

VISION

of the national development of IWRM

based on the IWRM-FV Project experience:

Regional Aspects

Since 2001, national teams from Kyrgyzstan, Tajikistan, and Uzbekistan have been implementing Integrated Water Resources Management (IWRM) in these three Central Asian countries under methodological and organizational guidance of the IWMI-SIC ICWC Association within the project financed by SDC. Unlike other approaches (UNDP, WB), this implementation of the IWRM principles is based on the bottom-up approach and supported by the national governments: it involves all levels of water users, the former on-farm network of kolkhozes and sovkhozes to main canals network. The IWRM-FV Project has selected the command areas of the Aravan-Akbura Canal in Kyrgyzstan, Khodja-Bakirgan Canal in Tajikistan, and South-Fergana Canal in Uzbekistan as pilot zones for development, customizing, and implementation of the IWRM principles on an area of over 130 thousand ha. Although the project personnel pursues common principles and orientation, the development and adoption of IWRM in each country are influenced by political, economic, social, and environmental conditions of the country and, furthermore, continuously are subjected to changes that take place in each country in the current complicated geopolitical atmosphere. As the IWRM basis, the Project considers the “management system, based on taking into account all kinds of water resources (surface water, groundwater, and return water) within hydrological units, and coordinating the interests of different economic sectors and hierarchical levels of water use, involving all stakeholders in decision-making, and promoting the effective use of water, land, and other natural resources to meet the requirements of ecosystems and human society through a sustainable water supply.”¹

The key principles formulated in this work by the creative team of SIC ICWC and IWMI with the assistance of SDC and national water management organizations are the following:

- water resources management is implemented within the hydrological units in concordance with geomorphology of the river basin or canals system under consideration;
- the management takes into consideration assessment and use of all kinds of water resources (surface water, groundwater, and return water) and the climatic features of the regions;
- close coordination of all kinds of water users and organizations involved into water resources management, including cross-sectoral (horizontal) coordination and coordination of hierarchical levels of water governance (basin, sub-basin, irrigation system, WUA, and farm as the end user);
- public participation not only in the water management process, but also in financing, planning, maintaining, and developing water infrastructure;
- setting the priorities of ecosystems' water requirements into the practice of water management organization;
- participation of water management organizations and water users in activity related to water saving and control of unproductive water losses; water demand management along with resources management;
- informational exchange, openness, and transparency of the water resources management system; and
- economic and financial sustainability of water management organizations, adequate equipping and availability of skilled personnel.

¹ Integrated Water Resources Management: Putting good theory into real practice. Central Asian Experience. Tashkent, 2008, 363 p., SIC ICWC. Editors: V.A. Dukhovny, V.I. Sokolov, H. Manthrilake.

In their work, the groups of executors from all three countries together with the regional group were aimed to achieve all the above-mentioned principles. To what extent they succeeded in that, one can see from the results of the submitted report on the Hydrographic Study of the Fergana Valley, Output B.2, Phase 5, IWRM-FV Project, which was prepared using source data, statistics, and special surveys.

It should be mentioned that despite the political, economic, and social differences in all pilot zones of the three countries, the need for IWRM arises from common grounds and roots, notably the problems of the region as a whole and of each country under consideration; moreover, the severity of some problems undoubtedly differs among the countries. These problems are listed below:

1. Natural

- 1.1. More and more increasing water deficit due to population growth and economic development;
- 1.2. Soil salinization and deterioration of land conditions;
- 1.3. Global warming.

2. Nationwide

- 2.1. Transition from the state-administered system to market economy.
- 2.2. Change in the system of organization and governance of agricultural and water sectors, the property rights and land & water use rights.
- 2.3. Reduction of farm sizes and modification or removing of the crop planning system.
- 2.4. Change in the priority level of some sectors at the national level (for example, in Kyrgyzstan and Tajikistan), in particular increase in winter power generation by hydropower plants, especially for the upstream countries.
- 2.5. Depression of the overall economic capacity, considerable period of recession, rupture of former economic relations and their gradual renewal, and economic growth.
- 2.6. Dramatic reduction of investments in the water sector.

3. Technical and economic

- 3.1. Complex bound irrigation system with gravity and pumped flow.
- 3.2. Depreciation of water infrastructure through expiration of its lifetime and increased loads due to expansion of winter wheat areas and the need to deliver water beyond the growing season (April 01 to September 30). This, in turn, complicated current and capital repairs of the infrastructure;
- 3.3. Insufficient financing of inter-farm and main networks and complete absence of government subsidies for the on-farm network;
- 3.4. Insufficient equipping (vehicles, hardware, office equipment) of water management organizations;
- 3.5. Lack of gauging stations and regulating structures at farm offtakes due to quick increase of the number of farms;
- 3.6. Poor financial and economic position of agricultural producers.

4 Artificial

- 4.1. Change of the operation mode of reservoirs located along transboundary watercourses into power generating one.

5. Organizational

- 5.1. Lack of consistency between agricultural and water-management reforms;
- 5.2. Incompleteness of the reforms;
- 5.3. Weak public participation in water delivery governance;
- 5.4. Insufficient awareness of the public about the water-related situation.

6. Personnel

- 6.1. No target training of specialists in higher and specialized secondary educational institutions, for their accommodation to the conditions of growing water deficit in some countries;
- 6.2. Lack of target and regular re-training and training of the specialists for adaptation to the IWRM requirements;
- 6.3. Decreased prestige of the profession of **WATERMAN**.

The regional working group (RWG) has worked out a “model-template” for the national groups to prepare their national visions of further IWRM development in each participating country. Such visions are to be developed by the national teams using the considerable experience and material of both our Project and previously implemented projects, such as the ESCAP Project “Strategic planning of water resources management” and impressive work by the World Bank and USAID. A series of key documents related to the water sector development was adopted in all the three countries. As a result, each country shows clearly its recognition of IWRM and has a package of measures for efficient implementation of all IWRM principles.

In the result of the conducted hydrographic study, one can say with sufficient confidence that all specialists and practitioners, who are familiar with IWRM basics, as well as some advanced water users, understand the rightness of the comprehensive approach to IWRM and the need of its development. It is demonstrated obviously enough that even with certain trimmed and fragmentary character of the measures carried out within the project, the results achieved are major and economically effective, are accepted both by water management organizations and stakeholders including local authorities. The project impact has spread far beyond the project area owing to demonstrativeness and involvement of multiple professionals and users in the training activities under the IWRM-Fergana Project and “Water Productivity Improvement at Plot Level” Project (WPI-PL) generated by it.

HS development included the preparation of compliance matrixes that assessed the current state of IWRM implementation in the pilot zones and beyond, achievements and shortcomings, as well as the degree of implementation of each of 7 IWRM principles at hierarchical levels - beginning from national to water user level. This allowed proceeding from the analysis of the situation to the development of recommendations, which include:

- change of the institutional structure for its accommodation to IWRM and associated legal measures and documents;
- need to change the system of planning, accounting, monitoring of parameters under control, and reporting;
- introduction of clearer financial and economic relations between water using sectors, water hierarchy levels;
- developing and distributing management tools of planning and water accounting linked to economic mechanism;
- program of water saving and water and land productivity improvement;
- capacity building of water management organizations and water users (training of personnel, education, computerization, informational support, development of the Gender and Water network).

These directions appear virtually in all National reports, with different degree of details, depending on local specifics of IWRM implementation and existing purposes to develop it. At the same time, it

is highlighted that based on clear understanding of the IWRM principles and tools, success in follow up will depend on the following:

- development of a comprehensive national water policy and its coordination with the public with subsequent approval by the Government;
- creation of the mechanism of motivation of water management organizations, water users, and the public for the implementation of IWRM;
- necessary institutional and resource support of IWRM implementation.

NATIONAL VISIONS OF IWRM IMPLEMENTATION

In accordance with the proposed model, the National Visions, with different level of details, presented specific recommendations for the Governments in this direction. It should be remembered that the VISION is not a specific actions plan with the scope of works, required capital investments, estimation of economic effectiveness, but rather the desired possible progress in the light of country's needs under appropriate conditions (first of all, political and social & economic ones) for implementation which is well conceived by specialist and decision makers.

The state of the art and preparedness of the recommendations for broad IWRM implementation, described in the matrixes² for each IWRM principle and each water hierarchical level allow focusing on IWRM implementation and defining the following conclusions:

1. INSTITUTIONAL AND LEGAL MEASURES FOR DEVELOPMENT OF IWRM

1.1. Lower level of the water hierarchy – WUA – has gained recognition in all the countries and was widely spread. Among the three countries, in Kyrgyzstan and Uzbekistan full coverage has been achieved and there are no doubts about reality and promising outlook of these community organizations of water users. Institutional, legal, and financial-economic measures are planned everywhere in order to ensure sustainability and development of these Associations. This concerns first, the involvement of other water users, establishment of WUGs, size and procedure of payment for water services, and possible payment options, such as in form of agricultural products, farmer labor contribution, cash, and taxation. The WUA status as a non-profit non-governmental organization should be updated and approved in light of enlargement of the list of activities in the WUA. Thus, small cooperatives are planned to be set up and is in progress in Kyrgyzstan. In Uzbekistan, an extension service is set up under WUA to assist farmers. Given that all this is aimed at improving farmer activities, it is advisable to exempt farmers from any type of taxes. It is necessary to widely use the hydrographic principle when establishing WUAs in these countries and consider it when changing farm boundaries within WUA. The situation is comparatively difficult in Tajikistan, where the issue of land restructuring has not been solved fully. Moreover, along with WUAs, there are still existing kolkhozes, cooperatives, and district water administrations (rayvodkhozes) in the country. Nevertheless, the Tajikistan Vision states with confidence about the promising outlook of WUAs and their sustainability when settling taxation and economic problems. In general, WUA sustainability can be achieved through creation of such conditions that promote increased profitability of agricultural production of water users, fostering of the sense of responsibility among them for efficient use of water resources and developing understanding that WUA is an organization by means of which these users can create from bottom up a chain of financial interest of higher water hierarchical levels in meeting of users' requirements. This recommendation is explained in more detail in Annex 1 "Model for improvement of the IWRM financial and economic mechanism".

² In Annex 1, extracts from the National Visions of Uzbekistan, Kyrgyzstan, and Tajikistan are given; those deal with the recommended water structures at different levels of the water hierarchy.

1.2. Irrigation system level

Pilot establishment of the hydrographic system with direct water transfer from CMOs to WUAs has proved the advantages through reduction of water delivery without damaging productivity and, in combination with public participation and joint governance bodies (UCWU and CWC, respectively) ensured equitable and uniform water supply to individual sites of the system. These structures have gained acceptance in all the three countries; at that, UCWU is only one of the options for joining of WUAs' efforts for achievement of stable water supply. Simultaneously, similar organizations named WUAs Federations have spontaneously emerged beyond the project zone in Kyrgyzstan. Although those fit in the legal framework, since laws (codes) on water and WUA permit such unions, their status has not been clearly secured, thus leading to different interpretations and obstacles. Considering this fact, the right of such entities to existence should be secured, and the procedure of their financing at the expense of water users should be legalized in order to reach their financial sustainability.

The canal and system management structure has been analyzed in the Fergana Valley conditions. On the one hand, CMOs and UCWUs have proved themselves as hydrographic organizations that are able to ensure water supply directly to WUAs with no intermediary; on the other hand, there exist ISAs that somewhere are supplementary and not quite necessary entities. It appears necessary for BISAs together with ISAs (or as suggested in Tajikistan, together with district water administrations) to focus on water demand management, by turning into the main body coordinating these measures, with the inclusion of district Water & Land Commissions, Hydrogeological Reclamation Expeditions (HGRE), and extension services as a part of the WUA support system. In the Tajik HS report, they presented a new private-public structure - self-supporting agency Mirob - but the mechanism of its activity and interaction with other water management organizations and users needs to be specified.

1.3. Sub-basin and small river basin level

This level mostly applies to Uzbekistan, where they proposed to develop the existing structure that is based on the hydrographic principle. While keeping the general governance scheme, it is planned to enhance the role of the Fergana Valley Main Canals Administration together with the Unified Dispatch Center (MCA UDC) with transferring under its control of the whole Big Fergana Canal and the key waterworks facilities (Kampyravat, Teshiktash, Palvantash), as well as the main canals located in the Namangan province, i.e. North Fergana and Big Namangan Canals, and establish under its umbrella special units responsible for small rivers in order to transport and supply water to local water organization. MCA UDC will divert water from the Syrdarya and Karadarya river stems (according to water limits), transport water along main canals, coordinate water diversions with the resources in small rivers and main collector drains, and transfer water to appropriate local water management organizations for delivery of water further to users.

1.4. Public governance level of the water sector

The general line of action in all visions consists in the need to strengthen critically at the government level the direction toward the long-terms development, elaboration of the strategic plan of transition to IWRM, and building a system for its support. Establishment or strengthening (where it is already established) of the National Water Council headed by the Prime Minister or its deputy and composed of the leaders of key ministries and agencies interested in efficient water use and connected with the water sector, as well as of most prominent experts in this area, is considered in all national visions as the top-priority task. An excellently working similar body in Israel can be used as example: it collectively settles all the issues of principle related to water supply in the

country that is a real example of exemplary use of water resources (setting and adjustment of quotas, water tariffs, capital investments, etc.).

Earlier Kyrgyzstan showed the biggest progress in this direction, but then it slowed down and even took a step backwards because of political instability.

All the National Visions clearly list the required laws and bylaws which are supposed to be developed and adopted for successful promotion of IWRM. Out of the first-priority documents, the Water Code will be revised or developed providing for sound regulations for IWRM principles (basin approach, public participation, multipurpose use of water resources, water saving, and measures to awake the community's interest in its implementation, etc.) development and use. Besides, efficient laws and regulations often do not fully work because of different interpretations of their context by leading ministries. Hence, adoption of appropriate subordinate regulatory acts, instructions, and departmental rules especially for the Ministry of Justice, Ministry of Finance, and Central Bank in strict compliance with the principles, practice, and recommendations of IWRM is a priority.

Summarizing the above-mentioned, the following should be underlined:

1. The merit of all the National Visions is acknowledgement and consideration of the IWRM principles when developing the water governance structures:

- Hydrographization principle:

- o Sub-basin level. All the National Visions recommend shifting to the basin principle and establishing sub-basin organizations. It is known that although the basin principle is officially acknowledged and introduced in Uzbekistan and Kyrgyzstan, basin organizations (BWA, BISA) are set up, as a rule, within provincial boundaries.
- o Irrigation system level. In Uzbekistan, they recommend completing hydrographization by transferring inter-farm canals, which currently belong to ISAs, to Main Canal Management Organizations. In Kyrgyzstan and Tajikistan, they recommend establishing Federations of WUAs (FWUA) within hydrographic boundaries. In Tajikistan, operational departments are recommended also to be set up within hydrographic boundaries.
- o WUA level. At the WUA level, all the republics admit the necessity to establish (reorganize) WUAs within hydrographic boundaries.

- Public participation principle

- o National level. All the National Visions recommend establishing the National Water Council (NWC) with greater scope of full powers. In Kyrgyzstan, it was set up as early as 2006.
 - o Sub-basin level. All the National Visions recommend establishing Sub-basin Councils with the involvement of key stakeholders.
 - o Irrigation system level. In Uzbekistan, the public participation principle is being implemented through setting up main canal (system) water committees (CWC); in Kyrgyzstan and Tajikistan, it is being implemented by establishing FWUAs which are non-governmental & non-profit organizations of water users.
2. All the National Visions apply the water governance and management function sharing principle, with which active public participation is ensured by means of establishing water governance bodies. The National Visions' authors have reached the understanding that combination of the functions of decision making (governance) and decisions fulfillment (management) within a single water organization, as was the case in the CAR water management practice since the Soviet times, lowers both the quality of the decisions made and the quality of their fulfillment. Combination of these functions within a single water organization is inadmissible because the operation principles of the governance body and management body are different in essence. The governance body's activity involves active

public participation on the basis of democratic principles; while the management body's activity is based on strict administrative management principles.

3. Significant difference between the National Visions is observed at the irrigation system level. The distinctive feature of the Uzbekistan National Vision as against those of Tajikistan and Kyrgyzstan is that the Uzbekistan Vision employs the principle of sharing water delivery and water use functions: it is recommended to establish separately the water use governance body (district/province WLC) and water use management body (district water administration – rayvodkhoz) entrusted only with the water use authority (without water delivery functions). At that, these structures are suggested to be set up on the basis of the administrative and territorial principle.

According to the Tajikistan and Kyrgyzstan National Visions, it is planned to remove rayvodkhoz and establish FWUAs. This is obviously a very progressive and bold step – the future belongs to FWUAs. However, here it is very important not to jump the gun. It is well known that the establishment of FWUA involves entrusting it with full responsibility for the use (operation and maintenance) of the inter-WUA network. Taking into account the financial condition of farmers and WUAs that are supposed to pay all operation and maintenance costs, as well as poor state of irrigation and drainage network, there is a fear that FWUAs will be unviable in the short term. Therefore, it seems necessary to thoroughly consider this issue and take a reasoned decision.

2. MEASURES AIMED TO PROVIDE FINANCIAL AND ECONOMIC MECHANISM

To date, there exist different financial and economic mechanisms of relationship between water users and water management organizations, with different degrees of involvement of water users and different shares of budgetary financing in the three countries. Domestic and industrial water supply is paid in all the countries. In Kyrgyzstan and Tajikistan, they pay to water organizations for irrigation services along with paying for WUA services; in Uzbekistan, they pay for WUA services. Nevertheless, contribution of water users and budgetary financing do not cover the costs of the sector, do not encourage water saving, do not create mutual obligations of different water hierarchical levels in the IWRM contract system.

The principal aspect of the economic system of IWRM must consist in full coverage of water-related activity costs, including management, operation, maintenance, development and reconstruction. The mechanism of financing WMOs at all water hierarchical levels includes both the funds from various budget sources (governmental, provincial, and local) and from water users, as well as direct incomes of water management organizations from their direct and indirect (additional) activities. Thorough planning of necessary economically and socially sound expenditures, fixing the size of the payment for water supply services and incomes from direct and other activities associated with water management and water use, as well as share of budget allocations should be correlated with each other on the basis of the balance of financial assets. Transition to this system will require certain time, during which the organizational efforts of the government, water sector, and water users, including farms and other crop production and processing entities, will be directed to widespread application of water accounting facilities, without which effective financial mechanism of water use and management is impossible.

Another main part of this mechanism should be the system encouraging rational use, protection, and restoration of water resources and water bodies, reduction of consumptive water use, prevention of aquatic ecosystem and soil pollution.

Along with introduction of water charges, it is necessary to change the **financing structure** too. The funds received from water users, besides WUAs, will be directed partly to maintenance of

irrigation system management organizations and main canal management organizations and partly to Provincial Hydrogeological Reclamation Expeditions (PHGRE), depending on execution of contractual obligations by the latter. At that, the contribution of water users and their associations in these expenditures should depend on the quality of the services rendered by system/canal management organizations. As for the budgetary funds, those should be used for maintenance of reservoirs, pump stations, main systems and for costs that are uncovered from other sources.

Separate item in the budgetary financing must be provided for **financing resource-saving technologies** at the local level (introduction of fine-dispersed sprinkling and drip irrigation as implemented in India). These funds must be assigned in the form of a state credit, viz. on a return basis, and should not exceed 50 % of the project value. The rest part must be paid by means of beneficiaries' funds and soft credits from banks. The Government should create proper conditions for banks encouraging them for allocation of the credits on easy terms.

It is necessary to introduce the standard that ensures double benefit to the beneficiary from application of new technologies. The first benefit is well known: less consume less pay. The second one must consist in that the Government should provide preferential taxation terms for the beneficiary. By adopting modern technologies, the Government will keep and improves the fertility of soil, which is a national asset, and saves water for both development and other economic sectors. Determination of the optimum water delivery service tariff is essential. In addition to its basic purpose, its size should make the water user to save water. At the same time, payment for water should not be burdensome for the water user.

When setting tariffs, one should rely on two points:

- Collected funds should allow maintaining specific hydraulic structures in proper technical state and covering the WUA personnel salary at the adequate level and, in case of efficient work, even paying bonuses;
- The tariff size should be oriented to payment by water users of about 5% of the average actual farm profit for the last 2-3 years. A particular focus should be made on the tariffs of water supply to makhalla committees, small dekhkan farms, and homestead lands. It should not be lower than that for water delivery to orchards, since the actual income from these lands is higher on the average than the income from orchards.
- Contribution of WUAs to maintenance of canals should be linked with the performance by CMO of its water supply duties and increase with water users' incomes and, accordingly, their payment for WUA services grow.

Considering the fact that crop prices are subject to high fluctuations, surplus funds can be formed in good years; these funds can be used in bad years. For this purpose, it is advisable to build the WUA's reserve fund.

Water tariff rates should differentiate depending on the territory, cultivated crop, and take into account priorities of the national policy. Adoption of water pricing system will be a new instrument for the Government in agriculture management by not administrative but rather economic ways using flexible water tariff rating, proceeding from the priority of crops and presence of state order on crops and taking into account complexity of irrigation and drainage systems. Certain contribution to the financing of the water sector in the form of additional payments to WMOs (or WUAs) must be made by the enterprises dealing with processing of irrigated agriculture products, because their production and, hence, their financial interest is subject to the effective operation of WUAs and WMOs.

This mechanism started to be worked out within the Project and is to be developed in linkage to the specifics of each country.

At that, detailed development with the preparation of Guidelines or Instructions must be made with respect to the following issues:

- Government subsidizing in covering costs at different water hierarchical levels from the basin to WUA = share determination method;
- Recommendations on the amount of payment by water users for water supply and irrigation system maintenance services, depending on crop profitability and local conditions;
- Participation of every lower water hierarchical level in financing the costs of the higher level: for example, WUA's contribution to financing WMO and through the latter to operation at this level of gravity and pumping systems separately;
- Procedure of service fee payment by rural and other water users that receive water through irrigation network, as well as through makhalla committees;
- Contractual and financial relations between water users and the organizations in charge of water demand management (HGREs, extension services); linkage of this payment with final water productivity results.
- Procedure of establishment of a reserve fund for the cases of bad harvest, water shortage, natural disaster, etc.;
- System of payment for personnel training and financing of training activities within the IWRM organizations system;
- Procedure of crediting and soft financing for application of a new irrigation technique and installation of water measuring stations. India's experience can be given as an example of encouraging application of new irrigation technique, where 50 % of capital investments and 60 % of electric power cost for adoption of drip and sprinkling irrigation systems is covered by the government.

3.4. MEASURES AIMED AT THE DEVELOPMENT OF TECHNICAL AND MANAGERIAL TOOLS

This section consists of two directions:

3.1 Distribution of tested and proven solutions and methods:

- development of water accounting and use assessment system;
- establishment of management information system for irrigation system canals up to the WUA level (currently such replication is carried out within the RESP 2 Project for the Mirishkor canal system in the Kashkadarya province);
- introduction of the system of daily water distribution for WUAs and water users;
- equipment of farm outlets with water accounting facilities;
- implementation of the SCADA system at higher hierarchical levels;
- equipment of water management organizations with communication systems;
- introduction of monthly recommendations and field certification by extension services.

3.2 Development of supplementary IWRM tools:

- development and introduction of informational advising system for the improvement of water and land productivity for extension services; such recommendations are worked out by SIC ICWC and widely asked for by implementing organizations from both Kyrgyzstan and Tajikistan. The software package needs to be adjusted;
- transformation of the daily water distribution method into a software package.

4. MEASURES AIMED AT THE DEVELOPMENT OF IWRM POTENTIAL

The following is to serve as the basis for this direction:

- national programs for training of high and middle-level personnel through universities and colleges, with the inclusion of special course on IWRM, and training systems for different water hierarchical levels;
- development of information system, based on the “information sieve” principle (for water supply: WUA-CMO-MCA UDC-BWO-MAWR; for water use:WUA-ISA-BISA-MAWR), which is provided with various GIS tools or remote sensing methods;
- enhancement of hydrometeorological services, including development of meteorological stations network straight on irrigated schemes, etc.;
- development of the communication system between water management organizations both horizontally and vertically;
- building of gender network to promote involvement of women in water demand and supply management and raise their role in the water use system.

VISION OF THE MEASURES AIMED AT IWRM IMPLEMENTATION INTER-STATE LEVEL

When developing HS and national visions, a whole number of issues and work directions of interstate nature were revealed³.

- 1. Enhancement of the BWO Syrdarya’s role** along the river stem with transferring all waterworks facilities on the Naryn, Karadarya, and Syrdarya rivers to its balance sheet and coordinated regulation of the operation mode of the Andijan, Toktogul, and Kayrakum reservoirs. It should be followed by the establishment of the Basin Council (on the analogy of the experience of France, Spain, and other EC countries) with the inclusion of the representatives of all riparian provinces, owners of large waterworks facilities, representatives of Environmental Committees of all riparian countries, and managers of BISAs and delta administrations. This will help to improve the accuracy of observing limits, decrease unexpected flow and level fluctuations due to introduced and approved by the Council members strict procedural regulations for operational river management and thus improve the stability of water supply to the whole valley.
- 2. Special attention should be paid to the improvement in the accuracy of accounting** of all kinds of transboundary waters in the Fergana Valley. Improved accuracy of these waters may allow employing additionally in controlled use of about billion of cubic meters of water (based on preliminary assessments), which is very important in the light of forthcoming water shortage. Along with well planned and allocated surface water from the main rivers in the Fergana Valley, there are numerous small rivers and main collector drains. Accounting of these waters has different degree of accuracy and reliability, as a result of which the total water balance in the Fergana Valley gives considerable discrepancy both in general and for particular provinces. There are especially great discrepancies in the interfaces between the basin and national levels of the water hierarchy, which calls for a need to improve the accuracy of accounting of and linkage between all these waters right here. Discrepancy in the total water balance across the Fergana Valley varies, according to the HS data, from 480 to 2200 million cubic meters a year. Growing water deficit and the need to search for water reserves bring to the forefront of project development at basin level the improvement of water accounting in the main collector drains that discharge return water into river and the downstream canals for re-use, canals, as well as of

³ Brief overview of the existing and recommended water organizations at the interstate level (at the large river basin and small river basin levels) is given in Annex 2.

accounting of water discharge from small sub-basins into the river and collector drains. This tool of joint using all kinds of waters calls for organization of continuous on-line analysis of the interaction between all waters based on verified data in the next project stage as a means to cover water shortage. By specifying the volume of combined waters from different sources and hierarchical levels, discrepancies can be reduced and water resources can be identified for covering future water deficit in some zones. Therefore, IWRM distribution to the higher level of the water hierarchy is urgent for the organizational and hydrological linkage of all waters within the Fergana Valley.

3. Small transboundary river management

The experience of work in small transboundary river (STR) basins indicates to availability of various approaches, including both the top-down approach (GTZ) and bottom-up approach, as well as combination of both (SIC ICWC+IWMI).

Institutional approach for STR worked out and being implemented within the IWRM-FV Project includes the following:

- Establishment of joint (community-governmental) water governance organizations on both sides of the river in the form of System Management Organization (SMO), i.e. River + Canal, on both sides of the border, which is fully in charge of water management in the territory of STR under consideration (for example, in Tajikistan it is necessary to set up the Khodja-Bakirgansay river sub-basin management organization by developing KBC MO and KBC UWU and the similar management organization in the territory of Kyrgyzstan);
- Development of an agreement on the establishment of bilateral basin commission involving the representatives of the National Governments in addition to SMO representatives. The agreement is to stipulate institutional and current cooperation mechanisms for the River Commission for equitable water resources allocation among the joint management parties and bodies (GTZ option);
- Establishment and strengthening of such commissions that are provided with appropriate institutional and technical mechanisms for water governance, based on the principles of IWRM on other STRs; at the same time, similar to the two basins that are already in the project, this management is to be carried out along with the IWRM implementation in the command area;
- Taking into account the specifics of each river system in the existing national legislation;
- Coordination of Basin Commissions' activities is supposed to be made by means of the BWO Syrdarya.

RECOMMENDATIONS ON ORGANIZATION OF THE FUTURE PROJECT PHASE

In general, proceeding from the results of the National Visions and HS report, two scopes of activity show up where IWRM implementation should be carried out:

ACTIVITIES OF THE NATIONAL TEAMS

- Development of the National Strategy for the IWRM implementation outlooks and making relevant comprehensive governmental decisions concerning the organizational, legal, and financial and economic aspects of the IWRM framework in each country, their coordination with the general development strategy and political aspirations of each country, as well as with economic capabilities for capital investment to the water sector and support to farmers. Based on that, a proper national roadmap can be implemented in the form of a special Government Resolution as was done within the UNDP Program in Kazakhstan. Basic tools, mechanisms, and guidelines related to the transition to IWRM in the form of manuals and methodologies,

practices and recommendations developed in the course of the project are endorsed by each country.

The objective of each National Team is dissemination of the IWRM-FV Project experience related to the scopes of activities selected by national water authorities. Among those are the activities according to Items 1.1; 1.2; 1.3; 1.4; 3.1. All these works should be executed within the national component of the Project guided by the National Project Leader in each country and cover the zone selected and agreed with project participants. The National Team will be responsible for performance of this work. The Item 2 activities will be carried out by the National Team in accordance with methodological recommendations that will be given by the joint Working Group composed of the economists of the Regional and National Teams. Likewise, regional experts will be involved in implementation of the Item 4 activities.

ASSOCIATION'S ACTIVITY

At the same time, it is obvious that a number of tools and new solutions or fine-tuning are required for certain IWRM directions. These include:

- fine-tuning of the proposed model of the IWRM financial and economic mechanism;
- development and implementation of the organizational and methodological aspects of IWRM at the basin level in the Fergana Valley;
- linkage between the water hierarchical levels by economic and financial, as well as technical interaction mechanisms with the view of absolute elimination of unproductive flow losses that are especially sizeable at the interfaces between these levels;
- creation of the mechanism encouraging not only water users but also staff of water management organizations, as well as government for saving water, because now their interests are sometimes contrary to each other;
- integration of land reclamation organizations' activities; development of final extension service performance forms; creation of legal instruments designed for more independence of IWRM organizations;
- this also involves the set of the above-mentioned topics and recommendations given for the basin level which previously either were not dealt with by the Project or were started and not finalized, like, for example, STR management.

These works must be performed under the guidance of the Regional Group composed of Association experts and through the Association with the involvement of all necessary actors, including the BWO and national representatives.

Moreover, in the project part executed by the National Teams, the Association will carry out MONITORING of the results and TRAINING of TRAINERS of these teams in specific issues. For general IWRM implementation related issues, the curriculum prepared by SIC ICWC together with the IHE-UNESCO Institute can be used.

The organizational management scheme for the proposed next phase is given below in Figure 1.

The Project will be implemented under the supervision of a foreign consultant selected through a tender. He/she will be in charge of the collection of reports from executors and submission to SDC within the time set by the Project. All financing of the work is to be made via the consultant on the basis of the contracts concluded (*separately with each National Team and with the SIC ICWC-IWMI Association*) for the scope of work executed by each project executor as specified in the Project Document. The entire work package is to be reported to the Project Steering Committee composed of the representatives of the three Governments, ICWC Secretariat, and SDC.

It is advisable to discuss the **ATTRACTION OF OTHER DONOR ORGANIZATIONS AND PROGRAMS** for the issues where these donors have groundwork or intentions. In particular, for

Item 4.1, UNECEE involvement is possible; in the Interstate Program (*Item 1*), ADB may be involved; and various donors for some positions of Item 4.



Figure 1. Organizational management scheme for the future project.

Water organizations at different hierarchical levels according to the National Visions⁴

Republic	Water organization
<u>National level</u>	
Uzbekistan	<p>National Water Council (NWC) of the Republic of Uzbekistan. NWC is a governance body under the Cabinet of Ministers of the Republic of Uzbekistan which organizes the development and implementation of the national water policy. NWC includes the leaders of key stakeholders: authorities, ministries, community organizations, institutions, etc., which are directly or indirectly associated with the water sector.</p>
	<p>National Water Users' Union (NWUU) of the Republic of Uzbekistan. NWUU is a non-governmental & non-profit organization of water users which integrates all water users' unions across the republic.</p>
	<p>State Committee of Water Resources (SCWR) of the Republic of Uzbekistan. SCWR is a governmental organization for governance of water resources. SCWR is responsible for development and implementation of the national water policy on formation and regulation of water use.</p>
	<p>Central Water Management Department (CWMD)⁵. <i>CWMD is a governmental organization for governance of water supply and water use.</i></p>
Kyrgyzstan	<p><i>National Water Council (NWC) of the Republic of Kyrgyzstan. NWC is a body for governance of the national water policy. NWC includes Parliament members, leaders of key ministries and agencies of the republic, as well as governors of provinces.</i></p>
	<p><i>Union of Water Users' Associations of the Republic of Kyrgyzstan (UWUA RK). UWUA RK is a legal entity that has the non-profit organization status; established based on the principles of voluntary participation, self-government, legality, publicity, openness; works for the public benefit. UWUA RK is a non-governmental & non-profit organization of water users. UWUA RK functions: promote development of WUAs; coordination of Water Users' Associations' activities; settlement of relationship between WUAs and other economic entities and governmental bodies; attraction of credits, grants, and other funds from donor organizations for improvement of irrigation infrastructure.</i></p>
	<p><i>State Committee of Water Resources and Land Reclamation (SCWRLR) of the Republic of Kyrgyzstan. SCWRLR is a governmental organization for governance of water supply and water use.</i></p>
Tajikistan	<p>National Water Council (NWC) of the Republic of Tajikistan. NWC is a body for governance of the national water policy. It is vested with greater scope of power and performs political control over the development and implementation of the national water policy. NWC includes the representatives of all ministries/agencies that work in the water sector.</p>
	<p>Republican Federation of WUAs (RFWUA). RFWUA is non-governmental & non-profit organization that coordinates the activity of FWUAs in the Republic of Tajikistan.</p>
	<p>Organization of Integrated Water Resources (OIWR). OIWR is a governmental organization for governance of water resources. OIWR</p>

⁴ The water structures that have already been established are given in italics.

⁵ The function of CWMD will be changed: CWMD will be in charge of only the development and implementation of the national water policy on water supply and water use.

Republic	Water organization
	performs regulating functions related to water resources and the national level ⁶ . OIWR prepares the national policy or coordinates this process if other relevant ministries are involved.
	MIROB Agency. The MIROB Agency is an independent self-sustained agency in the form of a state unitary enterprise, which is empowered to manage all water resources across the republic.
Sub-basin level	
Uzbekistan	Water Council of the Fergana Valley Sub-Basin (WC FVSB). WC FVSB is a body for public participation in water supply and water use.
	Fergana Valley Sub-Basin Water Committee (FV SBWC). FV SBWC is a body of public participation in water supply with the involvement of key stakeholders.
	Fergana Valley Sub-Basin Union of Water Users (FV SBUWU). FV SBUWU is a non-governmental & non-profit organization of water users which integrates all sub-basin water users' unions. FV SBUWU function is participation in the water supply and water use governance in the Fergana Valley sub-basin zone in order to defend water users' interests.
	Fergana Valley Sub-Basin Administration (FV SBA). FV SBA is a governmental organization for water supply management within the sub-basin.
Kyrgyzstan	Basin ⁷ Water Council (BWC) ⁸ . BWC is a body for water governance with the involvement of key stakeholders.
	Basin Water Resources Administration (BWRA) ⁹ . BWRA is a governmental body for water supply governance within the basin.
Tajikistan	River Basin Council (RBC). RBC is a body for water supply governance with the involvement of key stakeholders. RBC is composed of the representatives of various user categories such as: drinking water (in rural and urban areas); industry; irrigation; community or non-governmental organizations; fishermen; and other water users. RBC will act the part in basin planning, managerial actions, and decision making processes.
	River Basin Organization (RBO). RBO is a governmental organization for governance of water supply management. RBO bears the responsibility for performance of regulatory functions within the basin and develops the tactics and regulations for the basin. It is supposed to establish five river basin organizations for five main sources (Syrdarya,

⁶ These functions include: monitoring and analysis; planning; permission/licensing; management of required water quality/quantity for reuse; drinking water supply and treatment; ecosystems and environmental protection; irrigation; industrial use, hydropower engineering; tourism and use for recreational purposes; and any other use.

⁷ In the Kyrgyzstan and Tajikistan National Visions, the term "basin" is used. Since all these basins are parts of the basins of the two large rivers of CAR (Amudarya and Syrdarya rivers), in this table we refer those to the sub-basin level.

⁸ The Talass BWC has already been founded, as well as the BWC of the Djalalabad province. The Djalalabad province BWC includes the leaders of BWAs, environmental administrations, statistics administrations, provincial and district authorities, rural extension services, water users' associations, ayils (villages), and representatives of non-governmental organizations. The Head of the Djalalabad BWA has been elected as the Chair of the Basin Council, and the Chief Engineer of the BWA as the Deputy Chair.

⁹ BWAs are established but within provincial boundaries. In the column named "What to do" in the National Vision, it is recommended to "Reorganize the BWA structures on the basis of 1) hydrographization principle (in water supply) and 2) administrative and territorial principle (in water use)".

Republic	Water organization
	Gissar, Pyandzh, Vakhsh, Badakhshan).
	Basin MIROB (BM). BM is a basin subdivision of an independent self-sustained Agency MIROB that performs the function of basin-wide water supply governance. It is planned to establish five BMs. Provincial CWAs will be liquidated after the establishment of BMs.
<u>Irrigation system level</u>	
Uzbekistan	Canal (system) Water Committee (CWC) CWC is a body for public participation in water supply with the involvement of key stakeholders.
	Union of Canal (system) Water Users (UCWU) UCWU is a non-governmental & non-profit organization that unites WUAs and other water users in the main canal zone on a voluntary basis. The main function of UCWU is public participation in water supply governance on the side of water users through its representatives in CWC.
	Main System Management Organization (MSMO). MSMO is a governmental organization for management of water supply from the irrigation source (BWO Syrdarya facilities) to WUA gates. SFMC MO, BFMC MO, BAMC MO, etc. will be reorganized, respectively, into SFMS MO, BFMS MO, BAMS MO, etc.
Kyrgyzstan	Federation of Water Users' Associations (FWUA) ¹⁰ . FWUA is a non-governmental non-profit organization of water users that performs water supply governance and management functions.
Tajikistan	Operations Department (OD). OD is a unit of the basin MIROB that performs the function of water delivery from the basin source to WUA/FWUA. OD is established within hydrographic boundaries on the basis of liquidated District Governmental Water Administrations (DGWA).
	Federation of Water Users' Associations (FWUA). FWUA is a non-governmental non-profit organization of water users that performs water supply governance and management functions.
<u>Provincial level</u>	
Uzbekistan	Water & Land Commission of Province (PWLC). PWLC is a body for public participation in the governance of provincial water and land resources use.
	Provincial Water Administration (PWA) ¹¹ . PWA is a governmental organization for water use governance within the province.
<u>District level</u>	
Uzbekistan	District Water & Land Commission (DWLC). DWLC is a body for public participation in the governance of district water and land resources use.

¹⁰ There is a contradiction. In one case (in the Kyrgyzstan National Vision), it is written that FWUAs are set up instead of DWAs, while in another case (in the column "What to do") it is recommended to "Entrust the water supply functions to Main Canal Management Organizations and leave DWAs only with the water use functions".

¹¹ The name "BISA" may retain intact after the reorganization. Here, the name "BISA" has been changed for "PWA" in order to emphasize the territorial principle of its establishment and changed functions of this organization. The PWA's competence covers only coordination of the following work within the province: 1) assistance to WUAs in water use planning, organization of water accounting and control over water supply at the boundaries and inside WUAs, land reclamation, etc.; 2) repair and maintenance of pump stations; 3) introduction of water saving technologies; 4) development of recommendations on water demand management; 5) water use monitoring and assessment, etc..

Republic	Water organization
	<p>District Water Administration (DWA). DWA is a governmental organization for management of water use within district.</p> <ul style="list-style-type: none"> – Organization of support to WUAs. – Organization of work related to drawing up water use plans and estimation of water demand for each water user, WUA, and for the district in whole in linkage to inter-farm systems. – Organization and control over observing limits and rational use of water resources. – Development and improvement of on-farm irrigation and drainage network (repair, reconstruction, and modernization). – Organization of work on equipping outlets in the water-management network with water meters. – Introduction of advanced irrigation methods (sprinkling, drip irrigation, etc.) and improvement of furrow irrigation. – Development of recommendations on cropping pattern, taking into account flow probability.

Annex 2

Water organizations at the basin
(interstate) level

Basin	Current situation	Vision
Aral Sea Basin	There is no water governance body established based on the public participation principle.	Interstate joint water resources governance body (ICWC WC) is established (government + community); it will include representatives of all key stakeholders of the Aral Sea basin.
	There exists ICWC is an interstate water resources management body.	The ICWC's status and authority for water resources management risen.
Syrdarya River Basin	There is no Syrdarya river basin water governance body established based on the public participation principle.	An interstate joint water resources governance body (BWO Syrdarya WC) is established (government + community) ¹² ; it will include representatives of all key stakeholders of the Syrdarya river basin: representatives from all riparian provinces, owners of large waterworks facilities, representatives of the environmental committees from riparian countries, leaders of basin administrations, etc. ¹³

¹² By analogy with the experience of France, Spain, and other EU countries.

¹³ This will help to improve the accuracy of observing limits, decreasing unexpected flow and level fluctuations due to introduced and approved by the Council members strict procedural regulations for operational river management and thus improve the stability of water supply to the whole valley.

	There is BWO Syrdarya. Its authority for water resources management is limited: a few hydraulic structures, including reservoirs and sites of transboundary rivers have not yet been transferred under the BWO Syrdarya's jurisdiction. The BWO Syrdarya does not control the schedules and quantity of groundwater abstraction and return water discharge and does not control surface, return, and ground water quality. The protected areas of transboundary rivers have not been identified and officially transferred under the BWO Syrdarya's jurisdiction.	The BWO Syrdarya's status and authority for water resources management has risen as follows: 1) all waterworks facilities on the Naryn, Karadarya, and Syrdarya rivers are transferred to its balance sheet; 2) the Andijan, Toktogul, and Kayrakum reservoirs operation modes are coordinated; 3) etc.
Naryn-Karadarya Sub-Basin	There is no water governance body established based on the public participation principle.	An interstate joint water resources governance body (Naryn-Karadarya SB WC) is established (government + community): it includes representatives of all key stakeholders in the Naryn-Karadarya management organization's zone).
	Naryn-Karadarya management organization (MO): its water resources management authority is limited	The Naryn-Karadarya MO's status has risen and authority for water resources management increased.
STR Basin (project zone)	There are Unions of System Water Users (USWU) on both sides of the boundary; they integrate all water users of the national part of STR.	The organizational and financial sustainability of USWU achieved.
	There are water governance bodies in the form of STR Water Committee (STR WC) on both sides of STR ¹⁴ ; those are established based on the public participation principle among the representatives of key stakeholders of STR ¹⁵	Intergovernmental documents on STR agreed upon and approved ¹⁶ Bilateral River Commissions are set up on STRs; those are provided with institutional and technical mechanisms for water governance based on the IWRM principle.
	There is no STR commission established based on the public participation principle.	
STR Basin (extension)	There is no Union of System Water Users (USWU) on either side of the boundary which would integrate all	Unions of System Water Users (USWU) are established on both sides of the boundary; they integrate all water users of

¹⁴ It is expected that in the future these STR WCs of both countries will become representative bodies in bilateral River Commissions after both parties reach agreement.

¹⁵ The Khodja-Bakirgan River Basin Water Committee (KBRB WC) established in the Tajikistan part of the Khodja-Bakirgan river basin, as well as other STR WCs established within the IWRM-FV Project.

¹⁶ Agreements of joint management of STR water resources, Statuses of Joint Bilateral River Commissions of STR (STRC), Statuses of STR Water Committees (STR WC) which strengthen the legal and financial frameworks for the establishment and effective operation of STRCs and STR WCs (allowing for the specifics of each river system in the existing national legislation).

zone)	water users of the national part of STR.	the national part of STR. The organizational and financial sustainability of USWUs achieved.
	There is no water governance bodies in the form of STR Water Committee (STR WC) on either side of STR, which is established based on the public participation principle among the representatives of key stakeholders of STR.	Water governance bodies in the form of STR Water Committee (STR WC) on both sides of STR; it is established based on the public participation principle among the representatives of key stakeholders of STR.
	There is no bilateral STR commission established based on the public participation principle ¹⁷ .	Bilateral STR commissions are established on STRs; those are provided with institutional and technical mechanisms for water governance based on the IWRM principle.

¹⁷ The experience of the institutional reforms in the basin of the Chu-Talas rivers shows that solution of STR related problems: 1) is closely associated with the problem of implementation of public participation in the water sector; 2) involves employment of different approaches, including both the top-down approach (GTZ) and bottom-up approach, as well as their combination (SIC ICWC+IWMI).