

Implementation IWRM in Ferghana Valley (Uzbekistan)

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Abstract

Under current increasing water resources deficit, the complex water management system of the Republic of Uzbekistan calls for radical changes the fundamental principles of water resources management and governance and water use in the light of the changes taking place, first, in irrigated agriculture as well as global and regional challenges. Integrated Water Resources Management (IWRM) is just that line which allows building a long-term basis for gradual solution of most growing problems.

The IWRM-FV project, executed by SIC ICWC and IWMI with financial support of SDC from 2001, elaborated and implemented principles and tools for IWRM on the territory of 4 provinces of Kyrgyzstan, Tajikistan and Uzbekistan in Fergana valley of Syrdarya basin. As was discovered by special study provided at end of project, experience has convincingly demonstrated the effectiveness of IWRM implementation, which has been successfully developed in the three pilot canals (South Fergana MC, Aravan-Akbura Canal and Hodji-Bakirgan Canal –accordingly SFMC, AAC and HBC) zone covering an area of 129.3 thousands. ha of the command area Osh, Sogd, Andijan and Fergana provinces' territories. This IWRM implementation is carried out based on institutional innovations made at lower levels of the water hierarchy. Those were accompanied by developed management and financial & economic instruments in combination with great efforts aimed at building the capacity of water users and water management organizations.

As a result, noticeable reduction of total up to 260 mln.m3/year and specific water withdrawal has been achieved as well as improvement of other water use indicators along with considerable improvement of financial performances of newly established organizations in comparison with average showings in both the republic and the beyond-project zone of the Fergana Valley.

Uzbekistan has made on the base of this a significant move towards IWRM implementation on the basis of the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan # 320 (as of July 21, 2003), which allowed transiting to the hydrographic method of water resources governance and management. Further progress was achieved by introducing substantial amendments to the Law on Water and Water Use of 1993, which legalized the WUA status as a non-governmental non-profit organization entrusted with practically full operation of former water management network and water allocation within it. The IWRM-FV project experience has allowed working out a set of IWRM rules and guidance that was follow up to the up scaling IWRM in Uzbekistan to any 244 thousands ha water affected irrigation lands. As result Uzbekistan became leader in implementation of IWRM by “bottom-up” approach in Central Asia.

Keywords: IWRM, water governance, Central Asia

Introduction

IWRM became very popular as proper brand that presented comprehensive improvement situation in water management and water use twenty years ago after water and environment conferences in Dublin and Rio de Janeiro. Thank to works of GWP and some water academics global water community recognized IWRM as new paradigm of reassessment all scope of existed institutional, managerial, technical and legal framework for achievement multisectoral, public oriented. Western world created big success in implementation IWRM based on the deep roots of public participation in Spain and France and understanding of water as a resource belonging to public domain. This movement went in same manner to American continent same North and South, but attempts donors to promote it in developing world mostly got reflection in names of regular infrastructural projects under which they took places. Same stories were developed in Central Asia where all projects of World Bank in Kyrgyzstan, Tajikistan had name “IWRM...” but inside it were strict infrastructural projects.

Water situation in Central Asia with growing water deficit connected with climate changes impact, demographic pressure, growing hydropower production and change of water regime of main rivers from irrigated to winter – power interesting – stood up on the agenda of wellbeing need to find way for implementation best western approach to development of water management.

2001 became year of start attempts of Interstate Coordination Water Commission of Central Asia (ICWC) through their Scientific Information Center (SIC ICWC) to adapt, test and implement IWRM on the pilot area of three above mentioned states of region.

Taking into consideration the need for all-inclusive approach to IWRM, the activity aimed at the development of key directions and principles of water management improvement was started by the national teams from Kyrgyzstan, Tajikistan, and Uzbekistan under methodological and organizational supervision by the Association of IWMI-SIC ICWC with the assistance and monitoring by SDC. The Fergana Valley was selected as an object for implementation, at first, as one of the most socially stressful region of Central Asia due to high demographic pressure, territorial attachment of the rural community, limit of water and land resources for further extension of irrigated areas that are the main source of population's wellbeing. Second, in the Valley, being a zone of most ancient oasis irrigation, which from the earliest times was developed along numerous inflows of the Syrdarya river, in the following years large-scale irrigation was developed on the basis of water withdrawal from the river course by engineered water intakes and a number of canals built parallel to the river. This has formed complex water management system (Fig. 1.1). It is composed of the combination of main interstate canals that are crossed and fed by the inflows, which form small interstate basins, and an autonomously functioning system of collector and drainage channels that crosses and feeds these canals in part and partly the Syrdarya river. There are, in addition, a few thousands wells of both water supply purpose and those built for vertical drainage, which serve at the same time both as an additional water source and regulator of the condition of lands.

Based on own huge experience in arid zone and as a result of proper theoretical establishment, the partners succeeded in elaborating their own approach to IWRM, which somewhat differs from that of GWP. As the IWRM basis, the Project implies "management system based on accounting of all types of water resources (surface, ground, return) within hydrographic boundaries, linked the interests of different sectors and levels of water use hierarchy, involves stakeholders in the decision making process, facilitates effective use of water, land, and other natural resources for the sake of stable meeting environmental and public demands"¹.

The key principles defined in this work by the creative team of executors from SIC ICWC and IWMI with the assistance of SDC and water management organizations of the three countries are as follows:

- water resources are managed within hydrographic boundaries in accordance with the morphology of a specific river basin or system of canals;
- this management provides for accounting and use of all types of water resources (surface, ground, and return), taking into account climatic characteristics of regions;
- close linkage of all types of water use and all organizations involved in water resources management horizontally between sectors and vertically between water hierarchy levels (basin, sub-basin, irrigation system, water users' association (WUA), farm-end user);
- public participation not only in the management but also in financing, support, planning, and development of the water management infrastructure;
- priority of environmental requirements in the activity of water management bodies;
- orientation to water saving and control of unproductive water losses of water management organizations and water users; water demand management along with water resources management;
- informational support, openness, transparency of the water resources management system;
- economically and financially stable management, sufficient equipping, and staffing with skilled personnel.

In their work, the teams of executors from all three countries together with the Regional Group were aiming at achieving all the above-stated principles. One can see to what extent they succeeded from the below-stated results of the presented report based on the materials of primary data, statistic reporting, and specialized polls collected by a great deal of executors in the field, according to single forms and methodology guidelines.

¹ *Integrated Water Resources Management: putting good theory into real practice. Central Asian experience. Tashkent, 2008. 363 p. SIC ICWC, Edited by Prof. V.A. Dukhovny, Dr. V.I. Sokolov, Dr. Manthrithilake.*

Methodical approach

It is clear that IWRM couldn't be implemented on the whole area of Fergana valley and elaboration of theoretical framework and practical mechanism and tools project need to select pilot subjects for testing different options and ways of transfer from sectorized and centralized system of management to comprehensive decentralized. As a result of preliminary survey model pilot objects were selected with orientation on their typical features. Here it was required to organize experimental implementation of IWRM principles at three water hierarchy levels in all of the three countries: inter-farm main canals; former on-farm network on the basis of which was begun establishing Water Users' Associations, and direct water users. Discussions with the participation of key stakeholders led to democratically selected pilot zones:

- in Kyrgyzstan: Aravan-Akbura canal zone which later included the Right Bank Main canal zone in the Osh province;
- in Tajikistan: Khodja-Bakirgan canal zone in the Sogd province, which later included the basin of the same name located in its Kyrgyz territory;
- in Uzbekistan: zone of the South Fergana Canal with adjacent basin of the Shakhimardan river that is transboundary with Kyrgyzstan.

Unlike other approaches (UNDP, WB), the IWRM implementation was carried out following the "bottom-up" principle, having covered the levels of water users, former on-farm network of kolkhozes and sovkhoses, and main canals, along with the development, linkage, and implementation of IWRM principles on an area of over 130 thousand ha.

The practical work related to IWRM implementation was accompanied by continuous work with numerous interested parties (stakeholders), reasoning of results and mistakes, sucking in partners' ideas, creating a multi-authored product which can be tested by using foreign analogues. Continuous exchange of views was made not only between partners at the level of expert-members of the Association, but also during a number of workshops and discussions at different levels.

The Hydrographic Study after 10 years is developed for assessment results of "The Fergana Valley Project" which includes the following:

- assessment of the changes in the water management, environment and irrigated agriculture that took place in the Fergana Valley for the period from 2000 through 2010;
- assessment of the institutional changes in the water industry that took place in both pilot zone and other areas allowing for the changes taking place in the sector in organizational, legal, and managerial terms in context of current progress in each country;
- gender study and, based on that, assessment of the rural community's wellbeing and analysis of the possibilities for wider involvement of women in the management of the water sector and irrigated agriculture (some people wonder why the gender issue is paid so much attention in the IWRM report. Moreover, gender situation is narrowly understood as women condition; while, the gender analysis allows revealing the willingness and progression of the society towards achieving the Millennium Goals, which is one of important IWRM directions aimed at furthering at least a series of the key positions of those Goals in accordance with the Johannesburg Plan).

The HS analysis was carried out in line with the IWRM concept both in terms of the directions for improvement (organizational, legal, financial, economic, and technical) and the principles that characterize IWRM. A matrix was developed one for each one for each country and each water hierarchy level; the extent of the current compliance of the whole governance and management system with those principles was assessed and the project and non-project zones were compared in the context. The matrix indicates what has been achieved and what has to be achieved. Such an approach enables verifying what has to be done in general to bring the whole system to its completeness.

Results

The Hydrographic Study has proved obviously enough that all specialists and practitioners, as well as some part of advanced water users understood the soundness of the comprehensive approach to IWRM and necessity to develop it. It is demonstrated evidently enough that even with certain trimmed and

fragmentary character of the measures carried out within the project, the results achieved are significant and economically effective and are accepted by both water management organization staff and stakeholders, including local authorities. The impact of the results have spread far beyond the project area owing to their clearness and involvement of a great number of professionals and water users in the training activities under the IWRM-Fergana project and issued from it the Water Productivity Initiative at Plot Level (WPI-PL) project.

Let to describe total situation in Fergana valley for last 10 -11 years.

- The overall hydrological situation in the Fergana Valley remains, despite the availability of water resources, serious enough for several reasons:
 - Climate change has sharply increased the fluctuation of extreme (flood and dry) years within the hydrographs of both the Syrdarya river with its main tributaries and small rivers. It is significant that for last decades four low-water years occurred. Besides the successive low-water years 2000-2001, also two extremely low-water years in the late decade occurred - 2008 and 2011. For comparison – we had on Syrdarya river only 3 water extremely scarce years in previous 35 years from 1965 up to 2000.
 - Keeping the power generation regime of releases from the Naryn reservoir, started since 1994, has sharply intensified artificial floods in the Syrdarya river basin in winter and anthropogenic water deficit in summer time.
 - Along with easily planned and distributed surface water sources of major rivers, there are a number of local sources in the form of small rivers, water wells, collectors, water of which is used for various purposes, including irrigation. Accounting of these waters has different degree of accuracy and reliability; as a result, drawing up of the total water balance in the Fergana Valley gives considerable discrepancy both as a whole and broken down by province. There are especially great discrepancies at the interfaces between different levels of the water hierarchy, which calls for focusing on raising the accuracy of accounting and coordination of all these waters at the highest level of the water hierarchy. Organizational and hydrological coordination of all types of water within the Fergana Valley will allow attracting reserves to cover future water deficits. Therefore, extension of IWRM to the top level of the water hierarchy is urgent.
- The Fergana Valley keeps the trend of population growth and buildup of demographic tension. Average population growth rate of 1.5-2 % a year is typical for all Fergana Valley provinces. With sufficiently high stability of agriculture, this increases the load on irrigated agriculture and associated sectors.
- The Gross Regional Product in all the provinces has an upward trend. In the three Uzbek provinces this growth has reached almost 100 % per capita for the last decade and approached 1000 USD per person. The situation in Tajikistan and Kyrgyzstan is much worse, according to statistical data, although, according to the Gender Study data, the population wellbeing has improved in all the provinces. In the families engaged in agricultural production the average monthly income ranges within 56 to 100 US dollars. This is due to all-round increase in the value of gross agricultural production, including per capita. Accordingly, gross production per hectare has also risen. To some extent, change of cropping pattern, including countrywide reduction of raw cotton production and raised production of grain, vegetables, fruits, potato, and other effective crops, too, have an influence on the change in well being and level of production. It should be noted that in the pilot zone the share of the areas under state-order crops has been sharply reduced allowing for double crops.
- Project organized activities in some principal directions, most important from which is institutional restructuring.
 - a. Serious institutional changes have taken place in the implementation and support of IWRM in all the three countries. These changes were particularly associated with the transition to the hydrographic basin principle of organization, public participation in water management, especially at the low level of the water hierarchy and partly related to the integration of water users at that level. WUAs (Water Users Associations) have gained sustainable form of water resources management at the former on-farm level. The efficiency of the pilot zone WUAs is much higher than that of the non-pilot zone. The new established canal management organizations with involvement of the community in form of UCWU (Union of Canal Water users) and CWC (Canal Water Committee) have certain effect on the enhancement of uniformity, stability, and water supply level, which caused water use stability in the pilot zone. In the pilot zone, hydrographization has practically been completed and the process of the involvement of other water users is in progress along with gradual increase of financial contribution from those. Just thanks that the financial sustainability of WUAs has sharply been improved and improving. The

serious advantage of the pilot zone consists in established contractual relations between WUA and Canal Management Organizations (CMO), and between WUA and UCWU.

- b. Along with the development of hydrographization towards establishing stable water supply system, the Project plans and start implementing, on an experimental, basis water demand management at the district level through Water and Land Commissions.
 - c. Analysis of the capacity of the water management organizations shows that despite overall shortage of skilled personnel the labor turnover rate in the pilot zone is lower, while the employment (occupation) stability factor is higher. One of the best advantages of the pilot zone is regular organization of trainings which, to a considerable extent, improve the technical knowledge level of specialists and, at the same time, conduce to lower turnover rate. Total number of the trainings delivered throughout the project is about 900.
- Institutional restructuring is impossible without strong legal framework. As a review of the existing legislative acts shows, an arsenal of legislative acts for the regulation of water relations has been developed at the national level. The following may be concluded:
 - In all the three Fergana Valley countries, certain positive changes towards the establishment of the legal basis for the implementation of IWRM have taken place since 2000. Key laws that regulate water relations have been passed, in particular: Law on WUAs – Kyrgyzstan (2002), Tajikistan (2006); Water Code – Kyrgyzstan (2005), Tajikistan (2008); amendments and changes in the Law on Water and Water Use in Uzbekistan in 2009; as well as many relevant bylaws and regulatory and legal acts were adopted;
 - The basin principle of water resources management has been legalized and appropriate reorganization of management bodies was carried out in Uzbekistan (Decree of the Cabinet of Ministers of the Republic of Uzbekistan # 320 dated July 21, 2003) and Kyrgyzstan. At present, the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan have prepared recommendations on the transition to the basin principle of management within the agriculture and water sector development programs
 - Transfer of the water governance and management functions has been legalized and practically realized in all the three countries.
 - Managerial tools were next very important mechanism for IWRM implementation. The management tools developed under the Project and materialized in the form of guides, manuals, water measurement facilities and computerized programs, and introduced into the practice of the pilot CMOs and WUAs of the pilot zones has allowed improving water resources use effectiveness and productivity.
 - The accuracy of the approach to the specification of HMZ (hydromodule zoning) and crop irrigation regime, developed by the Project, has been confirmed by the “response” of the yield of crops cultivated and irrigated in the SFMC zone to the water consumption volume reduced as compared to that of the “old” HMZ.
 - Introduction of improved MIS (Management Information system) and its commutation to the automated water resources accounting system based on the SCADA system have created conditions for online control of water distribution, i.e. the promptness of decision making at one or another deviation from planned regimes has enhanced and water flow and volume accounting accuracy has improved.
 - The new calibrated and corrected discharge curves $Q=f(H)$ for the balance and monitoring gauging stations on the pilot canals, used in MIS during operating recording of water flow on the basis of the SCADA system, have allowed reducing the water level and flow measurement error from the previous 7-10 % down to 2-3 % with parallel improvement of water flow regulation accuracy.
 - Practical application of the daily planning of water distribution within the irrigated contours of WUA has allowed reducing unproductive water losses, caused by the mismatch between water supply and water distribution, by 10-15 %.

Conclusion

1. The institutional structure of the water industry must be reformed for the purpose of sharing functions: some bodies will be responsible for the water supply services; other for water use; yet others will ensure control at interfaces. Combination of these functions in one hand (as today) is ineffective from the standpoint of economic mechanisms and incentives. Besides, such sharing will create also incentives for the minimization of unproductive water losses in both water supply and water use.
2. The institutional water supply structure cannot be build within administrative boundaries, but only by means of the linkage of the water hierarchy levels from the transboundary basin to the end user according to the hydrographic principle in order to avoid administrative pressure (hydroegosim). Hydrographization is spatial (territorial) linkage of the water hierarchy units and their linkage to common water sources irrespective of heir administrative belonging. That is since water resigns administrative boundaries and principles, it is logical to integrate the water management hierarchy within hydrographic boundaries of catchment areas.
3. The system of making decisions on water governance (unlike the water management process) must be organized according to the "bottom-up" principle. This will allow minimizing professional/sectoral hydroegoism and making the whole process democratic as well as involving all stakeholders. The main purpose of the governance is provision of equal democratic conditions to all stakeholders involved in the water resources management process. So that water users and other interested participants are able to take part in the governance of equitable water distribution and its effective use, it is necessary to build a platform for their integration and involvement. The main criteria of success of such a platform are as follows: involvement (voting right); equal rights (possibility to express one's interests); transparency; effectiveness; accountability; coordination; responsiveness; wholeness; and ethical reasons. The Governments have to define, in the form of laws, the frameworks within which water management organizations with public involvement can work for the benefit of all sectors of the national economy and all water users.
4. Investments to the infrastructure have little effect without adequate (above-mentioned) institutional reforms.
5. Institutional changes have little effect without improving the IWRM tools. In particular, the following tools should be introduced in no longer pilot order but nationwide:
 - Introduction of financial mechanisms contributes to the financial and economic viability of institutional structures (especially at lower levels: at farm and WUA levels where products are produced by using water).
 - Among the tools, it is also significant to allow for social mobilization. Popularization and agitation of the IWRM ideas topicality for the region and transformation of those into the national program of the actions related to water sector reformation require special skills and funds, and time. Active involving the leaders of the water sectors of the regional countries-ICWC members in this process will provide necessary support to the development of the social mobilization of water users and all stakeholders, preparation of national plans of IWRM and adoption of those by the Governments.
 - One of the most important conditions of stable operation of water management entities is settlement of the conflicts and disputes arising during their activities. In the case of late settlement, conflicts may result in hampering the development and even breakup of WUA, loss of productivity in farms, great unproductive water losses in the systems. When considering disputes and conflicts, the mechanisms (both official, legal, complying with regulatory and legal acts of the countries and informal, that are based on customs and traditions of the peoples, which do not run counter to the existing laws of the country) of their consideration play an important role.
 - Water accounting and hydrometry (hundred percent coverage at all water hierarchy levels from transboundary rivers to the ultimate water user) should become a strategic objective. Water accounting is not only a means to control unproductive losses, but also the way to introduce the system of payment for water supply services and identify losses and inefficiencies.
 - Informational systems and software packages to solve operational water distribution tasks at both the canal level and WUA level.
 - Extension services on rational water management and use as irrigation productivity is the way to the improvement of water and land productivity and, consequently, financial sustainability of water users.

- Optimization of pumping irrigation system operation mode with the view of reducing electric power consumption and water supply cost.
6. The water saving works, the purpose of which is not just saving water owing to reduced unproductive losses but also training both water management organizations and water users to work under permanent water shortage conditions, which is very topical from the point of a long-term strategy, are very important.
 7. Orientation to social justice or only economic effectiveness of water use in the world today is unacceptable. It is necessary to seek reaching a tradeoff between the social justice and economic effectiveness taking into account environmental stability. From this point of view, a special program on “water education” and fostering a new generation of “water leaders” is necessary.
 8. Development and training of personnel is the basis of human potential for the implementation of the IWRM strategy.