



**Interstate Commission for
Water Coordination in Cen-
tral Asia (ICWC)**



**Global Water Partnership
Central Asia and Caucasus
(GWP CACENA)**



Asia and Pacific

Sub-Region: Central Asia

CHALLENGES AND ACTIONS FOR INTEGRATED APPROACHES

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LIST OF ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
ASBP	The Aral Sea Basin Program
BWO	Basin Water Organization
BMP	Basin Master Plan
CAREC	Central Asian Regional Ecological Center
CIDA	The Canadian International Development Agency
CAWATER	Information Portal for Water and Environmental Issues in Central Asia
CAREWIB	Project title on creation of CAWATER portal
EC IFAS	Executive Committee of the International Fund for the Aral Sea saving
EU WI	Water Initiative of the European Union
GWP CACENA	Global Water Partnership Central Asia and Caucasus
GWP	Global Water Partnership
GEF	The Global Environmental Facilities
GNP	Gross National Product
INBO	International Network of the Basin Organizations
ICSD	Interstate Commission on Sustainable Development
IWRM	Integrated Water Resources Management
IWRA	The International Water Resources Association
ICID	International Commission on Irrigation and Drainage
ICWC	The Interstate Coordination Water Commission in Central Asia
FAO	The Food and Agricultural Organization of the United Nations
NATO	The North Atlantic Treaty Organization
NGO's	Non-Governmental Organizations
MDGs	Millennium Development Goals
O&M	Operation and Maintenance
SPM	Strategic Planning and Management
SIC	Scientific and Information Center
SPECA	The UN Special Program for Economics of Central Asia
SCADA	Supervisory Control And Data Acquisition
SDC	The Swiss Development Agency
UNECE	The UN Economic Commission for Europe
UN ESCAP	The Economic and Social Commission for Asia and the Pacific of the United Nations
UNDP	The United Nations Development Program
USAID	United States Agency for International Development
WARMAP	Water Resources Management and Agriculture Project of TACIS
WB	The World Bank
WCC	The Water Canal Committee
WUA	Water User Association
WMO	Water Management Organization
4WWF	4 th World Water Forum

PRESENTATION OF THE REGIONAL DOCUMENT

The collaboration among five states around water resources in Central Asia is unique example not only of joint planning towards achievement of MDGs, exchange of information, but also cooperation in real-time management, operation and monitoring of transboundary water sources and infrastructure in a cooperative way. Some reasons formed conditions for such collaboration are:

- common historical, ethnic, customary and even religious roots of all nations in the states;
- past mutual experience from the Soviet period;
- political will of leaders of the five states and understanding of decision-makers about the importance of water issues for the region;
- creation of proper "cooperation spirit" not only among water specialists and professionals, involved in water management, but also among other sectors such as environment, health, water and sanitation and others.

The countries of the region are recently on the way of broad IWRM concept implementation within the context of sustainable development programs aiming to achieve MDGs. This concept already accepted by the Water Codes in three of five countries, and some pilot projects demonstrated success of the practical approaches towards IWRM innovations for all countries. The principal regional experience and lessons with IWRM implementation are based on the outputs of a number of the on-going pilot projects ("IWRM in Fergana Valley", "IWRM in Lowlands of Amudarya and Syrdarya", "National IWRM and Water Efficiency Plan for Kazakhstan" and others). The real ongoing actions supported not only by governmental water management authorities, but also by the most part of stakeholders and NGOs.

Within the preparation towards 4WWF in Mexico the water authorities of the region organized *local actions*, which have two main directions.

1. Test of practices to implement IWRM principles in Central Asia in terms of pilot projects.

Based on the on-going pilot projects outputs including organizational, institutional, technical and other measures under condition of satisfactory funding and capacity building the real progress can be achieved in reforming water sector over the Central Asian region, particularly aiming the following:

- To assist countries to meet MDGs related to water.

- Achievement of stable water availability; even and equitable water distribution by sub-basins along with significant reduction of unproductive losses.
- Introduction of democratic water governance principles by involvement of all concerned parties into water management process, including gender aspects.
- Partial solution of social problems connected with access to water and equitable water supply.
- Solution of ecological issues connected with human activity.
- Increase of water and land productivity.

To sustain the ongoing processes there are needed the following actions in coming future:

- IWRM national plans development for all countries in the region. Funds allocation through GWP and UNDP from Norway allowed Kazakhstan to start this activity that will serve good example for other countries of the region. Main task of national plan is create clear understanding of IWRM implementation, its objectives, effects, stages and scope of work.
- Give political support to water issues and IWRM implementation.
- Public participation at all hierarchic levels.
- Capacity development and training activity.
- Juridical and financial support to water sector.
- Technical measures (managerial tools dissemination).

2. Multilateral dialogue on ways for future development of water sector in Central Asia.

The important outcomes would be reached in the result of action: scenarios of future development for each country and the region as a whole with proper orientation to the stable water availability, even and equitable distribution of water resources over sub-basins under significant reduction of unproductive losses; introducing principles of democratic water resources governance through all concerned parties involvement; solution of social issues connected with equitable water distribution particularly drinking water; solution of ecologic issues connected with economic activity; and finally, water and land resources productivity increase.

Present document summarizing the outputs of those local actions and is devoted to broad circle of water society including decision makers determining water policy and reforms in water governance and management. It is intended for civil society representatives interested in proper reforms realization. Readers should realize that human-being already faced serious

water-related problems not only at the regional level, but over the globe. Everybody should understand that these problems could not be actually resolved by traditional methods. We believe that this document is a one more step forward to serve the problem resolution.

Also, it would be worth to mention that after the 3d World Water Forum in Kyoto Central Asian (March 2003) countries facilitated smooth transition from the command style of water management to new and more democratic water collaboration with the following principal results:

- The grave conflicts in water management, operation, and allocation among the countries of the region have been avoided.
- A range of important legal, financial, and institutional proposals have been prepared for submitting to the governments of the states, defining the principles of interaction on water issues.
- The practical measures for broad IWRM implementation were accepted by Water Authorities and Governmental Agencies in all countries.

CENTRAL ASIA: BACKGROUND INFORMATION

Central Asia covers territory of five countries: Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan (Fig. 1). It is situated in the heart of the Eurasian continent with the total area of 3,882,000 square kilometres and the population over 53 million (2004) of which more than 82 % is living in the Aral Sea Basin (Table 1). It borders with Afghanistan and Iran in the south, with China in the east and with Russia in the west and in the north.



Figure1. The countries of Central Asia

The climate in the region is sharply continental, mostly arid and semi-arid. Average precipitation (concentrated in the spring and winter) is about 270 mm, varying between 600-800 mm in mountains zones and 80-150 mm in desert regions.

Social-economic development of the region has depended on water and land resources since immemorial time. Irrigated farming and livestock production formed the biggest part of welfare, but in the same time created vulnerable conditions and water limitations for ecosystems. The region started actively using irrigation in the 6-7th century B.C and still it is one of the biggest irrigation region in the world (with about 9.1 million

hectares of irrigated crops). Population growth and irrigation development have significantly increased the demand for water in the region especially during the past 40 years. Actual consumptive water withdrawal in Central Asian countries varies from 20% of available water resources (Kazakhstan, Kyrgyzstan, Tajikistan) to 80-90% (Uzbekistan, Turkmenistan).

**Table1. The Basic Statistics
(included only territory of the Aral Sea basin)**

Indicator	Unit	1960	1970	1980	1990	2000	2004
Population	Million	14.6	20.3	26.8	33.6	41.8	43.8
Irrigated area Netto	1 000 ha	4510	5150	6920	7600	7896	8120
Irrigated area per capita	ha	0.31	0.27	0.26	0.23	0.19	0.18
Total water diversion	km ³ /year	60.61	94.56	120.69	116.27	105.0	102.0
Incl. irrigation	km ³ /year	56.15	86.84	106.79	106.4	94.66	93.0
Specific diversion per ha	m ³ /ha	12450	16860	15430	14000	11850	11450
Specific diversion per capita	m ³ /capita	4270	4730	4500	3460	2530	2120
GNP	Bln.US\$	16.1	32.4	48.1	74.0	27.5	34.4
Including agricultural production	Bln.US\$	5.8	8.9	18.3	22.0	9.0	10.2

A specific feature of the region from a hydrological point of view is the division of its territory into three main zones: (a) the zone of surface flow formation (upper watersheds in the mountain areas to the south-east), (b) the zone of flow transit and its dissipation (central part), and (c) the delta zones (to the north-west).

Available water resources (surface and underground) have always principal impact to the economic activities in Central Asia as limiting factor for development which is competing with ecological requirements. The largest rivers over the region are mostly transboundary and they are the following: the Syrdarya and Amurdarya (Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan), Chu and Talas (Kyrgyzstan and Kazakhstan), Tarim (Kyrgyzstan, Tajikistan, China), Ili (China, Kazakh-

stan), Irtysh (China, Kazakhstan, Russia), Ural, Ishim, Tobol (Kazakhstan, Russia).

During the last three decades of the Soviet era (1960-90), irrigated agriculture and the sectors of economy related to water management (processing of agricultural products, hydropower, construction and some others), contributed more than 50 percent to the GNP. Obtaining of independence by Central Asian countries and respective loosening of economic ties were accompanied by economic decline. This became the main cause of decline in gross national product and, particularly, agricultural production that represented large share of about 30% in GNP.

MAIN CHALLENGES FACING BY THE REGION REGARDING WATER ISSUES

An analysis of the water management situation in the region has revealed existence of the following general destabilizing factors:

- Demographic growth and permanent large share of rural population;
- Lack of consideration of environmental demand in current basin water use and conservation master-plans;
- Different national priorities concerning joint use and exchange of water and power;
- Construction of the new water infrastructure exerting transboundary impacts without coordination with other riparian countries;
- Uncertainties related to global climate warming;
- Lack of conflict resolution mechanisms and procedures to recover economic losses due to breaching the agreements on water sharing;
- Insufficient information interchange among riparian countries, first of all, exchange of hydro-meteorological data to ensure the more accurate forecast of water availability and to improve transboundary water management;
- Lack of policies and programs of the regional economic integration, and insufficient co-operation to improve the irrigated farming productivity on the basis of the model that enables optimizing the differentiation of labor in the region; and
- Vagueness at the regional level such as the prospects of water use by Afghanistan etc.

Also, there are specific negative factors at the national level and it is extremely useful to pay attention to the following internal (national) water challenges:

- water scarcity and pollution at the sub-basin and local levels;
- poor access of the big part of population to the safe drinking water;
- low water and land productivity or low output of an irrigated hectare;
- insufficient developing of the national legislative regulations;
- high-accumulated depreciation of assets owned by water organizations;
- an insufficient material and technical basis of water management organizations;
- inability of water users to pay for water delivery services;
- institutional issues (organizational and governing shortcomings);
- the poor cross-sectoral integration (between main water users);
- shortcomings of the personnel policy in the water sector;
- return flow (waste water) management issues;
- absence of proper regulations for transboundary groundwater use.

STRATEGIES SUGGESTED FOR IMPLEMENTATION

The first recognized in the region strategic document is "The Principal Provisions of Regional Water Strategy of Aral Sea Basin" (GEF Project 1996...1997, Task Manager Prof. J. Kindler). This document was prepared by a working group that consisted of the representative of all five states on equal base, and then it was confirmed by the five governments. Based on this document, the region formulated needs for future water development. The priorities were given mostly to the practical activities towards implementation of the IWRM concept. These priorities were later developed in more details, including five principal directions.

1. Legal base of interstate collaboration, which includes the following:

To prepare, make agree and get the national governments approval for principal interstate agreements such as "Agreement on the Exchange of Information and the Establishment of the Regional Database for the Transboundary Water Resources"; "Agreement on Strengthening the Institutional Structure for the Aral Sea Basin Transboundary Water Resources Management, Protection and Development"; "Agreements on the Rules for Water Use on the Amudarya and Syrdarya rivers" (separately); "Agreement on the Ecological Sustainability of Transboundary Waters of Aral Sea Basin".

To assume the "common water use" doctrine as a basis for inter-sectoral water relations. Strengthening regional bodies of ICWC and

ICSD along with enhancing their rights, authorities, and responsibilities are essential. There should be mandatory provisions to include in these organizations not only representatives of water management sector from the countries of the region, but also hydro-energy and water-delivery specialists, ecologists, and others. They should be granted by diplomatic status within the region and they should be free from requirements to follow decisions taken by the host country.

To establish well-defined regulations for operating regional organizations under various conditions and in different situations (water scarcity, floods, etc.); make these activities equitable, multinational, and transparent.

To lay down regulations for joint design, construction, and operation of multi-objective structures (for example Kamarata dam, Ragun dam, etc.), which will ensure that these complex hydro-structures will not be used in the interests of only one country or one sector.

To work out regulations for management of transboundary wastewaters returned to the main rivers.

2. Financial base and mechanisms for interstate collaboration, which includes the following:

To provide reliable financial support by the states for water management agencies, hydrometeorological services, and nature conservancy authorities in zones of flow formation and delta.

As a substitution for fuel/energy-water exchange, put into practice payments for flow regulation in reservoirs (over an annual, seasonal, or other period) with participation by all countries of the Aral Sea Basin in covering expenses for flow formation, as well as protection of the deltas.

To set well-defined limits on water withdrawal from the basins, taking into account ecologically viable volumes of water in the rivers, and allocate them among the countries in an equitable and reasonable manner. On the basis of these limits, make payments for exceeding the set levels of water withdrawal at a rate that reflects the price for water as a resource, and utilize this money for development of joint water saving activities in the basin.

To define, make agree and implement the mechanism of damage compensation as result of pollution, not-agreed actions along the river or deviation from approved order of water allocation. To make agree and implement the regulation on sharing expenses for monitoring of snow formation in upper watershed, snow melting and situation on the glaciers, as well as for operation on hydrometeorological network on the transboundary waters and information exchange.

3. General capacity development for ICWC and ICSD institutions, which should consist the following key items:

To strengthen the existing information network (CAWATER info) between ICWC members and their partners from other sectors and NGOs from top to bottom within the countries, including:

- information system on transboundary waters;
- knowledge base;
- analytical tools.

To expand the information network "CAWATER – foreign partners" (for example IPTRID, Grid Arendal, CapNet, INBO).

To continue support for joint regional projects, mostly addressed to the IWRM implementation in large scale.

To strengthen existing training system.

4. Capacity building for BWOs "Amydarya" and "Syrdarya" includes:

- equip headquarter and their regional units by modern computers, telephone and communication net;
- organize on this base dispatch service and information exchange;
- equip all head works of BWOs with automatic control and management system (SCADA) for prevention any possible uncontrolled water withdrawal from the river.

5. Capacity building for Hydromet Services at regional and national levels:

- rehabilitation of existed and construction of new hydrological monitoring stations on the transboundary waters with installation modern equipment;
- rehabilitation of monitoring stations on main glaciers, which are indicative points for both rivers;
- organizing satellite network communication between monitoring stations and national centers;
- organizing Regional Hydromet Center which can merge forces national Hydromets and join them with end water-users (BWOs, ministry of waters, etc);

- improve system of river forecast by using modern models of precipitation and flow formation;
- arrange general public awareness, especially end-users in forecast and real data.

DISSEMINATION OF EXPERIENCE

This position paper generalized proposed measures, decisions and their implementation to four super problems and subsequent sub-problems (table 2). Conclusion is very clear – all efforts concentrated on the smoothing growing transboundary problems and decisions regarding re-assessment of new approach to water governance and operational and prospective management. Decision-makers couldn't ignore these needs because it could create social disaster and catastrophic exposure of people's violence. That is why the priority needs were approved at the highest level within the so-called "Aral Sea Basin Program 2" (ASBP-2) in 2002. This new ASBP-2 covers most of the indicated problems. Unfortunately, two years has gone, but just only about 5 per cent of this program found formal commitment and financial support from the states and international donors. In any case, even movement started in the past few years is unique enough taking into account interstate specifics of the regional collaboration. What have been really done?

First of all, **preparation of legal tools for collaboration**, which has started within WARMAP Project (EU TACIS, 1995-2000). ICWC decision in 1996 stated a need to prepare at first stage four agreements, which would cover major directions of joint activities of the five states on the transboundary waters: institutional arrangement, information exchange, regulations of water use, environmental protections. In 1996...1999 drafts of these agreements were negotiated during the meetings of working group represented by each states and regional organizations. These drafts were agreed by all members of this group. One of the agreements – about information exchange - was signed by ICWC members and submitted to Board of IFAS for approval by the national governments.

USAID, initiated by Kyrgyz Government as result of growing deficit of this state in power and their priority to use water regime of Syrdarya in interest of hydropower, have organized other working group of water and power specialists for preparation of agreement on "water – power" exchange. This work succeeded in 1998 by signing other framework agreement well-known as Agreement 1998 on Syrdarya river, between Kazakh, Kyrgyz and Uzbek governments (later joined by Tajikistan) and agreed conditions of release water from Toktogul reservoir in summer with deliv-

ery gas, oil, coal and winter power. Although Agreement 1998 didn't pass the test of time and its provisions should be supplemented in reality each year by the interstate protocol, but it played proper role in creation of legal conditions of water management on Syrdarya river.

Decision of the Presidents of Central Asian States in 2002 on ASBP-2 approval indicates that there is a need to finalize draft agreements and to prepare some new one, particularly, regarding conflict resolution mechanism, new construction on transboundary waters and other. Unfortunately, this legal work didn't proceed formally from Executive Committee of Interstate Fund to Save the Aral Sea (EC IFAS) that itself must be first provider of this activity. NATO, ADB tried to enforce this legal initiatives by assisting in conduct some principal workshops and conferences, but nothing happened.

What are lessons learned from the above mentioned activities:

- setting up adequate legal framework on transboundary waters requires permanent activities of a working group, authorized by the national governments with delegating them strong responsibilities;
- the working group should be multi-sectoral with representatives of all stakeholders interested in water use and ministries of foreign affairs to promote negotiations and diplomatic approaches;
- preparation of legal base should exclude any attempts to put pressure or set up priority rights of upper watershed;
- negotiation requires public participation and a lack of ambitions;
- donors assistance is welcome to enable permanent activities of the working group on legal issue.

The second direction was addressed to **strengthening of institutions for joint management**. Organizational structure of ICWC is good enough for the moment. It was organized well enough and represents strong sharing of obligations and rights:

- ICWC consists of five equal in their positions members, authorized by the states. ICWC takes all decisions only on consensus base;
- BWOs are responsible for planning and operational activities;
- SIC ICWC is responsible for analytical, information and perspective activity, it prepares recommendations to members ICWC as well;
- ICWC Secretariat is an official representative body of Commission.

Governments through the water authorities of the five states allocated to ICWC staff, budget, arrangement, official status and rights that permit experienced specialists organize successfully their work. Many donors, especially the EU, UNDP, World Bank, CIDA, SDC, NATO Programme "Science

for Peace” have rendered technical assistance to ICWC bodies. One of the important elements of ICWC capacity building was setting up regional and national communication network, which interlinked regional bodies and national water-related agencies. This network is maintained by SIC ICWC and interconnects with many international organizations such as WWC, ICID, INBO, IWRA, GWP, UNECE and serves as a direct way to world water community and donors’ window.

Delay with signing of the agreements that provide a common regulations for all organizational issues caused certain disadvantages because initial status of ICWC didn't reflect main changes in water situation:

- Representative of energy, water supply, environment and other principal stakeholders are not represented in ICWC (there is need for more close cooperation with ICSD);
- ICWC bodies has rather weak financial arrangements and not all countries has their representatives in these bodies;
- ICWC bodies has weak public participation;
- ICWC didn't embrace in the sphere of its activity the management of all types of water as well as water quality issues.

What are lessons learned from the above mentioned activities:

Institutional structures are not “dead” formation – they should follow to changes of situation if we don't want to permit a lack and failure of regional collaboration. The establishment of ICWC and its bodies (1992...1993) was clear and right way, which could be developed on the example of International Joint Commission (USA–Canada) or Mekong Commission or according to other success examples. But attempt to keep national priorities in interstate collaboration led to creation of many parallel bodies with overlapping functions: Interstate Council, Interstate Fund, Commission of Sustainable Development, etc. Later, Interstate Council and Interstate Fund were merged, but absence of clear allocation of obligations in the sphere of coordination and fundraising disoriented donors and attempts of governments to concentrate their financing capacity on the real improvement of water situation in the basin.

The third direction is creation of regional and national information system. In accordance with Program 3 of the ASBP-1 the ICWC developed some interconnected information systems within each national authorities, BWOs and SIC ICWC. Setting up these system was done by common hierarchic method and as a result got single format and interconnected views thanks to assistance of SDC through CAREWIB (Central Asia Regional Water Information Base) project with assistance from UNECE and Grid-Arendal. This project has broad dissemination tools in e-

net, internet, printed form and based on the pyramid of information sieve from down to top which supported by information inputs from different projects and sources, implemented by not only SIC but as well as other ICWC bodies and cooperation with ICSD institutions. Information system* consists of:

- information portal with more than 20 different web sites including knowledge base, ongoing of ICWC, ongoing information about water resources picked up from Hydromerservice, ongoing situation on water allocation from information system of both BWOs;
- data base of dynamic social, environment, economic, land use information from all five states;
- set of analytical modules and models for analyze of situation on the basins, forecast of different situations which can be predicted on annual and multiyear water situation.

Besides inert users of CAREWIB inside of ICWC there was observed permanent growth of other's' interest to the system, which lead to more than 1300 persons (2 GB) visitors per month.

Lessons learned

- information system should have clear and convince interface and implementation of it need to be accompanied by training of users from "roots" to approach on system;
- information system need to include models and modules which permit to stimulate interest of user to support of system.

And the **fourth direction is training system**. Although a need for training have been very high as result of collapse of Soviet system's professional education, our first attempt to organize such education met with support just in the form of occasional thematic seminars and workshops up to 1999, when SIC ICWC together with CIDA and Israel arranged first training for water specialists. A series of the workshops presented advanced achievements of world practices in water management. Study tours for top-level water specialists to Canada, USA, Israel, Italy, France and Netherlands to review water management approaches in developed states was very useful and important.

In 1999 SIC ICWC in cooperation with McGill University submitted to CIDA a program of permanent training for specialists of Central Asian water agencies at interstate level. This program, namely ICWC Training Center establishment, was approved by CIDA and started its activity in 2000 in Tashkent. Later two branches of the Training Center were established: in

* Detail information about work of this system is available on our web sites www.cawater-info.net and www.sic.icwc-aral.uz

Urgench for lowlands of Amudarya – Turkmenistan and Uzbekistan with assistance of CIDA and in Osh for seven provinces of Fergana valley in Kyrgyzstan, Tajikistan and Uzbekistan with assistance of SDC.

While past five years CIDA and ICWC Training Centre has become a center of improvement, which promotes advanced methods of water resources management and environmental protection in Central Asian region. Over 4500 specialists were trained in Tashkent office and in the branches. First of all ICWC found the opportunity to cooperate in solving the issues through the dialogue not only between governments but also between various sectors of economy, between governmental and non-governmental organizations engaged in water management issues. Proper efforts needed for cooperation building among ICWC and ICSD with involvement of CAREC. The idea of integrated decision-making, orientation to the hydro-solidarity was always highlighted during the workshops.

The role of SIC ICWC, as a center of excellence, and Training Center in promotion of best practices is well recognized in the region. The trainees passed courses were familiarized with new knowledge about irrigation, water saving, planning of water use, community mobilization issues, which were provided by different on-going projects, leaded and introduced by SIC ICWC. The participants obtained skills in water management, particularly in Water Users' Associations (WUA), O&M of irrigation and drainage structures, application of information systems for water management and land reclamation, development of water use scheduling for conditions of huge number of water users, which was comparatively less in the past times of large collective farms existence.

Some difficulties in this activity were connected with:

- a need to cross the national boundaries for participation in training;
- ability of the operational staff to attend training courses;
- unequal educational level of participants;
- lack of proper experimental base.

Lessons learned

- net of training should be developed more broadly to meet current demand for training which is in fact in 10 times greater;
- training should be organized for specific audience not only for water specialists, but also water users;
- gender perspectives in water use and management should be considered;
- training activity should have a separate lines in the budget of national and regional water organizations.

Table 2. Diagnostic analysis on water related problems in the Aral Sea Basin

Super Issue	Sub-Problem	Solutions and Actions	Implementing Project or Donor
1. Appearance of the trans-boundary issues after the Soviet Union collapse	<ul style="list-style-type: none"> • Transboundary issues and water allocation principles; • Different priorities of downstream and upstream countries and sectoral trend; • Inter-sectoral contradictions concerning flow regimes; • Difficulties of interstate financing for mutual activities; • Difficulties in efficient water governance; • Collapse of common system of water accounting and forecast; • growing of "Hydroegoism" 	Development of long-term policy and agreed objective criteria for water allocation and use	WARMAP (TACIS), WEAP (USAID), EUWI
		Enabling acceptable and equitable rules of management and regulation of basin in different conditions	ICWC Program, WARMAP (TACIS), USAID, NATO for Peace
		Development and approval of finance rules for interstate structures and joint works	ICWC Program, UN-SPECA
		Implementation of SCADA system and establishing basin public committees with stakeholders participation	CIDA, SDC, USAID
		Establishment of the regional hydrological center (Hydromet. Services)	SDC, USAID
		Development of common information management system with broad stakeholders involvement	WARMAP, CAREWIB (SDC), RiverTwin, UNECE
		IWRM Implementation	IWRM-Fergana, SPM (UN ESCAP)
2. Collapse and weakening of strict "top-down" governance and necessity for integrated approach	<ul style="list-style-type: none"> • Increased institutional disadvantages; • Weakening control over water allocation, accounting and use; • Weakening of governance; • Brain drain; • Absence proper attention to water conservation 	Public involvement to management, (WUA, Public Committees (Councils))	ADB, TACIS, SDC, USAID
		New institutions with stakeholders participation	IWRM-Fergana
		Training system	CIDA, USAID, SDC, ADB

Super Issue	Sub-Problem	Solutions and Actions	Implementing Project or Donor
		Set of incentives (extension services, payment for services, privileges for water saving)	SDC
3. Economic decline and funding scarcity	Low water users' involvement to fund water sector	<ul style="list-style-type: none"> • Establish progressive scale of water charges; • Establish credit systems for water users to pay for water services; 	FAO, USAID
	<ul style="list-style-type: none"> • Not proper mechanism to funding interstate infrastructure; • States reduced interstate structures funding by 10 times; there is no means for its reconstruction and modernization; 	Developing and approving by states norms of O&M funding; support of interstate infrastructures and bodies; obligatory fulfillment of responsibilities; under funds scarcity fund rising from donors and organization of priority funding of sustainable functioning;	ICWC Program
	<ul style="list-style-type: none"> • water users can not pay for water delivery and services; • collapse of irrigation and drainage network, especially at in-farm level; • water sector lost its priority; 	<ul style="list-style-type: none"> • establish gradation of water users' involvement in water sector funding depending on their specific productivity; include payment for households; • attract loans and grants from international financial organizations to improve water supply and fulfillment of priority obligations; • introduce special program "Irrigated land drainage". 	World Bank, FAO
	Neglecting interstate needs for transboundary objects modernization	Increasing status of water-related organizations and their transformation into inter-sector bodies,	ICWC Program, UN-SPECA, UNDP, ADB

Super Issue	Sub-Problem	Solutions and Actions	Implementing Project or Donor
		providing their needs including interstate funding as priority driven.	
4. Neglecting the ecological demands	<ul style="list-style-type: none"> • Aral sea shrinking and delta desertification; • River water quality worsening; • Growing soil salinity and water-logging; • Flow formation zone degradation by erosion and deforestation 	<ul style="list-style-type: none"> • approval of obligatory releases to the delta and Aral sea; strict monitoring by ICWC and BWO; • set of nature protection measures for Priaralie new sustainable ecological profile establishing; • water conservation policy, return water recycling; • strict limits for salt disposal to the rivers; • priority-driven funding for measures on drainage O&M improvement and irrigated land reclamation; • development of strategy for flow formation zone conservation and establishing international programs on to support mountain landscapes and glaciers. 	INTAS, NATO "Science for peace", UNDP, EUWI

FUTURE PERSPECTIVE: IWRM AND PUBLIC PARTICIPATION

Integrated Water Resources Management (IWRM) is a combination of different institutional, managerial and technical measures which used as principal tool to involve stakeholders in these measures to combat various forms of "hydro-egoism". From regional point of view IWRM is a system of management which characterized by principal features of transition:

- from administrative boundaries to hydrographic one (basin and system);
- from sectoral management to inter-sectoral one;
- from "top-bottom" approach to bilateral one: "bottom-up" – requirements and "top-bottom" – limitations and support;
- from command-administrative method to cooperative management with water users participation at all hierarchic levels;
- from resource management to demand management;
- from close professional systems of water managers to open information-confidential involvement of water users and stakeholders.

Region suggests to consider IWRM as a **management system** based on taking into account and interactions of available waters (surface, ground, return) and associated land and other natural resources within hydrographic boundaries, connecting interests of various sectors and water and environment use hierarchic levels involving all stakeholders in decision making, planning, funding, support and development to meet society and nature needs sustainable.

Management system (IWRM) should ensure achievement (or approaching) of potential water productivity by all water users – industrial, agricultural or municipal – taking into account, that water spent for production unit is close to biological or technological requirements under minimum losses during water intake, transportation, delivery and use. This requires both close coordination of technological processes of water supply and distribution and technological requirements observance.

In irrigated agriculture, for example, it means necessity of reclamation and agrotechnique rules following and soil fertility maintenance, species selection; in water supply – treatment systems, wastes utilization, process technology; in industry – advanced technologies introduction, water recycling, solid waste utilization. Thus, IWRM framework often exceeds the limits of water use and protection and includes all spheres of water use as a main limiting factor.

The constructions of IWRM are oriented on the interconnection of all levels of hierarchy in their implementation of its principal role – meet of water demands and create of possibility for achievement of potential productivity. From this point IWRM needs to follow water demand from “bottom to top” and water limitations from “top to bottom” (Fig. 3).

The extremely important element of IWRM is broader involvement of public institutions in the management. Water management problems need to be considered in the context of relationship between the civil society and the government. Public participation should create the atmosphere of **transparency** and **openness**, in which the probability of making decisions that do not meet public interests decreases. The broader public participation, the less favorable conditions for corruption and public interest neglect. This would help to prevent local or agency level egoism in water use. This is a platform for equitable, responsible decisions on water allocation under growing water shortage with respect to the nature and other members of society.

Public participation is the most important factor for creation of hydro-solidarity in the region. Even if under previous existed administrative way of water management water users faced **administrative hydro-egoism**, under which decision makers of administrative territorial agencies have practiced dictates for their own benefits, with high opportunities for corruption, despotism, and infringement of other entities' rights, transition to hydrographic management as such do not imply transition to IWRM – such approach opens the way for **professional hydro-egoism** since, in the absence of public participation, water-management organizations themselves plan, establish limits, correct these limits and control them. Therefore, public participation is a guarantee of equity, equality and consideration of all interests in the management. Role of the public could be increased by establishing, parallel to water-management organizations, public structures in form of “Union of water users”, Councils or Committees. These are representative bodies that manage relevant systems. Representation implies participation in the process guidance of all interested parties, namely: representatives of water-management bodies; representatives of water use sectors (municipal sector, industry, fishery, etc.), direct water users, local authorities, public organizations, and non-governmental organizations. Union, Committee or Council coordinates activities of legal and physical entities of water relations, water management and use within an area, which is served by water management organization.

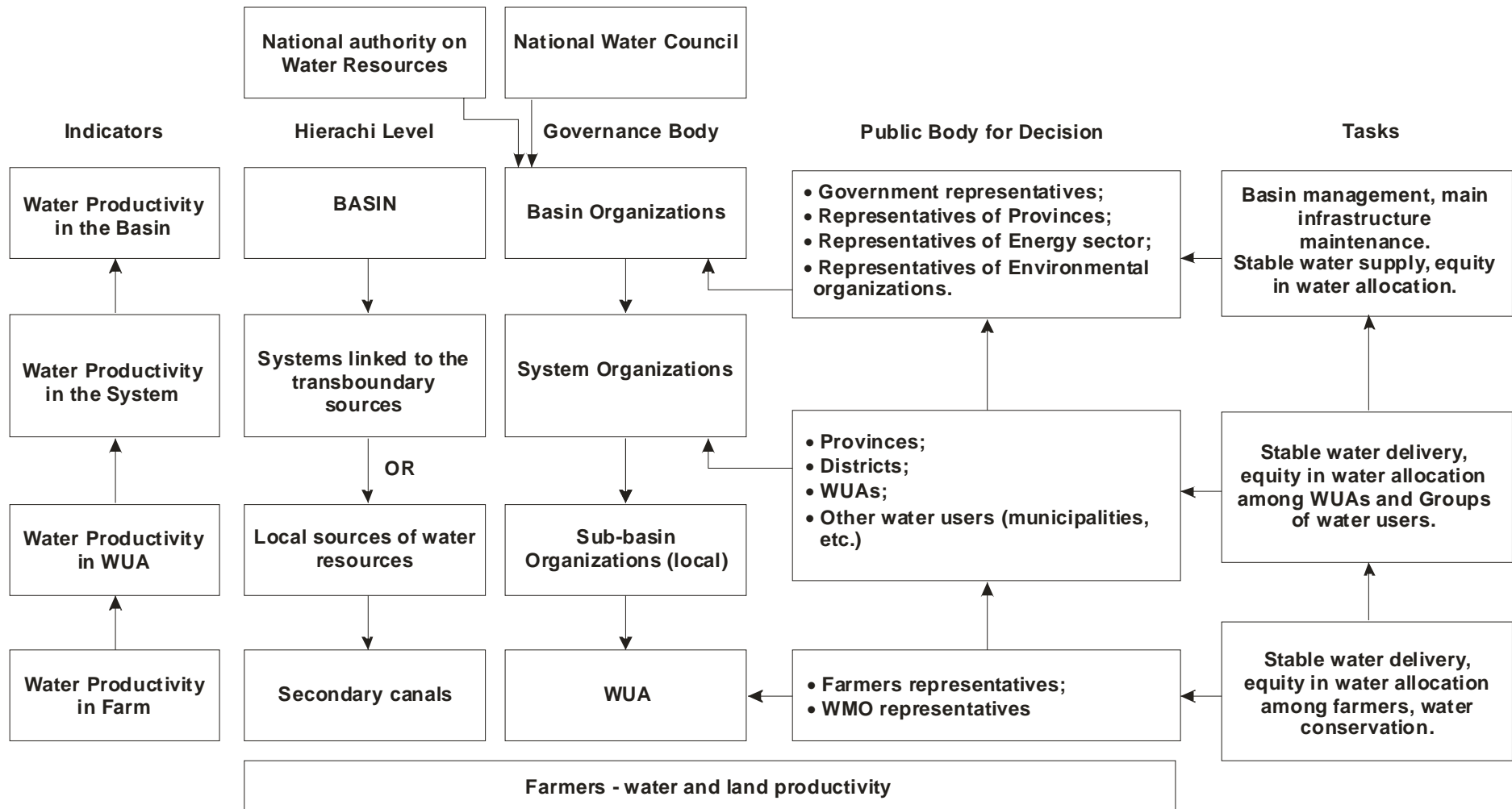


Fig. 3. IWRM Hierarchical Levels and their Links

ROAD MAP FOR FUTURE WATER DEVELOPMENT IN CENTRAL ASIA

Actions plan can be built up taking into account the provisions of "Diagnostic study" and problems analysis (Table 2). This process we describe as "Road Map" provided with proper legend, which allows to indicate which problems, how and when will be solved.

The principal role in providing and carrying on this plan should belong to "The Strategic planning of regional collaboration", which started with support from the Asian Development Bank (ADB) within ADB RETA project in 2005. The activity aims to prepare a strategic vision of future strengthening of ICWC institutions and cooperation with ICSD institutions. The all regional bodies would be evaluated from view point of existing shortcomings and needed measures for improvement should be suggested. Previous activities within framework of "The Principal Provisions of Water Strategy" (GEF and WB), UN - SPECA and GEF-2 projects should be accepted as a basic material for this activity.

It is expected that "Road Map" will initiate the program and agreed content of demanded legal and institutional works described in the Fig 4 and Table 3. The first phase should produce revised provisions of Regional Water Strategy that will include reassessment of proposed structure of regional organizations. On the basis of this document proper legal work on the finalizing and approval of draft agreements prepared earlier and their organizing implementation would be developed. Next step is a strategy for future improvement including simplification of structure of regional bodies for avoiding duplication of their activities and mandates, a feasibility study for setting up Water Energy Consortium, and inclusion of all transboundary waters under the jurisdiction of ICWC and interconnection with Hydrometservices. This strategic work should lay the foundation for a start of preparation "The Transboundary Water Code". The approval of this document would open door for institutional final reforms, as well as a ratification of the mentioned Water Code – same for reform recommendations, including setting up the Water Energy Consortium.

Strategic work needs to be developed in the direction of analysis of ongoing changes in the results and situation as well as proper plan of development activity in information example especially – in IWRM as main tools for penetration of idea to increase water productivity at all strata of water hierarchy. This work should overlap the results of "IWRM-Fergana" project, implementation of national plans of IWRM by Global Water Partnership in Central Asia and the Caucasus (GWP CACENA), as well as components of IWRM in other projects, provided by World Bank, ADB, TACIS.

The strategic activity should continue even later through permanent analysis of situation, change and especially preparation of framework for transfer from IWRM to IEWRM – **Integrated Environment and Water Resources Management**. First approach to this region is trying to create within RiverTwin EU project for Chirchik–Angren–Keless sub-basin and “IWRM for delta of the Amudarya” and “IWRM for delta of the Syrdarya” NATO project, which must be followed by proper new legal work and institutional changes. Simultaneously by development of all other lines of capacity development the mutual Strategic planning will be move accordingly.

Implementation of the described “road map” should provide the following key achievement over the region:

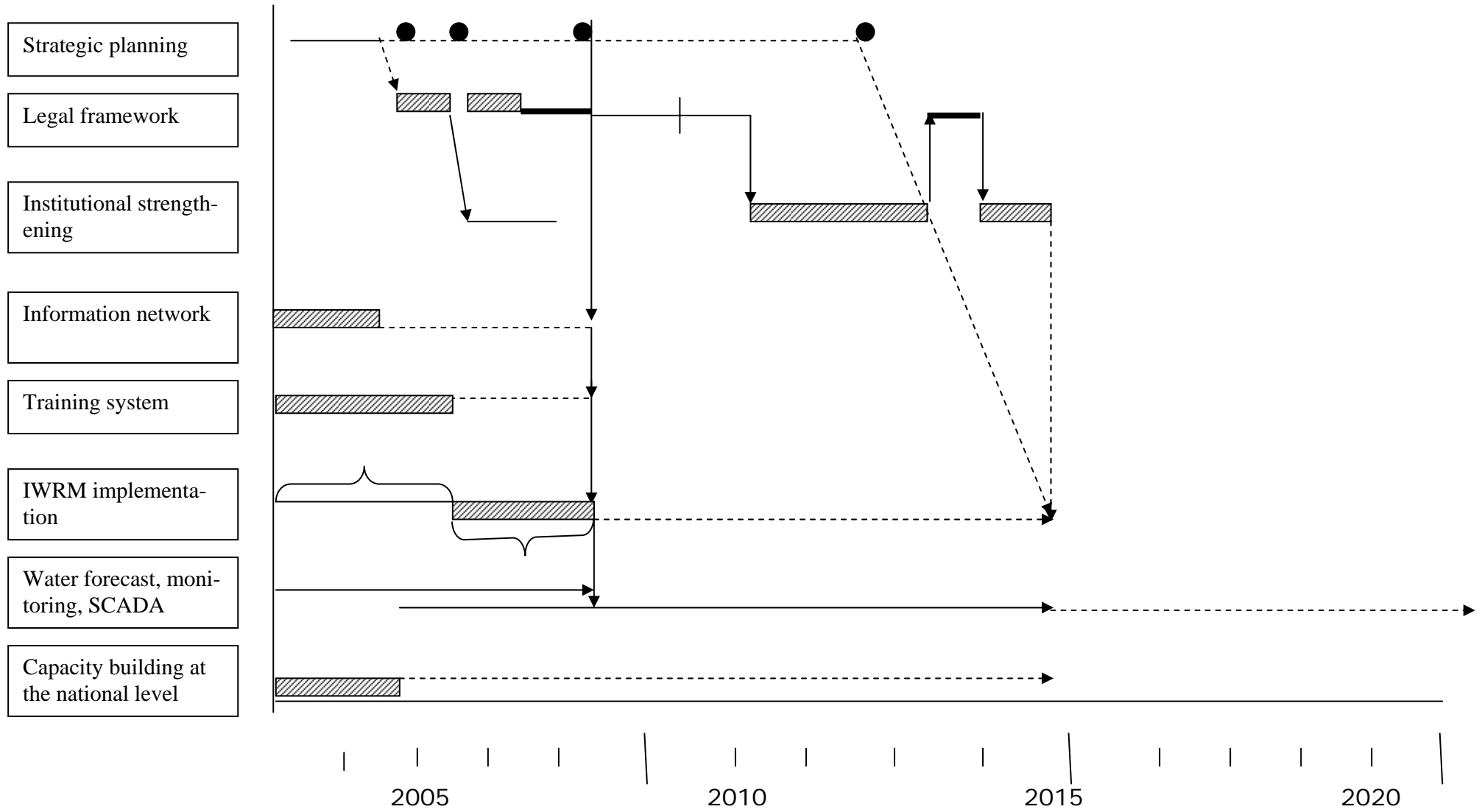
- to stabilize interstate water management to 2010;
- to create legal and institutional framework up to 2015;
- to create national capacity development to 2015;
- to achieve broad implementation IWRM to 2015 with full overlapping of all water branches of economy to 2020...2025.

Table.3. Details of the strategic road map

Steps within the Road Map	Problems could be solved
1 – Finalizing and approval of five draft agreements prepared earlier	<ul style="list-style-type: none"> • agreed rules of operation, management; • regulation of interstate activity; • involvement of stakeholders in Basin Water Management; • providing conditions for sustainable functioning all regional organizations and network; • regulation of information activity
2 – Transboundary Water Code of Aral Sea 2a – agreeing 2b – approval and ratification	<ul style="list-style-type: none"> • ground water and return flow are managed by ICWC; • BWOs manage all rivers with special divisions in deltas; • management of quality; • proper mechanism for constructions and rehabilitation transboundary infrastructures; • polluter pays principle; • targets of water saving; • conflict resolution
3. First stage of institutional restructuring regional organization	<ul style="list-style-type: none"> • creation of Water Council of basins; • internationalization of regional bodies; • openness and mutual trust of states and principal stakeholders
4. Second stage of institutional restructuring regional organization	<ul style="list-style-type: none"> • spreading institutional capacity of BWOs and their scope of responsibilities; • avoiding duplication and overlapping in regional organization activities
5. Preparation of legal framework for reforms towards IWRM	Ecological requirements should be priority of water use and development
6. Implementation of the environmental component of IWRM	<ul style="list-style-type: none"> • creation of IWRM Council in sub-basins; • creation of managing bodies for deltas Amudarya and Syrdarya rivers; • limitation of pollution on rivers; • hydro-ecological complex of upper watershed
7.a. Development of sustainable self-sufficiency of CAREWIB on the regional and national level	<ul style="list-style-type: none"> • transparency and openness information to broad scope of stakeholders of basin; • preparation of a framework for assessment consequences any national actions on transboundary issues; • preparation of a single approach of MIS, GIS for implementation at the national level
7.b. Achievement of workability of Regional Hydrometeorological service	<ul style="list-style-type: none"> • approach to regional Database on rivers and climate for BWOs and ICWC; • increase degree of correctness hydrological forecast;

Steps within the Road Map	Problems could be solved
	<ul style="list-style-type: none"> • coordination CAREWIB and Regional Hydrological center
8. Development National Information System	Creation flow of data from "bottom – to top"
9. Development of training system on the sustainable way	<ul style="list-style-type: none"> • self-sufficiency of the Training Center of ICWC and its Urgench branch; • creation of two TC branches in Tajikistan; • same in Kyrgyzstan and Kazakhstan • involvement of public participation at all levels of water hierarchy; • improvement of water education in colleges and universities
10. Implementation of IWRM, including IWRM Fergana	Development of extension services and water saving
11. National plan of IWRM in Kazakhstan	Political commitment and support for IWRM
12. National plans of other four states	
13. IWRM in Lowlands of the Amudarya and Syrdarya	Transboundary component of IWRM
14. Broad development of IWRM at all states	Payment for water service
15. Improvement of monitoring and water allocation network on transboundary rivers	<ul style="list-style-type: none"> • rehabilitation of all monitoring section on transboundary rivers; • implementation of SCADA and dispatch serving on all transboundary rivers; • improvement of water management quality
16. Same at the national level	
17. Capacity building at the national level a) preparation of national measures for capacity development at the national levels; b) implementation of national plan capacity development	<ul style="list-style-type: none"> • increase financial potential of WMOs; • allocation expenses between government and stakeholders; • business plan of WMOs; • communication network of low-level WMOs; • connection it with WUAs
17c. Support in capacity building for reclamation organizations	<ul style="list-style-type: none"> • involvement of all vertical and horizontal drainage in work; • improvement of workability of recommendation by expedition with implementations of GIS and RS; • planning for improvement of soil reclamation situation on the agricultural lands

Fig. 4. Road Map for future capacity development led by ICWC



ROLE OF THE INTERNATIONAL DONORS

Financial contributions by International Financial Organizations and donors are of great importance to maintain collaboration between developing states on transboundary waters. Certainly, level of regional cooperation depends heavily on funding and the development of joint actions, but they are also often affected by the lack of possibilities for appropriate communication - to meet and exchange information, experiences, lessons learned, etc. The region have enjoyed excellent examples of real collaboration with such donors as CIDA, SDC, the EU Copernicus, "Science for Peace" NATO and organizations like GWP, UNECE, UN ESCAP, all of which adhere strictly to the following very useful and efficient rules in their sponsorship:

- donors and recipients are partners: both participate in the development of action plans and common methodology, and they work together in the same way;
- broad use is made of local expertise and project implementation under the control of an independent steering committee, with participation from donors. SDC, for example, authorized ICWC and BWO Syrdarya to contract the local company Sigma, which operated a SCADA system for years at a cost per gate of only \$6,000 per unit (instead of the \$30,000-40,000 expended on similar structures by other donors using their own labor and equipment);
- payment for work should be made only after its completion and after acceptance of the output by the beneficiaries.

Very often donors may use recipient states as a base for economic penetration into the region, exerting pressure and obtaining local initiative and "know-how" without payment. Some donors employ their own staff and consultants to implement up to 80 percent of the so-called "grants." The Aral Sea Basin experience can provide many examples of these situations. There are examples of projects executed by foreign consultants which achieved no results in the long run, as well as of cases where the activities of various donors sometime duplicate, overlap, and even contradict each other. Wider acceptance by other donors of the rules and type of interrelation between donors and recipients adopted by the EU, SDC, USA State department, and "NATO for Peace" - along with stricter coordination of programs between donors, and between donors and recipients - should assist in improving efficiency in the use of donors' scarce financial resources.

It is also important that donors activities on transboundary rivers support as many regional programs as possible, and assist actions on which riparian states and their representatives should work together, increasing co-

operation, trust, consensus, and mutual understanding. Our experience of the implementation of regional programs, especially on regional training and joint preparation of action plans and strategies, shows the relative efficiency of such work, compared to that arising from attempts of donors to satisfy the needs of individual riparian states rather than considering regional interests.

Coordination between donors from one side, between donors and regional recipients from other side is very important from view point to avoid overlapping and duplication of efforts, and in the same time to “target” flow of limited funds.

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