the cost of monitoring of water resources condition
- The lack of unified water quality criteria
- Clash of interests between various water users and water consumers (in CA countries) giving rise to economic and political problems and constraining the development and implementation of a unified strategy of the use of water resources
- The lack of interstate agreement regulating the issues of quality of the transboundary waters and stipulating the establishment of an interstate authority to deal with such problems
- Serious problems of managing the transboundary water bodies lie in inadequate regulation of the issues of distribution and shared use of the transboundary rivers
- The practical lack (low capacities of SRC ICWC) of interstate system of water resources monitoring and exchange of reliable data on the use of water resources
- The existing bilateral agreements covering the problems of transboundary pollution did not produce any practical result i.e. reduction of pollution of the transboundary rivers. The lack of national mechanisms to fulfill the commitments under international conventions.

Recommendations

On the national level:

- To set the necessary water quotas for the transboundary water sources to fully cover the country's future needs;
- To establish and develop water market;
- To implement water-saving irrigation technologies and raise the efficiency of irrigation systems;
- To involve various agencies in water resources management
- To properly arrange various departmental approaches to water resources management;
- To establish targeted financial and investment structures.

To address the existing problems the actions as follows are required:

1. To establish the national and basin water councils;
2. To establish the national, basin and district commissions for irrigation and drainage;
3. To establish a dyke safety commission;
4. To strengthen the state supervision in respect of condition and use of water resources;
5. To strengthen economic capacities of water relationships of water management and protection activities;

To develop economic mechanism of water users stimulation to reduce the discharge of pollutants and observe the environmental laws.

To develop a unified water information system.

To build the regulatory base and improve water quality control in the country the instruments as follows need to be established:

- The Republican drinking water standard;
- The Rules of surface waters protection;
- The provisions on underground waters protection;
- The requirements of the composition and properties of domestic-drinking and utility water bodies in view of the territorial environmental capabilities.

To enhance the monitoring system the actions as follows are required:

1. To rehabilitate the operation of water control stations to reach the number existing in 1993 (147 stations);
2. To collect the reliable information on the conditions and use of water resources;
3. To apply the modern monitoring methodologies in order to compare the observation data of various departmental observation networks;
4. To ensure the required efficiency of collecting and processing the observation data;
5. To share the data collected between various levels and systems included in monitoring;
6. To provide the monitoring data in an prompt manner;
7. To prepare the data for the State Water Cadastre.

On the Transboundary Level:

- To revise the quality standards on the national level and harmonize on the regional level.
- To develop and agree upon the standards of environmental flow between CA countries.

- To develop the mechanism of executing the existing agreements between CA countries in the field of protection and rational use of the transboundary water courses.
- Enabling conditions for information sharing on the ecological conditions of the transboundary water bodies.
- To determine the areas of formation of underground trans-boundary waters and assigning the status of specially protected areas thereto.
- To establish the joint control stations at the frontiers to control the hydrological and hydro-chemical parameters; to change the location of the existing hydrological control stations to make it accessible for the neighboring countries and regulate the methods of measuring and testing the above parameters to obtain similar results.
- To use the uniform regulatory and methodological documents on water quality, taking into account the international requirements in order to obtain similar data.
- To establish an interstate system of environmental observations on the basis of satellite and aerial observations and the existing communications infrastructure.
- To assist in establishing the national and regional systems of environmental monitoring.
- To implement the state-of-the-art engineering and software and hardware provision.
- To share the scientific-technical information in the field of ecology and environmental protection.

Annex

Questionnaire for The NATIONAL REPORT Preparation

STANDARDS AND NORMS OF WATER QUALITY IN THE REPUBLIC OF TAJIKISTAN

Republic of Tajikistan City — Dushanbe Expert — Anvar Tyuryaev Date of issue — 23.02.2009			
1. Management of water resources and water quality ***1.The main document regulating water legislation in the country***			
1a	In place Yes	Title of the document: Water Code of the Republic of Tajikistan	Date of issue 29.11.2000

2. Water legislation of the Republic of Tajikistan is based on the legislative documents such as:			
2a	Constitution	Yes	6 November1994
2b	Water Code	Yes	10 November 2000
2c	The Law on Nature Protection	Yes	27 December 1993
2d	The Land Code	Yes	2 February 1992
2e	The Law of the Republic of Tajikistan on Sanitary-Epidemiological Safety of the Population	Yes	8 February 2003

3. The aim of water legislation of the Republic of Tajikistan		
3a	To ensure the rational use of waters for the needs of public, industries, water protection from pollution, littering and depletion, prevention and liquidation of adverse impact, improvement of the state and protection of water bodies, environmental protection	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	3c Achievement of optimal water use level between the neighboring countries	Yes

3d	Water use fee	Yes
4. State management in the field of water fund use and protection is provided by:		
4a	The Government of the Republic of Tajikistan	Yes
4b	The Ministry of Amelioration and Water Resources	Yes
4c	The State Committee for Environmental Protection and Forestry Management	Yes
4d	TajikGeologiya (underground waters)	Yes
4e	Committee of State Control of Industrial Safety and Mining Industry	Yes
4f	The Ministry of Energy	Yes
4g	The Ministry of Foreign Affairs	Yes
5. Management structure in the field of use and protection of water fund		
5a	Interstate	Yes
5b	State	Yes
5c	Basin	Yes
5d	Territorial	Yes
6. General requirements of the composition and properties of the surface waters for various types of water use are regulated by the document:		
6a	The Rules of Protection of Surface Waters (Moscow 1991)	Yes
6c	Consolidated List of MPC and Safe Reference Levels of Impact (SRLI) of Hazardous Substances on Waters and Fishery Water Bodies (Moscow 1990)	Yes
7. The Essence of Water Quality Standard-Setting is to		
7c	Establish a set of permissible values for waters of a water body in respect of its composition and properties that safely ensure good health of public, favorable conditions of water use and environmental well being of a water body	Yes
8. Types of water use		
8a	Public water supply	Yes
8b	Cultural-domestic supply	Yes
8c	Fishery	Yes
10. Frequently used integral indicators to evaluate water quality in water bodies		
10c	Hydro-chemical index of water pollution (IWP) and Hydro-chemical saprobity index (S)	Yes

11. Mandatory elements to calculate the index of water pollution (IWP):		
11c	Dissolved oxygen, hydrogen ion exponent pH Biochemical oxygen demand (BOD)	Yes
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		
12a	GOST 17.1.5.04-81 Nature Protection. Hydrosphere. Instruments and Devices for Selection, Primary Processing and Storage of Samples of Natural Waters. General Technical Specifications	Yes
12b	GOST 17.1.5.05-85 Nature Protection. Hydrosphere. General provisions of sampling surface and sea waters, ice and atmospheric precipitation	Yes
12c	HBH - 5.3.01-85 Instruction of Sampling for Waste Water Test	Yes
12d	GOST 17.1.3.07-82 Nature Protection. Hydrosphere. The Rules of Water Quality Control of Water Bodies and Water Courses	Yes
12e	GOST 24481-80 Methods of Sampling	Yes
17. Pursuant to Water Code, the use and protection of water fund is controlled on the levels as follows:		
17a	17a ministries and departments	Yes
17b	17b international, territorial and local levels	Yes
17d	17d state, industrial and public levels	Yes
18. Which governmental agency controls water quality of water bodies?		
18a	The Ministry of Amelioration and Water Resources	Yes
18b	The State Committee on Environmental Protection and Forestry Management	Yes
18c	Department of Sanitary-Epidemiological Supervision of the Ministry of Health (at water intake points for drinking purposes)	Yes
	TajikHydromet	Yes
19d Which document provides the official data of water quality in water bodies?		
19a	TajikHydroment: Annual reports on the quality of surface inland waters on the territory of Tajikistan	Yes
19b	Water Cadastre of the Ministry of Amelioration and Water Resources	Yes
20. Are the official data on water quality in water bodies available for the public		

20a	TajikHydromet provdes the information on water quality to the related organizations on a paid basis (except for scientific-research institutions)	Yes
21. Who else controls the quality of water in water bodies in accordance with the water legislation?		
21a	The related water user enterprises	Yes
22. Do the water user enterprises control water quality in water bodies?		
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
23. Which agencies analyze the monitoring reports provided by the user enterprises?		
23c	The authorized body of the State Committee of Environmental Protection and Forestry Management	Yes
24. As per GOST the place and frequency of sampling are established in accordance with:		
24c	Research program subject to the water body	Yes
25. The general requirements of sampling equipment are provided in		
25c	GOST 17.1.5.05-85 Nature Protection. Hydrosphere. The General Requirements of Sampling of the Surface and Sea Waters	Yes
26. The Terms and definitions of the main notions in the field of water quality are provided in		
26c	GOST 27065-86 Water Quality: Terms and Definitions	Yes
27. Water quality is determined (by testing) by the laboratories:		
27a	State	Yes
27c	Certified	Yes
27d	Industrial, departmental	Yes
28. Safety of water quality		
28a	SanNR 241004-07. Drinking Water. Hygienic Requirements of Water Quality of the Centralized Drinking Water Supply Systems, Reg. 49. 8.XII.2003	Yes
29. Can the standards of water quality be amended?		
29a	Yes, sanitary-epidemiological rules and standards on water quality are adopted by the order of the Minister of Health and registered with the Ministry of Justice	Yes
30. Which document determines the list of substances to be tested?		
30a	GOST 17.1.3.07-82 Nature Protection. Hydrosphere. The Rules of Quality Control of Water in Water Bodies and Water Courses	Yes

31. The list of tested substances is determined for the purposes as follows:		
31a	The list of water quality indicators to be determined in water bodies and water courses is determined in view of the intended use of water bodies and water courses, the composition of waste waters discharged and the consumer requirements	Yes
32. Who is entitled to amend the list of substances to be tested?		
32a	Authorized body in the field of use and protection of water fund	Yes
33. Can GOST's be amended? Which is the mechanism of such procedure? Which agency is to approve, review and implement?		
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. The review, approval, amendment and implementation are carried out by the authorized bodies	Yes
34. Is there any need of transition to other standards?		
34b	The National Plan for Integrated Management of Water Resources and Water Supply for Republic of Tajikistan stipulates the uniform methodology and methods to determine water quality	Yes
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		
35a	Water Code, Article 13: Individuals and legal entities, irrespective of the form of ownership, operating in the Republic of Tajikistan shall be entitled to participate in the activities on the rational use and protection of waters	Yes
36. The names and functions of government authorities (ministries, committees) performing the execution and control functions in the field of use and protection of water fund		
36a	The state Committee on Environmental Protection and Forestry Management:	Yes
36b	The Ministry of Amelioration and Water Resources	Yes
36c	Committee for State Supervision of Safe Performance in Industry and Mining Inspectorate:	Yes
36d	TajikGeologiya	Yes
36e	The Ministry of Health of the Republic of Tajikistan (Department of Sanitary-Epidemiological Supervision)	Yes
36f	The Ministry of Emergency Situations of the Republic of Tajikistan:	Yes
36q	TajikHydromet	Yes
36h	Local authorities	Yes

37. Ministries/ committees have the regional offices, the basin inspectorates on regulation fo the use and protection of water resources in oblasts/towns (please specify):		
The State Committee of Environmental Protection and Forestry Management under the Governemnt of Tajikistan has its regional subdivisions i.e. oblast level committees on environmental protection and forestry management (with offices in all districts and towns inside the oblast): 1. Sogdiysky. 2. Khatlonsky. 3. Gorno-Badakhshansky. 4. The districts of republican subordination (committees on environmental protection and forestry management in all districts and towns). **Ministry of Amelioration and Water Resources has the subdivisions as follows:** 1. Sogdiysky, Khatlonsky, Gorno-Badakhshansky oblast water management departments with all the relevant district offices. 2. The district water management departments exist in all the districts of national subordination. **The Ministry of Health:** 1. City centers of sanitary-epidemiological supervision (in oblasts and towns). 2. City centers of sanitary-epidemiological supervision (in the district centers).		
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:		
38a	Observations of qualitative and quantitative conditions of water resources	Yes
38b	Observations of hydro-chemical and hydro-biological water quality indices	Yes
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 there of		
39a	Water Code, Article 13: Individuals and legal entities, irrespective of the forms of ownership, operating within the Republic of Tajikistan shall be entitled to take part in the activities on the rational use and protection of waters	Yes
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		Yes

41. Representatives of public associations (PA) may take part in the activities of the basin councils		Yes
42. Public associations on their own initiative may carry out public control in the field of use and protection of WF		Yes
43. The procedure of public control in the field of use and protection of WF is being established		
43a	In accordance with PA charters, their goals and objectives in the field of water fund use and protection	Yes
43b	PA in line with the charters upon consent of the authorized state bodies providing state control in the field of the use and protection of water fund	Yes
44. Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, 17 March 1992)		
44b	The country is not a party to the Convention	Yes

THE LIST OF REGULATORY DOCUMENTS

1. Water Code of the Republic of Tajikistan.
2. The Law of the Republic of Tajikistan on Nature Protection.
3. GOST 2874-82 «Drinking water: Hygienic Requirements and Quality Control.
4. The Rules of Protection of Surface Waters (standard provisions).
5. Decree «On State Program of Environmental Education of the Population of the Republic of Tajikistan till 2000 and for Prospective of 2010».
6. The Action Plan to Implement the Law of the Republic of Tajikistan «On the Provision of Sanitary-Epidemiological Public Safety».

THE LIST OF REFERENCES

1. Constitution of the Republic of Tajikistan of 1994.
2. Water Code of the Republic of Tajikistan of 10.11.2000.
3. Land Code of 02.02.1992.
4. The Law of the Republic of Tajikistan «On Sanitary-Epidemiological Public Safety» of 08.02.2003,
5. The Law on Nature Protection 27.11.1993.
6. Decree of the Government of the Republic of Tajikistan «Provision of Segregation of Powers of the Special Authorized State Bodies on the Regulation of Use and Protection of Waters» of 04.02.2002.
7. Decree of the Government of the Republic of Tajikistan «On the Procedure of Maintaining State Water Cadastre of the Republic of Tajikistan» dated 03.04.2002 ref. 39.
8. Decree of the Government of the Republic of Tajikistan «Procedure of Execution, Registration and Issuance of Permits for Special Water Use» dated 03.12.2002 415.
9. Decree of the Government of the Republic of Tajikistan «State Environmental Program of the Republic of Tajikistan for the period of 1998-2008» dated 04.08.1997 ref. 344.
10. The Rules of Protection of Surface Waters dated 01.03.1991 (Moscow).
11. The Problems and Development Prospects of the Regulatory Base on Water Quality in Central Asia and Caucasus (Reports of International Workshop held on 28-29.04.05), 2005 (Almaty).
12. Instruction of Standard-setting of Discharges into Water Bodies, 2005 (Dushanbe).
13. Consolidated List of MPC and SRLI of Hazardous Substances for Fishery Water Bodies, 1990 (Moscow).
14. GOST 2874-82 Drinking Water, 1982 (Moscow).

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It Is Signed in seal 15.11.2009. Format 60x90 $^{1}/_{16}$. Papir ofset.
Garnitura Textbook. Усл.печ.л.3,0. Circulation 100.
Printed by OO «OST-XXI век»
Republic of Kazakhstan, 050043, Almaty, Orbita-1, h.40