

## **Global IWRM experiences and their relevance for transboundary water management organizations, notably ICWC, in Central Asia (Joop L.G. de Schutter, UNESCO-IHE)**

### **WRM and IWRM**

WRM goes back to ancient civilizations such as seen in China (Karez systems), Roman Empire (Aqueducts), Inca Empire (Machu Pichu complex), Egypt (Irrigation Systems), etc. With civilization central storage and distribution of water becomes a must and the need for structural systems to manage water resources is the answer to that. Systems were usually developed in the perspective of ecological stability, political responsibility, user (society) acceptance and institutional supervision.

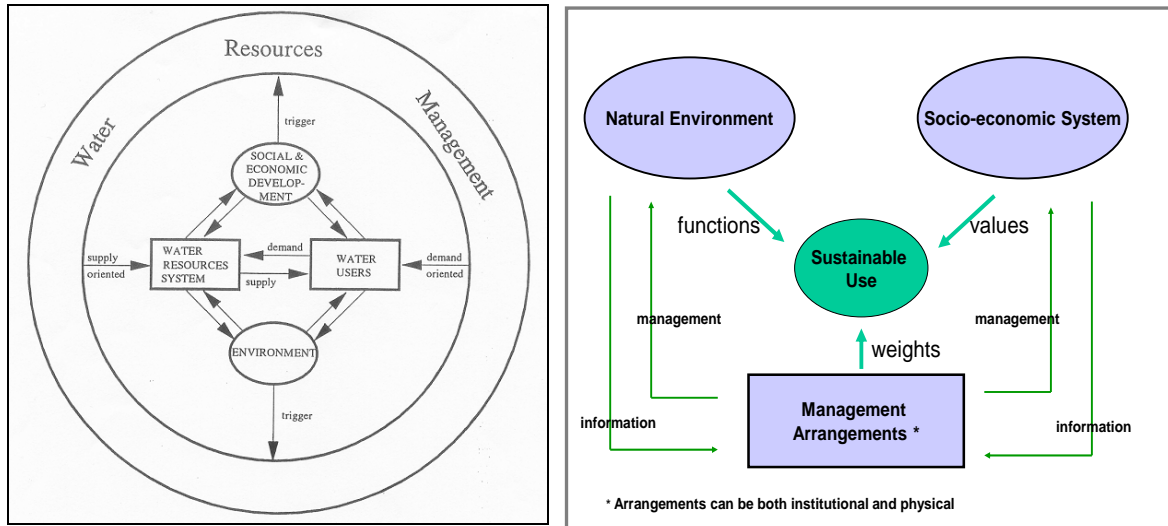
With the arrival of the industrial revolution (1760 onwards), water provision and allocation needs increased, which led to more complex (technical) systems and greater dependence of the resource. This in turn provided a boost to both the level of sophistication of the systems as well as to the need to organize water delivery (reliability). Water supply is mainly organized per sector (industry, agriculture, urban). Only in the 1970's the consequences of non cooperation between sectors became visible through pollution and (temporary) scarcity mainly.

An early example of IWRM is often mentioned to be the Tennessee Valley Authority (1933), which assumed to serve the interests of navigation, flood control and (hydro)power production while at the same time looking into serving erosion control (agriculture), recreation (boating and fishing) and public health (pollution). Accepting IWRM as the guiding principle for watershed management starts with the wider sharing of experiences and development of new water management approaches and principles such as presented during a UN Conference of Mar del Plata (1977). The conference recommended that countries develop water resources management capacity in the context of their national planning, under real coordination between all those bodies responsible for research, development and management of the water resources.

In the 1980's watershed management approaches, including valuation of ecosystems services, became introduced. A known example is the development of Canadian water management policies (David Pearce e.a. 1985), which even included ideas for water (services) pricing. Important progress with development of the concept was made during the Dublin International Conference on Water and Environment (1992) when (for example) a key note paper (1991) on Water and Sustainable Development was presented by Koudstaal, Rijsberman and Savenije that combined the new insights of sustainable development (Brundtland Commission report 1987) and preparations for the UNCED conference in Rio de Janeiro in 1992. The paper stated that "the real value of the concept of sustainable development is that it emphasizes that the potential -or carrying capacity- of resources must be examined first rather than just planning - socio-economic development- and minimize adverse impacts later". The concept is explained in the figure below.

The concept was inspired by results of ongoing research work and development of new concepts for integrated land, water and ecosystem system services management such as coming out of the work underlying environmental impact assessment and strategic assessment. The approach is to consider water resources management to be led by indicators representing the well functioning of the natural system on the one hand and the requirements of a society's socio-economic well being on the other. This system of supply and demand should be delineated by a balance between impacts and carrying capacity of the environment. However, the danger of imbalance is always there as is clearly demonstrated by over-use of resources and wide spread pollution in many watersheds around the world. Practice is, that in times of (assumed) scarcity, policy makers and stakeholders in general, tend

to attribute more weight to socio-economic development over the interests of future generations (as dictated by the concept of sustainable development). The concept of considering sustainability as a balance between the carrying capacity of the natural environment (functions) and requirements coming out of the socio-economic system (values) was further elaborated by Koudstaal and Slootweg in their article for the OECD in 1994.



**IWRM according to the Dublin 1992 key note article by Koudstaal, Rijsberman, Savenije (left) and according to Koudstaal and Slootweg (OECD 1994)(right)**

The concept of IWRM has been further elaborated both on the issue of what actually is "integration" as well as on the issue of the IWRM development process with participatory planning and decision making (stakeholder interests) as the guiding principle. Much used now is the GWP (2000) definition which says that "IWRM is a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner, without compromising the sustainability of vital ecosystems".

### **IWRM Planning and Decision Frameworks**

Following the development of the concept for IWRM, much research has been done in the last decades to translate this conceptual framework into analytical frameworks (and models) supportive to planning and decision making. The basis under these analytical frameworks are water system related performance criteria that represent the various services (economic, environmental, ecological) of the water resources system (Loucks and van Beek, 2005). Services serve many different purposes such as water supply, food production, flood protection, energy generation, landscape maintenance, navigation, etc. Performance criteria provide an indication about how well a system performs with reference to single criteria (e.g. area under irrigation, fish -re-production, urban water supply) or a combination of criteria (e.g. gross domestic product, jobs created, average calorie intake per person, etc.). Sometimes criteria are conflicting and trade offs are required to be able to choose between different development strategies under different scenario's.

A wide range of approaches and instruments is available to support these planning and decision making processes in variation of mainly qualitative (and requiring less detailed data) approaches, to very detailed and complex models that require extended data and produce output on a large variety of indicators. However, a leading principle is that stakeholders (on all levels) are participants in a process of informed decision making. It is therefore needed that a shared (among stakeholders) monitoring

(water and ecosystem resources) system is in place, which is consolidated in a well developed database system that allows to produce information on the main parameters of the water and ecosystem resources system. The current development of ww-web based data communication systems (e.g. CAREWIB in Central Asia, the Mekong River Data and Information Services Portal, DANUBIS for the Danube, etc.) is contributing much to improve the level of information of stakeholders, but planning and decision processes still require much guidance, training, communication and organization.

In order to structure the planning and decision making process on the basis of available data and assumed development objectives a wide range of integrated water resources management (IWRM), integrated river basin management (IRBM), integrated coastal zone management (ICZM), etc. models and integrated system analytical approaches in general is available. Although these models are capable of producing accurate results with reference to indicators, their trustworthiness to politicians, policy makers and stakeholders in general is often (very) limited. In a recent conference on water diplomacy (Water Security and Peace Conference, The Hague 2013) participants have addressed these issues and have come up with valuable recommendations to close this gap between system analytical approaches and political (diplomatic) processes dealing with (transboundary) water allocation problems.

As key outcomes for future dialogue between politicians, policy analysts and systems analysis experts the following were mentioned:

- The interaction between politicians, diplomats and system analysts is perceived as problematic. The process of developing models seems as important as the model itself.
- It is important to identify the translators at each side of the negotiation table. They have to translate the model results into understandable information for users at many different levels of involvement. The translators may be scientists, professional staff in regional technical bodies, diplomats, NGO's, etc.
- For modellers it is important to keep orders of magnitude in mind, as well as political priorities and sensitivities. Responses by the public and the domestic implications of proposed policies often overrule other, perhaps more subtle, considerations.

Modellers and professionals involved in international negotiations and politics both believe that they each act rationally, but they both do that at their own terms. An important question when starting modelling the system is "What to include in the equation?". One does not only have to acknowledge and define the boundaries of the water system and the political-administrative system but negotiating water functions needs to be practised from a broad perspective and needs to include for example energy policies, large scale water infrastructure networks, regional and national socio- economic development and even geo-political interests.

Eventually this is also where water and natural resources protection laws and conventions come into play, because different system values mean different things to different interest groups (which basically is the reason why agreements have to be made between people anyway). In the current situation with populations increasing, economies growing and the climate changing, the competition for water resources is increasing and therefore the role of water diplomats is becoming more important. Statements that the next regional wars may be on water illustrate that this conclusion is widely shared, although until now no real water wars were fought out. In order to understand how (transboundary) water management in river basins is organized both in rules and mandates as well as institutionally a comparative analysis among some known examples of river basin management organizations may serve this purpose. The comparison will use existing knowledge and information

systems and principles of legal and Institutional tasks and mandates as a guidance, drawing lessons for the present and future of the Interstate Commission for Water Coordination (ICWC) in Central Asia<sup>1</sup>.

### **IWRM and IRBM in Practice**

- **Murray Darling River Basin Authority** ( <http://www.mdba.gov.au/about-mdba> )<sup>2</sup>

The MDBA was established under the Australian federal Water Act 2007 as an independent, expertise based statutory agency involved in basin-wide strategy, policy and planning. The MDBA undertakes activities that support the sustainable and integrated management of the water resources of the Murray-Darling Basin in a way that best meets the social, economic and environmental needs of the Basin and its communities. The MDBA lead the planning and management of basin water resources, and coordinate and maintain collaborative long-term strategic relations with other Australian Government, the basin state government and local agencies; industry groups; scientists and research organizations. On the basis of a strong mandate the MDBA undertakes a number of functions:

- ✓ construct and operate River Murray assets such as dams and weirs
- ✓ advise the Commonwealth Minister for Water on the accreditation of state water resource plans
- ✓ develop a water rights information service to facilitate water trading across the basin
- ✓ manage water sharing between the federal states
- ✓ manage all aspects of MD Basin water resources, including water, organisms and other components and ecosystems that contribute to the physical state and environmental value of the basin's water resources
- ✓ measure and monitor water resources in the basin
- ✓ gather information and undertake research
- ✓ engage and educate the community in the management of the Basin's resources.

The MDBA in principle is a mainly expert led organization that deals with water allocation problems on the basis of the Australian water act. The Authority members draw on a breadth of expertise and experience in water, economics, the environment, natural resource management and agriculture. A number of Advisory Committees support the Authority's work. The fact that the basin is located within one (federal) political entity (as is also the case for example for the Yellow River in China) allows for straight forward, mainly systems analysis driven planning and decision making for water allocation and use. Direct political interference with the planning process is limited.

- **Mekong River Basin Comittee** (<http://www.mrcmekong.org/about-the-mrc/history/>)

The Mekong River Comittee was established over 50 years ago through intervention by the United Nations. At the time it was the largest single development project the UN had ever undertaken and no international river body had ever attempted to take on the kind of encompassing responsibilities for financing, management and maintenance of water resources. The 1995 Mekong Agreement established the MRC as a river basin agency under the management responsibility of the four member countries; Cambodia, Lao PDR, Thailand and Viet Nam. The Articles of the 1995 Agreement have shifted the focus from development of large-scale projects to sustainable development and management of natural resources. The past 50 years have learned much about the pros and cons of development and its

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<sup>1</sup> Examples of Water Diplomacy Practice / How do river basin organizations work / How are river basin organizations successful (or not) / Lessons to be learned for IFAS/ICWC

<sup>2</sup> Information reference for the river basin organizations are the mentioned websites in this article

impacts and the MRC has come to see nature and the environment as a complex web of interacting systems that the riparians must learn to manage cooperatively.

Moving towards this new level of maturity the MRC, in early 2011 endorsed two key strategies, the Integrated Water and Related Resources Management (IWRM)-based Basin Development Strategy, and the 2011-2015 Strategic Plan, that both shape a more comprehensive and new direction for the agency. The IWRM-based strategy provides regional and transboundary perspectives for basin development planning, representing over a decade of collaboration between Member Countries on their shared understanding of the river's opportunities and risks associated with development. The strategic plan for the 2011-2015 period will support the implementation of the strategy as well as provide a platform for the MRC's plan to decentralise core functions of the MRC Secretariat to the national level within the member countries.

The environment and water ministers of Cambodia, Lao PDR, Thailand and Viet Nam meet every year to discuss emerging issues related to the Lower Mekong Basin. As Council Members of the Mekong River Commission, the ministers convene to review and come to mutual conclusions on the management and development of water and related resources within the framework of the 1995 Mekong Agreement. The MRC Joint Committee, which comprises senior officials at no less than Head of Department level of the four countries and is supported by national line agencies including the Ministry of Foreign Affairs, takes these decisions and policies forward by putting them into actions. Technical and administrative functions fall under an operational arm, the MRC Secretariat, managed by a Chief Executive Officer. Currently, there are about 150 staff members based in two Secretariat offices—one in Phnom Penh, Cambodia, and the other in Vientiane, Lao PDR. The Secretariat facilitates regional meetings of the Member Countries and provides technical advice on joint planning, coordination and cooperation. It also works closely with the four countries' coordinating bodies, the National Mekong Committees (NMCs), and other state agencies. Currently, the People's Republic of China and the Union of Myanmar are engaged as MRC Dialogue Partners.

The Mekong River Commission is funded through contributions from the four Member Countries, and through technical and financial collaborations with a number of countries through their bilateral and multilateral development and financial institutions. In addition the MRC works with many different partners under jointly funded projects, under formal memoranda of understanding or in a research capacity. Since 2001, observer status for regional partner organizations was agreed upon by member countries and invitations for their participation in MRC Governance meetings are extended to attend the, for example, MRC Council and Joint Committee meetings.

The Mekong River Commission (MRC) supports a Basin-wide planning process based on the principles of Integrated Water Resources Management (IWRM). This planning process finds its shape through the MRC's Programmes that deal with a wide variety of subjects.

- ✓ Agriculture and Irrigation Programme
- ✓ Basin Development Plan Programme in accordance with the 1995 Agreement, the MRC is responsible for formulating the Basin Development Plan (BDP)
- ✓ Climate Change and Adaptation Programme
- ✓ Environment Programme
- ✓ Fisheries Programme
- ✓ Flood Management and Mitigation Programme through the Regional Flood Management and Mitigation Centre

- ✓ Information and Knowledge Management Programme (IKMP) to facilitate access to, and use of, data, information and decision support tools
- ✓ Initiative on Sustainable Hydropower
- ✓ Integrated Capacity Building Programme that provides training to the MRC Secretariat and National Mekong Committees in each country, targeting executive, professional and support staff of various agencies, and provide opportunities for young professionals to gain experience in MRC related activities.
- ✓ Mekong Integrated Water Resources Management Project implemented at regional, national and transboundary levels
- ✓ Navigation Programme

The MRC in principle is a research, policy development and decision support body. Executive power for planning and implementation of transboundary water management initiatives is with the governments of the member states. Ownership of commonly developed initiatives, plans and programs comes from the decisions and agreements reached during the yearly council of ministers meetings

- **Nile Basin Initiative** (<http://nilebasin.org/>)

The Nile Basin Initiative (NBI) was established in February 1999 in Dar es Salaam, Tanzania, by the Ministers responsible for Water Affairs of each of the nine Member States. The Nile Council of Ministers (Nile-COM) is the supreme policy and decision making body within the NBI. The Secretariat (Nile-SEC in Entebbe) has responsibility for building cooperation and capacity among member states. Nile-COM launched the 'Strategic Action Program' (SAP) comprising two complementary programs, the Shared Vision Program (SVP) and the Subsidiary Action Program (SAP). The SVP comprised eight basin-wide projects, with a major focus on building trust, confidence and capacity among member countries as well as creating an enabling environment for trans-boundary investments. The SAP has focused on preparation of trans-boundary investment projects that contribute to poverty alleviation, reverse environmental degradation and promote socio-economic growth. There are two sub-basin offices, one in the Eastern Nile region for the Eastern Nile Subsidiary Action Program (ENSAP) and the other in the Nile Equatorial Lakes region for the Nile Equatorial Lakes Subsidiary Action Program (NELSAP). There is also a Nile Technical Advisory Committee (Nile-TAC) made up of senior water officials (two per Member State) which provides technical advice to the respective water Ministers and to the Nile-COM in general.

The core function of the NBI is to facilitate, support and nurture cooperation amongst the Nile Basin countries so as to promote timely and efficient joint actions required for securing benefit from the common Nile Basin water resources. To this objective the NBI actively provides and operates a platform for inter-country dialogue and negotiation by Nile Basin Ministers of Water Affairs and senior officials on issues of sustainable water management and development. The NBI facilitates regional liaison among water-related interests and renders it more effective through the provision of strategic information. Among its core activities are:

- ✓ Facilitate multi-level and multi-stakeholder fora to promote informed dialogue, raise awareness and build a solid foundation for common understanding, mutual trust and confidence among riparians
- ✓ Enhance the capacities of countries to cooperate, communicate results and share and disseminate Information
- ✓ Monitoring the State of the Nile Basin in order to raise awareness and improve understanding of the bio-physical, socio-cultural and economic conditions within the Basin. Publishing every three years a report on the State of the River Nile Basin.
- ✓ Enhancing the NBI knowledge base by producing a.o.:

- The Nile-information System (Nile-IS), based at the Secretariat, and including data sets, articles, technical documents, maps, policies, strategies, and guidelines developed by NBI.
- The Eastern Nile Information Management System (ENTRO) comprising important characteristics of the river, climatic and hydrologic data and facilitate its utilization under grid for selected sub-basin components in the Eastern Nile sub-basin.
- ✓ Developing Analytical Capacity tools to provide the necessary analysis to inform decision-making in water resources planning and management. These include the Nile Basin Decision Support System (NB-DSS), the Nile Equatorial Lakes Planning Model and the Eastern Nile Planning Model.
- ✓ High level policy formulation addressing threats posed to the environmental assets of the Nile Basin, with the NBI Environmental and Social Policy (ESP), Climate Change Strategy (CCS) and Wetland Management Strategy (WMS) being important examples. The policy instruments do primarily guide trans-boundary water resource management and NBI investment planning and implementation; Member States are encouraged (not required) to integrate them in their national policies.
- ✓ The NBI promotes investments in three areas of priority, which are power; agriculture and regional trade and river basin management and development. The role of NBI is to identify opportunities and prepare investment projects which contribute to economic growth and poverty reduction. The NBI assesses costs and benefits of participation in proposed joint projects, it facilitates agreements on cost-benefit sharing and it supports mobilization of investment resources. It also facilitates preparation of multi-country agreements and provides technical assistance in project supervision and monitoring during project implementation.
- ✓ Power is critical for all sectors of the national economy and its supply is directly correlated with the economic performance of the countries. Hydro-power is the preferred energy source for most Nile Basin countries and NBI is contributing to the transformation of the region's power sector by providing a forum for joint planning and cooperative development of hydro-power generation and transmission options and promoting power pooling amongst the Nile countries. As a result for example, Ethiopia and Sudan are connected by transmission lines while multiple interconnections such as a Regional Transmission Interconnection Project are underway in the Nile Equatorial Lakes region,
- ✓ A regional approach to agriculture development and trade is supported in order to stimulate income, ensure adequate food security and accumulate assets necessary to survive shocks such as droughts and floods.

Despite a long history of cooperation between the countries of the Nile Basin it has taken a long time to negotiate a Comprehensive Framework Agreement (CFA) that was signed by only a part of the riparian countries (Ethiopia, Kenya, Uganda, Rwanda, Burundi and Tanzania) in May 2010. Especially the continued delay by Egypt and Sudan to sign is causing frustration to the cooperation process, whereas the CFA seeks to establish a permanent Nile Basin Commission through which member states will act together to manage and develop the resources of the river. Although the commission can be formed without these last two countries it is clear that the commission would lack decision power and effectiveness in practice.

- **International Commission on Protection of the Danube River** (<http://www.icpdr.org/main/>)



The main objective of the International Commission for the Protection of the Danube River (ICPDR) is to ensure the sustainable and equitable use of waters and freshwater resources in the Danube River Basin. The ICPDR is a transnational body, which has been established to implement the Danube River Protection Convention, which is the major legal instrument for cooperation and trans-boundary water management in the Danube River Basin. The ICPDR is formally comprised by the Delegations of all Contracting Parties to the Danube River Protection Convention (DRPC), but has also established a framework for other organizations to join. The Contracting Parties to the DRPC presently include Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Moldova, Montenegro, Romania, Slovakia, Serbia, Ukraine and the European Union. The Contracting Parties are represented by delegations to the ICPDR, led by Heads of Delegation. The different bodies within the ICPDR are:

- ✓ Ordinary Meeting Group: taking the political decisions
- ✓ Standing Working Group: providing political guidance: and
- ✓ Technical Expert Groups and Special Task Groups preparing the technical background documents

The work of the ICPDR is supported by a secretariat located in Vienna, Austria. The ICPDR is an international organization that meets twice a year. The ICPDR budget comes from the contributions of the Contracting Parties. According to the DRPC the Contracting Parties (except for the EU) in principle contribute an equal share. The current (2014) total annual budget of the ICPDR is a little more than one million Euros and much of the ICPDR's work is done directly by the Member Countries. However, these contributions in staff and material can also be considerable, even though this does not show in the ICPDR budget. Costs of participation in the Commission's and Expert bodies' work are also covered by the parties themselves. In some cases, the ICPDR engages in projects that have separate sources of funding. These include projects funded by the European Union, the United Nations Development Program, GEF, individual member countries or private businesses through the public-private partnership "Business Friends of the Danube".

The active involvement of the public is a core principle in (integrated) sustainable water resources management. This basic fact was recognized when the Danube River Protection Convention was developed and signed in 1994, with as a result that as to date 22 organizations (in a large variety of government and non government organizations) hold observer status and through this, cooperate actively with the ICPDR.

In 2000, the ICPDR contracting parties nominated the ICPDR as the platform for the implementation of all transboundary aspects of the EU Water Framework Directive (EU-WFD). The work for the successful implementation of the EU WFD is therefore high on the political agenda of the countries of the Danube river basin district. In 2007, the ICPDR also took responsibility for coordinating the implementation of the EU Floods Directive in the Danube River Basin. Since its creation in 1998 the ICPDR has promoted policy agreements and the setting of joint priorities and strategies for improving the state of the Danube and its tributaries. This includes improving tools used to manage environmental issues in the Danube basin, such as

- ✓ the Accident Emergency Warning System,
- ✓ the Trans-National Monitoring Network for water quality, and
- ✓ the information system for the Danube (Danubis) and maintenance of the Danube Portal; and

the common goals of the ICPDR are:

- ✓ Safeguarding the Danube's Water resources for future generation
- ✓ Naturally balanced waters free from excess nutrients
- ✓ No more risk from toxic chemicals
- ✓ Healthy and sustainable river systems
- ✓ Damage-free floods



The main objective therefore of the Danube River Protection Convention (and in line basically with the objectives of the EU Water Framework Directive), is to ensure that surface waters and groundwater within the Danube River Basin are managed and used sustainably and equitably. This involves:

- ✓ the conservation, improvement and rational use of surface waters and groundwater
- ✓ preventive measures to control hazards originating from accidents involving floods, ice or hazardous substances
- ✓ measures to reduce the pollution loads entering the Black Sea from sources in the Danube River Basin

The signatories to the DRPC have agreed to co-operate on fundamental water management issues by taking "all appropriate legal, administrative and technical measures to at least maintain and where possible improve the current water quality and environmental conditions of the Danube river and of the waters in its catchment area, and to prevent and reduce as far as possible adverse impacts and changes occurring or likely to be caused".

**IWRM and The Interstate Commission for Water Coordination** (<http://www.icw-aral.uz/>)

### *Some early Conclusions and Recommendations*

With the examples of the selected river basin management organizations in mind and considering the current status and functioning of the Interstate Commission for Water Coordination (ICWC) lessons can be possibly drawn from the past and conclusions applied for the future. The ICWC, represented by the five Ministers of Water Resources of the Member States, is a body of five governments, who take direct responsibility for functions related to sustainable water resources management and development, including a healthy hydro-ecological status of transboundary water resources of the Aral Sea Basin. The Commission first met in 1992 followed by a large meeting again in Nukus in 1993, which formulated a common strategy for water resources management in the basin (the Nukus Declaration). Meetings, under rotating chairmanship are held every quarter and deal with the following issues in principle:

- ✓ develop a single water economy policy in the interest of society in general and water related sectors (e.g. irrigated agriculture, hydropower, ecology) within the states;
- ✓ support and maintain rational use and protection of the water resources;
- ✓ initiate and support measures for enhanced water supply and improved water efficiency;
- ✓ identify and confirm annual consumption limits of water resources available to each of the member states and the mode of operation of the main water reservoirs in the region;
- ✓ decide on water allocation and adjustments to water allocation policies in the context of actual water availability and consequences to the water related economy.

*When considering these issues mandated to the ICWC ministers it can be concluded that whereas many river basin organizations in general have mandates that are very much policy oriented the issues coming under the ICWC mandate are management oriented. The ICWC is decision and management oriented. A consequence of this difference is that consensus is possibly more difficult to achieve and countries are requested to trade more of their autonomy against the development and implementation of a common water allocation policy than would otherwise be required. A question to be raised is about how effective this mandate is against the option of separating between a more policy oriented commission on the one hand and have implementing water resources management agencies on the other.*

The ICWC has 3 executive bodies which are the two basin organizations BWO "Amudarya" and BWO "Syrdarya" (engaging in water resources allocation and main water infrastructure management and maintenance) and the Scientific-Information Center (engaging in planning, development, information and communication of results of scientific work and maintaining relations with project

organizations in the member countries). A coordinating meteorological service exists since 2000. The main tasks and activities of the ICWC and its executive bodies are:

- ✓ River basin management (including development of automated operation and monitoring systems for main water infrastructure components such as dams, reservoirs, canals and river stretches) and non-conflict water allocation;
- ✓ Contribute to (irrigation) water saving and conservation;
- ✓ Interact with hydro meteorological services on river discharge forecasting and accounting;
- ✓ Develop and prepare Interstate Agreements and maintain international relations;
- ✓ Engage in scientific research, capacity development and training;

*Since the start of independence of the member states and the formation of the commission, the executive bodies of the ICWC have been developing and functioning well. The BWO's, with their experience of the past and on the basis of a well established mandate and expertise. The SIC meanwhile has developed itself as the lead research and capacity development agency for IWRM research and development in the region. Due to limited funding facilities provided by the member states much of this capacity had to be developed on the basis of international projects with World Bank, Asian Development Bank, European Union and Swiss Development Cooperation as major partners. This relationship of dependency from international financing sources should be a case for concern. One option is to increase financial participation by the member states and attract observer organizations (as is the situation with the ICPDR) who participate in joint projects and programs.*

*One specific issue of concern is the decreasing number of people seeking a career in water management in Central Asia. Although background and reasons for this situation are different some common reasons are lack of financial means for scientific research work, low financial means for water infrastructure development and maintenance and low salaries paid, as compared to other career opportunities (e.g. automation and computer science). Given the importance of the sector the ICWC should take a much stronger attitude to this issue. Both the training facilities under direct responsibility of the SIC as well as those belonging to universities and technical colleges should be obtaining stronger support if Central Asia wants to avoid a situation where serious shortage of water management capacity and water leadership is to be avoided in the future.*

According to the analysis of the water management situation in the region by the ICWC and its executive bodies the following selected and combined issues should be leading in the formulation of new water management policies and programs.

- ✓ Population growth and continued large share of the poor rural population. Lack of reform policies for agriculture development;
- ✓ Non converging national priorities concerning common and joint use of water for irrigated agriculture and hydropower. Lack of a development and negotiation framework for development and operation of existing and new large scale water management infrastructure. Insufficient exchange of hydro meteorological and climate data related to current and future water management conditions;
- ✓ Lack of a scientific and operational framework and conflict resolution mechanism to deal with socio-economic indicators in transboundary agreements for water sharing. Uncertainty about the future role and influence of Afghanistan taking its share in water resources allocation in the Amudarya basin;

*Although many other and detailed issues on different levels of scale (e.g. pollution, drinking water, irrigation efficiency, etc.) and importance exist, especially the situation with regard to development, maintenance and operation of large scale water management infrastructure (dams and reservoirs mainly, but also the weak maintenance of irrigation and drainage infrastructure ) is a lead issue in reaching cooperation on the basin level. It should be acknowledged that currently a sufficiently developed capacity and framework for accurate assessment and evaluation of socio-economic*

*indicators for water management is lacking within ICWC. This problem should be urgently addressed, preferably with external partner (observer) organizations (e.g. international energy agencies) in order to be able to develop and upgrade the large scale water management infrastructure that is so urgently needed in Central Asia. Common regional energy policies such as being implemented under the Nile Basin power agreements may serve as inspiring examples.*

One of the first strategic documents outlining a common strategy for water management in Central Asia was “The Principal Provisions of Regional Water Strategy of Aral Sea Basin” (GEF Project 1996-1997; J. Kindler). This document formulated needs for future water development according to the following selected principal policy issues.

- ✓ Prepare and agree on a legal base for interstate cooperation and collaboration such to develop a common monitoring framework and regional data exchange and strengthening of the institutional structures for water management (including guaranteed international status).
- ✓ The member states to establish a sound and reliable financial basis and mechanisms for water management agencies, hydro-meteorological services and nature conservancy authorities. Develop pricing policies for water allocation alternatives including water for energy substitution cases.
- ✓ Develop capacity of the ICWC and other regional institutions involved in transboundary water management and sustainable development. Strengthen the research and information exchange networks (data exchange, knowledge base, policy analysis tools) between the member states and strengthen capacity development and training programs.
- ✓ Undertake capacity building for regional water management and research bodies including the BWOs “Amudarya” and “Syrdarya” and the regional Hydromet Services. The offices and subsidiary offices to be equipped with the latest and most sophisticated technologies supportive to their tasks. Seek rehabilitation of existing and construction of new meteo-hydrological observation stations including development of a common data exchange and information format for the region.

*More than 15 years after these recommendations were formulated and agreement reached on their relevance and importance the regional water management and policy development organizations of the Aral Sea Basin (notably ICWC and IFAS<sup>3</sup>) still lack much of the status and capacity that should be considered basic to their tasks. A large number of agreements, some made among part of the members of the joint committees, have been established, with varying success. Some bilateral agreements have been made, where few regional agreements apply. One leading constraint (as also noted above) is estimated to be the difference in how to serve national interests against reaching a "modus operandi" for the transboundary water management system under common objectives. This may require revisiting the mandates of the regional organizations against how national interests are to be taken into account in order to reach an improved balance and better facilitated negotiation process. The way many international river basin organizations function (e.g. NBI, ICPDR, MRC) may serve as an example here, including the role that all these organizations allow to be played by third (observer and financing) parties.*

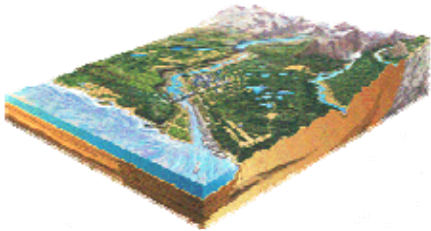
*The overall conclusion should be that the ICWC (and its executive bodies), after their current period of functioning and experience, may need to revisit both its tasks and mandates as well as how it is financed and how it is cooperating with, and in service of, the member states (including the future Afghanistan). An update of the division of tasks and responsibilities between IFAS and ICWC may be*

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<sup>3</sup> The mission of EC IFAS is to coordinate cooperation at national and international levels in order to use existing water resources more effectively, and to improve the environmental and socio-economic situation in the Aral Sea Basin. EC IFAS serves as a platform for dialogue among the countries of Central Asia, as well as the international community. <http://ec-ifas.waterunites-ca.org/about/index.html>

*part of this analysis. A modernized ICWC should (following the example of some of the river basin organizations mentioned above) for example comprise the following issues:*

- ✓ *be based on a stable and sufficient financial commitment by the member states and/or international partners,*
- ✓ *should have international status with access to regional(Aral Sea Basin) and national (member countries) data and information required,*
- ✓ *should have modern office facilities, capable staff representing the required disciplines (including socio-economic, legal, etc. capacity) connected to a modern monitoring and automated water management grid,*
- ✓ *should have a modern, regional, capacity development and training network that is also very well connected to the leading regional universities and technical colleges linked to the water, energy and agriculture sectors.*
- ✓ *Should have an open research and development structure inviting observers and partners from around the world to play a continuous role in research and development work for water management and policy analysis in the Central Asia region.*



*"complexity of a river basin"*