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Session II
Water – transboundary co-operation

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Water – Transboundary Cooperation in Central Asia – Past, Present, and Future.

Prague, OSCE 22 May 2007

From time immemorial, water has always been vital for Central Asia in forming life, welfare, livelihoods and food. Though this role of water in the region is natural and clear to everyone not so much for repeated slogan "Water is Life", as for custom to respect and worship water, which is still living in our generation and should be recalled repeatedly. Huge water development, particularly in our region leading in this respect throughout the Soviet space, has created an illusion of water abundance everywhere, perhaps, except for downstream residents, who suffered continually or periodically from water shortage, Aral Sea shrinking or from loss of vital capacities of one or another river reach.

Previously Central Asia had two water use priorities such as water-supply and irrigation but now water sector has become multipolar. Hydropower being before the secondary user and ecology being forgotten and sacrificed to agricultural development (Aral Sea, river channels and, especially, their deltas, upper catchment erosion, tail ponds) now are put in the forefront and make their demand for regimes and amounts of water. Of course, the general public do not see that competition as occurred behind a curtain of water sector and they know only about water flowing in canal or from tap and about electricity lighting their lives but drying brooks and streams, disappearing and becoming more expensive fish, polluted water containing chemicals and salts and regular power failures make them consider that something is wrong with water. Diversification of water and competition among its users emphasize the role of water and raise the general concern of future water survival in the region.

The Aral Sea basin as a single water organism providing water and contributing to prosperity of the six states, including Afghanistan, has been a ground of long-term cooperation in water resources use among the region's nations, first, within the borders of former USSR and now in the context of 5 independent states. Wise path towards maintaining cooperation on shared water resources among the states as declared by the Head of five Central Asian States in their Agreements of 1993 and 1994 is very important for keeping of peaceful and mutual water management on transboundary rivers such as Amudarya and Syrdarya. The States, having acknowledged the establishment of the Interstate Water Commission of the Aral Sea basin nations and having approved its Constitution based on Soviet period's water allocation, having included work bodies of this Commission into the International Fund for the Aral Sea Saving and later, in 1999, having justified its key by-laws, have guaranteed status quo of water sector in the basin.

Those fundamental documents initiated important activities of water-management institutions and government agencies for maintenance of conflict-free, harmonious water management to the benefit of all the countries. It is characteristic that during last 15 years, despite 3 highly dry years and 5 humid years, no conflict occurred among the states and cooperation has just strengthened.

This cooperation is a very important factor of sustainable water availability in the region and of social development in rural area. It is developed in form of:

- joint planning and supervision of annual water allocation on transboundary rivers between the countries and their major irrigation zones. Water allocation is done by two Basin Water Organizations (BWO) of the Commission;

- technologic improvement and development of capacity through the training system aimed at top and middle level professionals, the information system, and the application, yet mainly in the Syrdarya river basin, of automated water control, etc.
- joint improvement of legal, institutional, and technical bases of water use;
- wide implementation of IWRM in water practices in Central Asia.

Recent Regional Tendencies Influencing Water Sector and Agriculture

Economy and society always require that the future be predicted for selection of adequate development scenarios. Water requires long-term forecasting since water-related efforts need billions of capital investments and thorough analysis of present situation in order to understand correctly current tendencies and re-direct them accordingly.
Let consider, first, the major destabilizing factors:

- population growth is mostly slow as shown in the diagram (instead of 3,2 % in 70-ies and 2,5 … 2,6 % in 80-ies, 1,5 % now), but nevertheless annual growth of half a million people requires more than half a billion cubic meters a year even under minimum UN's norm of 1200 m^3 per person in arid zone (Figure 1);
- growing understanding of a role of the environment and increasing ecological development – establishment of a system of structures in Amudarya and Syrdarya deltas requires that, at least, environmental releases be increased above the limits stipulated in Amudarya and Syrdarya Master Plans by 3,5 km^3 and 1,5 km^3, respectively, in dry year and by 8 km^3 and 3 km^3 in normal year;
- growth of population in cities and villages, expansion of residential area, occurrence of new riches striving for living in luxurious cottages. Comparison of satellite images of Tashkent city for 1990 and 2005 shows that the city "ate up" 5,520 ha of irrigated land over 15 years;
- irrigated area is expanded both within the framework of specific program, especially in Turkmenistan (546 thousand ha), and in order to replace areas taken out for settlements. At the same time, in general we observe withdrawal of 870 thousand ha of irrigated land in Kazakhstan, including 50 thousand ha in the Aral basin zone, and 57 thousand ha in Kyrgyzstan;

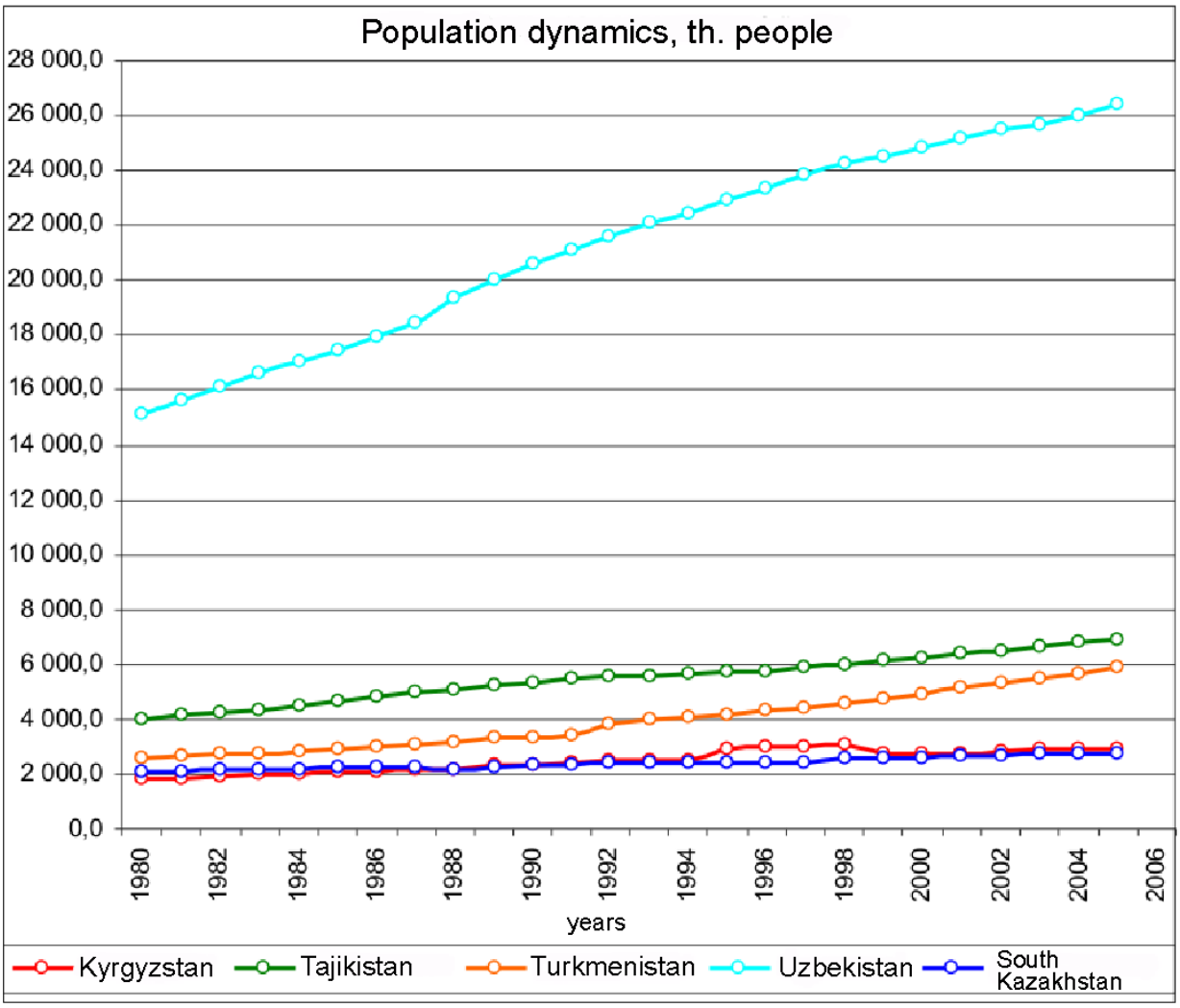

Figure 1.

- reduction of volume and profitability of agricultural production on irrigated land due to decreasing crop yields and, in general, falling purchasing prices (Figure 2);
- sudden reduction of government support and investments in water sector, particularly in irrigated lands, water use, and horizontal drainage. At present, the sector receives 3 – 4 % instead of 10 % in the budget. This has led to deterioration of irrigation systems, decrease in system efficiency, and growth of salinization (annual operating costs averaged 60 … 90 $/ha in 1990 as compared to 8 – 10 $/ha now). Among the consequences of this factor, the most hazardous one is expansion of heavy and medium saline land areas (Figure 3);
- growing prices of inputs, especially in pump irrigation – electricity cost increased dozens of times and spare parts cost was much higher;
- fragmentation of agricultural water users resulting from agricultural re-structurization that differs among the countries: less than 1 ha per user in Kyrgyzstan; on average 15 … 16 ha in Kazakhstan; 10 ha in Tajikistan and Uzbekistan; and more than 20 ha in Turkmenistan. Hence, loss of controllability and increase of organizational losses;
- weakening of staff capacity.

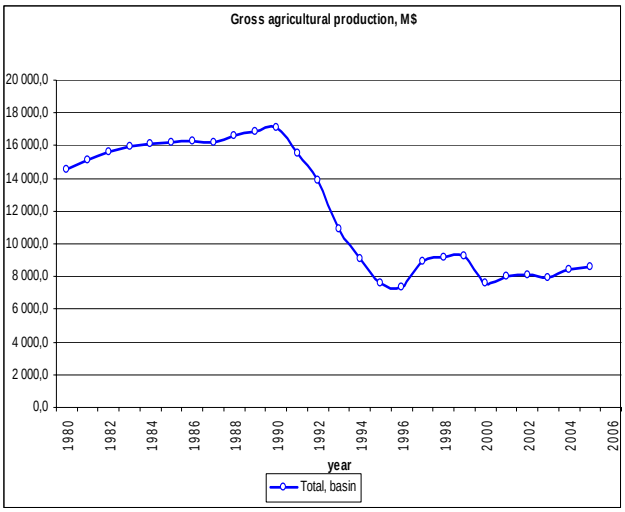

Figure 2

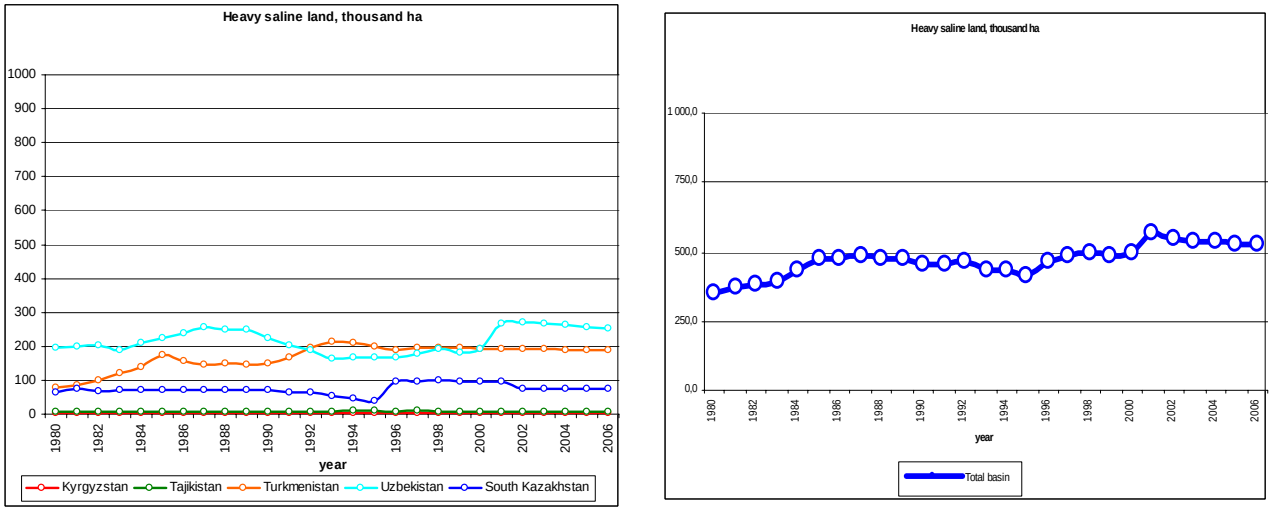

Figure 3

Thus, at present, the main table of our water indicators is characterized by the following data (Table 1).

Table 1

WATER DYNAMICS SINCE 1960

Indicator	*Units*	1940	1960	1970	1980	1990	2000	2006
Population	*million*	10,6	14,1	20,0	26,8	33,6	41,5	44.9
Irrigated area	*thousand ha*	3,8	4510	5150	6920	7600	7890	7950
Total withdrawal	*km^3/yr*	52,3	60,61	94,56	120,69	116,27	100,87	107.5
of which, for irrigation	*km^3/yr*	48,6	56,15	86,84	106,79	106,4	90,3	97.8
Unit withdrawal per irrigated hectare	*m^3/ha*	12800	12450	16860	15430	14000	11445	12300
Unit withdrawal per capita	*$m^3/capita/yr$*	5000	4270	4730	4500	3460	2530	2394
GDP	*billion $US*	12,2	16,1	32,4	48,1	74,0	23	27

Water Resources and Climate Change

The resource potential of water in the region has not been lost in quantitative terms, i.e. there was no depletion of surface and ground water. However, surface water quality deteriorates in some zones and places. This causes serious concern under present decline in gross production volume. Climate change impact on water resources is evident, though the trends of mean runoff values have minor deviation from the past ones. There is another characteristic of such impact: increase in scale and frequency of extreme phenomena, such as floods and droughts) (Figure 4). As shown, recently their size and frequencies have become much larger and higher. Our detail studies on expected climate change effects in the Chirchik-Akhangaran basin indicate to a possibility of decreasing water quantity by 40% in some years as compared to mean values, while water consumption will grow steadily in all cases.

Table 2

Comparison of two scenario simulation results (Chirchik-Akhangaran-Keles basin)

	Total resources		Water demand	
Year	**BAU/ECHAM**	**OPT/HADCM2**	**BAU/ECHAM**	**OPT/HADCM2**
2006	7908	8019	4778	4968
2011	8841	9404	4714	5404
2016	7263	7540	4714	5188
2021	6662	6944	5299	5958
2024	5154	5871	5362	6270

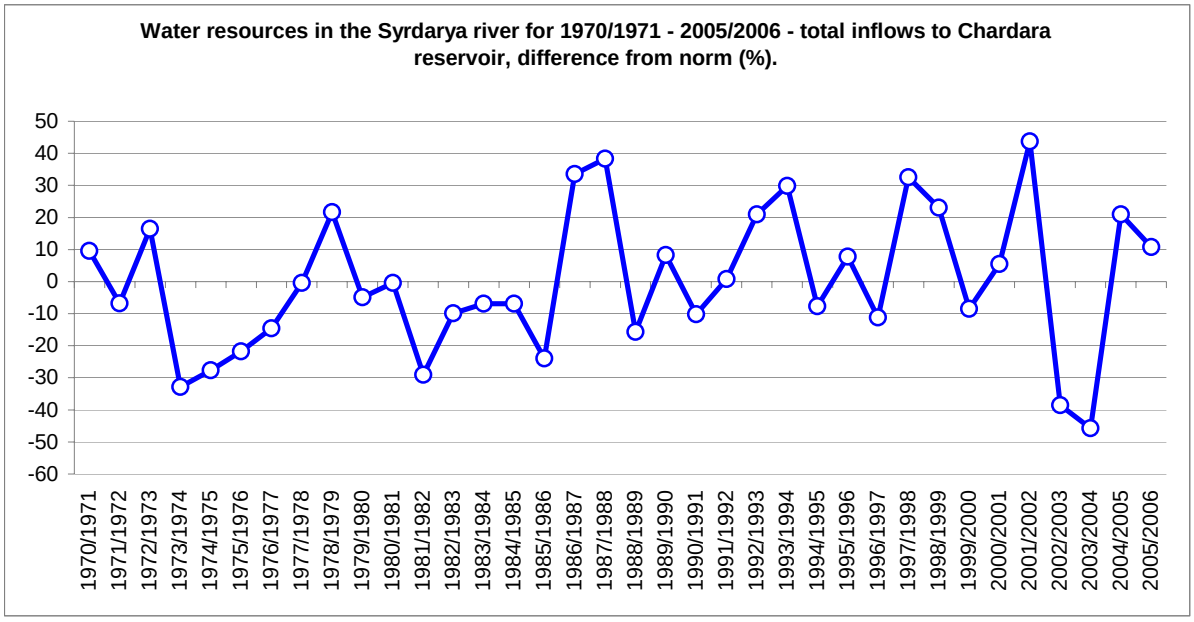

Figure 4

New Tendencies

However, the specificity of present moment in mankind history is that it is more and more subjected to influence of globalization, with its two-faced Janus bringing the good and the bad and has many hypostases. Informatics, culture, world experience and knowledge become the property of those who have access to communication networks and through them to global

progress. Nevertheless, whereas the common property of the people, intellect, wisdom, and customs bring the good, peace and cooperation to the society, "monetary" and "mega-financial" interests cause global competition and fight of capitalistic monopolies. Energy and fuel resources took the central place in the second half of XX century and early XXI century, and geopolitical circles started to fight for energy and fuel reserves, sources, and resources. It is clear that huge increase of fuel and energy prices is caused by speculation and struggle for money and does not contribute to common weal. While finishing redistribution of fuel markets, the capital targets hydropower, i.e. generation of electricity by hydropower stations. Many long years hydropower was considered as unprofitable for investments, since it took tens of years for cost recovery of HEPS. Present situation is different: parallel to growth of oil and gas prices, electric energy price is increasing, including hydropower, which according to expert forecasts will achieve 12 … 15 cents/kWh by 2020 … 2025 as compared to present world price of 4 … 7 cents/kWh. Previously, priority water users were domestic sector, then industry and food production (irrigated agriculture) and after hydropower. But now hydropower comes to the forefront. Exactly this allowed the World Bank's President Ismail Serigildin to state in 2000 at the Second World Water Forum that "XXI century will be a century of struggle for water similar to struggle for oil in the previous half-century".

Currently Central Asia is becoming the scene for geopolitical games, where one of target prizes is oil and gas available sufficiently in Kazakhstan, Turkmenistan, and Uzbekistan – three countries having strong positions in the world economic space. At the same times, two countries in the region – Kyrgyzstan and Tajikistan – lack those resources. The nature gifted those two countries many others treasures and, more important, the sources of two great regional rivers such as Amudarya and Syrdarya.

Such situation gave rise to quite good idea: interlinking (as done previously by USSR State Planning Committee) uses of water and energy resources to the benefit of all the countries in the region. This was reflected in the Agreement 1998 on the Syrdarya River, where this interlinking was stipulated on parity basis, with fulfillment of a number of key conditions.

But the Agreement raised more questions than answers. Recent practices showed that the Agreement did not satisfy downstream countries in dry years and upstream countries in normal years and posed a threat to all sides of the Agreement in humid years.

Virtually, realization of the Agreement 1998 have changed into continuous series of negotiations, protocols, monitoring over observance of these protocols and grating on the nerves of those who managed water and used water. Under influence of globalists challenges of hydropower, the mutually beneficial basis laid in the Agreement turned into certain dictate of power generation-based water regime on the Syrdarya river over irrigation one.

Currently those tendencies are propagandized by the mass media that, in the interests of energy monopolies and commercial advantages, try to create appearance of linkage between water and electric energy and create, under these circumstances, quasi-united market mechanism of water and energy mechanism. Everywhere official documents and the press mention the terms "water-energy resources" and "water-energy potential" that are quite different from earlier terms "hydropower resources" or "hydropower potential". In the world practice and particularly in international glossary of the International Committee for Irrigation and Drainage (ICID) those mean resources of water sources' energy potential, i.e. energy resources that may be generated through water regulation. Whereas in new interpretation it is a question of some symbiosis between water and energy resources since this covers water management area and energy management area that are under control of quite different agencies in each country and, per se, are absolutely not similar management subjects. Let consider a few differences as a proof of that postulate:

- energy resources may be generated from hydropower sources, fuel sources, solar energy, wind energy, bio-energy, and nuclear power – all these resources are interchangeable. At the same time, water, in light of its importance for human, nature, and society, is a vital substance, which can be replaced by nothing for both human and nature conservation;
- energy resource is a good, which can be exchanged and traded; however, water, except for bottled one, has never been a good. And international water law does not recognize commercial transactions regarding water resource. Water supply and regulation services may be paid and bottled water can be sold, as well as water right; however, water itself cannot be a good;
- water resources, unlike energy resources, are a vital element of natural system, without which the nature cannot exist. Meanwhile, the world had existed and developed without electricity.

  Thus, the matter may concern the use of water resources and of energy resources separately, in their association, taking into account a single water quantity available for both electricity generation and other purposes (water-supply, irrigation, recreation, etc.). Therefore, in preparing future regional development and use plans it would be correct and logical to develop separately rules and procedure of water resources use, procedure of energy resources use, and their linkage through comparison of water balances and energy balances.

Blending in one phrase of water-energy resources leads to misunderstanding and misinterpretation, based on the international law regulations and the law on water and energy resources use within territorial boundaries. The international law (Convention 1992, Convention 1997 and other documents) contains a notion of international waterways or transboundary water resources. There are no international energy resources or transboundary energy resources in the international law.

Attempts to bring together water and energy resources as a means of commodity circulation lead to neglecting of water role in the nature. Water passing through turbines can be paid by the cost of generated electricity, water in domestic sector can be paid at expense of municipal authorities, and even water for irrigation can be compensated by production cost (though all over the world irrigation water is subsidized, even in USA and the European Union). But who will pay for water for nature conservation and for water for in-stream needs?

Water Resources Use

The state of water use in all sectors and all the countries in the region leaves much to be desired. The following facts can be established from selected indicators of industrial, cultural, domestic, and irrigation use:

- the Tashkent city and others consume per capita from 450 and 550 l/day, respectively, for domestic needs, and almost 1.5 times more if include industry;
- though industrial production has declined several times everywhere, industrial water use decreased by 24% only in the region;
- irrigated agriculture is major user and waster. Given water withdrawal of almost 98 km^3 for irrigation in the region as a whole, beneficial water use estimated from evapotranspiration is 42 billion m^3 or, based on standard efficiency, even 0,55 – 76,3 billion m^3. In dry year of 2000, water use per irrigated hectare decreased to 11400 m^3/ha, and currently this indicator has increased again to 12300 m^3/ha on average in the region.

Our activities in many farms indicate to availability of large reserves in water use, especially, taking into account potential productivity. In Andizhan province, for example, water

productivity initially averaged 0,3 kg/m^3 for cotton at the potential productivity of 1,0 kg/m^3, while after extended consultations it averaged 0,54 kg/m^3.
However, in general, withdrawals for irrigation are almost twofold higher against estimation of water needs from potential productivity. The reason of water uncontrollability is non-coordinated system and instability of water delivery among hierarchical levels, disordered water distribution between farms, intake of excess water to canals for compensation of this disorder, poor water accounting, lack of material incentives of water users and managers for water saving. Application of water charges in Kazakhstan, Kyrgyzstan, and Tajikistan had insufficient effect on reduction of water use in farms since amount of charges was very small, accounting was poor, and water managers were interested, on the contrary, in increase of water delivery.
Instability of water supply at the interstate level causes particular concern.

What Can We Expect in the Future?

Under influence of the above-mentioned factors, we will feed growing tension regarding water supply. Even in optimistic option regarding demography and in business as usual scenario for resources we will have 1870 m^3/person; in business as usual regarding demography and resources – 1560 m^3/person; in pessimistic scenario regarding demography and resources – 1430 m^3/person against current 2460 m^3/person.
Thus, we will get past the point of "water deficit countries" according to UN classification and, given the total water supple, will have to have per person by 25; 35,5 and almost 42%, respectively, against the present level.
However, the heavier factor will be scenarios of future anthropogenic regime rather than of natural and even demographic ones. Simulations of 15 options on the consequences of operation of Vaksh cascade together with Roghun and without it under various dam elevations (1290 m and 1240 m) and release from Nurek for the future 25 and 50 years for future development scenarios (optimistic – collaboration of all the countries and coordination of plans and actions; BAU – business as usual; and national scenarios based on proposals made my the countries under GEF project) has produced very interesting results (Table 3). It is found that the dam elevation of 1290 m ensures long-term regulation, and under energy-generation regime of Roghun and combined irrigation and energy-generation regime of Nurek and optimistic development scenario, the region will receive profit of 200 million $US from hydropower production by the whole cascade (without damaging interim HEPS'), and current water shortage will be reduced slightly in mid- and downstream and here about 60 million $US will be received. In case of national development scenario and energy-generation regime of cascade operation, damage from this regime will well exceed those profits in hydropower that Tajikistan receives, and hardly damages will be undone.

Table 3

Options of Vaksh cascade operation under various engineering solutions, regimes and strategy alternatives, млн. долл. США

	Without Roghun			With Roghun								
				Energy-generation 1240 m			Energy-generation 1290 m			Irrigation, 1290 m		
	a	в	c	a	в	c	a	в	c	a	в	c
Socio-economic damage	94,7	21,1	896,4	211,3	28,05	916,2	174,6	20,83	961,8	37,85	5,81	844,3
Environmental damage	15,0	4,2	26,5	17,9	6,13	23,23	19,25	6,13	33,35	8,0	2,88	6,07

In 2001, according to N.Gaipnazarov and other's data, more than 1 million people suffered in downstream area. Damaged amounted to more than 100,0 billion dollars only in Uzbekistan. 97,2 thousand ha in Karakalpakstan and 26,0 thousand ha in Horezm were left unplanted. Moreover, out of cropped area 14,2 thousand ha in Horezm and 36,8 thousand ha in Karakalpastan were damaged (7,8 and 21,5 % of crops, respectively).

What Should Be Done?

First, everyone concerned with water – from the government to water managers at various levels in any sector – should turn away of routine and think about future. It takes years and decades to achieve anything in water sector and in water use but the foundation is laid today. One should face the non-fabricated but real truth that we will be on the way to water crisis if we do not change the following:

- water governance system;
- water management system;
- and, water use approaches.

"Water" from a slogan "water is life" should turn into really nation-wide matter. The Governments should pay more attention to water sector similar to those million-profit sectors as gas, oil, and minerals. The understanding of growing water crises should be brought about to the society, as well as deep comprehension that wasteful water use is an offence against the future, the nature and us and our generations. This calls for organization of information pressure on modern society by the media and water agencies and for education of future generations. Our school curricula do not include water and water conservation at all. The project "Water and Education" developed by us has been initiated only in Uzbekistan under OSCE support. And exactly those children, who are now 6 to 10 years old, will have to solve all complex problems related to water supply under conditions of shortage.

What Does Water Governance Look Like?

Governance of water sector and water protection involves the establishment of a comprehensive basis for sustainable and joint, equitable water allocation and use through:

- detail Agreements and Rules for water regulation and management in transboundary Amudarya and Syrdarya and in small transboundary rivers;
- elaboration and approval of National Water Strategy, which is the main document containing internal rules for water management and development, based on international bounds and IWRM;
- creation of climate in the countries and certain regions, which promotes wider involvement of public and establishment of state-public partnership;
- forming of financial mechanism for efficient water use and subsidy and investment policies;
- organizational actions on rational water use.

Particular attention in water governance is to be paid to implementation of IWRM jointly with public participation and establishment of social institutions at both national and interstate level. At BWO "Syrdarya" and BWO "Amudarya" Basin Councils should be established in

order to ensure more transparency, reasonableness, and equality in water allocation, consideration of the needs of various large water users, zones and the nature.
An example of effectiveness is the application of partnership principles by SFC Canal Management and Canal's Water Users Council in combination with MIS and water accounting that allowed the reduction of water withdrawals from almost 1 billion m^3 to 812 million m^3 without special investments in 4 years (Figure 5).
Of the same importance is the establishment of national special authorized water agency that should form the future strategy, implement it, and coordinate efforts and activities of different branches – water users, as well as create water sector development fund at the expense of charges for water and its pollution.

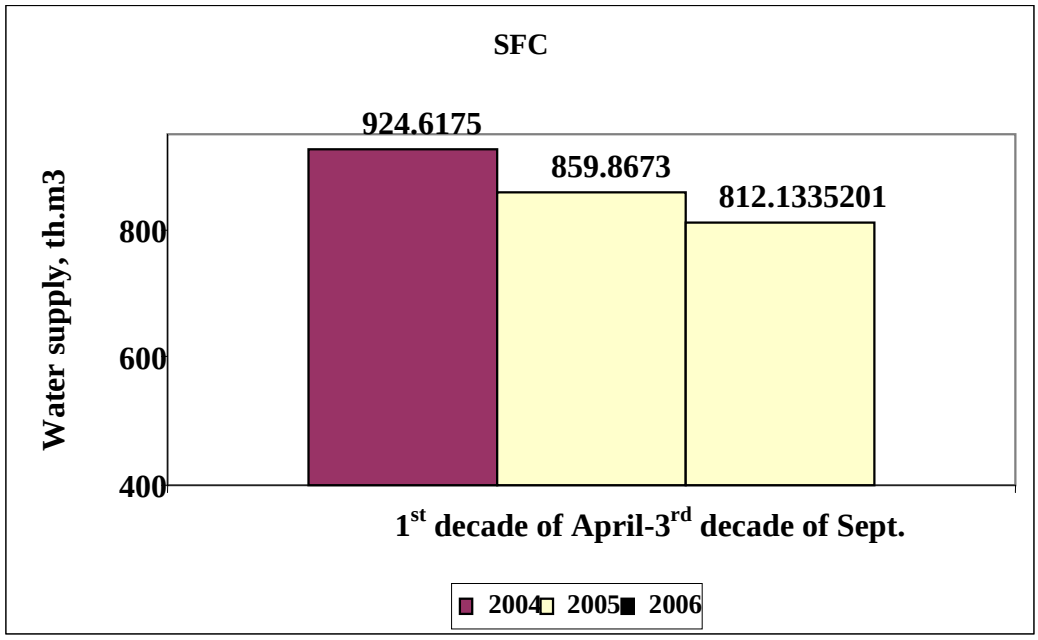

Figure 5

Water Management on the Basis of IWRM

As our experience in the Ferghana Valley shows, IWRM is based on a number of principles that may produce an impressive result only altogether. The hydrographic principle is learnt by everyone but along it cannot have an effect unless:

- addresses all kinds of water (surface, ground, and return);
- representatives of water and nature users at all water hierarchical levels and in all sector take an active part in management, including water delivery planning, its correction, financing, repair and maintenance, and, finally, improvement.

Basin Water Use Councils, Water Use Councils for Canal and Their Sections, WUA Councils and their groups from up to down will interlink together with water management organizations (WMO) the appropriate regimes and order of water use, establish control, enforcement system and arbitration among water users, and contribute their creative capacity and knowledge to WMO activities. To this end, we should help them: social mobilization is an integrated part of water management; it should be accompanied with training and education of water users. It is necessary to apply other mechanisms as well: block payments

for water; bonuses for water saving both for water users and WMO in an amount public water supply costs; subsidies to farmers for application of new irrigation techniques, etc.
Extension services should unite farmers and WUA, by recommending methods of water use and distribution, accounting and watering strictly according to climatic parameters.
It is particularly important to aim at coordinated management and development at the interstate level since any effort at the local level may fail if water supply from the interstate sources is unstable, and moreover it depends on various subjective factors. In this context, special attention should be paid to intensified construction of waterworks facilities for energy and runoff regulation purposes. Undoubtedly, those play positive role in increase of water supply, control of floods, guarantying of water supply during dry years, and production of substantial energy resources. The latter ensure sustainable electricity supply and create a possibility of energy import. Along with the establishment of efficient management and regulation rules, considerable contribution may be expected from implementation of SCADA system in all hydraulic structures and gauging stations on transboundary rivers, as well as from updating of short- and long-term forecasts that still produce wide variation of flow and, thus, it is very difficult to draw up tentative water distribution plan.

Conclusion

Undoubtedly, the region should itself solve its problems. Coordinated activities of all the countries on planning, implementation, and control over efficient water allocation, its local use, and conservation should form the basis.
However, much depend on donors, and here OSCE can organize both some assistance and coordination.
How can OSCE help to cooperation among the five countries?

- coordination of donors in forming the regional programs of water and ecological cooperation; improving usage efficiency of donor funds. The effectiveness of donor support may be increased greatly through higher reliance on local capacities of country-beneficiaries. The analysis on donors' contribution to the program ASBM-1 and a number of other projects implemented together with ICWC agencies shows that on average only 30% of funds indicated in ODA reports as a support to developing countries actually reaches the beneficiaries. The two contrasts are the projects of SDC, INTAS, and ADB, where 70 % reach directly the beneficiaries and the support of USAID, and TACIS, where this value is 10 … 25 %;
- widespread campaign on training of water users and water specialists; advanced training of 6,000-10,000 specialists at middle and lower levels should be provided every year;
- water productivity in Central Asia implies, first of all, land productivity under minimum water consumption; the promotion of extension services for farmer training can also contribute to the reduction of soil cover degradation, at which the new direction of OSCE is aimed;
- the future is in hands of our children and future generations: promotion of the "Water and Education" Program;
- work on strengthening the international law on transboundary rivers.