



Turkmenistan

Report

Assessment of Water Sector in Turkmenistan

Ashgabat, Turkmenistan

2010

This report has been put together by Dr. Ir. Yegor Volovik, an independent consultant in the field of IWRM. Dr. Volovik visited Turkmenistan with a screening mission in the period November 10-20, 2009. During this mission a series of meetings in the UNDP Country Office and in the key agencies responsible for water resource management were organised and supported.

The contents of this report do not reflect the official positions or views of UNDP, nor those of the agencies visited by the consultant.

Ashgabat, Turkmenistan, March 2010

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Acronyms

ADB	Asian Development Bank
AJSC	Agricultural Joint-Stock Company
BOD	Biological Oxygen Demand
BWO	Basin Water Organisations
CA	Central Asia
CIDA	Canadian International Development Agency
COD	Chemical Oxygen Demand
DANIDA	Danish International Development Agency
DFID	UK Department For International Development
EC	European Commission
EU	European Community
EMC	Environmental Monitoring Centre
IA(s)	International Agreement(s)
ICWC	Interstate Coordination Water Commission
ICSD	Inter-State Commission on Sustainable Development
IFAS	International Fund for Saving the Aral Sea
ISWG	Inter-Sectoral Working Group for IWRM
IWRM	Integrated Water Resource Management
GoT	Government of Turkmenistan
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
GWP	Global Water Partnership
Hydromet	National Committee on Hydrometeorology
JCC	JCC for the Tedjen river
KKC	Kara Kum Canal/River
MDGs	Millennium Development Goals
MLRWR USSR	Ministry of Land Reclamation and Water Resources of the USSR
MNP	Ministries of Nature Protection of Turkmenistan
MNR	Ministries of Natural/Water Resources in CA countries
MoFA	Ministry of Foreign Affairs of Turkmenistan
MPE	Maximum Permissible Emissions
MPL	Maximum Permissible Loads
MWR	Ministry of Water Resources of Turkmenistan
NIDFF	National Institute of Deserts, Flora and Fauna
NGO(s)	Non-Governmental Organisation(s)
NPU	Nature Protection Union of Turkmenistan
N/A	Not available (data or information)
O&M	Operation and Maintenance

PPP	Public-Private Partnerships
R&D	Research and Development
RoK	Republic of Kazakhstan
RWSS	Rural Water Supply and Sanitation
Sanepid	Sanitary Epidemiological Service
SDC	Swiss Agency for Development and Cooperation
SIWI	Stockholm International Water Institute
SPZ	Sanitary Protective Zones
SWOT	Strength-Weakness-Opportunities-Threats
TSS	Total Suspended Solids
UCC	UNEP Collaboration Centre
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNRCCA	UN Regional Centre for Preventive Diplomacy for Central Asia
USAID	U.S. Agency for International Development
USSR	Union of Soviet Socialist Republics
WFD	EU Water Framework Directive
WPZ	Water Protection Zones
WSS	Water Supply and Sanitation
WSSD	World Summit for Sustainable Development
WUA(s)	Water User Association(s)
WWTP(s)	Waste Water Treatment Plant(s)

Executive Summary

Introduction

As per a request from the Government of Turkmenistan to EU for launching a National Policy Dialogue on IWRM and ongoing consultations between EU and UNDP with the Ministry of Water Resources of Turkmenistan (MWR), it has been recognised that national level interventions are required to address water governance issues and capacity development for further management of the water sector. This paper is the first reaction to this request. In order to provide a comprehensive picture of the water management system and its strengths, weaknesses and opportunities, a detailed review/analysis has been commissioned by the Country Office of UNDP in Turkmenistan supported by the UNDP Water Governance Facility located at the Stockholm International Water Institute (SIWI). The main task of the study was to assess the enabling environment in Turkmenistan in relation to managing water resources, institutional setup, coordination mechanisms in place and capacity building activities required, as well as to make an evaluation of the concurrent platform and conditions for introducing IWRM measures at the national and/or pilot level.

The current paper is built in a way to support not only a critical analysis of the current situation in the water sector, but also to highlight the most needed interventions in the water sector feasible to improve the enabling environment and institutional basis of water management in Turkmenistan.

Objectives of the Study

The main objectives of the study included an assessment of Turkmenistan's enabling environment, institutional setup including division of responsibilities/functions and coordination mechanisms among ministries and other governmental authorities, and current practices for managing water resources of the country covering also a similar assessment of any existing international water resources management agreements relevant to the Turkmen river basins, development of recommendations for improvements, and the development of an IWRM project at the national and pilot levels.

Water Resources and Water Management Objects

The climate of Turkmenistan is continental and extremely dry. This is due to the peculiarities of atmospheric circulation, the intra-continental location of the country, nature of the underlying surface, and the presence of mountain ranges in the South-East and South. A more detailed description of the climate of Turkmenistan is included in Section 3.1.

There is practically no surface runoff on the territory of Turkmenistan. The episodic runoff occurs in a few places formed by takyr and takyr-like soils after rains of more than 3-5 mm. This local runoff together with reserves of groundwater form water resources of the desert of Turkmenistan. As the local runoff is related only to the plots with weakly permeable soils, and its volume is small, reserves of groundwater are limited, the own water resources are insufficient for desert development activities. Water formed on the adjacent to desert territories is widely used for desert irrigation. Water complex of Turkmenistan is an integral sector and supports not only irrigation needs of agriculture but also the requirements of other sectors of economy. Irrigation canals and reservoirs are the sources of water for municipal, domestic, and drinking water supply in rural areas, they also secure watering levels for pastures. Besides, other water use types are supported, namely: commercial fisheries, energy generation, transport, recreation and sport fishing, navigation, landscaping within residential areas, others. The main water consuming sector of Turkmenistan is irrigation (over 92% in the long-term). The other water uses are the following: domestic and drinking water supply, power generation, industry, watering of pastures, other uses. More details are presented in Section 3.2.

There are five major sources of water resources in Turkmenistan, notably: the main transboundary rivers (the Amu Darya, Atrek, Murgab, and Tedjen), the small rivers of the North-Western slope of the Kopetdag mountain range, freshwater aquifers, return and drainage waters from irrigation, and some small natural lakes. Water management objects include the KKC, artificial reservoirs and lakes,

irrigation mains/canals, collector-drainage network, artificial drainage lakes and the “Altyn Asyr” lake. A detailed structure of water distribution through this water management infrastructure is presented in Figure 4 on page 16.

The water sector of Turkmenistan is one of the main sectors to be affected by the climate change. “The First National Report on the United Nations Framework Convention on Climate Change” (Ashgabat, 2006) reads that Turkmenistan is situated in such a region where negative effects of the global climate change are expected to be the largest. Expected raise in air temperature and gradual reduction of the rivers’ flow will negatively influence the most socially important sectors of the Turkmen economy, notably: health care, water sector, agriculture including irrigated farming, coastal activities at the Caspian Sea. This is why, the future IWRM interventions in Turkmenistan are expected to be placed in perspective of the global climate change adaptation measures.

Legal Frameworks

The legal framework of water resource management includes a number of International Agreements/Declarations both on the environmental issues and transboundary rivers; national legal framework which is formed by the Constitution, laws, decrees of Halk Maslakhaty and its Chairman, Decrees and resolutions of the President, resolutions and decisions of Mejlis, Cabinet of Ministers, as well as decisions and acts of Ministries and other national level authorities of state executive power, resolutions of local administrations; other legislation and regulations. One of the key pieces of legislation is the New Water Code of Turkmenistan in force since Nov 1, 2004. The Code legally confirmed the current set up of the government power and re-distribution of functions and responsibilities in the field of management and conservation of water resources. A detailed review of both the Code and supporting legislation, regulations, standards, and norms are included in Section 4.2.2 on page 22.

There are a number of gaps of the current legal framework and opportunities have been identified as a result of this study. There is a common understanding in Turkmenistan of the utmost importance of modern legal and regulatory frameworks for water resource management and conservation. Detailed presentation of these is presented in Section 4.3 (page 26), and a brief summary of the main issues – in the table below.

Gaps	Opportunities
A number of international arrangements on water resources, i.e. Ashgabat Declarations, ICWC, etc., do not cover the whole spectrum of issues to be considered by IWRM.	Water quality issues are to be dealt with in parallel with water allocation activities. This would require a special attention to updating the existing legal basis for cooperation between main government agencies.
The progress in developing supplementary regulations, standards, and norms, which would make the Code working, is very slow.	Development and introduction of legislation/regulations required under the Water Code are to be given the highest priority.
Actual practices applied to water management have a clear administrative-territorial nature rather than accounting for the main IWRM principles.	Water resource governance system needs to combine the basin management principles of IWRM with the existing administrative-territorial approach. There is a need for a national IWRM programme.
Coordination mechanisms between the key government agencies on the issues of water resource management have not been formally established and/or weak.	There is a clear need for an improvement of coordination of activities/responsibilities of the main government agencies and the establishment of Inter-Ministry Coordination Mechanisms. This requires corresponding provisions in the existing legislation.

Gaps	Opportunities
Management system of the water sector in Turkmenistan is rather complicated, actual practices include both soviet-style approaches and modern practices.	Such capacity has to be built in all aspects of water management and conservation practices. Implementation of modern approaches/principles is to be included in perspective development programme and corresponding legislation/ regulation, e.g. in those supporting the New Water Code.
A number of water related services are heavily subsidised (if not fully covered) by the state through corresponding levels of the national budget, which limits introduction of modern mechanisms and incentives.	Introduction of new modern economic instruments and financial mechanisms will help to make more services provided within water sector self-sustaining from the economic point of view. However, such instruments/mechanisms are to be carefully tested within pilot or/and demonstrational activities.
Involvement of wider public and communities including NGOs still has a considerable potential for improvement, particularly, their participation in the decision-making process.	Public awareness/educational/training and other capacity building activities are required to support improvements in water sector.
The procedure of interaction with donor community is much complicated.	Better donor coordination in the field of water sector operation and development (IWRM and RWSS) is vital including the involvement of both international and local private sector donors.

Institutional Structures and Main Functions

There are a number of institutional structures set up in CA to manage scarce water resources of the region. These included international bodies, i.e. the Interstate Coordination Water Commission (ICWC), the Interstate Fund for the Aral Sea (IFAS), the Interstate Commission on Sustainable Development (ICSD), the Centre of Preventive Diplomacy, etc., as well as a number of government agencies in Turkmenistan.

IFAS is a high-level body, which carries out activities based on decisions of the Leaders of the participating countries, regulations of IFAS, Secretariat of IFAS, the Agreement on the statute of IFAS and its subsidiary organisations. The key functions of IFAS include funding and crediting of joint interstate environmental and scientific programmes, funding of joint fundamental and applied research, setting up and operation of interstate environmental monitoring networks and corresponding data/information storage systems, resource mobilisation for joint actions, as well as participation in implementation of international activities on the Aral Sea and improvement of environmental status of the Aral Sea basin.

The main aim of ICWC establishment was to strengthen the principle of collective leadership in decision-making process on general issues of regional interstate water management, use and protection and in implementing joint programs related to water resources of Central Asia. The specific role of ICWC was acknowledged under the aegis of IFAS and thus showed the deep understanding of the importance of joint management in using and protecting water resources, in developing all the countries and the region as a whole, as well as concerns about sustainable supply of their people with water and ensuring of adequate environmental conditions.

Overall coordination of sustainable development activities is carried out by ICSD. The main goal of ICSD – coordination and supervision of cooperation in the field of environment protection and sustainable development programmes in Central Asia.

The water sector in Turkmenistan is represented by a complex governance system comprising a number of ministries and institutions; very often these authorities share joint responsibilities and functions. In addition to the complicated management structure, national capacity remains a major concern at all levels. Furthermore, there is a lack of interaction and coordination among the ministries and institutions of the water sector. The key specialised governmental ministries responsible for water resource management and protection are the Ministry of Water Resources (MWR) and the Ministry of Nature Protection (MNP), as well as their subordinate offices in the regions. The main functions of these agencies, as well as some others are represented in Figure 5 on page 32.

Present Systems of Monitoring and Information Management

Currently, a series of governmental authorities are responsible for and carrying out regular monitoring of water resources in Turkmenistan:

- ▶ The National Committee on Hydrometeorology,
- ▶ The Water Management Department “Amu Darya” of the ICWC,
- ▶ The Ministry of Water Resources (MWR),
- ▶ The Centre of Environmental Monitoring (CEM) of the Ministry of Nature Protection (MNP),
- ▶ The Sanitary-Epidemiological Service of the Ministry of Health and Medical Industry,
- ▶ The State Concern TurkmenGeologiya.

Details on monitoring programmes and the current capacities of the laboratories above are presented in Section 5.3.1. Each laboratory involved in monitoring keeps logbooks of samples taken and (where applicable) analysis carried out. A single copy of the logbooks is maintained, registered and stored. All calculations required is performed manually. Computer equipment is rare and is mostly used by administrations and accountancy departments. All data processing in laboratories of is also done manually because computer equipment and software are not available. Data and information are stored as hard copies only.

It should be mentioned that there is a serious need to increase capacity of the existing laboratories of nearly all agencies to turn them able to carry out monitoring in accordance with modern requirements. Such exercises need to include a wide suite of educational/training activities, as well as participation in various international inter-comparison and inter-calibration exercises. Besides, accreditation of laboratories to perform analysis needs to include issues of QA/QC to ensure reliability of information used within the decision-making process.

Results of SWOT Analysis of Institutional Setup in Water Sector

It should be mentioned that there a number of facts testifying to the current interest of the managing authorities to improve the legal/regulatory frameworks and systems in place, i.e. monitoring systems, systems for storing and processing of data and information, modern reporting and public web-based information systems. Representatives of all agencies visited by the consultant stressed the urgent need to address the present practices of water management in order to drastically improve the effectiveness of decision-making. The SWOT analysis carried out within this study concentrated on the two key aspects being (i) enabling environment, structures, management and coordination procedures and (ii) technical supporting systems, i.e. monitoring systems, reporting/information flow and data exchange. Detailed presentation of the SWOT analysis results is included in Sections 5.4.1 (page 39) and 5.4.2 (page 40) of this report.

Water Supply and Sanitation Sector Review

A majority of the existing water supply systems were built in the 1950-1980s. According to some expert estimates the establishment of water supply systems, generally, was directed at the development

of new water sources, increase of capacity of pumping stations and water treatment/purification facilities, capacity of the main water distribution canals, etc. Such aspects as the optimisation/reduction of water use, installation of water gauging devices/meters, as well as a number of others practices currently widely used were not properly addressed nor introduced in the operational management and long-term development plans. As a consequence, within 10-15 years of independence the quality of water supply services drastically decreased. Currently, it is still a challenge to provide water with required quality and in the needed volume down to individual consumers.

Sewerage systems in Turkmenistan are available only in bigger cities. Due to the fact that rural population receive water from street pumps, the absence of sanitation facilities did not affect the state of residential areas. However, wide use of unprotected dug pits by the rural population and discharge of domestic sewage into natural cavities are the main limiting factors to prevent outbreaks of a series of diseases. The volume of sewage water received by the sewerage systems is just about 35% of that of water provided through the existing centralised water supply systems. Similarly to the water supply systems, the state of the existing sewerage systems is very poor. This is why the development of proper sanitation facilities is a matter of the highest priority.

Sustainable access of population, in particular, of the rural population to safe drinking water is officially declared as a priority state policy. This policy is implemented through the development of centralised systems of sewerage and water supply. A number of laws and regulations are related to the WSS sector in Turkmenistan including the New Water Code (2004).

Participation of private sector entities in WSS sector in Turkmenistan is weak. To a certain extent this could be explained by the still persisting soviet mentality, but there also other internal and external causes. Involvement of the private sector is limited to participation in tenders for construction of new and reconstruction of existing residential premises. Tariffs are set by the government/state and, therefore, dependent organisations. By default, these tariffs are much lower than actual costs involved. This is done deliberately to ease the financial pressure on population. Since such an approach makes WSS systems financially unsustainable *a priori*, there is no much interest from the private sector unless additional financial mechanisms and economic instruments are developed and introduced.

The needed platform for participation of a wider public in the decision-making process in relation to environment management and protection exists in Turkmenistan in terms of both national mechanisms and international Conventions/Declarations, which Turkmenistan has joint. Some efforts have been made to develop such mechanisms at the scale of demonstrational and pilot projects implemented in their majority by international organisations and donors. There is still a lack of understanding at higher political levels of the importance to involve key stakeholders at the grassroots level into the current projects and activities, on the other hand, local communities themselves are hardly interested in the issues of WSS, which is obviously related to insufficient awareness.

Financing of WSS (both maintenance and construction of new systems) is mainly provided from the following sources: payment for services provided, state and local budgets, loans, grants, technical assistance of IFIs and organisations. In Turkmenistan annually considerable funds are disbursed for new large-scale projects on centralised water supply and sanitation. Operational costs of WSS sector are covered/subsidised by the state in terms of services provided to the Turkmen population. Levels of these subsidies are not defined legislatively, methodologies of setting such levels do not exist. At the same time, some recent assessments carried out by the World Bank showed quite high readiness of the population to pay for high-quality services in the field of water supply and sanitation.

The recommendations developed for the improvement of the current state of urban water supply in Turkmenistan include a series of measures from accurate inventories and surveys through development and implementation of pilot and demonstrational projects to stakeholder participation and creating a friendly environment for domestic and international donors (see Section 6.2.1, page 45).

Since there was a special interest expressed by the client of this assignment, a more detailed analysis has been carried out of the challenges and recommendations for the rural water supply and sanitation sector. In order to structure the issues identified they have been split into 4 thematic areas, namely:

Enabling environment; Organisational and technical aspects; Financial mechanisms and economic instruments; and Public participation, stakeholder involvement, and training. The Enabling environment component included a series of issues related to the legal and regulatory frameworks in Turkmenistan and reforming of the governance system. Recommendations included a series of activities to improve the current development planning of RWSS sector, for instance, development of strategies and policies at all levels including detailed monitoring and evaluation plans, establishing inter-ministry coordination mechanisms, development of modern standards and norms, as well as a number of activities to promote proper development of the sector. All related issues identified were grouped under the Enabling Environment Theme presented in Figure 7 (page 48). The second component, Organisational Measures Theme, is focused on activities of organisational and/or technical nature. Such activities have a more “down to the ground” character and often require implementation of certain projects like strengthening of capacity of existing laboratories, application of modern technological solutions, installation of water gauging equipment, etc. The corresponding measures are presented in Figure 7 under the Organisational Measures Theme. The third component, The Financial Mechanisms and Economic Instruments Theme, is concentrated on certain aspects of converting a currently heavily subsidised system into a self-sustaining one. It is understood by the author that implementation of the proposed measures should be implemented with a great level of care, since there are many legal and other types of boundaries to operate within, however, gradual introduction of specific applicable for Turkmenistan mechanisms and instruments will lead to a better organisation and functioning of the water supply and sanitation system as such. The proposed measures are grouped together under the Financial/Economic Mechanisms/Instruments Theme. The final component, the last but not least, is related to the public participation, stakeholder involvement and training. It is widely recognised in Turkmenistan that awareness and educational activities are required at all levels. Good understanding of the main principles as well as a need for changing the current systems will not only intensify the reforms being undertaken, but will lead to the eventual behaviour change in water use as a whole. Implementation of the majority of activities identified required involvement of rural population and communities at grassroots level.

Review of Demonstrational and Pilot Activities in CA

This section of the report contains details on a number of international activities (Section 7, page 49):

- ▶ Transition towards IWRM in Lower Reaches and Deltas of Amu Darya and Syr Darya Rivers. The Pre-Feasibility Study (Donor - US Department of State; Executors - The Regional Environment Office of US Department of State, national experts from Kazakhstan, Turkmenistan, and Uzbekistan; Timing - 2004 to 2005);
- ▶ Developing the Kazakhstan National Integrated Water Resources Management (IWRM) and Water Efficiency Plan (The Government of Norway and DFID; Executors: Basin Water Organisations (BWOs), Ministry of Agriculture and Ministry of Economy and Budget Planning of the Republic of Kazakhstan, the UK Department for International Development (DFID), Global Water Partnership (GWP); 2004-2007);
- ▶ The UNEP and UCC-Water Sub-Regional Program for Central Asia: “Speedup of IWRM-2005 Goals Implementation in Central Asia” (Danish International Development Agency (DANIDA); Collaboration Centre for Water and Environment - GWP CACENA and national experts from the Republic of Kyrgyzstan, the Republic of Tajikistan and the Republic of Uzbekistan; 2005-2006);
- ▶ Water Governance in Central Asia Project (EU EuropeAid; WYG International, Ministries or State Committees for Environment and Natural Resources of Kazakhstan, Kyrgyzstan, Tajikistan, and Turkmenistan; 2008-ongoing);
- ▶ Promoting IWRM and Fostering Transboundary Dialogue in Central Asia (UNDP, EC, Norway; In-kind Contributions from Kazakhstan, Kyrgyzstan, Tajikistan; 2009-ongoing);

Conclusions

There are a number of conclusions to be drawn as a result of the current assessment of the water sector of Turkmenistan. Despite considerable amount of water resources formed in the CA region, their distribution is very uneven from both geographical and temporal point of view. Such fact shows the importance of a joint effective management and fair distribution of the available water resources amongst the CA countries, since availability of water for population, industry and, mainly, for agriculture is one of the key factors limiting further development of the regional economies. In order to streamline the joint management practices in the region implementing the IWRM concept as the basic approach has been recognised by all countries and supported at the highest political level.

In Turkmenistan implementation of IWRM is critical for further development of the country. Considerable efforts have been made in the recent years to modernise the existing infrastructure and improve the enabling environment, still a lot has yet to be implemented. Functions of water resource management are divided between a number of government agencies, however, priorities and objectives of these authorities are sometimes different. This fact makes a closer cooperation between them quite complicated. An institutional reform is though required.

At present, there are a number of international agreements in relation to water resources in CA, however, the main emphasis is put onto water allocation mechanisms rather than on the development of integrated management approaches. Water quality related issues are still not properly dealt with within these agreements.

Development and implementation of public awareness campaigns on IWRM is needed to reach out to as much stakeholder groups as possible.

In order to integrate the WSS sector into an overall IWRM scheme it is recommended to develop a clear strategy for the development of small-scale water supply and sanitation systems in rural areas, to design and implement a series of pilot activities with introduction of modern technologies and practices of water treatment, to set up of effective drinking water quality monitoring systems, to design targeted and focused educational and training campaigns, to support legislatively and financially the participation of private sector and the establishment of PPPs in the field of water supply and sanitation.

The current assessment resulted in a series of recommendations for further interventions feasible for reforming the water sector. Detailed interventions proposed are included in Table 9 on page 59. The table includes also a series of outcomes/impacts to be achieved by the proposed interventions. In addition, Appendix A contains a series of activities of these interventions in a form of an “idea pipeline” based on emerging funding opportunities. The same ideas have also been put as the basis for an IWRM project proposal for Turkmenistan, which is available at UNDP Turkmenistan office as a separate document.

Acknowledgements

The author wishes to extend his warmest thanks to all people, who provided support during his mission’s preparatory stage, during the mission itself, as well as during preparation of this report. In particular, the author wants to use the opportunity to thank UNDP Turkmenistan staff in Ashgabat (Mr. Rovshen Nurmuhamedov, Mr. Djemshid Khadjiyev, Ms. Selbi Esenova, Ms. Nina Kolybashkina, Ms. Bayramgul Garabaeva, and many others), the national consultant (Mr. Usman Saparov), all these people supported activities of the consultant extensively. Consultations with representatives from the Ministry of Water Resources, the Ministry of Nature Protection, the Ministry of Agriculture, the National Institute of Deserts, Flora and Fauna and the Institute “Turkmensuvlymytaslama” have also substantially contributed to the current paper.

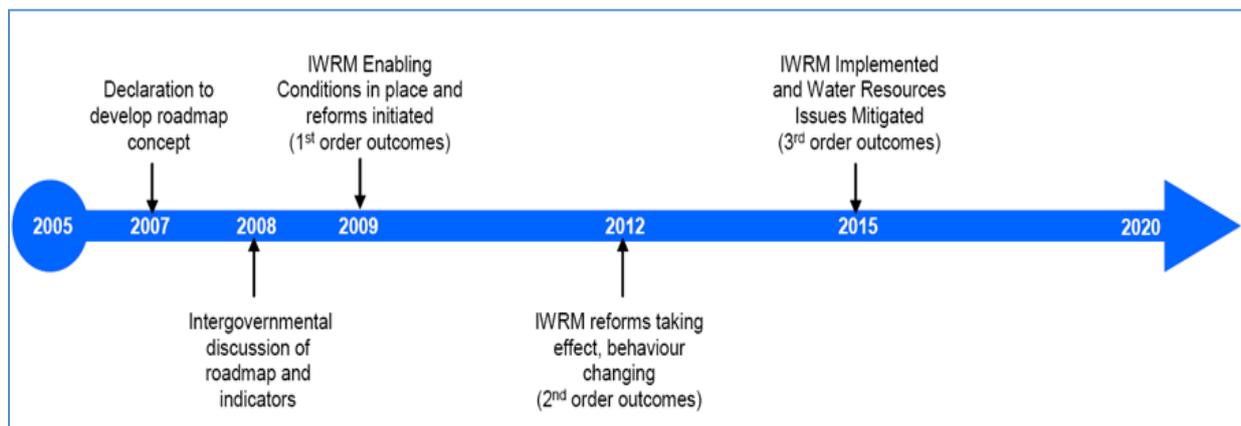
1. Introduction

The Global and Regional Perspective

At the World Summit for Sustainable Development (WSSD) held in Johannesburg in 2002 the international community decided to include in the WSSD plan of implementation a call to all countries to “Develop Integrated Water Resource Management (IWRM) and water efficiency plans by 2005, with support to developing countries”.

The IWRM 2005 Target set a milestone for an initial planning exercise including specification of actions at all levels to realise future rational and appropriate water governance mechanisms by the countries to support future environmentally sustainable economic and social development. A general roadmap (Figure 1) resulting an attempt to identify the milestones for implementation of IWRM plans and strategies in order to reach a level of improved water governance timely enough to contribute to the achievement of the MDGs and the further development beyond 2015 [1]. More details on the corresponding activities are presented in Section 8.2, page 53.

Figure 1 The Roadmap for Implementing IWRM



In order to succeed with implementation of IWRM nationally a number of core interventions are to be made, for instance:

- ▶ Policy, legal and regulatory framework:
 - a. Defining water and land rights
 - b. Modifying agricultural, electricity/power and water specific strategies and policies
 - c. Optimising subsidies and other supports that distort input use and cropping patterns.
- ▶ Improved management/governance and institutional strengthening:
 - a. Strengthening of water resource management, development of sound mechanism to avoid duplication of functions of the main governmental authorities, introduction of adaptive management principles
 - b. Providing incentives and extension to support the use of water saving technologies and other appropriate technology, water harvesting and the uptake of water and soil modern conservation practices
 - c. Promoting cooperative management of joint supplies to all water users, e.g. groundwater and larger water harvesting structures
 - d. Development of mechanisms for wider involvement of public and other stakeholders

- ▶ Infrastructure development:
 - a. Preparation of integrated investment programmes
 - b. Investing in support services, including transportation and marketing
 - c. Development and introduction of Public-Private Partnerships (PPP) in water sector.

Turkmenistan supported the principle of IWRM at the highest political level. Considerable efforts and resources are currently put into the development of water management structures and modern practices; however, there has been no regular reporting on the progress available internationally on introducing IWRM in the country.

Relevance of the Current Assignment

As per a request from the Government of Turkmenistan to EU for launching a National Policy Dialogue on IWRM and ongoing consultations between EU and UNDP with the Ministry of Water Resources of Turkmenistan (MWR), it has been recognised that national level interventions are required to address water governance issues and capacity development for further management of the water sector. This paper is the first reaction to this request. In order to provide a comprehensive picture of the water management system and its strengths, weaknesses and opportunities, a detailed review/analysis has been commissioned by the Country Office of UNDP in Turkmenistan supported by the UNDP Water Governance Facility located at the Stockholm International Water Institute (SIWI). The main task of the study was to assess the enabling environment in relation to managing water resources, institutional setup, coordination mechanisms in place and capacity building activities required, as well as to make an evaluation of the concurrent platform and conditions for introducing IWRM measures at the national and/or pilot level.

Assessment of Water Sector in Turkmenistan presented in this report is a qualitative analysis focused on the present situation in water sector of the country and state of transboundary cooperation with neighbouring countries.

Objectives of the Study

The main objectives of the study included the following:

- ▶ Provide an assessment of Turkmenistan's enabling environment for managing water resources of the country, namely existing water strategies and policies or governing mechanisms, laws, codes, decrees and other legislative documents and customary practices regulating the water, sanitation and irrigation sectors. Assessment is to contain a description of the current status, identification of main barriers and gaps, and the key recommendations for improvement.
- ▶ Provide a similar assessment of any existing international water resources management agreements relevant to the Turkmen river basins.
- ▶ Undertake a review of the institutional setup, division of responsibilities/functions and coordination mechanisms among ministries and other governmental authorities dealing with water management and/or water quality issues, with identification of setbacks and problems, stakeholders, roles and responsibilities, as well as recommendations for further improvement.
- ▶ Provide analysis of the existing water management practices at the local (district) level and evaluation of the environment and capacities for IWRM at national and/or pilot level. In consultation with various stakeholders a pilot area and scope of intervention for an IWRM pilot project is to be identified and proposed.

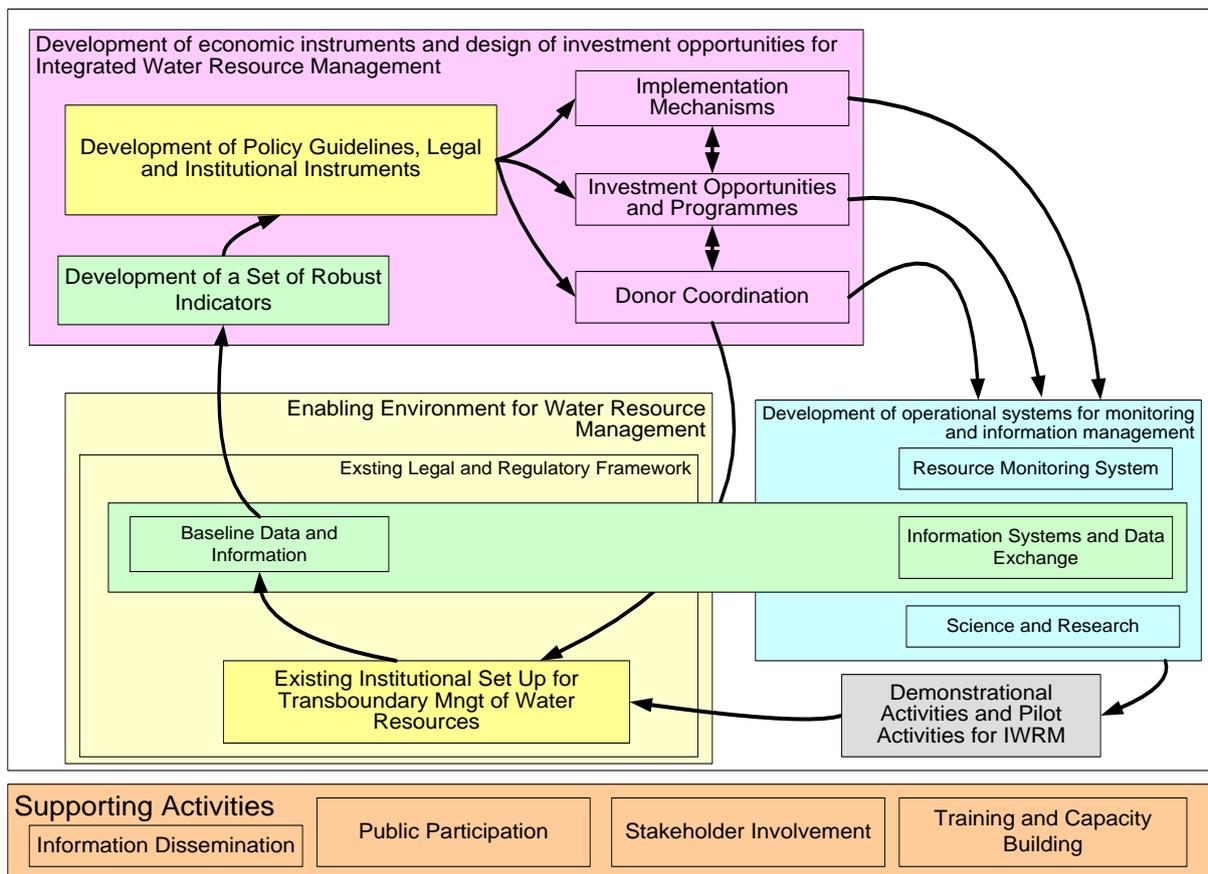
- ▶ Develop a project proposal¹ to address three main objectives:
 - a. enhancing the enabling environment;
 - b. institutional capacity building opportunities; and
 - c. implementing a pilot IWRM project in one district (scale to be small basin based).

Approach and Methodology of the Study

During this study the following data collection and analysis methods have been used:

- a) desk research – literature review of the relevant strategy/policy papers, standards, national laws and regulations, programme/project documentation materials of different organisations and institutions, reports and publications covering water resource management as such, as well as those related to the three key sectors (water management, irrigation, water supply and sanitation);
- b) focus group discussion with representatives of the key governmental authorities; and
- c) individual interviews and brain-storm sessions with technical experts and specialists supporting activities of the consultant.

Figure 2 The Overall Approach to Water Management Sector Analysis



¹ The project proposal has been prepared as a separate document; however, an “idea pipeline” of possible IWRM interventions based on emerging funding opportunities is presented in Appendix A, page 63.

Methodologically the study followed the approach presented in Figure 2. In order to get a broader picture of the current situation in the water sector and to develop a proper set of recommendations for the improvement, the following assessments have been carried out:

- ▶ Review and description of the key baseline information on water resources and types of water use in Turkmenistan;
- ▶ Assessment of the legal and regulatory frameworks and institutional structures in the field of water resource management and conservation;
- ▶ Assessment of the current systems of monitoring and information exchange including those at transboundary level;
- ▶ Assessment of the existing economic instruments and investment mechanisms;
- ▶ Assessment of the needs for training and capacity building.

Since one of outcomes of the current assignment is an IWRM project proposal, a clear understanding was critical of both the current situation in water sector and gaps to be bridged up with possible future interventions.

2. Administrative Organisation of Governance in Turkmenistan

Turkmenistan, a Newly Independent Central Asian State, formally declared independence from the USSR in October 1991. Turkmenistan is situated between the Turkmen-Khorasan Mountains in the South and Ustyurt Plateau and the Aral Sea in the North, the Caspian Sea in the West and the Amu Darya River in the East. Its territory extends from West to East by 1,100 km, and from the North to the South by 650 km. Turkmenistan borders in the West by the Caspian Sea, in the North-West by Kazakhstan, in the North-East by Uzbekistan, in the South-East by Afghanistan and in the South-West by Iran. The neighbouring countries are: Kazakhstan in the North, Uzbekistan in the East, and Iran and Afghanistan in the South.

Table 1 General Information on Turkmenistan (2005)

Territory	491.18 thousand km ²
Population	6.550 million (average population growth 5% ²), of which 3.468 million – rural population (53%)
Capital (population)	Ashgabat (871.5 thousand people)

There are four administrative levels of organisation in Turkmenistan (Figure 3) [2]. These include:

- ▶ National Level;
- ▶ Welayats (Oblast) Level;
- ▶ Etraps (District) Level; and
- ▶ Local Level.

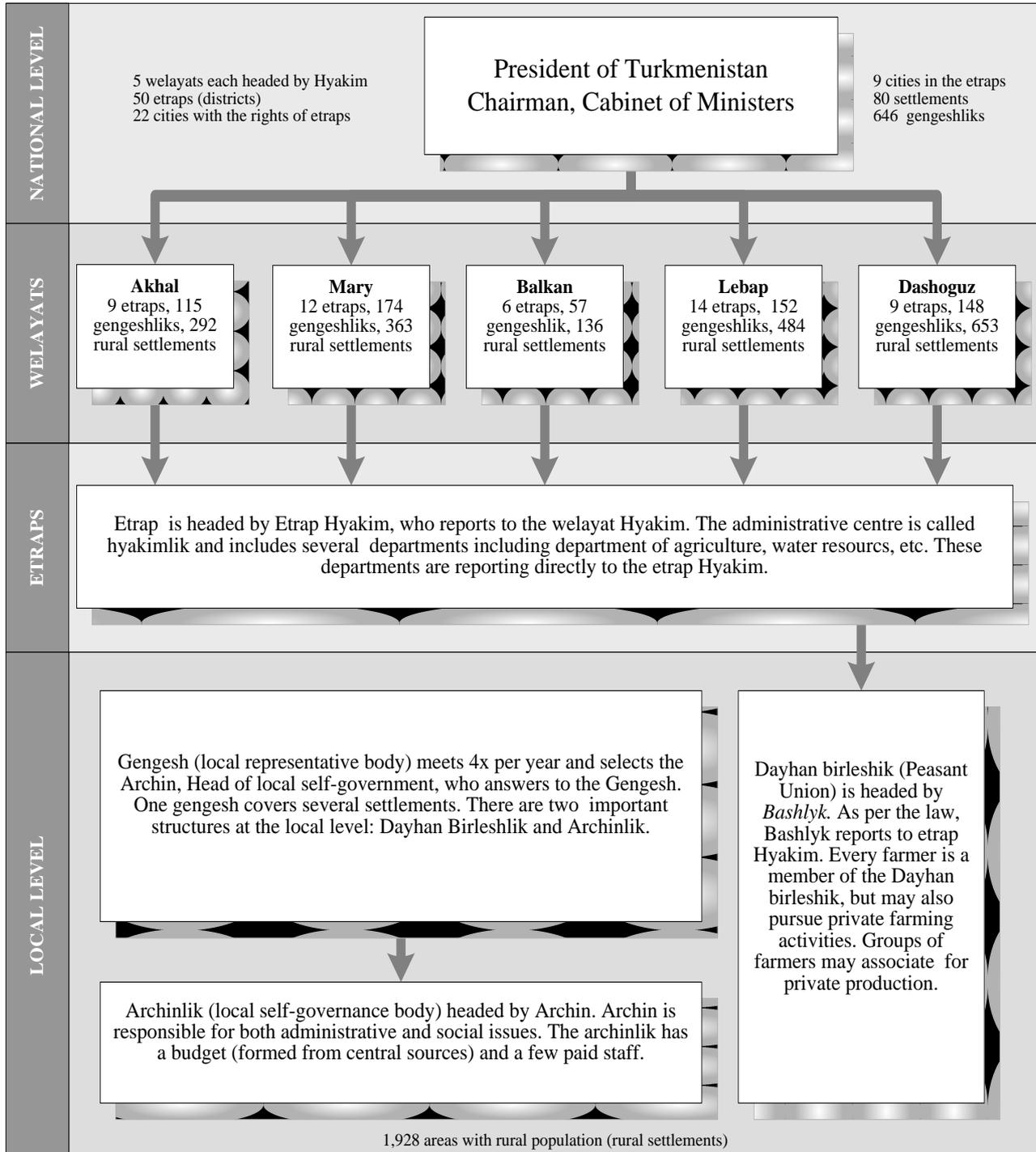
Welayats are the largest administrative units similar to oblasts or provinces. There are five welayats in Turkmenistan, namely: Akhal, Mary, Balkan, Lebap, and Dashoguz. Welayats are headed by Hyakims (Governors), who are appointed by the President. Welayats contain a number of etraps (districts).

Etraps are headed by etrap Hyakims, who report to the welayat Hyakim. Etrap Hyakims are also appointed by the President. The administrative centre is called hyakimlik and includes several

² According to official data of the State Institute of Statistics and Information of Turkmenistan “Turkmenmillikhasabat”

departments including departments of water resources, agriculture, etc. These departments are reporting directly to the etrap Hyakim. The city of Ashgabat, the capital of Turkmenistan, headed by the Ashgabat Hyakim does not belong to any of the welayats and also comprises 4 etraps. Other cities of Turkmenistan have rights of etraps.

Figure 3 The Administrative Organisation of Turkmenistan



The local administrative level is represented by gengeshliks, archinliks, and dayhan birleshik³. Gengesh (local representative body) meets four times a year and selects the Archin, the Head of local self-government, who answers to the Gengesh. One gengesh covers several settlements.

There are two important structures at the local level: dayhan birleshlik and archinlik. Archinlik (local self-governance body) headed by Archin. Archins are responsible for administrative issues and social issues. The archinlik has a budget (formed from central sources) and a few paid staff.

Dayhan birleshik (Peasant Union) is headed by Bashlyk. As per the law, Bashlyk reports to etrap Hyakim. Every farmer is a member of the Dayhan birleshik, but may also pursue private farming activities. Groups of farmers may associate for private production.

More details on the administrative organisation of governance in Turkmenistan as well as on the composition of all territorial-administrative units are presented in Figure 3.

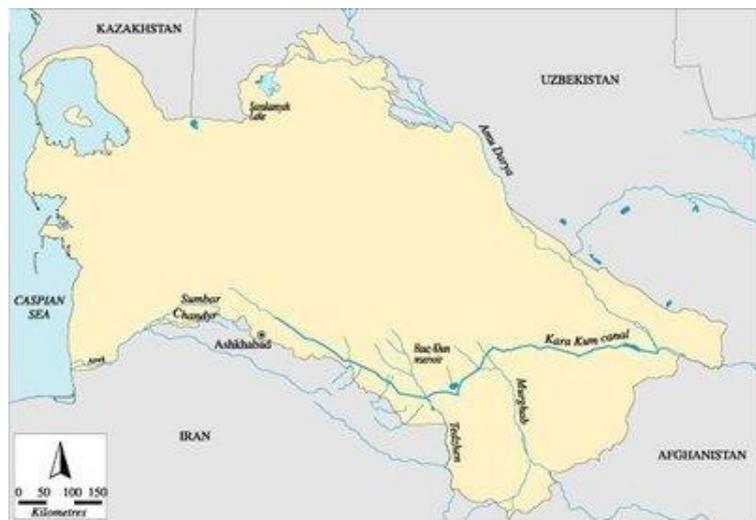
3. Review of Water Resources and Water Management Objects

3.1. General Information on Turkmenistan

The total area of the country is about 500 thousand km² (491.18 ths. km²). The Gara Kum desert covers 80% of the total area of the country. In the South-West, along the border with Iran, the Kopetdag mountain range lies with its highest peak at 2,919 metres. The Kougitangtau Mountain with a peak at 3,137 metres is located in the East of the country at the border with Uzbekistan.

The climate of Turkmenistan is continental and extremely dry. This is due to the peculiarities of atmospheric circulation, the intra-continental location of the country, nature of the underlying surface, and the presence of mountain ranges in the South-East and South. The average annual temperature of air over the entire territory varies from 11-13 °C in the north to 15-18 °C in the South-East.

The winters are mild, with little snow and moderate frosts. The coldest month is January with a temperature ranging from – 6 °C in the North-East to +5 °C in the South-West. The summer is very hot and dry. The temperature of air is the highest in July, and in the coastal regions - in August. In the South-West, between the Murgab and Tedjen Rivers and in the central part of the Central Gara Kum desert, the average monthly temperature of the air in July exceeds 32 °C. On the remaining territory, it varies from 27 to 30 °C. The absolute maximum (48-50 °C) was noted in the Central and South-Eastern Gara Kum deserts. The average annual precipitation varies from 100 mm (Kara-Bogaz-Gol Bay and North-East of the country) to 400 mm (Koine-Kesir in the Kopetdag Mountains). Rainfall occurs during the winter season, mainly in October and April. The amount of precipitation in the cold period of the year is two or three times greater than in the warm one [5].



3.2. Water Use Composition

There is practically no surface runoff on the territory of Turkmenistan. The episodic runoff occurs in a few places formed by takyr and takyr-like soils after rains of more than 3-5 mm. This local runoff

³ Cooperative peasant unions (kolkhozes).

together with reserves of groundwater form water resources of the desert of Turkmenistan. As the local runoff is related only to the plots with weakly permeable soils, and its volume is small, reserves of groundwater are limited, the own water resources are insufficient for desert development activities. Water formed on the adjacent to desert territories is widely used for desert irrigation.

In Turkmenistan, the issue of water resources stands out as one of the most critical factors limiting future development of economy and welfare of the country. An old Turkmen proverb says: “A drop of water is a grain of gold”. This shows historical attitude of the Turkmen people to water as one of the most precious natural resources.

Water complex of Turkmenistan is an integral sector and supports not only irrigation needs of agriculture but also the requirements of other sectors of economy. Irrigation canals and reservoirs are the sources of water for municipal, domestic, and drinking water supply in rural areas, they also secure watering levels for pastures. Besides, other water use types are supported, namely: commercial fisheries, energy generation, transport, recreation and sport fishing, navigation, landscaping within residential areas, others. A diversified collector-drainage network, the main function of which is the diversion of drainage waters and land melioration measures on irrigated land, is also used for fisheries. Distribution mains and artificial lakes formed during years by return waters (about 80 lakes) are the habitats for a variety of water fowl and birds.

Table 2 Water Use Composition in Turkmenistan (2TP-Vodkhoz Reports, 2008)

Water Use	Water Allocated, million m³	% of Total
Agriculture (incl. irrigation)	16,758.0	89.29 %
Power generation	790.7	4.21 %
Domestic and drinking water supply	460.1	2.45 %
Industry	634.4	3.38 %
Others	124.8	0.66 %
TOTAL	18,768.0	100.00%

The main water consuming sector of Turkmenistan is irrigation (over 92% in the long-term). The other water uses are the following: domestic and drinking water supply, power generation, industry, watering of pastures, other uses [7]. The most recent data (2008, reported) shows the distribution as presented in Table 2. The cultivable area is estimated at 7 million hectares (ha), or 14% of the total area of the country.

Agricultural runoff (being mainly the return waters from irrigation) is a major transboundary problem for Turkmenistan causing downstream pollution affecting population health and reducing agricultural productivity in the Amu Darya River catchment. Turkmenistan receives transboundary flows at several locations, including source water from the Amu Darya and return water from the Khorezm region of Uzbekistan. There is a great concern about the quality of these waters, especially the return water, due to large volume of these waters and suspected considerable level of pollution. Currently, Turkmenistan assumes responsibility for the disposal of these return waters, which exacerbates drinking water pollution problems by contaminating groundwater sources.

3.3. Water Resources of Turkmenistan

By geographical areas of runoff formation water resources of Turkmenistan can be divided into two main groups. The first group includes the rivers with the flow fully (or mostly) being formed beyond the country's boundaries, such as the Amu Darya, Murgab, Tedjen, Atrek Rivers, small rivers of the Eastern and Central Kopetdag. The second group includes small rivers, sources, springs, and temporal runoff in the Kopetdag and other highlands, reserves of fresh groundwater and the local runoff being

formed on the weakly permeable soils of piedmont plains and plain part of Turkmenistan [8]. In addition to the mentioned surface flow there are a number of small freshwater aquifers, return waters from irrigation and small natural lakes. The long-term average volume of water resources available is presented in Table 3.

Table 3 Water Resources of Turkmenistan

River, Gauging Site	Long-Term Average, million m ³	Remarks
Amu Darya, Atamurat	22,000	In accordance with the existing agreements
Murgab, Tagtabazar	1,550	
Tedjen, Pulikhatun	770	
Atrek, Chat	170	
Small rivers	310	
Freshwater aquifers	470	Actual water abstraction
Return waters	9,900	Reported data for 2006
Collector-drainage waters from Uzbekistan	4,300	

To summarise, the sources of water resources in Turkmenistan include the following (Figure 4) [9]:

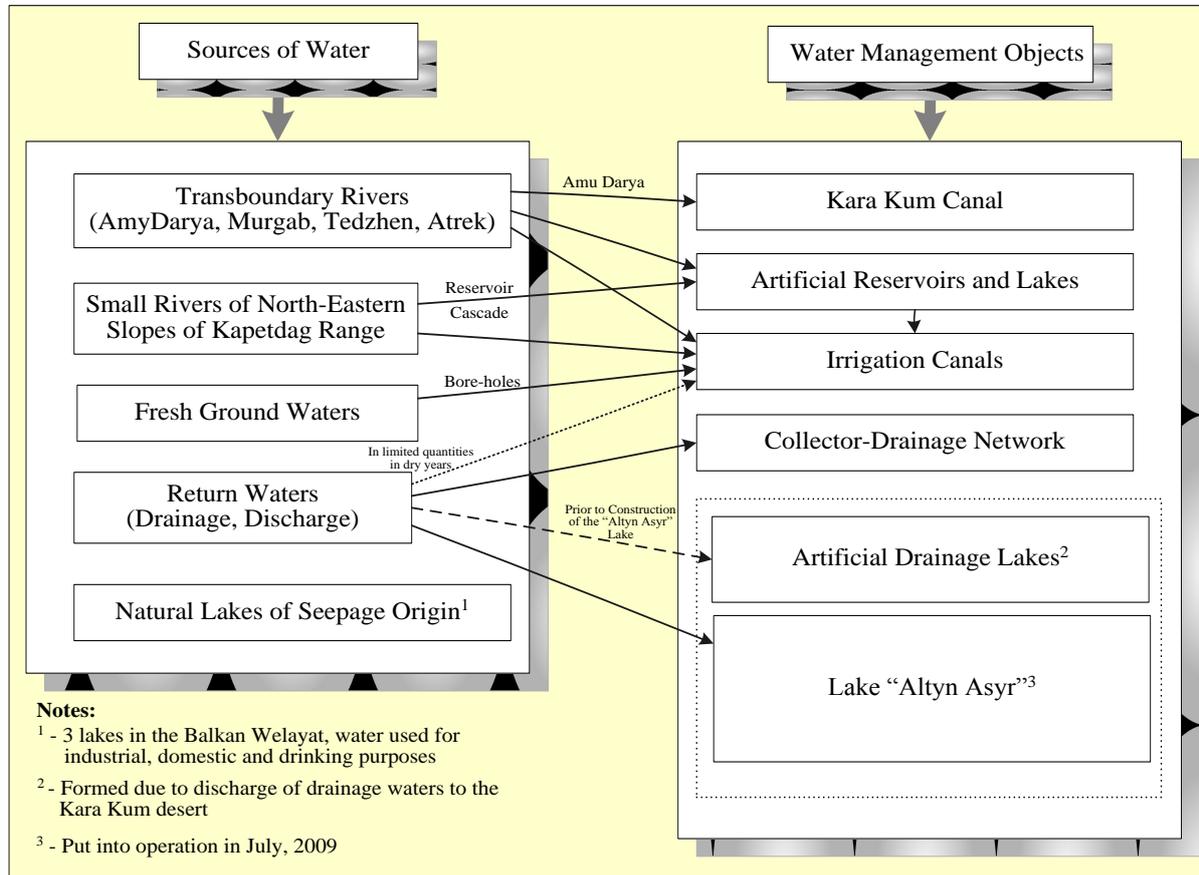
- ▶ The main transboundary rivers, namely: the Amu Darya, Atrek, Murgab, and Tedjen;
- ▶ The small rivers of the North-Western slope of the Kopetdag mountain range;
- ▶ Freshwater aquifers;
- ▶ Return and drainage waters from irrigation;
- ▶ Small natural lakes.

The main river of the first group is the Amu Darya River, which is the largest river in Central Asia. Spring-summer floods caused by melting snow and ice in the mountains, and sustainable mean water characterises its regime. The flood begins at the end of March – early April, and the maximal discharge occurs in July-August. The distribution of the river flow during the year is quite favourable for irrigation. The flow during most of the crops vegetation period (May-August) constitutes 61.2% of the annual flow, at that time the demand of water is the highest. The average annual discharge near Kerki town is 1,940 m³/s [10]. The largest average annual water charge near Kerki town can reach 2,540 m³/s and drop to 1,580 m³/s. The maximal charge here vary from 4,160 to 9,060 m³/s, the minimal vary from 721 to 410 m³/s. The average annual flow constitutes 68.1 km³/year, and the flow of 90% probability is 55.2 km³/year. Five countries use water of the Amu Darya River: Afghanistan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. The share of Turkmenistan according to the existing transboundary agreements is 22 km³/year. The Amu Darya River plays extremely important role in providing the Turkmen economy with water. The largest hydro-technical facility, the man-made river Kara Kum Canal (KKC), also called the Kara Kum River, diverts every year from the Amu Darya 10-12 km³ of water and brings it to the central part of Turkmenistan, which is scarce of water resources, and to the Western waterless regions of the country. The Amu Darya River is the main and vitally important water source, covering almost 90% of the country's water demand.

The second largest river of Turkmenistan is the Murgab River. It originates from the Paropamiz Mountains; the main supply of its water is melting snow on the mountains and rainfall, mostly in the winter-spring period. Underground income secures sustainable discharge for the low water period. The river's regime is characterised by a slightly prolonged flood in the spring (usually in March) caused by the melting mountain snow and rainfall. The multi-year average discharge of the Murgab River

constitutes $50.4 \text{ m}^3/\text{s}$, it varies significantly - within $26.6\text{-}88.8 \text{ m}^3/\text{s}$. The maximal discharge can reach as much as $753 \text{ m}^3/\text{s}$, and the minimal drops down to $11.9 \text{ m}^3/\text{s}$. The volume of the Murgab flow is estimated in average as $1.69 \text{ km}^3/\text{year}$. The distribution of the Murgab flow during the year is less favourable for irrigation if compared with that of the Amu Darya. The flow during May-August constitutes only 42.2% [8].

Figure 4 Water Resources and Water Management Objects of Turkmenistan



Another large river of Turkmenistan is Tedjen. The river's regime is characterised by the main spring flood, which has several peaks, caused by rainfalls. Quite often rains can lead to the short-term floods during winter time. In July-November the river is drying up. The multi-year average discharge of the Tedjen River constitutes $31.2 \text{ m}^3/\text{s}$ with fluctuations from 3.86 to $84.6 \text{ m}^3/\text{s}$. The maximal discharge reaches $1,090 \text{ m}^3/\text{s}$. The volume of the Tedjen flow averages $0.98 \text{ km}^3/\text{year}$ [8].

The Atrek, the last large river of Turkmenistan, is located in the South-West of the country. Its flow to the Caspian Sea is not significant and can occur only with floods. It is caused not only by small amount of precipitation in the catchment but also by the intensive water abstraction for irrigation upstream in Iran. The multi-year average flow in Turkmen territory is $8.62 \text{ m}^3/\text{s}$, and the maximal is $120 \text{ m}^3/\text{s}$. The average annual flow is 0.26 km^3 . As a result of increasing withdrawal of water in Iran, the river is losing its water-bearing capacity on the territory of Turkmenistan [8].

Except for the above-mentioned large rivers there are many small rivers and streams in Turkmenistan, mostly in the highlands. Most of them are located on the North-Eastern slope of the Kopetdag Mountains. All rivers of the slope are small rivers and most of them are fed by groundwater. The rivers' flow does not change significantly during the year; however, floods sometimes occur after heavy rains. The average number of floods varies from one to three per year. In some years floods may not occur at all. The average annual discharge of rivers of the North-Eastern slope of the Kopetdag Mountains is between 0.02 and $1.0 \text{ m}^3/\text{s}$. During the rainfall floods the maximal discharge of some rivers reaches tens and sometimes even hundreds of m^3/s . The total average annual discharge of all

those rivers is estimated approximately of 6-7 m³/s, and the flow volume is 0.19-0.21 km³/year. Thus, the total average flow of small rivers of Turkmenistan constitutes 2.7 km³/year, and the flow of the 90%-probability is 1.4 km³/year.

The total resources of the multi-year average flow of the large and small rivers and sources equal 27.1 km³/year, and the flow of the 90%-probability is 22.8 km³ [8].

KKC was constructed in the 1950s, and it is one of the longest canals in the world (over 1,300 km). The canal's capacity is estimated at 630 m³/s. Its average annual water intake can reach 340-380 m³/s, which is 3-4 times more than the total flow of the Murgab, Tedjen, Atrek rivers and rivers on the North-Eastern slope of the Kopetdag together.

The aforementioned agreement between the five Central Asian countries stipulates that on average 22 km³/year are to be reserved for Turkmenistan (of which 0.68 km³/year are internal renewable water resources) and 22 km³/year for Uzbekistan, which are equal portions (50%:50%) of the total volume.

The inlet of KKC at the Amu Darya River is located just after the river enters Turkmenistan from Uzbekistan. It brings water to Ashgabat and to oases in the South of the country. The water loss from KKC, banks and bed of which are unprotected, is estimated at 18% of the total flow. This has caused massive water logging and salinisation of the surrounding land. KKC itself together with a cascade of small reservoirs form an integrated irrigational complex within four welayats.

In comparison with other Central Asian states, Turkmenistan has the lowest operational resources of groundwater. The renewable groundwater resources are estimated at 3.36 km³/year, of which about 3 km³/year are estimated to be infiltrated from the rivers.

The largest reserves of freshwater groundwater used for drinking are concentrated in the piedmont areas of the Kopetdag mountain range and territorially belong to the Akhal welayat; freshwater reserves of the Mary and Dashoguz welayats are insignificant. Uneven distribution of operational resources of groundwater creates difficulties to use it for domestic and industrial water supply in the Western etraps of Turkmenistan.

Another source of water resources shown in Figure 4 represents three natural lakes of seepage origin in the Balkan welayat. Water from these lakes is used for industrial water supply, as well as for drinking and domestic water supply of local rural population.

The water sector of Turkmenistan is one of the main sectors to be affected by the climate change. "The First National Report on the United Nations Framework Convention on Climate Change" (Ashgabat, 2006) reads that Turkmenistan is situated in such a region where negative effects of the global climate change are expected to be the largest. Expected raise in air temperature and gradual reduction of the rivers' flow will negatively influence the most socially important sectors of the Turkmen economy, notably: health care sector, water sector, agriculture including irrigated farming, coastal activities at the Caspian Sea.

First of all, it is expected that the rivers' flow reduces drastically. This in its turn will change hydrographs of the main rivers and cause an increase in the evaporation rates, which will lead to a significant reduction of water available for irrigation. According to estimates of experts from Uzbekistan the flow of the Amy Darya will drop by 15%, which will considerably reduce water resources available for the Turkmen economy, since currently about 90% of water used in Turkmenistan is abstracted from the Amy Darya River.

3.4. Water Management Objects

The most of water from the Amu Darya River (amounting to over 21.5 km³/year) is supplied through KKC being 88% of all water used in Turkmenistan. Besides, waters from the transboundary rivers are also diverted into artificial reservoirs and irrigation canals. Water resources of small rivers of the North-Eastern slope of the Kopetdag mountain range is discharged into other smaller irrigation canals

directly or through a cascade of reservoirs. At the same time irrigation canals are also fed with water from bore-holes abstracting water from a few small freshwater aquifers.

Apart from the aggravating situation with water supply in the recent years the most serious challenge is the protection of water resources from pollution by effluents. Annual volume of effluents and drainage water in Turkmenistan is 8.74 km³, of which 6.62 km³ are formed by drainage waters. Practically all discharged waters are diverted without any treatment into the deserts, rivers, and irrigation canals causing deterioration of water quality and environment. In the lower reaches of the Amu Darya water salinity in the low-level period increases up to 2.5-3.0 g/l. In certain areas return waters' salinity reaches as much as 27-30 g/l⁴.

Return waters from agricultural fields (both effluents and drainage waters) are discharged through the collector-drainage network into natural cavities. As a result, artificial drainage lakes have been formed. Prior to opening of the Turkmen artificial lake⁵ return waters had been accumulated in artificial lakes in the Gara Kum desert, however, presently these waters are diverted through a number of canals into the Altyn Asyr Lake.

The length of the lake and input canals together are designed to reach 2,700 km. Two of those canals are currently operational: one being 720 km long, and the other – 383 km (will still be extended to 432 km). Construction of the Altyn Asyr Lake is expected to have a positive effect on the environmental situation due to interception of significant quantities of drainage waters. In the past these waters used to be directly discharged into the Amu Darya River. More positive effects on agriculture are expected after the improvement of water conditions of pastures and fields surrounding the Altyn Asyr Lake.

As already mentioned in the previous section irrigation constitutes over 90% of the total volume of water use, whereas industrial, domestic, drinking water supply, fisheries, as well as watering of pastures and fields altogether account to less than 10% of the total volume of water used in the country. Due to widespread soil salinity and overall land degradation problems, the issue of water quality becomes a critical element of water management. Given the existing and prospective government plans to increase its irrigation lands to boost agricultural production⁶, as well as the construction of the Altyn Asyr Lake, water quality is a pivotal and vital element in ensuring human security and socio-economic growth of the country.

4. Review of Legal Frameworks

The current study reviewed the legal frameworks at both international and national levels, since water cooperation in Central Asia has always been a very serious challenge due to scarcity of water available for economies of Central Asian states.

4.1. Review of International Agreements/Declarations

There are a number of International Agreements (IA)/Declarations related to water resource management and conservation, to which Turkmenistan is a signatory. These include:

- ▶ The “Agreement on Cooperation in Joint Management, Use and Protection of Interstate Sources of Water Resources”:

On February 18, 1992 five Ministers of Water Resources of Central Asian states (N. Kipshakbayev, M. Zulpuyev, A. Nurov, A. Ilamanov, R. Giniyatullin) signed in Almaty “Agreement on cooperation in joint management, use and protection of interstate sources of water resources”. Actually, this agreement founded a united body Interstate Coordination Water Commission (ICWC) (see Section 5.1.1). This Agreement was confirmed by the Decision of the Presidents, Kzyl-Orda, March 26, 1993 and their “Agreement on joint actions

⁴ Personal communications of the author in the Ministry of Agriculture of Turkmenistan.

⁵ The “Altyn Asyr” (The Golden Century) Lake was officially opened by the President of Turkmenistan in July 2009.

⁶ As stipulated by the National Programme “The Strategy of Economic, Political, and Cultural Development of Turkmenistan Until 2020”.

on resolving the problems related to the Aral Sea and its coastal zone on environmental sanitation and social-economic development in the Aral Sea region”, and later by Agreement of the region's five countries of April 9, 1999 “On status of IFAS and its organizations” [16].

▶ The Ashgabat Declaration, 1999

The Declaration focused on the Aral crisis consequences, which had negatively effected the standard of living of population in Central Asia. The problems of social protection and provision with pure drinking water became aggravated. The States of Central Asia give unceasing consideration for improvement of situation in the region, for attraction the world community to settle these problems. In common with international organisations and funds, including considerable GEF support, a series of national attention was paid to the issues of water resource management in Central Asia directed to radical improvement of the water and other resources usage, enhancement of efficiency and culture of the nature use within the region, and normalisation of ecological situation as a whole. Nevertheless, it was recognised that the efforts, undertaken to settle the Aral Sea basin problems, are insufficient. This is why, the five Presidents of the Central Asian countries declared to [17]:

- admit the importance of comprehensive solution of the problems, connected with normalisation of social- ecological situation in Aral Sea basin,
- strengthen both in the CAS and in their representations abroad the activity to attract the attention of international community, means and abilities of donor-countries, funds and organisations for implementation the programs and projects related to the Aral Sea basin problems,
- provide every kind of assistance and support for implementation of “Control on Water resources and Environment in Aral Sea basin” project, being realised under the aegis of World Bank and GEF,
- give more consideration to the problems of mountain territories – zone of the rivers flow formation within Aral Sea basin,
- realise a number of all-round measures and priority projects on social protection of population living in Aral Sea basin,
- brisk up the works against desertification and pollution the border transiting water objects,
- assist to international organisations and institutions in their activity on implementation of the programs and projects related to the Aral Sea basin problems,
- promote (through educational and other programs) rising of the population being in the know about urgent problems of nature protection, rational nature use and improvement the social dwelling environment for present and future generations.

▶ A series of agreements on individual transboundary rivers. Five Central Asia countries have prepared drafts of three Inter-state Agreements of Water Use and Conservation [7]:

- Between Republic of Kazakhstan, Kyrgyz Republic, Republic of Tajikistan, Republic of Uzbekistan, and Turkmenistan on the development of cooperation and division of functions of inter-state organisations for protection, management and development of water resources of the Aral sea
- Between Republic of Kazakhstan, Kyrgyz Republic, Republic of Tajikistan, Republic of Uzbekistan, and Turkmenistan on water use in modern conditions
- Between Republic of Kazakhstan, Kyrgyz Republic, Republic of Tajikistan, Republic of Uzbekistan, and Turkmenistan on joint planning and use of transboundary water resources.

4.1.1. The Amu Darya

Considerable effort has been put on reaching an agreement on the main principles of water distribution between Turkmenistan and Uzbekistan after disintegration of the USSR. These principles have been applied and carefully tested during many years in the joint management of the Amu Darya water resources. One of the key players in the process of managing water resources of the Amu Darya is the Interstate Coordination Water Commission (ICWC).

In addition, in 1996 a separate permanent agreement between Turkmenistan and Uzbekistan was signed on an equal distribution of water resources available (fifty-fifty). This agreement defines water allocation for both countries in similar quantities as estimated at the Atamurat hydrological site.

Institutional mechanisms of cooperation within ICWC are presented onwards in this paper (Section 5.1.1, page 28).

4.1.2. Transboundary Cooperation within other River Basins

During soviet times water resource management issues were dealt with by the Ministry of Land Reclamation and Water Resources of the USSR (MLRWR USSR). Management procedures and practices were prescribed in so called “Integrated Schemes of Water Use in the Aral Sea Basin”, other similar regulatory documents/plans. These documents took account of the actual hydrological situation in a particular region and/or river stretch (floods, low water periods, droughts, etc.).

After break up of the USSR Turkmenistan as a legal successor of the USSR on its territory confirmed the obligations between Iran and USSR on the transboundary rivers and waters. These obligations are included in [4]:

- ▶ The Agreement between the USSR and Persia about the joint use of transboundary rivers and water along the border between the two countries from the Geri-Rud River (current name – the Tedjen River) to the Caspian Sea dated 20.02.1926;
- ▶ The Protocol to the Agreement above on settling disputes on transboundary and financial issues dated 02.12.1954;
- ▶ The Agreement between the government of the USSR and the Shahanshah government of Iran on the regime of the Soviet-Iranian border and procedure to resolve border conflicts and incidents, dated 14.05.1957, signed in Moscow;
- ▶ The Soviet-Iranian Agreements on the transboundary rivers of Araks and Atrek, dated 11.08.1957, signed in Teheran;
- ▶ The Agreement between the USSR government and the Shahanshah government of Iran on the development of temporary procedures on the equal water distribution and use of border stretches of the Araks and Atrek rivers for the purposes of irrigation and power generation, dated 05.03.1958, signed in Teheran.

A number of critical from the management point of view issues were addressed in nearly all aforementioned agreements, such as sustainability of river beds, particularly in the areas where the state border was defined along the rivers. In addition, corresponding officials were defined to deal with international disputes, if such disputes arise. Nearly all rivers of the Kopetdag mountains are covered by these agreements.

In the Agreement of 20.02.1926 on the Geri-Rud River proportions of water distribution were defined out of 10 as 3 (Iran) and 7 (the USSR). However, distribution of the annual flow of the Tedjen river was changed to 50:50 in accordance with the Agreement between Turkmenistan and IRI “About Construction and Exploitation of the Water Reservoir Dostluk (Friendship)”. Operational management of water resources of the reservoir Dostluk, construction of which was jointly funded and, therefore, owned by both countries (Turkmenistan and Iran), is executed by a Joint Coordination Administration (JCA) of Turkmenistan and Iran. In April 2005 the official opening ceremony took place. The volume

of the reservoir is 1.25 km³. The reservoir provides many-year operation and flow regulation including anti-flooding aspects.

4.2. Review of National Legal Framework

4.2.1. Composition of National Legal Framework

The national legal framework of Turkmenistan in accordance with the Law “About Legal Acts” includes the following [3]:

- ▶ The Constitution of Turkmenistan;
- ▶ Laws of Turkmenistan;
- ▶ Decrees of Halk Maslakhaty⁷ of Turkmenistan;
- ▶ Decrees of Chairman of Halk Maslakhaty of Turkmenistan, Decrees and resolutions of the President, resolutions and decisions of Mejlis (the Parliament) of Turkmenistan;
- ▶ Decrees of Cabinet of Ministers of Turkmenistan;
- ▶ Decisions and acts of Ministries and other national level authorities of state executive power;
- ▶ Decisions and resolutions of the welayat, etrap, and city/town Halk Maslakhaty;
- ▶ Resolutions of Hyakims⁸;
- ▶ Resolutions of Gengeshliks⁹.

The Constitution of Turkmenistan has the highest legal power among all legal acts. Provisions of the Constitution have direct action. All other legal acts are to be in compliance with the Constitution. All legislation/regulations, which contradict the Constitution, have no legal power.

A Constitutional Law of Turkmenistan is a legal act, which was adopted by a national referendum or by the Halk Maslakhaty and with touches upon the key basic principles of the Constitutional order of Turkmenistan. The Constitutional laws have higher legal power over other legislation and regulations except for the Constitution.

A Law is an adopted by the Mejlis¹⁰ of Turkmenistan or by a national referendum on the key aspects of national importance.

The legal framework of Turkmenistan at its highest level could be characterised by the following:

- ▶ The Constitution;
- ▶ The Administrative Code;
- ▶ The Arbitral- Procedural Code;
- ▶ The Civil Code;
- ▶ The Forest Code;
- ▶ The Housing Code;
- ▶ The Labour Code;
- ▶ The Criminal Code;
- ▶ The Marriage and Family Code;

⁷ The Elders’ People Council, which plays an advisory role in the decision-making process in Turkmenistan.

⁸ Mayors.

⁹ Heads of Local Administrations.

¹⁰ The Assembly (Mejlis) is the legislative branch of Turkmenistan. It has 125 members elected for a five-year term in single-seat constituencies.

- ▶ The Customs Code;
- ▶ The Water Code;
- ▶ The Land Code;
- ▶ The Tax Code;
- ▶ The Code on Social Protection.

The legal acts above are of the framework nature and require a number of sub-level legislation or regulations, which specify mechanisms and norms to be applied.

4.2.2. The Water Code of Turkmenistan (2004)

Prior to adoption of the Water Code decisions and resolutions of the President and the Cabinet of Ministers regulated the corresponding functions in relation to water resource management. That was the way to avoid frequent amendments, adjustments and introducing complications in one of the most critical sectors of the country's economy. Since these legislative acts are of the direct action, their provisions were obligatory for and duly/timely fulfilled by the corresponding governmental authorities [4].

The Water Code of Turkmenistan is in force since Nov 1, 2004. The Code legally confirmed the current set up of the government power and re-distribution of functions and responsibilities in the field of management and conservation of water resources. Being an integral part of the legal framework of the country as mentioned in the section above, the main goal of the Water Code was to clearly define the legal framework of relationships of different parties involved in the water sector of Turkmenistan, as well as to stipulate the main principles of management, rational use, and protection of water resources towards future development of economy and society [4].

In addition, the Water Code defines the following aspects of water resource management and conservation:

- ▶ The key objectives of water management;
- ▶ Ownership over water and water resources of the country;
- ▶ Procedures of placing, design, and construction of water infrastructure;
- ▶ Types of water use and categories of water users;
- ▶ Procedures for receiving permits for specialised water use, rights and obligations of water users;
- ▶ Water protection arrangements and prevention of pollution including Water Protection Zones (WPZ);
- ▶ State monitoring of water resources, State Water Cadastre;
- ▶ Participation of NGOs and wider public/communities organisations in water use and protection;
- ▶ Others.

According to Article 4 of the Water Code water resources are the exclusive property of the state but assets (water facilities of all kinds) could be the property of both legal entities and individuals. Such a provision was newly introduced in the Turkmen legislation. Previously, water facilities could be assigned to legal entities only.

The Water Code sets the boundaries of jurisdiction and defines responsibilities of the main governmental authorities in the field of water resource conservation and management, namely: the Cabinet of Ministers, authorised ministries, committees and other public authorities, as well as administrations, executive bodies at the local level, NGOs and wider public.

Article 78 of the Constitution defines the Cabinet of Ministers responsible for the state support to the economic and social development of Turkmenistan. The Cabinet of Ministers is also to secure proper management and protection of natural resources. The Water Code defines in more detail the functions of the Cabinet of Ministers in relation to water resource management and conservation. Particularly, the Cabinet of Ministers annually sets water use limits for each of the five welayats and each etrap. Similarly, water use limits are established for each sector of economy. Water abstraction limits are defined for each water source.

Article 12 of the Law “About the Cabinet of Ministers of Turkmenistan” prescribes the Cabinet of Ministers to address at its meetings the measures on protection and conservation of land, deposits, water resources, plants and animal communities. The Water Code defines mechanisms for this through approved in accordance with the existing legislative procedure Basin Schemes on Integrated Use and Protection of Water Resources¹¹, as well as through national, multi-lateral, and regional programmes and projects.

Regulations on MWR approved by the Decree of the President dated June 15, 2000. MWR is assigned therein as a governmental authority responsible for the management of water complex of Turkmenistan (including infrastructure). Amongst the key tasks of MWR the following are specifically mentioned: (i) water resource management, (ii) water use and management planning, (iii) allocation of water to different users, and (iv) monitoring of and control over water use.

Article 5 of the Water Code defines MWR as the main authority responsible for the allocation and distribution of water resources to various users (water quantity management), and MNP –as the key water protection governmental body (water quality management).

It should be mentioned that since water distribution is a very sensitive issue in mainly agricultural Central Asia, there is always a big concern in both government and society of Turkmenistan about drastic ill-conceived reforms in the water sector and agriculture. This why, the current reform of water and land related legislation, marked by the adoption of the Water Code and the Land Code, was based on a thorough analysis of results of reforming private sector and nature protection practices. Evolution of water and land related reform is not anticipated by the Turkmen society to be quick but rather been carefully developed. This is why the new Codes retained the basic parameters of the previous legal platform and national water saving culture though had been supplemented by modern developments in the international environmental and water law. Both Water and Land Codes do not directly push forward the process of reforming water/land relations and emphasize the need to reform current water/land relations. On the other hand, the Codes do not exclude such reforms either. Nevertheless, both Codes stimulate and form conditions for the development of economy (including private sector) based on modern principles of conservation and rational use of natural resources of the country [4].

Another important document is the National Programme “The Strategy of Economic, Political, and Cultural Development of Turkmenistan Until 2020”. The Programme envisages an increase in agricultural production of more than 15 times (17.7 times) only due to utilisation of the current natural and accelerated industrial potential. Wheat production is planned to grow 2.9 times and cotton production – 4.9 times by 2020 as compared with 2000. Considerable proportion of agricultural irrigated lands is planned to be transferred to the private sector enterprises. The private sector tenants will include joint-stock companies, dayhan (farmer) cooperatives and unions. These categories of land users are expected to introduce more effective and efficient water use technologies and water saving practices.

In 2005 Turkmenistan started a new phase of the agricultural reform. One of the key features was the establishment of larger agricultural associations and Agricultural Joint-Stock Companies (AJSCs). In 2004 an umbrella AJSC was established in Turkmenistan, which by the start of 2005-year season created as much as 44 etrap-level AJSCs including 412 specialised branches. Three of the best performing agricultural enterprises were also transformed into AJSCs. The Water Code reads that the

¹¹ An analogue of Basin Management Plans.

water management authorities are to support and provide technical and other assistance to dayhan and other private sector companies on a contract (paid) basis for operation and maintenance of internal¹² irrigation canals and facilities. This means that contract-based relations have been introduced between public authorities and private sector enterprises. At the same time the private sector enterprises legally entitled to sell 70% of cotton at world prices. Part of the profit generated this way is to be used for the operational costs of the irrigation infrastructure used, as well as for modernisation.

The Water Code legally re-confirmed the responsibility of the state to support and develop irrigation and drainage systems at the basin and sub-basin levels. Article 57 clearly states that all assets of a common use must be on the books of the corresponding governmental water management bodies.

Besides the above, the Water Code re-affirmed the principles of waters use applied in Turkmenistan:

- ▶ Water for domestic and drinking purposes is provided on a free-of-charge basis, costs of construction, re-construction and operation of municipal water supply systems are born by the respective municipalities or local administrations and funded from the state and/or municipal budgets;
- ▶ Water for industrial water use (within established limits) is provided on a paid basis in accordance with the established tariffs¹³;
- ▶ Excessive use of water (over established limits) and discharge of pollutants (over permitted volumes) is subject to fines in accordance with the existing legislation;
- ▶ Water for irrigation within the allocated volume (limits) is provided on a free-of-charge¹⁴ basis;
- ▶ Operational and maintenance costs of internal irrigation mains, infrastructure and facilities are covered by the owners of the assets;
- ▶ Funding of construction, re-construction and operation of water infrastructure of national, basin, inter-etrap (inter-district), and those of common use is provided from state budget of the corresponding level.

Thus, reforms in water sector of Turkmenistan within the last decade concentrated on the optimisation of existing practices of relations of the water management authorities on one side and various types of water use(r)s on the other. The water users represent both public and private sector with a clear tendency towards a year-after-year increase of proportion of private sector enterprises.

Adoption of the Water and Land Codes has completed the process of forming an integral framework of environment protection legislation. In both Codes the norms and requirements were introduced to provide for safety of production, introduction of environment-friendly technologies and practices, preserving biodiversity, landscapes, human health.

Turkmenistan is a party to the Aarhus Convention, and, this is why, the Water Code defines NGOs, civil society and communities as regular members of water relations including their legal rights in the court. Article 106 of the Water Code outlines juridical order of resolution of disputes in the field of water use and management.

However, the Water Code is a framework legal act. In order to fully regulate relations in the water sector a number of supporting regulations have to be developed. A shortened list of the main regulations includes:

- ▶ Regulations of specialised governmental authorities in the field of management and conservation of water resources (Article 7);

¹² Operation and maintenance of bigger mains and infrastructure is carried out by the structural units of MWR and funded from the state budget.

¹³ Introduced by the Decree of the President of Turkmenistan # 1800 on May 5, 1994.

¹⁴ Though the water is provided free of charge, farmers pay 3% of the total cost of crops for services related

- ▶ Designation of WPZ and important water bodies (Article 15) and an order of establishment of WPZs (Article 92);
- ▶ Categories of specialised water uses (Article 18) and an order of the development, concordance on and issuing of water use permits (Article 23); also
- ▶ for individual use of water objects (Article 25);
- ▶ Procedure of payment collection for water and services (Article 29);
- ▶ Rules of operation of water intake facilities of decentralised water supply of population (Article 41);
- ▶ Rules for small vessel navigation (Article 47);
- ▶ Quality standards for water used for irrigation (Article 48);
- ▶ Requirements for maintenance regime of irrigation and collector-drainage infrastructure (Article 58);
- ▶ Water use within preserved areas (Article 65);
- ▶ Registry of internal water ways and rules of their operation (Article 66);
- ▶ Rules of use of water ways for different purposes – air navigation (Article 67), fire fighting and emergency situations (Article 68);
- ▶ Procedures for limiting, suspension or cancellation of effluent discharge into water bodies (Article 70);
- ▶ Rules of operation for each reservoir (Article 76) and main canals of multi-purpose use (KKC, the Tukmen Derya¹⁵);
- ▶ River Cadastre (Article 79);
- ▶ Set of regulations on standartisation and metrology in the field of water resource use and protection (Article 84);
- ▶ Norms in the field of water use and protection including those on environmental safety, environmental standards and water quality categories (classification), pollution discharge limits, technological norms of water use and irrigation regimes of Turkmenistan, scientifically based irrigation norms (Articles 85-90);
- ▶ Rules of monitoring and the State Water Cadastre (Article 100);
- ▶ Basin Schemes of Integrated Use and Protection of Water Resources for each catchment (Article 102);
- ▶ Others.

Detailed review of the progress in developing the above legislation, regulations, and norms/standards is beyond the scope of the current study, however, such an inventory is strongly recommended for implementation within follow-up activities.

4.2.3. Other Water Resource Related Legislation

Besides the Water Cod a series of other important laws and regulations stipulate relations within water management and environment protection sectors of Turkmenistan. These include:

- ▶ Law on Nature Protection (1991);
- ▶ Law of Turkmenistan on Hyakims (1995);
- ▶ Law of Turkmenistan on Standartisation and Metrology (1993);

¹⁵ Derya means a river.

- ▶ Administrative code of Turkmenistan (1993);
- ▶ Sanitary Code of Turkmenistan (1992);
- ▶ Others.

Legal acts issued by the President of Turkmenistan relate to different aspects of water resource management and conservation, they also are directed at further improvement of the water legislation of the country. There are a number of approved by the President regulations on:

- ▶ Protection of fish stocks and fisheries control within territorial waters and internal water bodies (20.03.1998);
- ▶ Fisheries Inspection (04.06.1998);
- ▶ Preserved and protected areas of Turkmenistan (15.12.1995);
- ▶ Ministry of Water Resources (15.06.2000);
- ▶ State Corporation “TurkmenGeologiya” (22.12.1997);
- ▶ National Committee on Hydrometeorology at the Cabinet of Ministers of Turkmenistan (05.01.98);
- ▶ Others.

4.3. Gaps and Opportunities

There is a common understanding in Turkmenistan of the utmost importance of modern legal and regulatory frameworks for water resource management and conservation. This understanding was obvious when the consultant visited ministries and institutions involved in water resource management. Sectoral regulations are rather developed; however, there are a number of gaps identified, which are recommended to be addressed by any future interventions within both international projects and national development programmes:

- ▶ There are a number of international arrangements on water resources, which Turkmenistan is a party to, i.e. Ashgabat Declarations, ICWC, JCC for the Tedjen river, etc., however, the main coordination effort of these activities is still does not cover the whole spectrum of issues to be considered by IWRM. For instance, much effort is put into water distribution (water quantity) but integrated transboundary systems for monitoring of water quality (even at transboundary stretches of the rivers) prescribed by the Agreement are not fully operational.
- ▶ Adoption of the Water Code was a big step forward in reforming the water management sector and systematisation of water related legislative and regulatory frameworks, however, the progress in developing supplementary regulations, standards, and norms, which would make the Code working, is very slow. A very few pieces of legislation and norms/standards were developed within more than 5 years since the Code was put in force.
- ▶ Despite the main principles of IWRM are declared within the existing legislation (i.e. Water Code in Article 102 requires to develop Basin Schemes of Integrated Use and Protection of Water Resources), actual practices applied to water management have a clear administrative-territorial nature. Besides, water distribution (water quantity) and environment protection (including water quality) functions are separated and executed by different ministries (MNR and MNP respectively). Coordination mechanisms between the two ministries are not well developed.
- ▶ Other water management functions are also divided between a number of ministries and institutions, and, similarly to the above, the inter-ministry mechanisms of coordination have not been formally established or very weak.
- ▶ Review of the current water sector of Turkmenistan identified significant complexity of the management system. The sector was developing for over 15 years from a centralised planned

management system. *De jure* a number of remaining peculiarities of the former system and legislative base are still in place, whereas *de facto* other relationships were established. Such situation resulted in absence of a clear division of the management tasks between different parties of the process, i.e. between water supply organisations, Welayats, Etraps, community-based organisations, NGOs and population. As a recommended remedy to this situation, a modern management system needs to incorporate new water use(r)s including those representing private sector entities.

- ▶ According to the current legislation of Turkmenistan a number of water related services are heavily subsidised (if not fully covered) by the state through corresponding levels of the national budget. Though the main idea is clearly understood – to support population and economy, which would not be able to cover the costs related to maintenance and development of water distribution and drainage infrastructure from their income, such an approach completely eliminates a possibility of use of modern flexible financial mechanisms and economic incentives to stimulate introduction of water saving technologies (including recycling) and practices. Particularly it is important for Turkmenistan since water losses due to dissipation from irrigation network and evaporation due to water-extensive irrigation practices are still very high.
- ▶ There is a clear need for a more intensified involvement of NGOs, community-based organisations and wider public in the process of decision-making. Despite the fact that the Water Code directly stipulates this, there are no formal mechanisms developed.
- ▶ The procedure of interaction with donor community is rather complicated. Any cooperation with international community is implemented through and coordinated by the Ministry of Foreign Affairs of Turkmenistan (see Figure 5). Such cooperation is usually initialised by an international donor organisation, which addresses MoFA with a certain proposal. The MoFA then coordinates such requests with the corresponding ministry/agency, which then follows up with the donor. Such an approach means that many potential activities, which could have been generated from inside of Turkmenistan, are left out from the international activities taking place in Central Asia let alone globally.

On the other side of the stick, a series of opportunities could be pointed out for the future water-related activities in Turkmenistan. Amongst these opportunities the following could be mentioned:

- ▶ Water quality issues are to be dealt with in parallel with water allocation activities. This would require a special attention of the government to updating the existing legal basis for cooperation between main agencies within the country and with those of the neighbouring CA states. Since the current state of cooperation in water quality management including monitoring is very weak, introduction of new management practices, monitoring programmes/networks is expected to take both considerable financial support and technical guidance of the international community and donors. Transboundary cooperation in such aspects though has been included in a number of international activities is obviously has a great deal potential for further elaboration/improvement.
- ▶ Development and introduction of legislation/regulations required under the Water Code are to be given the highest priority. Since introduction of those will make the New Water Code working *de facto*, drafting of the key documents needs to be included in as many internationally funded activities as possible to support the currently lagging behind process. It is obvious that current capacity of the country does not allow proper addressing of a number of issues, however, international technical assistance activities can bridge this gap up and support Turkmenistan in promoting the Water Code further.
- ▶ The need for a national IWRM programme. Despite a series of activities are implemented in Turkmenistan on introduction of IWRM principles, a national Programme/Strategy of water sector development has not yet been prepared. The current practices of water management in Turkmenistan are mainly based on the territorial-administrative principle. Nevertheless, there is a clear understanding at the highest political level of the country, as well as in the main

agencies involved in water resource management and conservation, of the urgent need to introduce the concept of IWRM nationally. This relates to the enabling environment (policy/legislation), institutional frameworks, technical supporting mechanisms (monitoring systems, information exchange, etc.), and introduction of large-scale public activities and campaigns leading to a gradual behaviour change in the county and capacity built nationally. The corresponding capacity has to be built in all aspects of water management and conservation practices. Implementation of modern approaches/principles is to be included in perspective development programme and corresponding legislation/regulation, e.g. in those supporting the New Water Code.

- ▶ Water resource governance system needs to combine the basin management principles of IWRM with the existing administrative-territorial approach. There are examples (KKC) in the country, as well as pilot projects, results of which need to be scaled-up nationally and internationally.
- ▶ Introduction of new modern economic instruments and financial mechanisms will help to make more services provided within water sector self-sustaining from the economic point of view. However, such instruments/mechanisms are to be carefully tested within pilot or/and demonstrational activities to be implemented within various (also internationally funded) both ongoing and coming up projects.
- ▶ Better donor coordination is vital in water sector issues and the involvement of both international and local private donors. Particularly, the involvement of these donors will speed up the needed reforms in RWSS sector. Having a national development programme of RWSS, it is then easier to support certain (pilot) activities in rural areas. Such activities would cover limited geographical areas and then could be scaled-up. It is important that the donors participate at the earliest stages of programme development to design programmes, which better fit the main work programmes and interests of the donors including International Financial Institutions and International NGOs. Only a harmonised approach can really change the current situation to the better and to provide enough resources to implement the projects required.
- ▶ Public awareness/educational/training and other capacity building activities are required to support improvements in water sector. In terms of public awareness and educational activities these can include (i) changing of behaviour and local mentality in terms of water use, (ii) specialised awareness and educational programmes currently implemented by international organisations and UN have to be scaled-up to all Welayats and Etraps of the country, (iii) incentives have to be developed and introduced for population promoting issues of sustainable water use and saving drinking water.

5. Review of Institutional Structures and Main Functions

5.1. International Institutional Mechanisms

5.1.1. The Interstate Coordination Water Commission (ICWC)

The main aim of ICWC establishment was to strengthen the principle of collective leadership in decision-making process on general issues of regional interstate water management, use and protection and in implementing joint programs related to water resources of Central Asia. Formation of ICWC and its work is under close attention of the Presidents of Central Asian states. The Head of States through their agreements of 23 March 1993 and 9 April 1999 acknowledged a specific role of ICWC under the aegis of IFAS and thus showed the deep understanding of the importance of joint management in using and protecting water resources, in developing all the countries and the region as a whole, as well as concerns about sustainable supply of their people with water and ensuring of adequate environmental conditions. The Ministers of Water Resources of the five Central Asian countries are the members of ICWC.

The main tasks of ICWC are the following [11]:

- ▶ Development of a common water management policy of the region, as well as its main parameters with account of requirement of population, economies of the countries, and rational use and protection of water resources;
- ▶ Development and approval of annual limits of water use for each state for the main water bodies, as well as regimes of bigger reservoirs and water distribution;
- ▶ Coordination of implementation of bigger water resource related projects and coordinated use of water resources available;
- ▶ Establishment of a united informational base on water resources use.

Meeting of ICWS are held quarterly chaired by the countries on rotational basis. All decisions are taken unanimously and they are obligatory for each country. Each member has right of veto.

The international donor community through its active collaboration with ICWC has been providing considerable support to the implementation of IWRM, development of training activity, water conservation, improved forecasts and measurements of water flows, automation of hydro-structure operation, development of information system, etc. It is worth to note such international organisations as the UN, World Bank, the European Union, Canadian International Development Agency (CIDA), Swiss Agency for Development and Cooperation (SDC), Asian Development Bank (ADB), the Governments of Norway and Finland, UK Department For International Development (DFID), U.S. Agency for International Development (USAID), UNDP, the Japanese Water Forum, the Network of Global Water Partnership (GWP), etc.

5.1.2. The Interstate Fund for the Aral Sea (IFAS)

The Interstate Fund for the Aral Sea (IFAS) is a high-level body, which carries out activities based on decisions of the Leaders of the participating countries, regulations of IFAS, Secretariat of IFAS, the Agreement on the statute of IFAS and its subsidiary organisations.

The key functions/activities of IFAS include:

- ▶ Funding and crediting of joint interstate environmental and scientific programmes and projects directed at saving the Aral Sea and improvement of environmental and ecological situation in the regions suffering from the disaster, as well as at addressing general social and environmental challenges of the region;
- ▶ Funding of joint fundamental and applied research related to the Aral Sea rehabilitation and conservation of natural resources (including water) of the region, protection of environment
- ▶ Establishment and operation of the interstate environmental monitoring network, as well as databases and other systems with information on the Aral Sea basin environment;
- ▶ Resource mobilisation for joint actions to protect atmosphere, water and land resources, flora and fauna of the region;
- ▶ Participation in implementation of international programmes and projects on the Aral Sea and improvement of environmental state of the Aral Sea basin.

5.1.3. The Interstate Commission on Sustainable Development (ICSDD)

Overall coordination of sustainable development activities is carried out by the Interstate Commission on Sustainable Development (ICSDD). The main goal of ICSDD – coordination and supervision of cooperation in the field of environment protection and sustainable development programmes in Central Asia. ICSDD comprises of 15 members – 3 representatives from each Central Asian country: the Ministers of Environment, Deputy Ministers of Economy, representatives of Scientific Institutes and other sectors. These representatives are appointed by the governments of the countries. ICSDD meets twice a year.

5.1.4. The United Nations Regional Centre for Preventive Diplomacy for Central Asia (UNRCCA)

The Regional Centre for Preventive Diplomacy opened on December 10, 2007 in Ashgabat seeks to assist the governments of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan in building “capacities to peacefully prevent conflict, in facilitating dialogue, and in catalysing international support behind projects and initiatives.” While establishing UNRCCA the Governments took into consideration the multiple threats that face Central Asia, including international terrorism and extremism, drug trafficking, organised crime and environmental degradation. It is headed by a senior representative of UN Secretary-General Ban Ki-moon and had an initial budget of \$2.3 million as well as small international staff.

In accordance with the UN Global Counter-Terrorism Strategy and the recommendations of the High-level Panel on Threats, Challenges and Change on the need to strengthen the United Nations capacity for conflict prevention, UNRCCA has been established to carry out the following main functions [18]:

- ▶ To liaise with the Governments of the region and, with their concurrence, with other parties concerned on issues relevant to preventive diplomacy;
- ▶ To monitor and analyse the situation on the ground and to provide the Secretary-General of the United Nations with up-to-date information related to conflict prevention efforts;
- ▶ To maintain contact with UN for Security and Cooperation in Europe, the Commonwealth of Independent States, the Shanghai Cooperation, UN and other regional organisations, encourage their peacemaking efforts and initiatives, and facilitate coordination and information exchange with due regard to their specific mandates;
- ▶ To provide a political framework and leadership for the preventive activities of the United Nations country teams in the region; and to support the efforts of the Resident Coordinators and those of the United Nations system, including the Bretton Woods institutions, in promoting an integrated approach to preventive development and humanitarian assistance;
- ▶ To maintain close contact with the United Nations Assistance Mission in Afghanistan to ensure a comprehensive and integrated analysis of the situation in the region.

5.2. Governmental Stakeholder Organisations and Main Functions in Water Sector

The water sector in Turkmenistan is represented by a complex governance system comprising a number of ministries and institutions; very often these authorities share joint responsibilities and functions. In addition to the complicated management structure, national capacity remains a major concern at all levels. Furthermore, there is a lack of interaction and coordination among the ministries and institutions of the water sector.

The water resource use and protection is based on a combination of the basin-type (e.g. management of KKC is based on principles similar to a water body basin management), territorial and administrative-territorial governance. It is carried out by the Government of Turkmenistan (GoT), local offices of the key responsible authorities, as well as by the specialised authorised governmental bodies.

In accordance with the Water Code (see Section 4.2.2) the state water resource management and protection is carried out by the Cabinet of Ministers, as well as by a number of specialised governmental water management and environment protection agencies in accordance with the existing legislation (Figure 5). The Cabinet of Ministers executes the following functions: (i) approves the main parameters and programmes related to water resource development, (ii) defines and regulates the delegation of water management and nature protection functions to certain authorised governmental bodies, (iii) defines and regulates the order of state control over distribution and use of water resources within the country, and (iv) regulates and supervises transboundary cooperation with neighbouring countries, etc.

The key specialised governmental ministries responsible for water resource management and protection are the Ministry of Water Resources (MWR, on the right) and the Ministry of Nature Protection (MNP), as well as their subordinate offices in the regions¹⁶.

MWR is the main government agency in the field of management of water resources. Majority of water intakes, bigger canals and mains of common use, reservoirs, bigger drainage canals are on the books of MWR. For instance, MWR operates 7.8 thousand km of inter-sectoral irrigation systems, along with as much as 33.4 thousand km of internal irrigation canals. The KKC, of which length is over 1300 km, incorporates 115 hydro-technical facilities, 32 transport units, 3 reservoirs with total capacity of 2.4 km³ [6].



There are water management departments at both welayat and etrap levels. There are offices execute their functions within the corresponding administrative units. Welayat water management departments comprise maintenance, construction and monitoring departments. The monitoring departments include chemical-analytical laboratories. Besides, a design and research institute “Turkmensuvlym-taslama” containing two laboratories is also within the structure of MWR. The Institute “Turkmensuvlym-taslama” is the main institute within the structure of MWR and is responsible for scientific and research activities, project

design and development, specific monitoring (analysis of geological material, soils, water, etc.), as well as some other functions. While performing its function the Institute develops measures for rational use, protection of water resources, prevention of deterioration of waater quality and pollution of water.

MNP is one of the agencies implementing the state policy and inter-sectoral control in the field of environment protection and use of natural resources. According to its regulations MNP is responsible for the overall control over remedial actions and protection of ecosystems, prevention of deterioration of surface and ground water resources, monitoring of environmental media and natural resources. In addition, it carries out state ecological appraisal of different projects.

The structure of MNP includes 5 welayat Departments on Nature Protection, National Institute of Desserts, Flora and Fauna (NIDFF). An Environmenal Monitoring Centre (EMC) comprising 2 chemical laboratories is subordinate to NIDFF.

NIDFF implements a complex of scientific research on nature protection, biological diversity and sustainable development. NIDFF develops recommendations on the protection of the most



important objects against unfavorable deserts factors.

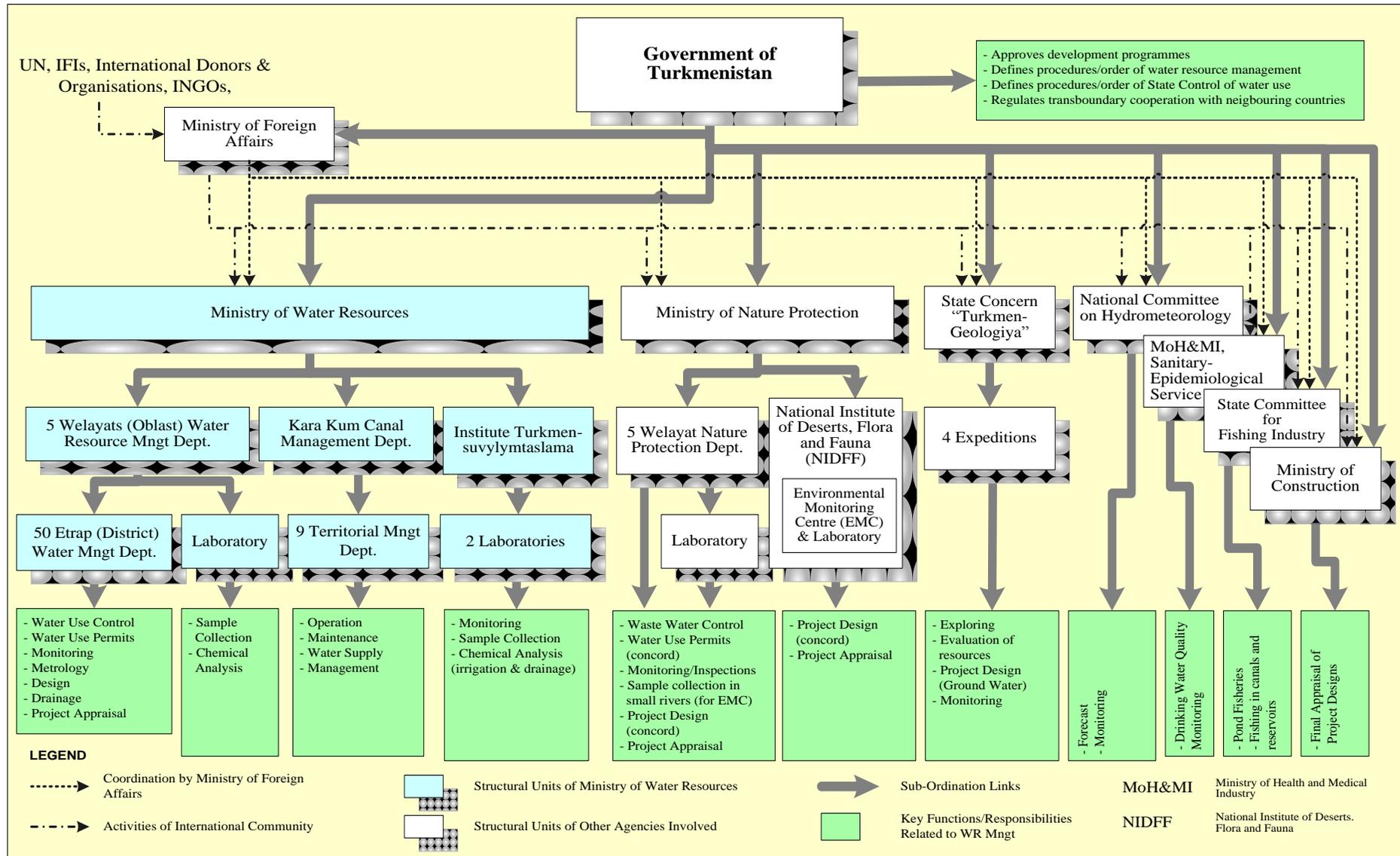
EMC has the following functions:

- ▶ Systematic monitoring of environment pollution (atmospheric air, surface waters, soil and radioactive pollution);



¹⁶ Article 5 of the Water Code.

Figure 5 Institutional Structure of Water Resource Management Agencies



- ▶ Systematic analysis and assessment of the state of environment of Turkmenistan;
- ▶ Presentation of information on the state of environment to governmental, industrial, and other interested organisations, ensures information exchange in emergency situations;
- ▶ Provides methodological support of the network of welayat chemical laboratories;
- ▶ Develops Maximum Permissible Emissions (MPE)¹⁷ and Maximum Permissible Loads (MPL)¹⁸;
- ▶ Issues environmental passports for enterprises.

There are a number of other governmental institutions with certain functions related to water resource management. These are:

- ▶ The National Committee on Hydrometeorology at the Cabinet of Ministers of Turkmenistan (Hydromet), which is responsible for the forecasts of hydrometeorological regime. Hydromet also carries out monitoring activities. However, due to heavy underfinancing in recent years monitoring activities are being reduced from year to year.
- ▶ The State Concern “Turkmen Geologiya” is responsible for carrying out geological surveys and monitoring of ground water resources and forecasts (including fresh, mineral, industrial, thermal waters), supervision of conservation, rational use, and protection of ground waters; issuing permissions on re-equipment of exploratory boreholes and wells into operational ones and drilling of absorbing boreholes for discharge of effluents, ensuring concordance with permissions on a specialised water use of ground waters, ensuring concordance of projects on boreholes drilling, operation of a unified system of geological information including information on ground waters, and other functions.
- ▶ The Sanitary Epidemiological Service of the Ministry of Health and Medical Industry. Sanepid carries out supervision functions and monitoring of the sanitary and epidemiological state of environment and drinking water quality in centralised and decentralised systems, as well as quality of water in water bodies – sources of water supply. Sanepid undertakes the supervision of implementation of the sanitary legislation, participates in the elaboration of corresponding legislative initiatives, laws and other normative-legal acts, and informs executive governmental authorities and population about sanitary-epidemiological situation.
- ▶ The State Committee for Fishing Industry along with breeding of commercial fish species and fisheries is the state agency responsible for protection of fish stocks. This is why representatives of the Committee are involved in any activities related to projects on fishery water bodies. These projects include construction, re-construction of new facilities effecting quality of water, waste water disposal in accordance with approved limits.
- ▶ The Ministry of Construction is the state agency responsible for licensing of design, construction and some other works where requirements of water resource protection need to be taken into account.

The state authorities mentioned above carry out the following functions related to water resource management:

- ▶ State control over use and protection of water resources and their state;
- ▶ Water quality and hydrological monitoring;
- ▶ Metrological support;
- ▶ Design, scientific, R&D activities in the field of water management and conservation;
- ▶ Development of land reclamation measures for irrigated areas;

¹⁷ Permits, which are used to control emissions to atmosphere.

¹⁸ Permits, which are used to control discharge of polluted effluents into water bodies.

- ▶ State environmental assessment of new projects and re-constuction works at water management/supply units;
- ▶ Concordance and issuing of licences for specialised water use.

Distribution of these and some other function between different authorities is defined in the corresponding regulation and presented in Figure 5.

The local administrations also have certain responsibilities related to water quality management. In particular, the bodies of local executive power approve WPZs at the water distribution mains and other sources of centralised domestic and drinking water supply, they also implement required measures for prevention and elimination of consequences of accidents and natural harmful events (Article 8).

As already mentioned above, population and NGOs are also guaranteed certain rights by the current legislation. For instance, one of the major NGOs with interests in water use and protection is the Nature Protection Union of Turkmenistan (NPU) (Article 11), which has a number of branches in various cities.

When licences for specialised water use are issued, a clearance has to be received from a number of agencies:

- ▶ MWR – always;
- ▶ Sanitary-Epidemiological Service – when water is used for domestic and drinking water supply purposes, as well as for effluent discharge into water bodies used for domestic and drinking water supply;
- ▶ Geological Service – when ground water is used including discharge of waste waters into ground water sources;
- ▶ Fisheries authorities – when water bodies are concerned used for fisheries;
- ▶ Local Executive Bodies/Administrations – within their administrative borders;
- ▶ Veterinarian Services – when water is used for animal husbandry and irrigation of forage crops.

5.3. The Present Systems of Monitoring and Information Management

5.3.1. Monitoring Systems

Decisions to be made on water resources need to be based on reliable data and information. These data and information have to be provided by modern monitoring systems. Currently, a series of governmental authorities are responsible for and carrying out regular monitoring of water resources in Turkmenistan (Figure 6). However, water bodies to be monitored, sampling frequencies, lists of determinands to be analysed, capacity of chemical laboratories and personnel involved vary a great deal. Recent assessments of the state of environment and water resources carried out by various institutions as a side result showed that current monitoring activities as such are scattered, un-coordinated, directed sometimes at narrow sectoral interests. Data and information collected are poor [8].

For instance, the National Committee on Hydrometeorology carries out systematic observations and monitoring of hydrologic regime of the rivers (flow and levels) at a very few gauging stations and sites. Monitoring of water quality is not carried out at all.

Water Management Department “Amu Darya” of the ICWC performs regular hydrological and hydrochemical monitoring. However, monitoring objectives fit exclusively the tasks of the water distribution/allocation activities and discharge of highly salinated drainage water from irrigated fields into the Amu Darya river and the minimisation of damage to the river’s ecosystem. As far as the list of

determinands is concerned the following is monitored: salinity, major ions (HCO_3^- , SO_4^{2-} , Cl^- , Ca^{2+} , Mg^{2+} , Na^+ , K^+), water hardness, physical parameters (temperature, colour, odour).

MWR performs hydrochemical monitoring of surface waters in rivers (including transboundary and small rivers), canals, lakes and reservoirs, drainage collectors, as well as ground waters to evaluate whether they could be used for irrigation and defining salt mass balance. Water is analysed for salinity and major ions.

There are six laboratories within the structure of MWR: four in the welayat departments of MWR (Akhal, Mary, Lebap, Dashouz) and two in the Turkmensovlymtaslama Institute. These labs have old and worn out equipment and poorly provided with chemicals and reagents for analysis. Laboratory of Water Management Department "Amu Darya" presented above is reported to be in a similar shape [8].

The National Committee for Hydrometeorology within the GEF project "Water Resource and Environment Management" has been provided with new automated equipment for water quality monitoring for two hydrological sites in Turkmenabad and Birata. However, due to lacking professional staff and capacity of these stations this equipment is not currently used.

The biggest number of water quality parameters is monitored by CEM of MNP. Samples are usually taken by the welayat laboratories and sent to Ashgabat. Analysis of the first day, namely: organoleptic and physical parameters, dissolved oxygen, pH, and salinity, are carried out by local welayat laboratories, whereas the central laboratory of CEM analyses samples for the major ions, nutrients, organic pollutants, and chlororganic pesticides¹⁹.

Sanitary-Epidemiological Service of the Ministry of Health and Medical Industry monitor microbial state of sources of water supply and the major irrigation canals, since they are also used for drinking water supply of population. However, results of these analyses are classified and not publicly available.

State Concern TurkmenGeologiya is responsible for ground water monitoring both levels and quality. Sampling takes place from bore-holes of the monitoring network and samples are sent/delivered to the Central laboratory. Traditionally, samples are analysed for:

- ▶ common parameters: pH, suspended solids, turbidity, hardness, magnesium, calcium, sulphates, chlorides, hydrocarbonates, potassium, sodium,
- ▶ water quality determinands: ammonium, nutrients, nitrates, total phosphates, total phosphates, poly-phosphates, ortho-phosphates, aluminium, molybdenum, arsenic, strontium, fluorine, iron, manganese, zinc, copper, lead, COD, cadmium;
- ▶ organic pollutants including phenols, oil products, pesticides, surfactants.

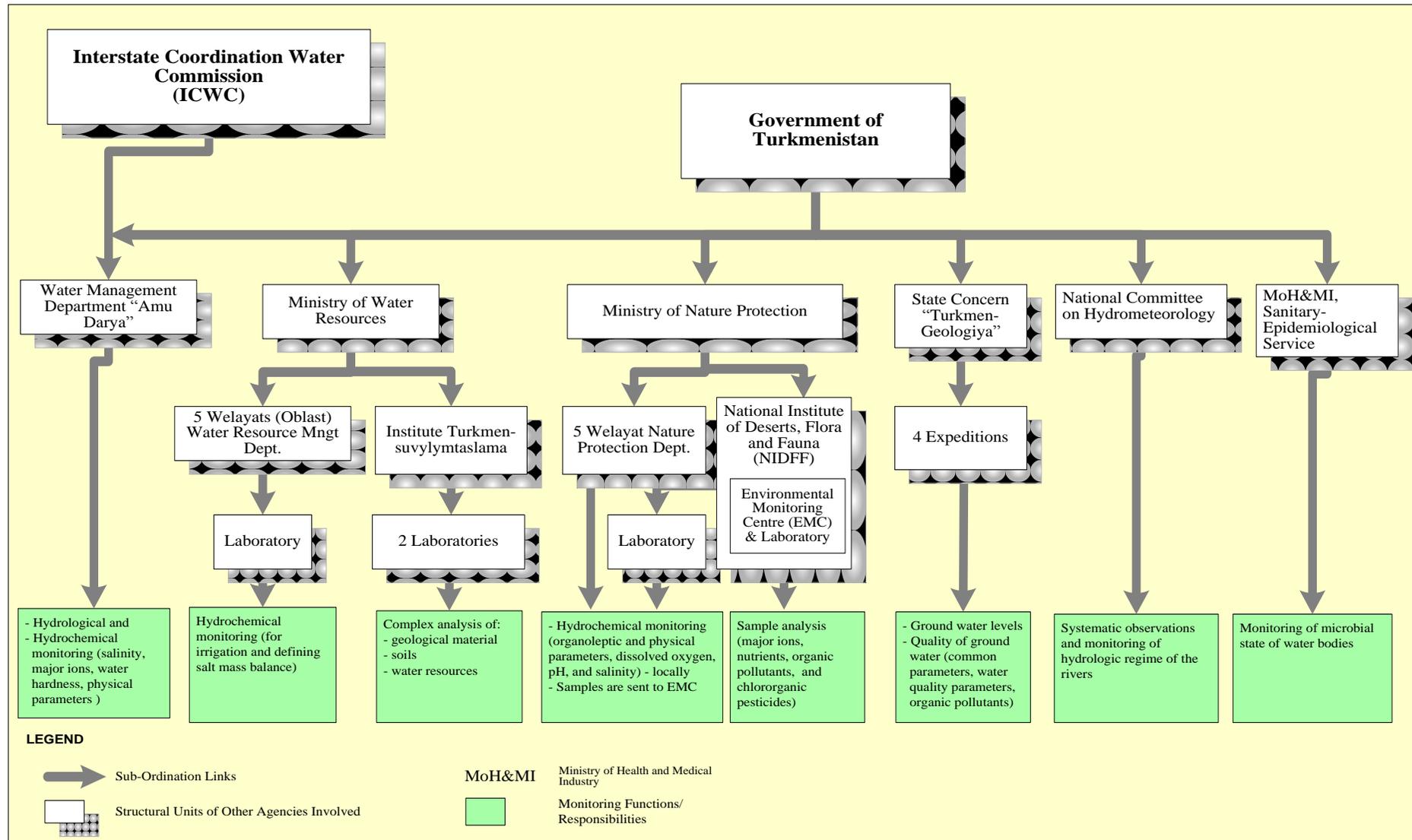
In addition, selective analysis takes place of a limited number of samples taken in the Amu Darya River, collector-drainage network, wells. These are analysed for screening purposes.

In order to get a more adequate assessment of the current state of water quality, as well as to provide reliable forecasts and human health protection from harmful effect of bad water quality the following set of parameters need to be monitored on a regular basis [8]:

- ▶ Chlororganic and phosphororganic pesticides;
- ▶ Nutrients (ammonium, nitrites, nitrates, phosphates, etc.);
- ▶ Organic pollution (dissolved oxygen, BOD, COD);
- ▶ Surfactants;
- ▶ Radiological parameters;
- ▶ Bacteriological parameters;
- ▶ Heavy metals.

¹⁹ According to personal communications with representatives of CEM, the current state of equipment, reagent supply, etc. do not allow to perform analysis of a series of determinands from this list, particularly organics.

Figure 6 Agencies and Organisations Performing Monitoring of Water Resources



Monitoring of various media of environment including water resources are to be monitored by MNR, and chemical labs functions at each welayat department of MNR, however, these laboratories do not have required capacity for an effective monitoring. Analytic laboratories, which are technically capable of doing so, i.e. labs of the Scientific-Production Enterprise “GUN”, the state concern TurkmenGeologiya, the Ministry of Health and Medical Industry, are not involved (according to the current regulations) in such monitoring. These agencies are not legally responsible for performing the corresponding monitoring functions.

At the same time, the regional labs of MNP are obliged to carry out regular monitoring of various environmental media (air, surface and discharge waters, soil, etc.). However, existing labs in the Lebap and Dashouz departments of MNP are not capable of executing these functions due to a lack of required equipment (both sophisticated and simple ordinary equipment, spare parts and reagents). The most of equipment available and being used has been in operation for more than 13 years. Besides, after the existing equipment was delivered into Turkmenistan, it have been in possession of a few labs by now.

The poor state of labs means that today it is hardly possible to assess the real state of water quality, to define the most critical long-term trends, as well as to identify the main polluters and hot-spots due to poor state and bad representativeness of the data and information available and being further collected.

Finally, the actual state of a majority of labs allow to provide mainly analysis of the first day (dissolved oxygen, BOD5, odour, temperature, ion carbonate) and to preserve collected samples for future analysis in CEM in Ashgabat. If regular supply of reagents and chemicals is provided, a more extended analysis could be carried out (pH, TSS, ammonium, nitrites, nitrates, sulphates, chlorides, BOD5, oil products, hardness).

There is a great deal demand for capacity building in the labs involved in water resource monitoring. For instance, personnel of the Lebap department of MNP currently include 8 people, but only one of them has a higher education in the related field. In the lab of the Dashouz department of MNP, on contrary, there are more people with the required educational background but the needed conditions like equipment and chemicals are lacking. The latter also limits implementation of the monitoring functions.

To summarise the paragraphs above, there is a serious need to increase capacity of the existing laboratories of nearly all agencies to turn them able carrying out monitoring in accordance with modern requirements. Such exercises need to include a wide suite of educational/training activities, as well as participation in various international inter-comparison and inter-calibration exercises. Besides, accreditation of laboratories to perform analysis needs to include issues of QA/QC to ensure reliability of information used within the decision-making process.

5.3.2. Systems for Storage of Monitoring Information

Departments of MNP. Each laboratory involved in monitoring keep logbooks of samples taken and (where applicabe) analysis carried out. A single copy of the logbooks is maintained, registered and stored. All calculations required is performed manually. Computer equipment is rare and is mostly used by administrations and accountancy departments [8].

All data processing in laboratories of local offices of MWR is also done manually because computer equipment and software are not available. Data and information are stored as hard copies only.

5.3.3. Systems for Storage of Reported Data (2TP-Vodkhoz)

In order to register water resources abstracted from the natural sources, as well as volumes of water used and quantity and quality of effluents discharged a special reporting form has been used since the early 1990s (30 August 1993). All water users regardless of their nature and legal status provide annual reporting to specially designated agencies, notably: organisations of national statistics, local offices of MWR, MNP, Sanitary-Epidemiological Service, and if ground water is used – in addition to the local office of the State Concern “Turkmengeologia”. Generalisation of this information per all sectors and administrative territories is carried out by MWR.

The general report is produced based on a double-sided form, which contains primary information provided by water users, so called 2TP-Vodkhoz. The form includes information on both quantity (side 1 of the form) and quality (side 2) of water abstracted and used/discharged.

Results of chemical analysis of natural and return/drainage waters are published by MWR annually in a special bulletin. The bulletin contains generalised results of chemical analysis on systematically (monthly) taken samples, as well as processed information (using the Kurlov’s formula). During last few years due to staff reduction of the monitoring service this work is not implemented to the full extent. Only some information is stored in an electronic form. Similar situation is reported to be observed in MNP.

Information collected by means of the 2TP-Vodkhoz form is used for assessment purposes and decision-making in the field of water resource management and conservation.

5.4. SWOT Analysis of Institutional Setup in Water Sector

One of the key tasks of the current study is to adequately assess contemporary developments in the water sector of Turkmenistan, identify the main strengths and weaknesses of the existing enabling environment and technical means available, as well as the external factors, which are likely to effect activities on reforming water management system of the country. This section presents brief results of a SWOT²⁰ analysis undertaken by the author of this report.

It should be mentioned that there a number of facts testifying to the current interest of the managing authorities to improve the legal/regulatory frameworks and systems in place, i.e. monitoring systems, systems for storing and processing of data and information, modern reporting and public web-based information systems. Representatives of all agencies visited by the consultant stressed the urgent need to address the present practices of water management in order to drastically improve the effectiveness of decision-making.

The SWOT analysis was concentrated on the two key aspects:

- ▶ Enabling environment, structures, management and coordination procedures;
- ▶ Technical supporting systems, i.e. monitoring systems, reporting/information flow and data exchange.

Material presented hereinafter could be characterised as a breadth analysis or as an entry point and is recommended to different stakeholders to facilitate the in-depth analysis in future. A summary of the issues identified is presented onwards in Sections 5.4.1 and 5.4.2.

²⁰ SWOT stands for Strengths-Weaknesses-Opportunities-Threats.

5.4.1. Structures, Management and Coordination Procedures

	POSITIVE	NEGATIVE
INTERNAL FACTORS	STRENGTHS	WEAKNESSES
	There are a number of international agreements Turkmenistan is a party to, the cooperation is ongoing and strengthening.	Complicated hierarchical structure with various functions in the area of water resources use and protection, division of management tasks.
	A new, more progressive, Water Code is in-force since 2004.	Weak cooperation between agencies involved, lacking inter-ministry coordination mechanisms.
	All the authorities report about a shortage in legislation on water resources, and the need to intensify the process of development of laws and regulations required by the new Water Code.	Water laws, normative acts, strategies, programmes, standards required by the New Water Code are not being developed limiting the effectiveness of the New Water Code.
	Legislatively there is no considerable overlap of functions of the main agencies.	Water resources management system is mainly based on the administrative-territorial method of management with an exception for the Kara Kum Canal.
	Organisations have annual work programmes, regular meetings of leaders and regular staff meetings.	The issue of participation of private sector in WR related activities (incl. safe drinking water supply) is still not clearly stated and partially prohibited by the national legislation.
	Information to the public is given through mass media (both printing and electronic) concerning water level, floods, access to water, water reserve, etc.	Training/information about new directives, laws, strategies, and programmes seems to be given in a form of consultation only and for the top managers of the agencies.
	Authorities are actively involved in WR management supported by the international community (UN, ADB, EBRD, SDC, WB, GTZ, etc.).	Limited guidance has been given how to implement international standards.
Countrywide establishment of water use associations and the development of diversified forms of private, collective, and joint-stock entities.	Limited potential for the use of financial instruments and economic incentives due to heavy subsidies in water sector playing a positive social role.	
EXTERNAL FACTORS	OPPORTUNITIES	THREATS
	Gradual transition to the systemic management method within the hydrographical units instead of administrative divisions, introduction of IWRM principles.	If not enough guidance is given on the main water laws and legal framework directive (strategies, programmes, plans) and international standards ratified by Turkmenistan, it turns out to become a risk that the practical implementation varies a great deal.
	There are a number of processes in Central Asia directed at implementation of legal and institutional reforms in water management and RWSS sectors.	Weak coordination with coherent regional activities could lead to inefficient use of resources and duplication of work on the one hand, and Turkmenistan falling out of contemporary international activities, on the other hand.
	There is support to implementation of IWRM principles announced at the highest political level of Turkmenistan.	
	The experts from the respected organisations should be involved closer in the law-making process (preparatory work, expert and technical meetings, knowledge transfer).	A gradual transition to introduction of flexible financial mechanisms and economic instruments instead of subsidising is required for the development of financially sustainable systems, particularly, in RWSS sector, to widely introduce water-saving practices and technologies.
	Traditional value of water in the country and culture of Turkmenistan – “A drop of water is a grain of gold”.	
	Training/information about new developments (directives, strategies, programmes, plans) could be given to the staff and community representatives as early as possible - not only to the heads - for the sake of professional work in time.	Since nearly all surface water resources Turkmenistan received from the upstream countries, weak regional cooperation could lead to insufficient water to support the announced reforms in other sectors of economy, e.g. agriculture.
Introduction into practice the water demands management, differentiation of water tariffs and its delivery in accordance with the specific conditions.		

5.4.2. Monitoring and Information Systems

	POSITIVE	NEGATIVE
INTERNAL FACTORS	STRENGTHS	WEAKNESSES
	There are systems in place for monitoring of the impact on both water quantity and water quality.	There is lack of practical guidance for carrying out monitoring, existing monitoring systems are not coordinated in terms of methods used and standards.
	There is no duplication of monitoring effort between the agencies involved in water resource management.	Most of laboratories have capacity challenges, both in terms of equipment and staff qualification.
	Monitoring objectives of each sectoral monitoring system are clearly defined, e.g. water meeting irrigation requirements or sanitary norms, etc.	Laboratories do not take part in any international inter-comparison and inter-calibration exercises. Data are not always available and expected to be insufficiently reliable, processing results are not verified.
	There are a number of laboratories available to carry out monitoring of water resources	Most of data processing is done manually, reports and logbooks are stored as hard copies only.
	There is clear understanding in the agencies involved of the need to improve the existing monitoring systems	There is no any monitoring activities (sampling, duplicate samples, inter-comparison of results) implemented jointly with neighbouring countries for transboundary rivers and other water bodies.
	All ministries, its branches and authorities at the local levels produce annual reports about their work, additional occasional reports (usually quarterly) are prepared as well	Monitoring data and information are not publicly available/accessible. Internet is used quiet often but Ministries do not have yet their own official websites where they can present the reports and any other relevant information.
	There are special units for public relations in each ministry	There is a lack of hardware/software and office equipment in the agencies involved in monitoring. There is a serious deficit in supply of spare parts, reagents and chemicals, other expendable goods.
EXTERNAL FACTORS	OPPORTUNITIES	THREATS
	There are a number of projects implemented in Turkmenistan, which address issues of water resource management and monitoring (e.g. GTZ, UNDP, etc.)	If the monitoring results are not verified regularly it would be difficult to see a clear picture of what the state of environment is and what the emissions from different operations are.
	There have been numerous projects implemented on strengthening of monitoring and information systems (including capacity building activities), considerable experience and approaches are internationally available	Different authorities involved in monitoring and data collection must be willing to cooperate and to provide their data to the other agencies, which is not currently always the case.
	Proper monitoring of water resources leads to making adequate managerial decisions, particularly in the transboundary context	If the technical provisions and capacity for a data exchange are not developed, the exchange will raise a lot of additional work and thus create resistance of the participants.
	Reliable data produced by monitoring increase trust of the international community to conclusions and recommendations produced in Turkmenistan	The development of practical guidance for monitoring. The system shouldn't be too complex and does not require a lot of experience and competence.
	Development of a modern integrated monitoring programme helps to properly report on both the state of the environment and the emissions to the environment	Unavailability of access to the official information (authorities' reports at national and local levels) by interested audience including civil society, mass media, donors, lead to difficulties in analysis on the effectiveness of work performed.
	Publicly available/accessible information on state of environment and water resources will build trust and gain support of population to actions/measures taken by the authorities. Image of authorities could be improved by developing a reporting system and more transparent informing of civil society on their water management and protection activities	
It is the right time to develop proper reporting procedures and install a functioning electronic database		

6. Review of Water Supply and Sanitation Sector

6.1. A Brief Review of the Current Situation in WSS sector in Turkmenistan

6.1.1. Water Supply

A majority of the existing water supply systems were built in the 1950-1980s. Due to the low energy tariffs and relatively low prices of technological equipment systems dominated with low capital investments and, therefore, quite high operational costs. According to some expert estimates [15] the establishment of water supply systems, generally, was directed at the development of new water sources, increase of capacity of pumping stations and water treatment/purification facilities, capacity of the main water distribution canals, etc. Such aspects as the optimisation/reduction of water use, installation of water gauging devices/meters, as well as a number of others practices currently widely used were not properly addressed nor introduced in the operational management and long-term development plans.

Table 4 Technical Parameters of Water Supply Systems in Turkmenistan

Water Intakes ²¹	Treatment Facilities	Mains and Distribution Network, km	Average age of Systems
1200	17	12,600	> 30 years

As a consequence, within 10-15 years of independence the quality of water supply services drastically decreased. This was mainly caused by a significant reduction of funding due to the collapse of former planned economy and the absence of new approaches and practices. Real income of population was constantly dropping down similarly to the state budget. As a result by the year of 2000 the majority of mains and other infrastructure heavily deteriorated. Worn out infrastructure required considerable investments for putting it back into operation but sources for such funding were very limited. This situation closed the “circle of problems”. The main activities at that time were related to the liquidation of consequences of various accidents and malfunction of equipment/facilities.

Currently, it is still a challenge to provide water with required quality and in the needed volume down to individual consumers. In the cities about 60% of urban population are supplied with water from centralised systems 24 hours a day. Other water users (both individual and corporate) are provided with water only 6-8 hours a day. In some areas (e.g. the town of Magdanly) water is supplied to nearly 80% of population twice a week for 2 hours a day [15].

Table 5 Operation Indicators of Water Supply Systems in Turkmenistan

Population Access to Water, %		Average Water Consumed, l/day/person	Average Water Availability, hours/day		Water Losses, %	Tariff, \$/m ³	Payment Collection Rate, %	Water Meters Installed
Urban	Rural		Urban	Rural				
85.4	42.1	323	18	6	75	0	N/A	0

²¹ Water intakes in the rivers, tapings, deep and artesian bore-holes/wells

Analysis of the information collected from experts [15] allows to make the following assessment:

- ▶ Water supply systems are often deteriorated, similarly, the state of mains and other distribution infrastructure is poor and requires rehabilitation;
- ▶ Water losses are very high;
- ▶ Percentage of the 24-hours-a-day supply systems is still small, and often water is supplied in an unregulated by the time manner with frequent interruptions;
- ▶ Low percentage of population with sustainable access to drinking water, particularly, in rural areas;
- ▶ The current practice of subsidies for water supplied for domestic/drinking purposes and irrigation required considerable state budget for both operation (including staff training) and development, and such an approach is not supporting the process of transfer of existing systems to the financial sustainability;
- ▶ There is no water gauging devices available, which does not allow for an accurate estimates of actual volumes of water consumed;
- ▶ Lack of trained personnel especially in rural areas;
- ▶ Generally low capacity of water supply enterprises.

6.1.2. Sanitation and Sewerage Systems

Sewerage systems in Turkmenistan are available only in bigger cities. Due to the fact that rural population receive water from street pumps, the absence of sanitation facilities did not affect the state of residential areas. However, wide use of unprotected dug pits by the rural population and discharge of domestic sewage into natural cavities are the main limiting factors to prevent outbursts of a series of diseases. The volume of sewage water received by the sewerage systems is just about 35% of that of water provided through the existing centralised water supply systems. Some data on the existing sewerage systems are presented in Table 6 below.

Similarly to the water supply systems, the state of the existing sewerage systems is very poor. This is why the development of proper sanitation facilities is a matter of the highest priority.

Table 6 Data on Sewerage Systems in Turkmenistan

Population Access to Sewerage, %		Length of Sewers, km	WWTP		Cities Served	Average Age of Systems
Urban	Rural		Total	Operating		
61.8	2	>2200	1	1	1	>50

6.1.3. The State Policy

Sustainable access of population, in particular, of the rural population to safe drinking water is officially declared as a priority state policy. This policy is implemented through the development of centralised systems of sewerage and water supply. Due to a traditional compact manner of location of residential areas within the existing oases, construction of bigger centralised systems of water supply and sanitation is reported to be optimal. Further distribution of water to population and sewage received from population is carried out through the corresponding water mains and sewers.

6.1.4. Legal and Regulatory Frameworks

A number of laws and regulations are related to the WSS sector in Turkmenistan. These are: Administrative Code (17.12.1984), The Law on Nature Protection (12.11.1991), Sanitary Code of Turkmenistan (19.05.1992), the Law of Turkmenistan “About Natural Deposits” (14.12.1992), the Law of Turkmenistan on State Environmental Assessment (15.06.1995), the Criminal Code of Turkmenistan (12.07.1997), the Law on Licensing of Certain Activity Types (12.06.1999), the Water Code (01.11.2004), the Law of Turkmenistan on Hydrocarbon Deposits (06.12.2005), the Law on Daikhan Farms (30.03.2007) and on Daikhan Unions (30.03.2007) [15].

Details on the key water related piece of legislation, notably: the New Water Code (2004), are separately presented in Section 4.2.2, however, a number of issues directly to the WSS sector should also be mention here. First of all, the Water Code legally confirmed the traditional since many long ago and until present days, the leading function of the state in supporting and developing of irrigation networks and drainage canals at the basin and inter-basin level. The Article 57 of the Water Code clearly specifies that common irrigational and drainage systems together with the corresponding hydro-constructions and objects have to be on the books of state water management organisations. Besides, the Water Code confirmed the main principles of water allocation and use on the territory of Turkmenistan:

- ▶ Water for domestic and drinking purposes is supplied to population free of charge, costs of construction, re-construction and operation of urban water supply systems are to be covered from the municipal or state budget;
- ▶ Water for industrial water use is provided on a paid basis in accordance with approved tariffs;
- ▶ Over-limit water intake or waste water discharge is subject to fines;
- ▶ Water for irrigation within approved limits is provided free of charge;
- ▶ Costs of operation and maintenance of internal (within a farm, enterprise, etc.) water supply and sewerage systems are to be covered by the respective water users;
- ▶ Funding of construction, re-construction and operation of assets and objects of the national, inter-basin, inter-etrap (inter-district) and inter-farm level is provided from the national state budget.

However, it should be mentioned that introduction into force of the new Water Code marked the beginning of the development of second-level legislation and regulations required (see Section 4.2.2). This process will include both improvement of the existing legal/regulatory basis and the development of new modern norms and standards.

In Turkmenistan specialised municipal water supply services are responsible for centralised water supply and sanitation, which are subordinate to the local administrations/governments. Besides, some smaller scale systems supplying water to residential areas are operated by industrial enterprises.

6.1.5. Participation of Private Sector

Participation of private sector entities in WSS sector in Turkmenistan is weak [**Error! Reference source not found.**]. To a certain extent this could be explained by the still persisting soviet mentality, but there also other internal and external causes. Involvement of the private sector is limited to participation in tenders for construction of new and reconstruction of existing residential premises. This activity is licensed.

Tariffs are set by the government/state and, therefore, dependent organisations. By default, these tariffs are much lower than actual costs involved. This is done deliberately to ease the financial pressure on population. Since such an approach makes WSS systems financially unsustainable *a priori*, there is no much interest from the private sector unless additional financial mechanisms and economic instruments are developed and introduced.

6.1.6. Public Participation

The needed platform for participation of a wider public in the decision-making process in relation to environment management and protection exists in Turkmenistan in terms of both national mechanisms and international Conventions/Declarations, which Turkmenistan has joint. However, until now there are no mechanisms developed in the country to operationalise a more close participation of public in the decisions made on water supply and sanitation. Some efforts have been made to develop such mechanisms at the scale of demonstrational and pilot projects implemented in their majority by international organisations and donors. There is still a lack of understanding at higher political levels of the importance to involve key stakeholders at the grassroots level into the current projects and activities. On the other hand, there is a need to raise public knowledge and awareness of the issues related to water supply (particularly rural water supply) and sanitation [Error! Reference source not found.].

6.1.7. Financing of WSS

Financing of WSS (both maintenance and construction of new systems) is mainly provided from the following sources:

- ▶ Payment for services provided;
- ▶ State and local budgets;
- ▶ Loans, grants, technical assistance of IFIs and organisations.

In Turkmenistan annually dozens of millions of US dollars are disbursed for new large-scale projects on centralised water supply and sanitation. Operational costs of WSS sector are covered/subsidised by the state in terms of services provided to the Turkmen population. However, the level of these subsidies is defined in an unregulated manner without required clear methodological or normative justification. Water supply and sanitation services are free of charge for population. At the same time, some recent assessments carried out by the World Bank [15] showed quite high readiness of the population to pay for high-quality services in the field of water supply and sanitation.

Table 7 Estimates of Required Investment in WWS Sector Until 2015.

Required Investment, billions USD			Available Funding as of 2009
Total	Including		
	Water Supply	Sanitation	
≈0.7	≈0.3	≈0.4	≈15%

Table 8 Summary on WSS Development Projects

Project Completed by 2009		Project Types		
Quantity	Overall Cost, millions USD	Development of Legislation and Regulations	Construction	Technical Assistance
38	180	0	35	3

In order to provide three main cities of the country with water four large drinking water preparation facilities have been put in operation with total capacity of 610 thousand m³/day. Construction of these facilities required funding of over USD 70M. Besides, about thirty smaller projects amounting to over

USD 60M have been completed. Some of these projects were related to the installation of desalination plants at the cost of the Aral Sea and within the area of the Aral Sea crisis where there are no sources of water with salinity less than 1 g/l. Five large WWTPs are planned to be finalised by early 2010. Construction of WWTP for the capital city, Ashgabat, and its suburb with capacity of 300 ths. m³/day started in 2004. In 2005 a new project started on the construction of WWTP for the city of Turkmenabat (100 ths. m³/day). At later stages all five administrative centres of Turkmenistan will be provided with WWTPs [15].

6.2. Recommendations for Improving WSS Sector

6.2.1. Urban WSS

The main WSS target for Turkmenistan will be achieved, if by the year of 2015 92.7% of urban and 71% of rural population are connected to the systems of water supply and sanitation. This means that today access to safe drinking water is provided for at least 89% of urban and 57% of rural population. However, there is no statistics to confirm these numbers, and only expert estimates of the progress need to be used. The most optimistic estimates indicate achieving of the targets for urban and at least 10% lagging behind the planned percentage for rural population connected to centralised systems of water supply and sanitation [15].

The following recommendations have been developed for the improvement of the current state of WSS sector in Turkmenistan:

- ▶ Accurate inventories /statistical surveys to assess the actual state of WSS sector, development of plans and programmes of actions required to achieve the 2015 year targets;
- ▶ To attract additional funding for WSS related project and streamline the focused donor support to improve access of the population to safe drinking water and sanitation facilities;
- ▶ Development and implementation of pilot and demonstrational project in the field of water supply and sanitation and introduction of new acceptable and affordable technologies of water treatment, modern approaches to monitoring of drinking water quality, realisation of activities directed at the effective management and use of water resources;
- ▶ Awareness raising of population, public participation in the process of decision-making, forming of modern water-saving attitude (behaviour change) to water use and the corresponding services provided;
- ▶ Development of stimulating mechanisms and incentives to attract more professionals into the WSS sector, development and implementation of capacity building programmes for the existing personnel;
- ▶ Increasing of a role the water users play in the process of water management and water allocation;
- ▶ Development of a friendly environment for private sector involvement.

6.2.2. Rural WSS

Since there was a special interest expressed by the client of this assignment, a more detailed analysis has been carried out of the challenges and recommendations for the rural water supply and sanitation sector.

In order to structure the issues identified they have been split into 4 thematic areas, namely:

- ▶ Enabling environment;
- ▶ Organisational and technical aspects;
- ▶ Financial mechanisms and economic instruments;

- ▶ Public participation, stakeholder involvement, and training.

The Enabling environment component included a series of issues related to the legal and regulatory frameworks in Turkmenistan and reforming of the governance system. Recommendations included a series of activities to improve the current development planning of RWSS sector, for instance, development of strategies and policies at all levels including detailed monitoring and evaluation plans, establishing inter-ministry coordination mechanisms, development of modern standards and norms, as well as a number of activities to promote proper development of the sector. All related issues identified were grouped under the Enabling Environment Theme presented in Figure 7:

- ▶ Adoption of Drinking Water Law;
- ▶ Development of norms/standards for drinking water;
- ▶ Development of legislative basis for the Inter-Ministerial Coordination Body;
- ▶ Introduction of strategic planning and development concepts (Policies and Strategies for RWSS) at all levels, monitoring and evaluation plans;
- ▶ Measures to ensure budgeted support from the government through national, regional, and local budgets;
- ▶ Mechanisms to involve NGOs and wider public in the decision-making process (bottom-up approach);
- ▶ Promoting institutional reform to optimise governance system;
- ▶ Introduction of a pilot incentive system (see Financial/Economic Mechanisms/Instruments);
- ▶ Financial planning (short-, mid-, and long-term);
- ▶ Critical analysis of the functions and responsibilities of the governmental agencies involved in RWSS and local administrations;
- ▶ Establishment of Sanitary Protective Zones (SPZ), demarcation of SPZ at RWSS objects;
- ▶ Introduction of a compulsory contractual system of relationships between suppliers and customers;
- ▶ Development of procedures for setting up non-governmental, community-based, private sector, and other organisation with interests in RWSS;
- ▶ Implementation of a demand driven planning (Bottom-Up approach).

The second component, Organisational Measures Theme, is focused on activities of organisational and/or technical nature. Such activities have a more “down to the ground” character and often require implementation of certain projects like strengthening of capacity of existing laboratories, application of modern technological solutions, installation of water gauging equipment, etc. The corresponding measures are presented in Figure 7 under the Organisational Measures Theme:

- ▶ Establishment of RWSS Committees at grassroots level;
- ▶ Envisage different types of ownership, i.e. state, communities/committees, cooperative, joint-stock, private organisations, etc.;
- ▶ Development of new projects for rehabilitation and construction of RWSS objects and water mains with account (parallel provisions) for sanitation and hygiene;
- ▶ Rehabilitation/setting up of drinking water quality laboratories;
- ▶ Development of methods for control and monitor drinking water quality;
- ▶ Orientation at innovative but affordable technologies;
- ▶ Strengthening of capital equity of RWSS units, procurement and installation of new equipment;

- ▶ Installation of water gauging equipment, including water meters;
- ▶ Search for new sources of water and power (incl. solar and wind driven devices);
- ▶ Development of a guiding document on operation of RWSS units/objects;
- ▶ Inclusion of ownership issue in project design and development documentation;
- ▶ Implementation of DEASA projects: (D)emand driven – (E)fficient –(A)ppropriate – (S)ustainable – (A)ffordable;
- ▶ Focus on local suppliers of equipment and materials, as well as spare parts.

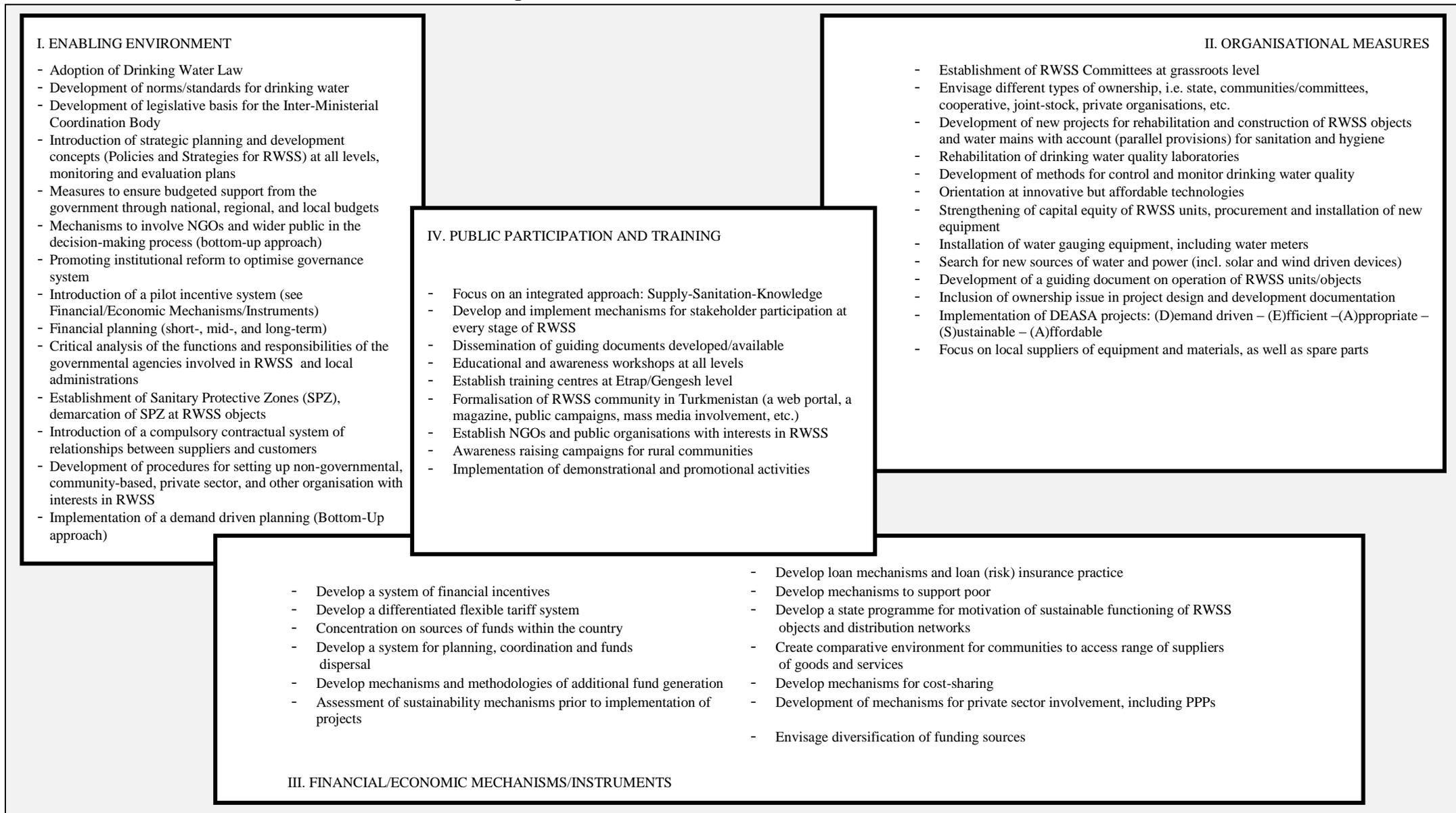
The third component, The Financial Mechanisms and Economic Instruments Theme, is concentrated on certain aspects of converting a currently heavily subsidised system into a self-sustaining one. It is understood by the author that implementation of the proposed measures should be implemented with a great level of care, since there are many legal and other types of boundaries to operate within, however, gradual introduction of specific applicable for Turkmenistan mechanisms and instruments will lead to a better organisation and functioning of the water supply and sanitation system as such. The proposed measures are grouped together under the Financial/Economic Mechanisms/Instruments Theme:

- ▶ Develop a system of financial incentives;
- ▶ Develop a differentiated flexible tariff system;
- ▶ Concentration on sources of funds within the country;
- ▶ Develop a system for planning, coordination and funds dispersal;
- ▶ Develop mechanisms and methodologies of additional fund generation;
- ▶ Assessment of sustainability mechanisms prior to implementation of projects;
- ▶ Develop loan mechanisms and loan (risk) insurance practice;
- ▶ Develop mechanisms to support poor;
- ▶ Develop a state programme for motivation of sustainable functioning of RWSS objects and distribution networks;
- ▶ Create comparative environment for communities to access range of suppliers of goods/services;
- ▶ Develop mechanisms for cost-sharing and private sector involvement, including PPPs;
- ▶ Envisage diversification of funding sources.

The final component, the last but not least, is related to the public participation, stakeholder involvement and training. It is widely recognised in Turkmenistan that awareness and educational activities are required at all levels. Good understanding of the main principles as well as a need for changing the current systems will not only intensify the reforms being undertaken, but will lead to the eventual behaviour change in water use as a whole. Implementation of the majority of activities identified required involvement of rural population and communities at grassroots level:

- ▶ Focus on an integrated approach: Supply-Sanitation-Knowledge;
- ▶ Develop and implement mechanisms for stakeholder participation at every stage of RWSS;
- ▶ Dissemination of guiding documents developed/available and educational and awareness workshops at all levels;
- ▶ Establish training centres at Etrap/Gengesh level;
- ▶ Formalisation of RWSS community in Turkmenistan (a web portal, a magazine, public campaigns, mass media involvement, etc.);
- ▶ Establish NGOs and public organisations with interests in RWSS, awareness raising campaigns for rural communities;
- ▶ Implementation of demonstrational and promotional activities.

Figure 7 Distribution of Issues Identified in RWSS Sector



7. Review of Demonstrational and Pilot Activities

7.1. Transition towards IWRM in Lower Reaches and Deltas of Amu Darya and Syr Darya Rivers. The Pre-Feasibility Study.

Donor: US Department of State, Executors: The Regional Environment Office of US Department of State, national experts from Kazakhstan, Turkmenistan, and Uzbekistan [14] (2004 to 2005).

The main project objective was the development of a detailed plan for supporting and establishing the IWRM system and creating the water partnership at the national and inter-state level in Amu Darya River lower reaches (Khorezm Province and the Republic of Karakalpakstan in Uzbekistan and Dashoguz Province in Turkmenistan) and in Syr Darya River lower reaches (Kyzyl-Orda Province in Kazakhstan). A priority of this objective is conditioned by extremely keen ecological and socio-economic problems in above regions due to Aral Sea crisis and the low level of water resources control.

Key project outputs included:

- ▶ Review of the current trends and issues that need to be tackled;
- ▶ Analysis of the political, legal and institutional frameworks necessary for functioning IWRM elements;
- ▶ Review of the national and international projects related to water resources management issues in Amu Darya and Syr Darya lower reaches;
- ▶ IWRM activity planned in lower reaches; and
- ▶ Regional and national action plans.

The project was aimed at developing the Pre-Feasibility Study (PFS) for the introduction of IWRM principles under the specific conditions in lower reaches that are the most depressive region from the socio-economic point of view in Central Asia subjected to recurrent catastrophic drops in water availability (for example, in 2000 and 2001) and environmental degradation. It was assumed that based on the PFS, international donors will receive the opportunity to assist the region in adaptation of IWRM methods to these conditions and to cover, selected with stakeholders' participation, pilot irrigation systems in Kyzyl-Orda Province in Kazakhstan, in Dashoguz Province in Turkmenistan, and in Khorezm Province in Uzbekistan, by analogy with the IWRM-Fergana Project. In spite of the fact that an appeal to the many international donors was not crowned with success, some project outcomes were reached:

- ▶ The IWRM conception was adapted to the conditions in lower reaches (considering the environmental requirements);
- ▶ Transboundary aspects of IWRM were specified.

Special consideration was given to land reclamation issues in the course of implementing IWRM. Peculiarities of Amu Darya and Syr Darya lower reaches show up, first of all, in the form of social and environmental tensions, and in some losing of water resources controllability, which emerges in extremely dry years (2000 and 2001).

By present time, specific socio-economic and environmental conditions conditioned by *inefficient water resources management during last 5...10 years* have been formed in different areas of lower reaches.

At the national level, in contrast to "IWRM in Fergana Valley", consideration of local peculiarities is needed for each specific area in lower reaches:

- ▶ The situation in Khorezm Province is similar to the situation in Fergana Province (limited land resources and high population density), but differs by the specific character of land reclamation conditions resulting from stratified soils of deltaic layered- lacustrine sediments.
- ▶ The situation in Kyzyl-Orda and Dashoguz provinces and in Karakalpakstan a little bit different: abundant land resources; unsustainable water supply, insufficient natural and man-made drainage; salt-affected soils, and excessive carrying capacity of irrigation and drainage canals;

Tackling these specific matters requires different managerial, technical and land reclamation approaches for developing IWRM, but should follow the same key directions and mechanisms that are fine-tuned within the framework of IWRM-Fergana Project.

At the inter-state level:

- ▶ Strengthening the interstate co-operation in allocating a runoff of the Amudarya and Syr Darya rivers based on IWRM principles and by means of improving the institutional frameworks of existing organizations established for managing transboundary waters – the BWO “Amu Darya” and BWO “Syr Darya”:
 - Establishing the Public Boards (Councils) of the BWOs with inclusion to them of the representatives from all countries, provinces located in each river basin, large-scale water users such as hydropower schemes, as well as representatives of Hydro-Meteorological Services, administrations of large main canals, and the Hydro-Ecological Councils for Deltas Management that represent the interests of deltaic complexes;
 - Setting up special subdivisions in each BWOs for monitoring and controlling river water quality that will be responsible for developing their proposals to the ICWC and national governments regarding measures necessary for improving natural streams and for integrated using of surface, return, and ground waters.
- ▶ Receiving national governments’ endorsement of fundamental documents related to managing transboundary river flows such as:
 - The Statute of Basin Water Councils and procedures for their participation in planning and governing the water economy in Amu Darya and Syr Darya river basins;
 - Estimated values of environmental water requirements of natural complexes, rivers, and especially their deltas;
 - Forecast of available water resources of rivers in years with the different runoff probability;
 - Rules for regulating and allocating water resources in years with the different runoff probability, taking into consideration the specificity of flow regimes;
 - Instructions to BWOs regarding water management under emergency events (extreme droughts or floods);
 - Scheme of reservoirs system operation, including the regimes of water releases and filling;
 - Procedures for financial relations between countries participating in control and regulation of river flows; and
 - Regulations concerning the responsibility of countries and large-scale water users related to maintaining of established operational regimes.
- ▶ Developing a set of models for water resources management in each river basin (for annual and long-term operation) taking into account the interacting of rivers and areas under economical activity (water diversions, formation of return water, productivity of water use). The set of developed models should become the base for:

- Developing the national and sectoral strategies for regulating their economic activity related to water use and assessing impacts of their economic activity on downstream areas and riparian countries; and
- Specifying the possible consequences of management decisions and ways for achieving the consensus in the process of decision making.

The Pre-Feasibility Study approved by the ICWC was submitted to potential donors to provide financial support to the IWRM-Lower Reaches Project.

7.2. Other Smaller-Scale Interventions in Turkmenistan

There were a number of smaller-scale projects implemented in Turkmenistan. Among those the following could be mentioned: FAO project on “Management of Soil and Water Resources in Irrigation Systems”, some pilot activities in the Mary and Lebap welayats, projects funded by the State Department of the USA, GTZ funded activities.

The aforementioned pilot project in the Mary and Lebap welayats were related to modernisation of irrigation (improvement of water supply services, management practices within supplying organisation, improvement of communication, improvement of irrigation and collector-drainage networks, prevention of salinisation of soils, anti-flooding activities, water saving practices). It should be mentioned though that information on the results of these projects is very scarce and not openly available.

8. Review of Internationally Funded IWRM Activities in Central Asia

There are a number of IWRM related projects being currently implemented in Central Asia.

8.1. Developing the Kazakhstan National Integrated Water Resources Management (IWRM) and Water Efficiency Plan

Donor: The Government of Norway and the UK Department for International Development. Executors: Basin Water Organisations (BWOs), Ministry of Agriculture and Ministry of Economy and Budget Planning of the Republic of Kazakhstan, the UK Department for International Development (DFID), Global Water Partnership (GWP) [14] (2004-2007).

The Project objectives included:

- ▶ Assistance to the State Water Resources Committee and Ministry of Agriculture of the Republic of Kazakhstan in developing the National Integrated Water Resources Management (IWRM) and Water Efficiency Plan, as well as Basin IWRM and Water Efficiency Plans for eight river basins in the Republic of Kazakhstan (Aral – Syr Darya, Balkhash-Alakol, Irtysh, Ishim, Jayik-Caspian, Nura-Sarisuy, Tobol-Torgay, and Chu-Talas).
- ▶ Establishing the Basin Councils in all eight river basins in the Republic of Kazakhstan (RoK).
- ▶ Developing the strategy for achieving the MDGs in the field of water supply and sanitation, reducing by half a share of the population without access to safe drinking water by 2015.

This project was reported to be a considerable step towards awareness of the IWRM principles and substantially facilitated follow-up introducing this method into the practice of national water sector [14].

The corresponding plan (its first draft) outlined the actions needed to reduce negative effects on national water resources through both inefficient use of water and through pollution; it also focused on the problem of managing water resources use and water quality. As top-priority measures, the plan envisaged strengthening a role of the State Water Resources Committee and BWOs, establishing the National Information Centre, preparing the Basin IWRM and Water Efficiency Plans and providing

sufficient funding the water resources management system. The strategy for achieving the MDGs in the field of water supply and sanitation had to be developed as well.

In 2007, the following activities were planned and implemented in the frame of this project:

- ▶ Submitting the National IWRM & Water Efficiency Plan for endorsement by the ministries and departments of the Government of the Republic of Kazakhstan;
- ▶ Supporting the formal meetings of Basin Councils of the Republic of Kazakhstan;
- ▶ Preparing the proposals concerning address some modifications in the Water Code of RoK to strengthen a role of the Basin Councils in decision making;
- ▶ Specifying possible financial mechanisms for achieving the MDGs; in the field of water supply and sanitation in RoK;
- ▶ Developing the program for achieving the MDGs; and
- ▶ Informing the general public (public awareness) and stakeholders regarding the MDGs and the importance of their achieving.

The project was quite important for the top level of IWRM introduction, because as a result of this project, not only IWRM has received the legal acknowledgement in the first one of countries in Central Asia and the water management organisations based on the hydro-geographical principle were officially established, but also the National IWRM & Water Efficiency Plan was approved. This plan outlined the time constraints and financing sources for some IWRM components, including establishing the training network, national and basin information systems, Basin Councils etc.

However, the IWRM introduction mechanism was insufficiently outlined in the plan, since the National IWRM & Water Efficiency Plan had been confined exclusively to the national and basin level of water management without coverage of all water management hierarchy, especially of the most crucial “bottom” level – Water User Associations (WUAs) and farms. Just on that level, a considerable scope of works related to social mobilisation of water users, including public awareness regarding putting IWRM principles into practice in the irrigated farming sector, needed to be implemented. All measures for improving the efficiency of water use by direct consumers were ignored. Public involvement was confined to the advisory functions and powers, but decision making remains the prerogative of water authorities. Thus, functions of water governance and management remained only in the hands of water professionals even at the top level of governance resulting in the possible strengthening the professional hydro-egoism.

The project provided the following outputs:

- ▶ A conceptual note for the National IWRM and Water Efficiency Plan (March 2005);
- ▶ An Inter-Sectoral Working Group for IWRM (ISWG) (May 2005);
- ▶ Draft IWRM plan sections (July 2005);
- ▶ The First National IWRM Forum (July 2005);
- ▶ The first draft of National IWRM and Water Efficiency Plan (November 2005);
- ▶ The second meeting of the ISWG (January 2006);
- ▶ The Second National IWRM Forum (March 2006);
- ▶ The Substantiation Report for including the National IWRM and Water Efficiency Plan into the National Medium-Term Socio-Economic Development Plan;
- ▶ The Resolution No 978 of the Government of the RoK issued on October 11, 2006;
- ▶ The second draft of National IWRM and Water Efficiency Plan (November 2006);
- ▶ The third meeting of the ISWG (December 2006);

- ▶ The Congress of Basin Councils of the Republic of Kazakhstan (April 2007) where expected project outcomes by 2008 have been reviewed;
- ▶ The National and Basin IWRM and Water Efficiency Plans for Kazakhstan; and
- ▶ A Strategy for Achieving the MDGs in the Field of Water Supply and Sanitation.

8.2. The UNEP and UCC-Water Sub-Regional Program for Central Asia: “Speedup of IWRM- 2005 Goals Implementation in Central Asia”

Donor: Danish International Development Agency (DANIDA). Executors: UNEP Collaboration Centre for Water and Environment - GWP CACENA and national experts from the Republic of Kyrgyzstan, the Republic of Tajikistan and the Republic of Uzbekistan (2005-2006) [14].

Project objectives included:

Long-term objective: «Speedup of IWRM-2005 Objectives Implementation in Central Asia».

Short-term objectives:

- ▶ Assistance to development of the IWRM plans in those countries which are ready to start this process;
- ▶ Promotion of the IWRM in dialog about water policy through initiatives for awareness improvement with involvement of the ministers of water resources;
- ▶ Capacity building in the area of the IWRM plans development; and
- ▶ Analysis of the IWRM problems at the national level.

A “road map” (Figure 1, page 8) describes objectives and the process of phased transition towards IWRM-2005 MDGs achievement (for short-term, medium-term, and long-term periods). To the point, the road map is the working sketch of the detailed IWRM plan, which should be prepared by each country-participant of the project in compliance with the proposals of the World Summit on Sustainable Development (Johannesburg, 2002).

The process of developing the national “road maps” within the framework of the UNEP and UCC-Water Sub-Regional Program for Central Asia was initiated at the first national workshops held in April 2006. There was proposed to national experts from three countries and members of the National Groups for Coordination and Support to IWRM to assess the following:

- ▶ At which stage of the IWRM planning cycle does a country stand?
- ▶ What factors are restraining the process of planning?
- ▶ What actions should be undertaken for implementing the IWRM plan?
- ▶ What is required for realization of these actions?

On the basis of the specificity of IWRM processes in each country, a composition of measures, dates scheduled for their implementation and funds required for the short-term period could be different, but were grouped in similar clusters:

- ▶ Capacity building in water management organisations;
- ▶ Establishing the enabling environment for IWRM (legal and political); and
- ▶ Technical and technological measures.

In the process of developing “the road maps”, along with specific tasks conditioned by peculiarities of the water policy in different countries, purposeful activity for phased solving of the following key problems existing at different levels of water management hierarchy was envisaged:

- ▶ Practical providing the jurisdiction of water organisations within hydro-geographical boundaries that meets to IWRM principles and allows making water management decisions in

timely manner and to render water services without interference of administrative-territorial authorities.

- ▶ Integrated water resources management taking into consideration all types of water use within the hydro-geographical boundaries, and based on the analysis of real-time hydro-meteorological information including data on the dynamics of water supply and multi-sectoral water resources use. This information should be in a format suitable for all water users.
- ▶ Strategic planning of water use and consumption taking into consideration the needs of agriculture, municipal and rural water supply, industry and nature, as well as other water-consuming sectors.
- ▶ Practical decentralisation of water governance with transferring of the administrative functions towards an acceptably low level (WUAs and their federations, Canal Councils) based on the national legislation and under assistance of the Government in establishing and developing WUAs and their federations.
- ▶ Gradual transition from direct state governance of water supply to regulation of water sector's activity and its relations with other economic sectors.
- ▶ Step by step transition towards governing WUAs' activity (and later the water management organisations' activity) by Public Councils that will be authorized by relevant powers in the frame of national legislation in order to pursue a water policy, to establish procedures and rules necessary for their water management systems.
- ▶ Based on the introduction of the measures for improving land and water productivity, to provide the conditions, which enable farmers to cover completely all expenditures related to O&M, as well as small repairing works and improving all irrigation and drainage systems within WUAs.
- ▶ Assurance of the practical participation of Canal Councils, WUAs and their federations in developing a water policy and establishing rules for water resources management.

The draft national "road maps" were reviewed and discussed at the first regional seminar (Bishkek, July 27-28, 2006). During discussions, participants of the seminar made the constructive comments and proposals on the presented draft national "road maps" (the need to stress the improvement of water use productivity, prepare rational of the essential activities, social mobilization of stakeholders, and training in IWRM principles etc.).

The draft "road maps" and rational improved in accordance with these comments were discussed during the second phase of national seminars and then submitted to the key ministries and institutions of Kyrgyzstan, Tajikistan, and Uzbekistan. The national "road maps" and rational for the short-term period coordinated with key national ministries and institutions were presented at the final regional seminar (Tashkent, November 29-30, 2006). In the course of this seminar, it was proposed to national experts to submit "road maps" to the national governments officially to make decision on their practical implementation, and to the GWP CACENA (with assistance of the UNEP Collaboration Centre for Water and Environment) to submit the project findings to potential donors/international organisations with purpose of seeking the financial support to the follow-up developing of the national IWRM plans based on the "road maps".

The UNDP support to the Ministry of Agriculture and Water Resources of Uzbekistan in developing the national IWRM plan (Section 8.1) was the important follow-up step of promoting the project findings. After consultations with stakeholders and representatives of governmental and donor organizations, the decision was made to implement the pilot project "Zerafshan River Basin IWRM Plan" as the first phase of developing the national IWRM plan on the ground that the Basin Water Organization is the most advanced for introducing IWRM: i) water management is implemented within hydro-geographical boundaries; ii) there is the database on water diversions and water delivery to users; iii) considerable donors' assistance in rebuilding WUAs and water authorities' capacity. A preparatory phase (September 2007 to January 2008) covered clarification and coordination of project

objectives, as well as preparation of project rational for its submitting to the Cabinet of Ministers of Uzbekistan.

Project outputs:

- ▶ The sub-regional and national reports on progress with implementation of the IWRM 2005 MDGs and the IWRM planning in three countries in Central Asia: the Kyrgyz Republic, the Republic of Tajikistan, and the Republic of Uzbekistan;
- ▶ The accomplished national road maps/working plans for implementation of the IWRM objectives;
- ▶ Capacity needs assessment for support to implementation of the IWRM reforms, as identified in the “road maps” and working plans;
- ▶ The managerial capacity building in the IWRM planning for the key water managers and decision makers.

8.3. Water Governance in Central Asia Project

Donor: EU EuropeAid. Executors: WYG International, Ministries or State Committees for Environment and Natural Resources of Kazakhstan, Kyrgyzstan, Tajikistan, and Turkmenistan [13] (2008-ongoing).

This project is designed to provide technical assistance to the countries of Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan) in implementation of IWRM and planning and the harmonisation of the Water Framework Directive. The project is purposefully targeted at water quality management aspects of IWRM rather than water quantity, since it is believed that progress that is more effective can be made both nationally and regionally in this area and in the knowledge that there has been less donor effort and therefore less problem of project overlap will occur.

Since the project focuses on water quality, the main project beneficiaries in the countries are the Ministries or State Committees for Environment and Natural Resources. However, it is recognised since the project will address water governance in general, and therefore, where they exist, the Ministries, State Committees and Departments dealing with water resource management are to be also closely consulted and involved. Furthermore, the implementation of IWRM requires all water use sectors and stakeholders to be involved in the decision-making process, and therefore have to be consulted as part of the project implementation.

The introduction of IWRM requires a modification in the manner by which many of the stakeholders view water resource management. Water is not only a production tool for agricultural or hydropower production, but primarily a natural resource to be protected for this and future generations. The philosophy guiding IWRM views water at the same time as a natural resource and an economic good and places primary importance on the involvement of all stakeholders in the development of water resource plans for hydrologically delineated river basins. The stakeholders consulted by this project do not universally hold this vision and IWRM is subject to many inconsistent interpretations by countries and donors alike.

The project focus is the development of integrated water management approaches, by the means of:

- ▶ Reinforcing the water basin management planning through regulatory and institutional measures;
- ▶ Planning, promoting a coherent and integrated approach to water management bringing together quality and quantity issues;
- ▶ Promoting the reform of water quality standards as a tool to improve the information base for water management and basin planning, using the EU Water Framework Directive (WFD) as a reference framework;

- ▶ Promoting appropriate economic mechanisms targeted at economic operators in line with IWRM principles;
- ▶ Strengthening of legislative and regulatory framework that reinforces procedures of inter-institutional coordination, ensuring compatible approach and enabling the recognition of procedures and results of one institution by another, both within and between countries;
- ▶ Promoting the participation of user groups in the decision-making process;
- ▶ Support the further cooperation among countries in the water and environment sectors in particular in the improvement of management systems and legal and regulatory framework in the area of water quality taking into account EU WFD and international experience.

8.4. Promoting IWRM and Fostering Transboundary Dialogue in Central Asia

Donor: UNDP, EC, Norway, In-kind Contributions from Kazakhstan, Kyrgyzstan, Tajikistan (2009-ongoing).

The main objective of this project is to introduce the IWRM principles in transboundary dialogue between Central Asian countries. While the Aral Sea Basin is closed (water is limiting), improved governance and sectoral service delivery are among the key water management challenges in Central Asia, rather than absolute scarcity [12]. This regional programme builds on successful experiences with introducing IWRM in Kazakhstan, and aims to promote transboundary dialogue and sustainable water resources management in Central Asia through interventions (i) at national level (mainly involving Kyrgyzstan and Tajikistan), and (ii) at transboundary level (mainly involving Kazakhstan and China) in parallel.

In Kyrgyzstan and Tajikistan, the objective is to develop and implement national integrated water resources management and water efficiency strategies (IWRM Planning) at national and basin level. In doing this, the project focuses on a IWRM governance and institutional reform, as well as on concrete interventions to improve (a) irrigated agriculture, (b) the rural water supply and sanitation situation, and (c) small-scale hydropower service delivery. In the Ili-Balkash River Basin, the main focus is placed on fostering the transboundary dialogue and cooperation between Kazakhstan and China, aiming at improved management of the shared River Basin system and its resources. On a regional level, the programme focuses on (i) capacity building – a joint IWRM training plan with GWP, SDC and possibly other partners and (ii) knowledge and experience exchange as well as (iii) trans-regional trust-building and coordination interventions.

The overarching strategy adopted for all activities under this project entails the careful approaching of (a) transboundary and (b) divisive issues from a national, river basin or local, as well as mutual beneficial perspective. The intention is to build national capacities and readiness for a more integrated approach to water management by tackling issues and tasks located in these “easier domains”, with an aim to simultaneously, and step by step, build capacity and readiness to address transboundary and “divisive domain issues” by the governments.

At a pan-regional level, the aim is to build sub-regional capacity and provide adequate expert support to ensure efficient and effective project implementation, pan-regional coordination of activities (in and outside the scope of this project), as well as joint and coordinated capacity building and policy advice.

The sectoral activities will aim at two sets of key results:

- ▶ Realistic national investment, strategies, plans and financial policies, which will be informed by the results of
- ▶ Demonstration projects that develop both practical management instruments and feasibility studies for possible donor funding.

Other expected results include the development and implementation of: (i) a joint management agreement – for equitable water, energy and O&M cost sharing – in a small transboundary sub-basin,

(ii) context-specific participatory IWRM processes, (iii) additional demonstration projects, to address stakeholders next highest priorities, and (iv) context-specific institutional reforms.

9. Conclusions

There are a number of conclusions to be drawn as a result of the current assessment of the water sector of Turkmenistan. Despite considerable amount of water resources formed in the CA region (5,057 m³/capita), their distribution is very uneven from both geographical and temporal point of view. Such fact shows the importance of a joint effective management and fair distribution of the available water resources amongst the CA countries, since availability of water for population, industry and, mainly, for agriculture is one of the key factors limiting further development of the regional economies. In order to streamline the joint management practices in the region implementing the IWRM concept as the basic approach has been recognised by all countries and supported at the highest political level.

In Turkmenistan, the country receiving the major portion of water for its economy and population from the neighbours, implementation of IWRM is critical for further development of the country. Considerable efforts have been made in the recent years to modernise the existing infrastructure and improve the enabling environment, still a lot has yet to be implemented.

Since negative impacts of the global climate change are expected to effect the Turkmen economy, future IWRM interventions need to be closely coordinated with the climate change water adaptation measures.

After announcement of independence from the USSR a series of important steps have been made to optimise and reform the existing systems of water management, however, with account of the recent developments, acceptance at the international level the principles and approaches of IWRM, and changes in the economic potential of Turkmenistan there is still a considerable gap between the required changes, particularly in the enabling environment, legislative and regulatory frameworks, institutional/organisational systems of water resource governance, and the current state of affairs.

Functions of water resource management are divided between a number of government agencies, however, priorities and objectives of these authorities are sometimes different. This fact makes a closer cooperation between them quite complicated. An institutional reform is though required. Besides, an overall guidance has to be provided by establishing effective inter-ministry coordination mechanisms. In addition, in case of water supply and sanitation, the corresponding local governments and administrations play also an important role. Proper integration of the water supply and sanitation issues into the overall governance system will require the involvement of local bodies of power as well.

Improved trans-boundary cooperation is most likely to be successful within individual river basins. Technical cooperation over water-monitoring and dam safety is also a useful vehicle for cooperation, as are the investments in new river regulations or electricity generation.

At present, there are a number of international agreements in relation to water resources in CA, however, the main emphasis is put onto water allocation mechanisms rather than on the development of integrated management approaches. Water quality related issues are still not properly dealt with within these agreements. In order to prevent the increased environmental damage from transboundary irrigation drainage water flows, Turkmenistan has proposed the development of a Transboundary Water Quality Agreement for the Amu Darya Basin. Such activity could be the start of an intensified cooperation between CA countries not only on water quantity but also water quality issues.

The legislative framework of IWRM to be developed and implemented at the national level is to include the following provisions [19]:

- ▶ Recognising IWRM as the main way of improving water sector activities including such aspects of IWRM as establishing water management within drainage basin or irrigation system boundaries, public participation, and economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems;

- ▶ Defining rights and duties of the main parties involved in water resource management and water use - water users and government agencies;
- ▶ Establishing procedures of water licensing or water rights regulation;
- ▶ Developing legislative regulations regarding an economic value of water and ecologic water releases as well as nature requirements on water supply, development and introduction of incentives for saving water including effective economic instruments and financial mechanisms of cost recovery;
- ▶ Introduction of paid water services and the principle “a polluter pays”; and
- ▶ Regulating the governmental participation in water sector maintenance and development, as well as tasks and obligations of municipal bodies.

Legislative frameworks at the local level include the following [19]:

- ▶ Procedures for registration of community based water associations²² as legal entities, and at the same time such organisations are to be registered as non-commercial, non-governmental organisations exempt from taxes;
- ▶ Procedures for settling disputes that can take place in the process of water allocation, water supply, collection of water charge, and participation in public works etc. At the same time, it is necessary to use as much as possible traditional ways of settling such disputes;
- ▶ Introduction of effective economic instruments in the water sector on the basis of market relations, including mutual settlements between water suppliers and consumers, as well as between several water services within the irrigation system and corresponding supporting organisations;
- ▶ Phased-in introduction of a system of the full recovery of operational costs related at the expense of water users’ fee in combination with subsidies from state budget in order to prevent deteriorating of irrigation and water supply assets and infrastructure;
- ▶ Developing and putting into practice the procedures of obligatory fee collection for allotment and withdrawal of land for new irrigation development or land reclamation to improve the farmland productivity;
- ▶ Involving the private sector and foreign investors in funding operation and rehabilitation of existing irrigation and drainage infrastructure and developing new irrigated lands;
- ▶ Improving the taxation and tariff policy in order to increase the efficiency of irrigated farming;
- ▶ Step-by-step introduction of normative funding into the irrigation sub-sector;
- ▶ Inventorise the capital assets of irrigation systems to specify the need in financial resources for O&M;
- ▶ Priority funding of the most unique and vulnerable hydraulic structures;
- ▶ Recognising construction and operation of water supply systems as high priority interventions of the national policy; and
- ▶ Developing and putting into practice modern advanced irrigation methods, as well as preferential terms for power supply during the transition period towards market relations in the zones of pumping irrigation where welfare of local population mainly depends on irrigated farming.

Development and implementation of public awareness campaigns on IWRM is needed to reach out to as much stakeholder groups as possible.

²² Similar to Water User Associations (WUAs) in Kazakhstan, Uzbekistan, or Tajikistan, or Canal Boards, Water Councils, etc.

Particular challenges lie in the field of access to safe drinking water and sanitation facilities. This is why RWSS development is one of the key priorities in all CA countries including Turkmenistan:

- ▶ Dilapidation of systems and infrastructure;
- ▶ High rate of water losses;
- ▶ Insufficient coverage and sustainable access to safe drinking water of population, particularly, in rural areas;
- ▶ Low tariffs and subsidies for supplied water makes the whole sector dependent of the state budgets and make a considerable involvement and sustaining interest of the private sector entities unrealistic;
- ▶ Water use measuring devices are very rare, which makes accurate estimates of water abstracted/used impossible;
- ▶ Low capacity both in terms of equipment and staff qualification is typical throughout the country;
- ▶ Use of water of drinking quality for irrigation and other domestic or industrial purposes; others.

In order to integrate the WSS sector into an overall IWRM scheme it is recommended to develop a clear strategy for the development of small-scale water supply and sanitation systems in rural areas, to design and implement a series of pilot activities with introduction of modern technologies and practices of water treatment, to set up of effective drinking water quality monitoring systems, to design targeted and focused educational and training campaigns, to support legislatively and financially the participation of private sector and the establishment of PPPs in the field of water supply and sanitation.

The current assessment resulted in a series of recommendations for further interventions feasible for reforming the water sector. It is clearly understood by the author that these recommendations have a preliminary character and require further analysis, particularly by representatives of various donors interested in supporting Turkmenistan in its development towards the introduction of IWRM as a usual practice in water resource management in the country. Moreover, the recommended interventions should also have an integrated nature and address the development of various aspects of IWRM. The purpose of such interventions will be to improve the enabling environment, institutional structures and systems for the integrated water resource management in Turkmenistan and with neighbouring countries.

In order to structure the proposed activities Table 9 below is proposed. The table contains the basic areas of intervention versus expected outcomes/impacts. The proposed list is not exhaustive but rather recommended as a series of aspects to bridge up the most priority gaps in water sector operation in Turkmenistan.

Table 9 Proposed Interventions in Water Sector vs. Expected Impacts to be Achieved

#	Area of Intervention	Expected Outcomes/Impacts
1.	Baseline Studies - Assessment of the adequacy, reliability and appropriateness of existing, available data and databases for water resource operational management and strategic planning	<u>Outcome 1:</u> Updated inventory of the data available (Data Register) provides required information for better understanding of the current state of society, natural resources including water, and other key sectors of the Turkmen economy. <u>Outcome 2:</u> A comprehensive Report on the State of water and environment and governance system in Turkmenistan presents the updated knowledge to the international community and local stakeholders.
2.	Development of a new integrated, cost-effective, monitoring and information systems for water	<u>Outcome 3.</u> A prototype of a new inter-agency cost-effective water resource monitoring system, which provides reliable, quality assured and verified data, serves effectively for testing

#	Area of Intervention	Expected Outcomes/Impacts
	resource management, implementation of a prototype at one of transboundary rivers of Turkmenistan.	approaches to the cross-sectoral monitoring of water resources. Recommendations are developed on how to scale-up the prototype nationally and in the transboundary context. <u>Outcome 4.</u> An integrated information system (including GIS and Web interfaces) linking the main data providers becomes an effective means for operational information exchange in accordance with information needs of the main agencies involved in water resource management.
3.	Development of economic instruments and promotion of investment opportunities for pollution control and protection of water resource management and RWSS	<u>Outcome 5.</u> Guidelines/templates for socio-economic analysis developed in line with internationally accepted methodologies unify approaches country-wide and provide updated knowledge on socio-economic situation in Turkmenistan. <u>Outcome 6.</u> Potential for additional resource mobilisation is investigated in close cooperation with international organisations and financial institutions, including PPPs and a donor conference.
4.	Analysis of Water Resource Management and Conservation Strategies/Policies, development of a set of recommendations and drafting legislative/regulatory base to improve enabling environment for the effective IWRM.	<u>Outcome 7.</u> Results of a detailed analysis of the Water Resource Management and Conservation Strategies/Policies provide a clear plan supported by the main government agencies involved to close the existing gaps in legislation and strategic/policy papers. Draft papers are widely discussed by the respective ministries, committees and other governmental authorities.
5.	Development of Perspective Water Resource Management Plans	<u>Outcome 8:</u> Water Resource Management Plans become an effective tool for perspective planning and interventions in the water sector of Turkmenistan in a medium to long-term.
6.	Increased stakeholder and public involvement in water resource management process including educational campaigns and extensive public awareness and training activities	<u>Outcome 9:</u> Community involvement increased through an expanded and strengthened network to undertake awareness raising and pollution reduction activities <u>Outcome 10:</u> Sustainable operation of the “Umbrella NGOs” achieved, leading the further expansion and effectiveness of the network, active involvement of the “Umbrella NGOs” members in policy development and water management practices assured through partnerships with the government agencies (e.g. activities to involve public in the Management/Planning process in the frame of the EU Water Framework Directive, etc.) <u>Outcome 11:</u> Educational, information and awareness raising campaigns become regular events and a platform to raise awareness on issues related to effective water resource use, management and conservation.
7.	Selection and Implementation of Pilot Demonstrational Projects on IWRM	<u>Outcome 12:</u> Introduction of IWRM at a smaller scale shows the appropriateness of similar approaches in other basins leading to a better management and use of water country-wide.
8.	Selection and Implementation of Pilot Demonstrational Projects on RWSS	<u>Outcome 13:</u> Improved capacity of the Government, the communities and the private sector to expand a sustainable and cost-effective coverage in water supply and sanitation through better water resource management and conservation practices

However, a more detailed elaboration and an “idea pipeline” on the corresponding interventions including proposed individual activities designed to achieve the impacts recommended with account on emerging funding opportunities are presented in Appendix A to this report (page 62).

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Appendix A. “Idea Pipeline” on Interventions in Water Sector Based on Emerging Opportunities

AREA OF INTERVENTION Title / Brief Description	ACTIVITIES Preliminary List Based on Assessment of Water Sector in Turkmenistan	OPPORTUNITY Is/does the idea / concept / project comply with / have ...						ASSUMPTIONS
		UN(DP) competency	National and international partner(s)	Potential financial partner(s)	Substantive partner(s)	Political implications and/or constraints	Other reasons	
An assessment of the adequacy, reliability and appropriateness of existing, available data and databases for water resource operational management and strategic planning	An inventory (a technical review) of existing, available data, in order to identify: which types of data are available in which organisation; the nature of the data (e.g. hydrology, meteorology, water quality, demands, discharges, fisheries, groundwater, land use, demography, etc); the locations/sites for which these data are available, or the extent of geographical coverage; and the form in which the data are held (loose-leaf paper records, bound reports, maps, computer files, databases, etc).	Practice competency (UNDP/UNEP)	MWR, MNP	bilateral donors (tbi), local contributions (also in-kind)	Research institutes within government agencies involved in water resource management including monitoring	Sensitive regional cooperation, some agencies are reluctant to release data, e.g. Ministry of Health.	The assessment will serve as a basis for baseline studies required to design and implement required reforms and/or justify individual projects related.	Government agencies cooperate and are open to provide both information on the data available (metadata) and the data themselves
	Development of a Data Register using the information obtained while implementing the above task	Practice competency (UNDP/UNEP)	MWR	bilateral donors (tbi), local contributions (also in-kind)	Research institutes within government agencies	Not foreseen	The Data Register will provide required structuring of information available	Collected data and information could be used for optimistiaon of the decision-making process
	Hold a series of working meetings to discuss and agree on findings of the tasks above	Practice competency (UNDP/UNEP)	MWR	bilateral donors (tbi), local contributions (also in-kind)	As above, plus representatives of wider public and other stakeholders	Not foreseen	Required to widely discuss the findings and have preliminary support from the key stakeholder groups	Government agencies are open, interested and actively buying-in into the process
	Preparation of an Inter-Agency Agreement/MoU on data sharing for water resource management including data/information exchange protocols	Practice competency (UNDP/UNEP)	MWR	Bilateral donors (tbi), local contributions (also in-kind)	Government agencies - information holders and users	There could be certain reluctance of certain authorities to legalise this cooperation	Required to provide a legal basis for further cooperation on related issues	Government agencies are willing to cooperate and share available data, and, consequently, sign and afterwards closely fulfil the Inter-Agency Agreement(s) on monitoring and information exchange.

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		UN(DP) competency	National and international partner(s)	Potential financial partner(s)	Substantive partner(s)	Political implications and/or constraints	Other reasons	
An assessment of the adequacy, reliability and appropriateness of existing, available data and databases (cont'd)	Gathering information on water resource state, critical analysis of the time-series available, analysis of the current state of water resources and environment including trend analysis.	Practice competency (UNDP/UNEP)	Research Institutes within government agencies, international consultants	Bilateral donors (tbi), local contributions (also in-kind)	Government agencies - information holders and users	Capacity training required to apply modern analysis methodologies	Such analysis has not been carried out	Government agencies are willing to cooperate and share available data
	Development of a report on the state of water resources and environment in Turkmenistan, the report needs to contain analysis of system boundaries in space and time, scoping of environmental and social impacts, research on causality.	Practice competency (UNDP/UNEP)	Research Institutes within government agencies, international consultants	Bilateral donors (tbi), local contributions (also in-kind)	Government agencies - information holders and users, international consultants	Not foreseen	To provide modern updated information on the state of environment for international community and local population	Reliability/quality of the data stored allow to make justified judgments on the state of environment and water resources
An analysis of the enabling environment and institutional frameworks in place in the field of water resource management and conservation	A detailed review of institutions, laws/regulations, practices, economic/financial instruments currently used (i.e. state subsidies for water and irrigation, gas and power supply, etc.).	Practice competency (UNDP/UNEP)	MWR, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities involved	Sectoral regulations are not easily available, only hard copies available and within the agencies only	There is an obvious duplication and gaps in functions of the main agencies, but there is no analysis available.	Government agencies fully buy-in and support activities related to institutional/legal improvements/ amendments
Analysis of Water Resource Mngt and Conservation Strategies/Policies, development of a set of recommendations and drafting legislative and regulatory base to improve enabling environment for the effective IWRM.	Establishing an inter-agency working group on drafting lacking legislation and regulatory documents, which includes also technical experts and specialists from various institutions required for the development of standards, regulations, norms, etc.; development of a MoU between the key agencies.	Practice competency (UNDP/UNEP)	MWR, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities involved	Government agencies are difficult to get involved closely in a development process, nevertheless, involvement and buy-in of the authorities is critical	Second-level legislation and consistent regulations are required for proper management decisions made on both allocation of water and protection of water quality	The corresponding authorities and institutions assign proper experts in timely and due manner

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		UN(DP) competency	National and international partner(s)	Potential financial partner(s)	Substantive partner(s)	Political implications and/or constraints	Other reasons	
Analysis of Water Resource Mngt and Conservation Strategies/Policies, development of a set of recommendations and drafting legislative and regulatory base to improve enabling environment for the effective IWRM (cont'd).	Development of concrete proposals and initiatives on improvements of the existing systems and infrastructure, including closing gaps in legislative acts, rules and provisions, which form the regulating basis for water resources management; optimisation (restructuring) of the existing WRMS; and development of perspective (strategic) basin management plans for transboundary river(s).	Practice competency (UNDP/UNEP)	MWR, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities and institutions involved supported by a team of local and international consultants	Proposals are to take account of the actual state of affairs and be realistic in terms of further endorsement by the government agencies involved	Results of activities of the working group need to be resulting in a set of concrete recommendations on improvement of enabling environment for water resource management.	The working group is properly coordinated to streamline the process of development into practical needs of the reforms.
	Development of a plan endorsed by the main government agencies involved and based on the recommendations developed within the above task to introduce required measures to bridge-up the existing gaps	Practice competency (UNDP/UNEP)	MWR, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities involved	The plan has to be coordinated with workplans of the agencies and prepared well in advance of approval of those	Endorsement is required to formalise the process and include corresponding actions in workplans of government agencies	Agencies are cooperative and ready to endorse the developed initiatives
	Drafting of the key missing pieces of legislation, regulations and normative acts	Practice competency (UNDP/UNEP)	MWR, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities and institutions involved supported by the team of local and international consultants	There is a potential conflict of interests of various agencies and institutions. Such conflicts are to be avoided.	It is critical for the new modern legislation to properly work, since a number of laws, codes, etc. require supplementary regulations, norms, standards, etc.	Agreements with the corresponding parliamentary groups are reached within the life-span of the project, whereas introduction of actual amendments to legislation are seen as long-term outcomes and will be finalised after the end of the project.

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		UN(DP) competency	National and international partner(s)	Potential financial partner(s)	Substantive partner(s)	Political implications and/or constraints	Other reasons	
Development of Perspective Water Resource Management Plans	Production of socio-economic development and water use scenarios for transboundary river basins in the medium to long-term. The scenarios are expected to incorporate the global climate change perspective as well.	Practice competency (UNDP/UNEP)	MWR, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities and institutions involved supported by the team of local and international consultants	There must be enough information available to develop socio-economic scenarios.	Medium to long-term planning of water resources available is important for other sectors of the Turkmen economy.	Government agencies are keen to participate in the process
	Production of a strategic plan for the medium to long-term management and development of the transboundary river basins, to include the management goals and objectives of the basins.	Practice competency (UNDP/UNEP)	MWR, MoFA, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities and institutions involved supported by the team of local and international consultants	This process have to harmonised with those at the transboundary level	The current plans are not fully implemented and certain activities (e.g. a joint monitoring) are not implemented. The strategic visions need to be realistic and shared by all countries involved.	Strong coordination is provided by MWR and government, cooperation with basin councils and authorities from neighbouring countries is also critical.

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		UN(DP) competency	National and international partner(s)	Potential financial partner(s)	Substantive partner(s)	Political implications and/or constraints	Other reasons	
Development of Perspective Water Resource Management Plans (cont'd)	Production of a medium to long-term implementation plan or plans for water resource management and development, to include the identification of specific measures.	Practice competency (UNDP/UNEP)	MWR, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group of representatives from the main authorities and institutions involved supported by the team of local and international consultants	Boundary conditions defined at the transboundary level provide enough room for further planning of water resource allocation within the country	Measures are to be endorsed, planned and funded in accordance with the local legislation and procedure. This could require account of timing within the year to be included in the state budget distribution	Specific measures developed will be included in work programme of the agencies involved and sufficiently funded from both internal and external sources
Development of integrated, cost-effective, monitoring and information systems for water resource management, implementation of a prototype at one of transboundary rivers of Turkmenistan	Identification of management issues, priorities, and information gaps, with regard to integrated water resources management in Turkmenistan, and recommendations for filling information gaps, organisation and holding a number of meetings and workshops.	Practice competency (UNDP/UNEP)	MWR, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group of representatives from the main authorities and institutions involved supported by the team of local and international consultants	If successful - a big step forward towards the establishment of inter-ministry cooperation mechanisms for water resource management	Based on the current assessment - serious gaps exist between the management information needs and actual data/information utilised.	Readiness of government agencies to cooperate within an integrated inter-agency monitoring system
	Review of existing regulatory documents relating to water quality and quantity, monitoring systems and services, including: planning of monitoring system (network and frequencies), sampling, sample analysis, initial data processing/reporting, and the development and operation of a database	Practice competency (UNDP/UNEP)	MWR, other government agencies	local contributions (also in-kind)	A working group of representatives from the main authorities and institutions involved supported by the team of local and international consultants	Sectoral regulations are not easily available, only hard copies available and within the agencies only	There is obvious duplication/ gaps in functions of the main agencies, but there is no analysis available.	There is enough support within the agencies involved to strengthen the capacity of their laboratories and sustain this capacity in future, in particular, related to introduction of required QA/QC arrangements and international and/or inter-agency inter-calibration exercises

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		UN(DP) competency	National and international partner(s)	Potential financial partner(s)	Substantive partner(s)	Political implications and/or constraints	Other reasons	
Development of integrated, cost-effective, monitoring and information systems for water resource management, implementation of a prototype (cont'd)	Establish and implement QA/QC procedures including inter-institutional calibration exercises for chemical and ecological monitoring and the development of the Standard Operating Procedures (SOP). Organise workshops on application of modern assessment techniques and SOP.	Practice competency (UNDP/UNEP)	MWR, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	Government agencies (mainly laboratory staff) involved in monitoring supported by international and local consultants	QA/QC procedures and SOPs are not developed and used in laboratories involved in water resource monitoring	The current systems of sampling, sample handling and processing, and data processing are old and require changing.	Monitoring institutions involved will be supported with necessary financial means and equipment for sampling and laboratory work from mainly local sources of funding
	Develop, implement, and test a new inter-agency cost-effective prototype water resource monitoring system, including prioritisation of management issues at key locations, if the available data are insufficient the data gaps need to be revealed, and where necessary, certain measures to fill them taken (including additional surveys).	Practice competency (UNDP/UNEP)	MWR, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	Government agencies involved in monitoring supported by international and local consultants	There is no coordinating agency in the field of monitoring, inter-ministry cooperation is weak.	An integrated monitoring of water resources is absent, monitoring efforts seem to be clearly sectoral.	There is enough financial support given to activities related to water resource monitoring and, in particular, the joint monitoring in transboundary rivers
	Strengthen the capacities of identified monitoring institutions through staff training as needed for improved chemical and ecological monitoring, and provide, where necessary and based on an inventory of available equipment in laboratories, basic monitoring equipment.	Practice competency (UNDP/UNEP)	MWR, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	Government agencies involved in monitoring supported by international and local consultants	Not foreseen	Current capacity of the laboratories involved in monitoring of water resources is weak to the extent that the laboratories can not perform the analyses they are required to by legislation/regulations.	Following the inventory required, some additional (basic) monitoring equipment needs to be provided/procured to be installed in laboratories. Further support mechanisms need to be developed in terms of operational/upgrade costs required.

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		UN(DP) competency	National and international partner(s)	Potential financial partner(s)	Substantive partner(s)	Political implications and/or constraints	Other reasons	
Development of integrated, cost-effective, monitoring and information systems for water resource management, implementation of a prototype (cont'd)	Update current data collection practices, develop an inter-agency information system, a corresponding inter-agency agreement/MoU, data exchange protocols, databases and DB management applications, including user and web interfaces. Provide required computer equipment, installation of the information system, manuals and training.	Practice competency (UNDP/UNEP)	MWR, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	Government agencies involved in monitoring supported by international and local consultants	Additional hardware/software need to be provided/procured to be installed in agencies and supported further in terms of operational/upgrade costs required by the agencies themselves	Currently data and information are stored and processed as hard copies. Information exchange is weak. Public does not have easy access to environmental data.	Agencies are willing to share data and information and to support operation of their terminals of the integrated system.
	Improve reporting formats with user friendly interface to assure coherent and analytical presentation of data and information for decision making.	Practice competency (UNDP/UNEP)	MWR, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	Government agencies involved in monitoring supported by international and local consultants	Not foreseen	Regular reporting to decision-making authorities and public is poorly developed.	Agencies are willing to regularly publish information on state of environment and water resources
Development of economic instruments and promotion of investment opportunities for pollution control and protection of water resource management and RWSS	Prepare guidelines and templates for the socio-economic analysis for Turkmenistan in applying a methodological approach developed and accepted internationally for economic analysis (e.g. under the EU WFD).	Practice competency (UNDP/UNEP)	MWR, Ministry of Economy and Development, State Statistics Committee, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	MWR, other government agencies (not only with responsibilities in water resources, e.g. economics, statistics, etc.)	Adoption of developed internationally methodologies at national level could require certain legal procedures	The analysis need to be conducted in an internationally understood and accepted manner with the use of developed guidelines, recommendations, etc.	There is political will to initiate activities on socio-economic assessment and a follow up introduction of proposals on cost-recovery mechanisms

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Development of economic instruments and promotion of investment opportunities for pollution control and protection of WR management and RWSS (cont'd).	Organise consultation and information meeting with governmental authorities to explore possibilities for cost recovery for water services.	Practice competency (UNDP)	MWR, Ministry of Economy and Development, State Statistics Committee, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities involved supported by international consultants	Cost recovery mechanisms could start properly working not immediately, but after some time. This needs to be explained.	Since the issue of financial sustainability and introduction of cost recovery mechanisms are socially sensible, a very careful and delicate approach should be taken	Government agencies are prepared to introduce new market/sustainability mechanisms.
	Carry our socio-economic analysis at national level and identify significant deficiencies regarding water resource management and water supply related legislation including water pollution charges, fines and incentives, subsidy mechanisms, etc.	Practice competency (UNDP)	MWR, Ministry of Economy and Development, State Statistics Committee, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities involved supported by international and national consultants	Socio-economic analysis requires considerable amount of data and information and certain expertise available. Both could be lacking in Turkmenistan.	Results of the analysis will help to develop realistic mechanisms and incentives for further development.	Government agencies participate closely in the analysis and provide required data and information.
	Present results of socio-economic analysis at a workshop with representatives of the key stakeholders.	Practice competency (UNDP)	MWR, Ministry of Economy and Development, State Statistics Committee, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities involved supported by international and national consultants	Proper selection of stakeholders has to be done, since it's impossible to organise a large conference.	Results are to be explained to the key stakeholder groups.	Government agencies are prepared to accept results of the analysis and take them into account for future planning.

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Development of economic instruments and promotion of investment opportunities for pollution control and protection of WR management and RWSS (cont'd).	Summarise results of socio-economic analysis and evaluate mechanisms for the cost recovery for water services in line with a methodological approach selected (e.g. EU WFD guidelines). Prepare a summary report on socio-economic situation in Turkmenistan and make judgment about the most cost-effective combination of measures with respect to IWRM approach.	Practice competency (UNDP)	MWR, Ministry of Economy and Development, State Statistics Committee, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities involved supported by international and national consultants	Not foreseen	After discussions and with account of the feedback collected at the workshop, some amendments could be required to get the results accepted by the stakeholders	Workshop participants provide required feedback and support a development team in finalising the analysis. A corresponding budget is made available for translations and publishing of the final report.
	Examine opportunities for public-private partnerships for investment projects in water sector (e.g., municipal/rural water supply and wastewater treatment, environmental friendly industrial/agricultural production, modern water-efficient irrigation practices, etc.)	Practice competency (UNDP)	MWR, Ministry of Economy and Development, State Statistics Committee, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities involved supported by international and national consultants	Legal base is required for the establishment of PPPs.	PPPs proved to be an effective tool for cost recovery of water services in other regions. PPPs have a high potential in Turkmenistan as well.	Government/parliament are prepared to introduce changes if required to introduce PPPs in water sector
	Investigate the current potential in cooperation with UNDP and other international organisations for a donor conference (IFI and bilateral donors) to mobilise financial support for the implementation of measures (particularly in transboundary and inter-sectoral context) directed at an improvement of the current state and efficiency of water use in Central Asia	Practice competency (UNDP)	MWR, Ministry of Economy and Development, State Statistics Committee, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities involved supported by international and national consultants	Involvement of UNDP and MoFA required, close cooperation with donors (both IFIs and bilateral) is critical.	Donor coordination is critical to develop harmonised interventions by various donors and international organisations. Participation and guidance of the Turkmen government is anticipated.	Both government of Turkmenistan and donors are interested and active in organising a donor conference.

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Increased stakeholder and public involvement in water resource management process including educational campaigns and extensive public awareness and training activities	Develop criteria and evaluate the effectiveness of NGOs in the support of water resource management and rural domestic and drinking water supply.	Practice competency (UNDP)	MWR, MNP, Ministry of Education, other government agencies	Bilateral donors (tbi), local contributions (also in-kind), NGOs, INGOs	Nature Protection Union of Turkmenistan at all levels, INGOs	Strong guidance is required from international community, particularly, from INGOs.	Public participation mechanisms are not well developed in Turkmenistan. Effectiveness of newly established NGOs is very important for sound reforms of the current system.	There is enough legal and practical support to the NGOs to participate in management and distribution of water resources, including supply and sanitation issues.
	Provide support to the “Umbrella” NGOs (e.g. Nature Protection Union) through capacity building in the form of consultation meetings and reinforcement of communication and information management (NGO websites).	Practice competency (UNDP)	MWR, MNP, Ministry of Education, other government agencies, INGOs	Bilateral donors (tbi), local contributions (also in-kind), NGOs, INGOs	Nature Protection Union of Turkmenistan at all levels	Information exchange in Turkmenistan is not easy, internet is mainly operates slowly.	Building a strong community- and public-based platform will reinforce the feedback mechanisms between decision-makers and society.	Umbrella NGOs play a strong coordinating role to mobilise wider public
	Support the production and distribution of NGO publications in national language on the issues and challenges of water resource use, conservation and management.	Practice competency (UNDP)	MWR, MNP, Ministry of Education, other government agencies, INGOs	Bilateral donors (tbi), local contributions (also in-kind), NGOs, INGOs	Nature Protection Union of Turkmenistan at all levels, INGOs	Additional funding is required for preparation of publications and printing.	Since internet is still not well developed in Turkmenistan, the hard-copy publications are still the choice number one.	Donors, Government and local administrations are prepared to allocate required budget for preparation and printing of additional visibility and awareness material.
	Organise educational campaign(s) on various aspects of water resource use, conservation and management.	Practice competency (UNDP)	MWR, MNP, Ministry of Education, other government agencies, INGOs	Bilateral donors (tbi), local contributions (also in-kind), NGOs, INGOs	Nature Protection Union of Turkmenistan at all levels	It is vital to involve not only UNDP and other international organisations, but also local administrations.	Understanding of all aspects of IWRM in its inter-dependence and application in everyday life is limited.	Representatives of the donor community, Government and local administrations participate in the development process to make the campaigns realistic and the most effective.

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Increased stakeholder and public involvement in WR management process (cont'd).	Conceptualise and implement public information and awareness raising campaigns on IWRM and/or RWSS issues.	Practice competency (UNDP)	MWR, MNP, Ministry of Education, other government agencies, INGOs	Bilateral donors (tbi), local contributions (also in-kind), NGOs, INGOs	Nature Protection Union of Turkmenistan at all levels, wider public	Since replication/adaptation of successful campaigns require a bigger scale, thus support from the government is needed.	Successful experiences are to be scaled-up country-wide to reach out to more stakeholders in the country.	Government agencies and local administrations are prepared to participate in educational campaigns rising by this fact the importance of such campaigns.
Selection and Implementation of Pilot IWRM Demonstrational Projects	Studying previous and ongoing projects related to IWRM and preparation of, discussion and agreement on a set of criteria for an IWRM pilot project by the main agencies involved.	Practice competency (UNDP)	MWR, MNP	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities involved supported by international and national consultants	IWRM is understood at various levels of government agencies, however, it is often emphasised that it is not feasible for Turkmenistan.	There have been a series of pilot interventions at different scales, however, an experience sharing note/summary is missing. That included in the current report is not comprehensive enough because of the limitation of the current assignment.	Ministries and other organisations involved in previous projects do provide required background information on the projects implemented.
	Identification and development through a consultative process involving the key national stakeholders, local governments/administrations, international organisations, donors, and local communities/public of a potential IWRM pilot project.	Practice competency (UNDP)	MWR, MNP, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group containing representatives from the main authorities involved and local administrations supported by international and national consultants	Stakeholders are important to actively participate in the process and provide required feedback to get proper set of opinions representing various stakeholders.	Since stakeholders represent different groups a special stakeholder analysis exercise is required to map the key stakeholder groups and develop a corresponding communication strategy for each group.	Political commitment exists and financial means are sufficient to revise and apply legislation if needed to implement the pilot projects selected

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Selection and Implementation of Pilot IWRM Demonstrational Projects (cont'd).	Detailed design of the pilot project interventions including M&E and stakeholder involvement plans, getting an official support from the key government agencies on the project	Practice competency (UNDP)	MWR, MNP, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group of representatives from the main authorities involved and local administrations supported by international and national consultants	It is of utmost importance to closely involve local administrations in the process of designing pilot projects, which should be in compliance with the respective development plans.	Since the pilot is to be coordinated with the prospective development plans of the corresponding administrative-territorial unit(s), IWRM principles tested are to be reaching out beyond the corresponding borders.	Representatives of neighbouring territories, be it regions of Turkmenistan or other countries, participate in and support the pilot project interventions. Enough funds need to be allocated for the coordination effort.
	Creation of opportunities for (an) <i>ad-hoc</i> basin or sub-basin committee(s) and stakeholders council(s) to formulate short-term plans based on adaptive management approach and to start contributing to an overall plan	Practice competency (UNDP)	MWR, MNP, other government agencies	Bilateral donors (tbi), local contributions (also in-kind)	A working group of representatives from the main authorities involved and local administrations supported by international and national consultants	Cooperation at the sub-basin level is a model for further implementation basin-wide.	Mechanisms to be applied at the catchment level are to be tested and tailored according to the local situation. The <i>ad-hoc</i> arrangements are a means for achieving this.	All parties to the <i>ad-hoc</i> institutional structures actively participate in the process and ready to introduce required legal/regulatory adjustments if required.
	Provision of knowledge on IWRM principles to the local administrations and civil society through meetings, seminars and workshops, regular providing of information (e.g. through a public information centre) on the project to the key governmental stakeholders and public/communities through experience sharing workshops and publications.	Practice competency (UNDP)	MWR, MNP, other government agencies, local administrations	Bilateral donors (tbi), local contributions (also in-kind), local budgets and other sources at local level	A working group of representatives from the main authorities involved and local administrations supported by international and national consultants	Representatives of local administrations are busy with their own duties, so additional effort required for this activity will depend on the willingness of the decision-makers and public to get involved.	Educating local administrators is important for further implementation and, more critically, for future sustainability of the interventions' outcomes.	Preparedness of the civil society/public and private sector to adopt technological know-how including financial considerations

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Selection and Implementation of Pilot IWRM Demonstrational Projects (cont'd).	Implementation of Pilot Project(s).	Practice competency (UNDP)	MWR, MNP, other government agencies, local administrations	Bilateral donors (tbi), local contributions (also in-kind), local budgets and other sources at local level	The main authorities involved and local administrations supported by international and national consultants	Implementation of pilot project requires close involvement of the local administrations and society for the sustainability of outcomes.	Proper steering of the implementation process is required by the key stakeholder groups. The corresponding modalities are to be developed.	Sufficient national support for the implementation of pilot projects at all levels
	Development of up-scaling to ensure that the processes and methods used in the IWRM demonstration project become embedded into the work of local administrations	Practice competency (UNDP)	MWR, MNP, other government agencies, local administrations	Bilateral donors (tbi), local contributions (also in-kind), local budgets and other sources at local level	The main authorities involved and local administrations supported by international and national consultants	Not foreseen	Up-scaling potential has to be kept in mind from the very beginning of the interventions while opting for certain technical, etc. solutions.	There is enough support at the national level to scale-up and replicate the most successful solutions/experiences country-wide.
	Consolidation of working procedures for all concerned agencies to support the local development initiatives with technical and financial assistance available	Practice competency (UNDP)	MWR, MNP, other government agencies, local administrations	Bilateral donors (tbi), local contributions (also in-kind), local budgets and other sources at local level	The main authorities involved and local administrations supported by international and national consultants	Consolidation of working procedures for all government agencies could require adjustment of legal/ regulatory basis.	Close cooperation is vital for the sustainable achievements.	Stakeholder involvement activities provide a wide buy-in of the local population and communities
	Regular monitoring of progress, reporting on lessons learned, and an independent final evaluation of project results	Practice competency (UNDP)	MWR, MNP, other government agencies, local administrations	Bilateral donors (tbi), local contributions (also in-kind), local budgets and other sources at local level	The main authorities involved and local administrations supported by international and national consultants	M&E efforts have to be prepared beforehand and properly structured.	Regular monitoring is critical to keep the interventions on track and tailor the approach if required by local circumstances	Government agencies and other stakeholders actively participate in monitoring of the progress and fine-tuning of activities if required.

Assessment of Water Sector in Turkmenistan,

UNDP Turkmenistan, March 2010.

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