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Some ideas about IWRM implementation in Central Asia

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Introduction

The actual state of water sector in Central Asia is complicated and determined by transition from old command governance system to hydrographic, changes in water use structure, market relations development between supplies and consumers. In condition of independence and social-economic degradation, below listed principal destabilizing factors which resulted as weakness both of water organizations and water users. Among these factors the following are the most serious:

- high rate of population growth (2,5…3,2 % per annum);
- low national income per capita;
- growing water deficit due to growing needs and poor demand management;
- significant environmental damage due to lack of attention to water requirements for ecosystems (upper watershed, deltas, Aral sea, etc.).

Water resources management is an art to deliver required water volume of acceptable quality to requested place in proper time. To realize this principle several interconnected elements are needed, first of all, engineering infrastructure (water reservoirs, canals, regulating facilities, pipelines, and wastewater disposal systems). To maintain this infrastructure, institutional infrastructure is needed – water organizations. For normal functioning of institutional infrastructure management tools are needed- legal base and regulations, scientific- methodological base, monitoring system (hydrometric and information base). Besides, system of financing and initiatives (payment for services, pollution, etc.) is needed. Thus, it is clear that this is complex multifactor process –so called IWRM.

IWRM is a system based on account of all types of water (surface, ground, return) within hydrographic boundaries, which connects interests of various sectors and hierarchic levels, promotes effective water use in interest of sustainable development of society and ecologic security (aiming maximum productivity).

IWRM is considered as methodological approach for water resources governance, management and development. IWRM concept implementation started from hydrographic management with public participation in Spain (beginning of XX century), France and Italy (second half of XX century) under name of “Integrated water and land resources development and management” and it was also well developed in the former USSR in 1950-80-s during development of the Hunger, Karshi and Dzhizak Steppe, etc. Officially IWRM was recognized by the world water community within Dublin Declaration (1992), but along with clear and correct provisions on social and ecological value of water, there were wrong statements about water consideration as a ”good”, that made complicated practical water relationships.

IWRM process includes range of key principles, which determine its practical essence. These principles are as follows:

- water management is performed within hydrographic boundaries according to specific basin morphology;
- management foresees account and involvement of all types of water (surface, ground, return) with regard to climatic particularities;
- close water use coordination with all economic sectors in horizontal direction and hierarchic level in vertical one;
- public participation in water governance, management, financing, maintaining, planning and development;
- information provision, transparency of water governance system;
- priority of natural requirements;
- incentives availability for water saving and unproductive losses reduction.

The UN ESCAP since 2000 implements project "Capacity Building in Natural Resources Strategic Planning and Mmanagement in Asia and Pacific" (SPM), within framework of which since August 2002 SIC ICWC has organized activity in Central Asian countries. The SPM system has a goal to realize IWRM principles to achieve sustainable functioning of water sector and to solve strategic priority issues of social-economic development.

In this context, IWRM principles approbation is possible firstly on pilot system with development of recommendations on staged transition to entire water sector and other economic sectors.

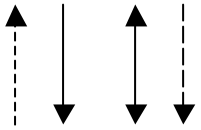
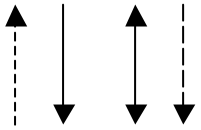
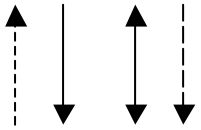
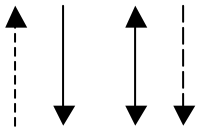
The ESCAP initiative with SPM methods application of IWRM strategy development is very important for decision makers understanding and long-term experience use for survival strategy development under growing water scarcity. It is supposed that participation of technical experts from five Ministries of agriculture and water management will contribute to preparation of materials on certain organizational, technical and legal measures and legislative initiative, public campaigns promoting fund rising. In result, important outcomes can be achieved: stable water supply, 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 ecology degradation connected with economic activity; and finally, water and land resources productivity increase.

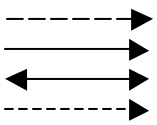
How IWRM principles should be implemented into practice

From the horizontal coordination point of view, water related bodies should equally represent interests of all water uses, follow water saving and environmental priorities within single hydrographic unit. Problem is that different types of water are managed by various agencies. For instance, surface water for irrigation are managed by the Ministry of Agriculture and Water Resources or Water Department; in interest of power engineering – by the Ministry of Power; ground water is managed by geologic agencies; drinking water supply is responsibility of municipal services and local authorities. As a rule, all these agencies do not coordinate their activities. If in former USSR there was common statistic reporting (2TP-vodhoz), today nobody has even general information. For coordination of sectoral interests, three components are necessary: common legal base, organizational structure and common tools of water management.

From the vertical coordination point of view, IWRM principles realization at the national level should be built in following chain: water related agency (Ministry, Department) – basin water resources management body – irrigation/canal system management body –WUA – water users. Organizational structure covering hydrographic basin is shown in layout. WUA level should replace earlier existing structure of on-farm network O&M.

Fig.1. IWRM organizational structure within hydrographic basin [1]

Hydrographic level	Organization	Key function
National level	National water agency 	Policy and normative formation in the country and in river basins, water use coordination between agencies (sectors), hydrometeorologic information submitting.
Hydrographic basin	Basin management 	Hydroecologic management organization. Water distribution within the basin plans preparation, aquatic ecosystems protection, infrastructure management, development, financing; inter-sector agreement conclusion; disputes resolution at basin level.
Main canal	Canal system management 	Hydrometeorologic information submitting; Water distribution within canal plans preparation, water protection from pollution, infrastructure management, development, financing; agreement conclusion between organizations; disputes resolution at system level.
Distributors or small main canals	Water users association (WUA) 	Water distribution within WUA plans preparation, Water distribution within WUA plans preparation, water supply, water protection from pollution, infrastructure management, development, financing within WUA(including drainage); disputes resolution at WUA level; consultations to water users. Water productivity increase.
Farmers and enterprises – water users	Water users	Water distribution and use account and analysis, water protection, drainage O&M, site distributor' infrastructure maintaining. Water conservation.



Minimization of hierarchic levels in water management and strict coordination of water use sectors permit reduce unproductive water losses that is main goal of necessary reforms.

Broad public participation in water resources management is very important IWRM element. Water use management should be considered in context of interrelations between civil society and the state. State is society superstructure (political and administrative institutions) emerging during mankind development for society governing. Public participation should create atmosphere of transparency and openness reducing risk to make decision being in contradiction with public interests. More public participation - less possibility for corruption and public interests neglecting.

[1] Proposed base for transition to IWRM in Ferghana valley under water users active participation. SIC ICWC, IWMI, SDC, Tashkent, 2004

This is mean to prevent local and sectoral egoism. This platform for equitable but responsive decisions on water distribution under growing water scarcity.

Taking into account that water is both private and public good, it is evident that public participation is most important element of water use management. Public role is increased through *public structures establishing by water organizations (Councils and Committees)*. Water Committee is representative body governing certain system infrastructure. Representative supposes participation of all concerned parties in water management: water organizations, industry, agriculture, fish-breeding, water users, local power, nature protection bodies and NGOs. Committee coordinates activity of juridical and physical entities with command area of canal/system. Committee main goal is IWRM principles realization jointly with its Executive body and with participation of all concerned parties. Committee follows Constitution and national legislation, governmental provisions and typical status approved by national water agency. Governing infrastructure Committee is supported by executive body (water organization, canal board). Canal board provides necessary works on canal O&M, rehabilitation, water supply to water users in accordance with their applications with regard for climatic and other factors.

Table 1. Functions of leading (Water Committees and Public Councils) and executive (board or water organization) bodies are distributed as follow[2].

Public body functions (Water Committee)	Executive body functions (Board)
1. Approval of water distribution rules, water supply and disposal; 2. Approval of pollutants release limit; 3. O&M plan approval; 4. Cost breakdown approval; 5. Fund rising; 6. Audit; 7. Water services pricing; 8. Approval of prospective development program; 9. Water conservation and demand management policy conducting.	1. Annual planning: - water requirement and local water resources; - water allocation and distribution with regard to established limits; - water disposal and quality protection; 2. water use plan realization and revision. 3. Control of fulfillment: - water account; - water conservation. 4. Infrastructure O&M, measures on system efficiency improvement. 5. Water users and public involvement in water management and use. 6. Information system establishing and maintaining. 7. Extension service maintaining. 8. Water fees collection. 9. Extreme situation mitigation.

After independence gaining water agencies started to take into account ecologic situation aggravation under anthropogenic activity. Main condition of transition to sustainability of natural and natural-anthropogenic cycles is minimization of negative factors of interaction between groundwater and territory and surface and ground water. From hydrographic territory's ecologic sustainability point of view, approach can be suggested when two interconnected nature-protection aspects considered: water quality in source and pollutants accumulation in economic active zones. Well-being criteria are as follows:

- area and ecosystems' pollution level should not exceed allowable limits; intensity of pollutants accumulation should be negative;
- pollutant concentration in the water source in all zones of hydrographic basin from spring to mouth does not exceed allowable concentration for all water users;
- anthropogenic load on watershed ecosystems allows maintain optimal level of biodiversity and bio productivity.

[2] Proposed base for transition to IWRM in Ferghana valley
under water users active participation. SIC ICWC, IWMI, SDC, Tashkent, 2004

On base of these criteria range of provisions can be formulated, which should be taken into account in water management practice. Firstly, it is necessary to coordinate states' obligations concerning ecologic requirements. Secondly, equal right on water use (that does not mean equal water volume in each basin) can be presented as equal right of each water user for minimal water use determined by "advanced water use" norm providing minimal man needs for survival, employment and food staff. This right of each man, which is given to him by state and state is responsible for productive water use. Thirdly, increase of allowable water diversion level by each water consumer can create certain fund of ecologic protection for hydrographic basin, which will be used for ecological situation improvement.

Presently, ecosystem water requirements can't be satisfied on base of residual principle (water remaining after economic needs).It should be one from priority spheres of water related organizations' activity within IWRM framework.

Taking into account IWRM complexity, given processes can't be realized at national and basin level simultaneously (in certain time interval). IWRM principles should be introduced in staged way through gradual strategic and coordinated planning for several years. Terms of introduction depend on governmental support, financial-economic situation and external assistance(for developing countries). In ideal conditions IWRM realization processes runs through minimum three stages:

- Creation of IWRM "environment" – public awareness, political will, legal base, conditions for all concerned parties participation and capacity building system.
- Process of IWRM national planning – analysis of situation and ranking, action plan development.
- Creating conditions for plan implementation – political support and strategy of reforms financing.

For IWRM principles realization, public awareness about them and political will to support necessary reforms are needed. Awareness is necessary, first of all, among key politicians, specialists and organizations involved in water problems. For that, national campaign should be initiated, which must form political will and interest to IWRM principles realization.

Secondly, it is necessary to create conditions for broad participation of all concerned parties using existing mechanisms (public councils, committees, etc.) for wide consultation among sectors - agencies, professionals – water managers, water users, local authorities. It is very important to establish WUAs with key role in the process. Organization of national or regional conferences is mighty tool for establishing coordination platform.

Maybe, presently capacity building is most important question for Central-Asian countries. It is necessary to establish and develop training system, improve communication system, publish IWRM materials. Water resources account should be improved (including contact with hydromet service). And, finally, it is necessary to complete existing information systems (databases, models, GIS, etc.).

Main element of IWRM "environment" is its legal base. Water legislation (water code or similar laws) almost in all countries of the region needs to be revised. Legislation put a base for authorities, responsibilities and rights required for certain institutions and mechanisms of IWRM realization. Legal provisions stipulated in "Law on Water", "Water Code" or "Law on Land" should be accompanied by effective state water policy by means of:

- Definition of government, water organizations and other concerned parties role and responsibility in water resources use, distribution, management, preservation and protection;
- Clear definition of water social, economic and ecologic value;
- Creation of certain position concerning restructuring, authorities, privatization, strengthening role of local communities and water users participation;
- Clear definition of water right, WUA role, rules of coordination between sectors and its mechanism;
- Establishing links with nature protection bodies, agriculture, local power, economic development, etc.

Methodology for the IWRM strategic national planning

Strategic planning should be started from analysis of situation in the country. Summarizing existing strategies and plans will allow define where is the country on the way to IWRM and enlighten following questions:

- Whether there is national water strategy or similar document at the national, regional or basin level?
- Essence of national water policy.
- Set of existing programs and projects on IWRM realization (fully or partially).
- Other national plans (developed under support of international organizations) – on Sectoral Reform, Infrastructural Plan, Strategy of sustainable development and poverty reduction, water supply and sanitation, National Action Plans on environment, etc.
- Whether water supply and sanitation included as high priorities into the strategy (health, production, etc.)?
- Whether environmental element is included as a part of planning?

Second planning stage is creation of management organizational structure in forms and functions needed for IWRM. It is necessary to formulate regulation of following key participants of planning process:

- National agencies, basin organizations, regulating bodies and groups representing civil society, their interrelations, transboundary organizations, information sharing mechanisms;
- Institutions (organizations), which should participate in IWRM national plan development.

From right strategy point of view, during planning stage strict ranking is necessary to define priorities concerning water resources management for the nearest perspective with regard to:

- Conflicts between water consumers (presently and in future).
- Water resources state regarding IWRM impact.
- Main threats to water resources

One from main results of planning is management functions definition and distribution. It is necessary answer the question how key organizations distribute authorities between themselves concerning separate IWRM aspects, in particular:

- Water resources management;
- Water demand management;
- Water service and infrastructure management;
- Functioning and development financing and sustainability;

- System of links and obligations financing to reach IWRM objectives.

Later should be important planning result for financing regulation and definition of the mechanisms of:

- Financing water management functions and IWRM principles realization;
- Financing services (water supply and sanitation, irrigation, etc.);
- Necessary investments to maintain infrastructure;
- Necessary investments for further infrastructure development.

Services financing mechanisms under active water users participation should include the following functions:

1. Assessment of expenses for regulating and governing activity of water organization at all hierarchic levels;
2. Assessment of water services cost;
3. Definition of financing sources including water fees, payment for water services and taxes;
4. Definition a base for water fees, local fees and other organizational expenses;
5. Necessary procedures of financial reporting and audit.

General layout of IWRM planning process for hydrographic basin is presented in fig.2. From this figure logic succession of necessary measures and public involvement degree can be seen. In right side of figure Main IWRM principles realization succession is presented.

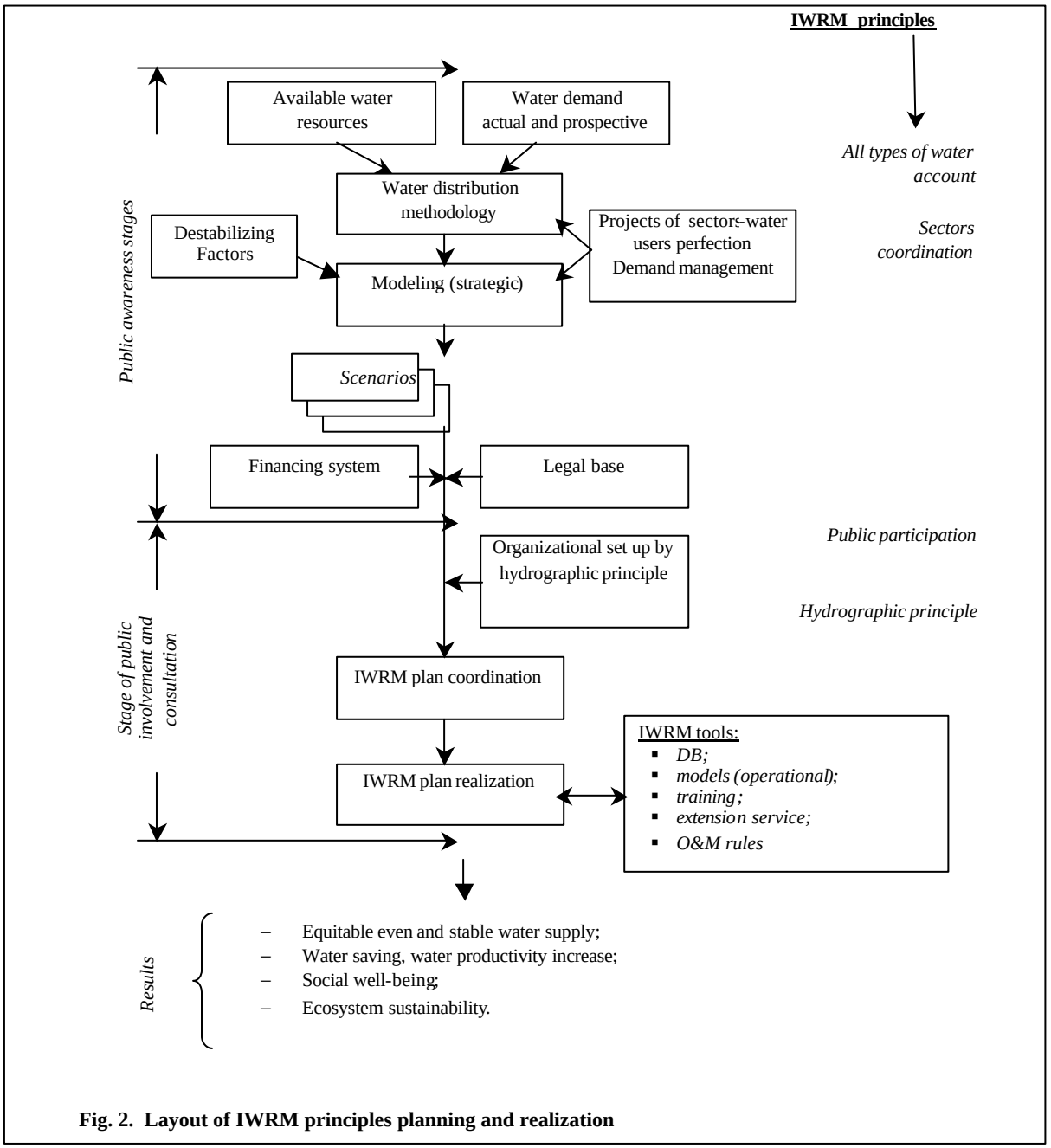


Fig. 2. Layout of IWRM principles planning and realization

Upon IWRM national plan preparation, necessary conditions should be created for its practical realization. Each state must decide how to provide political support to this process and how to distribute roles and participation between agencies and hierarchic levels.

It is evident that beside organizational setup and IWRM "habitat" establishing, set of tools is necessary for routine practice and perfection of water management:

- Management tools (assessment, planning, water use efficiency indicators);
- Regulation tools (indicators, criteria rules, methods);
- Economic tools (water/services charges, subsidies and initiatives, market, payment for pollution);
- Information exchange (database and set of mathematical models);
- Social tools (education, training);
- Conflict resolution (public involvement, search of consensus, arbitrage).

Plans for sustaining the SPM approach – mission of ICWC

ICWC program of priority recommendations and proposals realization on integrated management can become effective SPM output including:

- Conditions and measures on ecologic requirements observance,
- Proposals on rational water use norm revision (oriented at water saving),
- Proposals on rational regime of flow regulation and distribution minimizing losses and satisfying population social needs (drinking water supply, food security, etc.), environment (ecologic requirements) and economy,
- Proposals on minimal risk from climatic changes and natural draught,
- Proposals on prevention of conflict situations (artificial draught and flood), searching consensus, compensation measures (in case of damage) and reducing damage and extreme situation risks.

Priority program should be agreed at state and interstate (ICWC) level because it should foresee integration and interconnection of goals, results and resources over the region.

Finally, this program realization should *regulate all disputes , establish common methodological and computational base, create preconditions for sustainable political environment and effective water resources use especially in dry years* (artificial and natural draughts and floods), stabilize social sphere rehabilitate environment and minimize economic damage.

Important step in program realization is IWRM principles adaptation to Amu-Darya and Syr-Darya basin conditions finding consensus in basin management with regard to regional restrictions and boundary conditions at the national (local) level – establishing clear rules of interaction between those distributing water and those its consuming under consumption monitoring and control.

At that, it is possible to disseminate SIC ICWC experience in IWRM introduction in Fergana valley and lower reaches (most socially tense zones) where beside organizational decisions and recommendations, environment and water productivity, legal base and economic incentives, extension service and public opinion formation aspects are developed.

SIC ICWC position in interstate water-power resources management is as follow.

If power resources are goods, water resources are social and ecologic good and only under certain conditions it can become goods. It is necessary to create special structure for economically beneficial water and fuel-power resources exchange. Resources should move in direction where there is mutual interest and aspiration to get maximum benefit and the market will define itself order and path of actions. With this purpose ICWC initiated idea of consortium as financial mechanism providing order of water-power exchange between the states. Consortium is real mechanism preventing water-power conflicts and their full resolution in future. Governments of five countries should be guarantee of consortium stable function. Consortium should *not replace existing structures* of interstate management (ICWC, BWO "Syrdarya") like suggested international united dispatch company (IUDC).

ICWC plays main role in priorities realization and consensus finding as strategic manager with appropriate authority.

First of all, *free information exchange* should be established (on base of prepared agreement). For that, regional information system based on internet technologies should be introduced. CAREWIB project can analogue of this system (project goal is creation on base of advanced technologies

software and communication means of single regional information system including information about water resources formation and forecast, current and future water consumption assessment and measures on sustainable water management on base of IWRM).
On base of *ICWC training activity* its leadership in IWRM can be strengthened through involvement of wide circle of specialists from adjacent sectors to water resources management criteria and tools development, effective management incentives formation, promotion of SPM and IWRM principles introduction (after reaching certain results and effects), explaining ICWC position in prospective water-power resources management issues, re-distributing funds and investments on base of SPM and IWRM principles.

It is important to create "right" *public opinion reflecting public interests on main issues* of water resources management (drinking water quality, ecosystems maintaining, population employment, damage compensation during draught, etc.).

SIC ICWC experience *in computerization* (methodological computer program realization, decision making support), IWRM guideline for the region preparation, explaining IWRM advantages, providing services to water organizations and water users in water use plan preparation, existing structures efficiency increase and disputes resolution and consideration of reciprocal measures expediency and effectiveness.

Region needs financial aid, new technologies and equipment. From this point of view, based on selected priorities, it is necessary to take responsibility for relationships with donors, which *direct countries* at preventing conflicts and support regional initiatives and search of consensus. In this connection, questions of *future potential conflicts* should be properly studied especially during dry years and in lower reaches caused by destabilizing factors with assessment of probability and IWRM methods efficiency, development of social-political measures, to minimize risk and prevent conflicts on base of consensus.