Interstate **C**oordination **W**ater **C**ommission **C**entral **A**sia	BULLETIN № 3 (35)	December 2003

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DUSHANBE INTERNATIONAL FORUM ON FRESH WATER

As it is known, UN General Assembly at its 55-th session under initiative of the President of the Republic of Tajikistan E.Sh.Rakhmonov declared 2003 as International Year of Fresh Water.

In order to underline importance of this initiative, in Tajikistan on August 29 –September 1, 2003 International Water Forum took place under support of leading international organizations and special agencies. In order to underline importance of this initiative, in Tajikistan since August 29 till September 1, 2003 Dushanbe International Fresh Water Forum was held under support of leading international organizations and specialized agencies.

Common theme of Dushanbe Forum was "Water, Environment and Security". Three-days forum consisted from plenary sessions with presentations of famous specialists, discussions at high level, special events and presentations of international and national organizations, NGOs, as well as exhibition "Water World". One day before forum several technical tours were organized.

Following thematic areas were determined for discussion during the forum:

- Water and interstate cooperation
- Water and health
- Water saving technologies and water productivity in agriculture
- Information exchange for water partnership strengthening.

Range of officials from different continents, known professionals and experts, representatives of international and interstate organizations took part in the forum.

Organizing Committee and Working Group have developed and give information on special site in internet www.freshwaterforum.org. Dushanbe Water Appeal is final document of the forum.

DUSHANBE WATER APPEAL

Fresh water is necessary for life and is a inseparable part of ecosystem and most important component for achieving sustainable development.

At the Summit of Millennium in 2000 and Summit on Sustainable Development in 2002 leading role of water has been recognized and commitments were taken by the states to develop clear agenda for solution of short-, middle- and long-term issues in water resources development, sanitation and environment protection.

Primary role in these documents implementation belongs to adequate public opinion formation. International Fresh Water Year 2003 declared by the UN General Assembly and based on Tajikistan initiative promoted the world community awareness improvement. This year should become transition from discussions and commitments declaration to concrete programs and projects implementation.

History witnesses that water crisis can grow into conflict but water resources can be catalyst of cooperation between countries and people with regard for existing and future generation rights.

Water management should be used for peace and prosperity. Countries should share experience, knowledge and advanced technologies in rational water use. Water should serve a link in common efforts in water resources protection, equitable distribution sustainable development and peace.

We, participants of Dushanbe Fresh Water Forum representing governments, scientific and educational organizations, local administrations, NGO and international organizations as well as private sector.

We call for:

- All politicians, governmental officials and public activists put water highly on agenda and support proposal of the Tajikistan President E.Rahmonov to the Third World Water Forum in Kyoto (Japan) about International Decade "Water for Life";
- All countries not joining common declaration «Perspective of renewable energy sources development» accepted in Johannesburg to consider possibility to join it.
- Confirm commitments to make contribution in achieving Millennium Development Goals and Plan of World Summit on Sustainable Development:
- by 2015 – reduce by 2 times share of population not having access to safe drinking water and basic sanitation;
- by 2005 – prepare national plans of integrated water management and effective water use.

We suggest to all countries to achieve it through:

- introduction of integrated (complex) water resources management in order to take into account interests of all sectors using water resources (power engineering, agriculture, industry, water supply and sanitation) as well as all people living upstream and downstream, in cities and villages;
- transition to basin water management including transboundary waters, widening mandate of water-related organizations, development regional legal base of their functioning involving various sectors of economy and society;
- strengthening public awareness to provide future generations with information helping address emerging challenges of next century, creation of necessary conditions for information exchange and promotion of its distribution among competitive water users;
- development of advanced financial mechanisms, financially stable strategies including new pricing policy with regard for ecosystem services, creation of public funds, risks minimization, private sector and investments involvement;
- promotion of partnership links between public and private sector with regard for poor people needs satisfaction within framework of stable and transparent base though establishing international network of integrated water management;
- development of unused hydropower resources to increase share of renewable energy sources;
- achieving set objectives to reverse natural resources degradation and increase biological diversity by 2010.

We greet:

- Tajikistan initiative of International Fresh Water year 2003 and Dushanbe Fresh Water Forum declared by UN General Assembly;

- decision of Heads of State of “Central-Asian Cooperation” organization on establishing international water-power consortium as a step to integrated water management in scale of river basin;
- -appeal of Heads of State of Central Asia on giving IFAS status of UN organization and UN Commission establishing for external assistance coordination within the Aral sea basin;
- Asian-Pacific Region initiative on priority protection of fresh water quality and population provision as a base for World Summit on Sustainable Development objectives achieving.

We suggest to declare decade 2005-2015 International Decade “Water for Life” and establish permanent monitoring of international forum decisions implementation (it is expedient to establish International Center on Fresh Water in Dushanbe).

Excepted by participants of Dushanbe International Fresh Water Forum on September 1, 2003.

10-year jubilee of International Fund for Aral sea Saving (IFAS)

DECISIONS OF INTERNATIONAL FUND FOR ARAL SEA SAVING BOARD

August 28, 2003 Dushanbe

Preparation and realization of measures dedicated to 10-year jubilee of International Fund for Aral sea Saving and Dushanbe International Fresh Water Forum

1. Accept information of EC IFAS about measures dedicated to «Program of Preparation and realization of measures dedicated to 10-year jubilee of International Fund for Aral sea Saving» and Dushanbe International Fresh Water Forum.
2. EC IFAS and its branches, ICWC, SDC take active part in preparation of special presentation ASBP-2 at the Dushanbe International Fresh Water Forum
3. EC IFAS and its branches as well as other IFAS subdivisions to make efforts for realization of «Program of Preparation and realization of measures dedicated to 10-year jubilee of International Fund for Aral sea Saving».

Republic of Kazakhstan	A. Ryabtsev
Kyrgyz Republic	B. Mambetov
Republic of Tajikistan	K. Koimdodov
Turkmenistan	T. Altiev
Republic of Uzbekistan	A. Jalalov

Approval of «Program of concrete actions on improvement of ecological and social-economic situation in the Aral sea basin for 2003-2010»

1. Approve prepared by all states – IFAS founders «Program of concrete actions on improvement of ecological and social-economic situation in the Aral sea basin for 2003-2010» (ASBP-2)».
2. EC IFAS jointly with ICWC and SDC provide coordination of activities within this program and inform governments and IFAS Board about its implementation.

Republic of Kazakhstan	A. Ryabtsev
Kyrgyz Republic	B. Mambetov
Republic of Tajikistan	K. Koimdodov
Turkmenistan	T. Altiev
Republic of Uzbekistan	A. Jalalov

Measures on promotion of social projects and programs on population provision with safe drinking water

Accept EC IFAS information about «Measures on promotion of social projects and programs on population provision with safe drinking water».

Taking into account importance of drinking water supply, EC IFAS and its branches to pay special attention to this issue during fees distribution among the states.

EC IFASD together with ICWC and SDC involving specialized organizations specify level of drinking water supply in the region and take measures on social situation improvement.

Republic of Kazakhstan	A. Ryabtsev
Kyrgyz Republic	B. Mambetov
Republic of Tajikistan	K. Koimdodov
Turkmenistan	T. Altiev
Republic of Uzbekistan	A. Jalalov

Support to SDC activity

1. Accept EC IFAS information about «Support to SDC activity».
2. Approve provision about «Interstate Commission on Sustainable Development», endorsed by SDC members (decision № 5 dated October18, 2000).
3. Approve Regional Plan of action on environment protection (RPEP).
4. EC IFAS, SDC Chairman facilitate bulletins and journal «Sustainable development of Central Asia».

Republic of Kazakhstan	A. Ryabtsev
Kyrgyz Republic	B. Mambetov
Republic of Tajikistan	K. Koimdodov
Turkmenistan	T. Altiev
Republic of Uzbekistan	A. Jalalov

GEF project «Water resources management and environment protection in the Aral sea basin» completion

1. Accept EC IFAS information about GEF project «Water resources management and environment protection in the Aral sea basin» completion on 30.06.2003. Recommend to IFAS bodies to use accumulated materials during program ASBP-2 implementation.
2. Charge EC IFAS to establish commission from project participants to perform procedures associated with project completion.
3. To express gratitude to international organizations and funds helping project implementation.

Republic of Kazakhstan	A. Ryabtsev
Kyrgyz Republic	B. Mambetov
Republic of Tajikistan	K. Koimdodov
Turkmenistan	T. Altiev
Republic of Uzbekistan	A. Jalalov

About regional Hydrological Center (REC)

1. To establish Regional Hydrological Center (REC).
2. Draft provision on REC prepared by IFAS with participation of national hydromet services of states-IFAS founders to submit to IFAS Board members for final coordination with the governments during September 2003 and forward to IFAS Board for approval.

Republic of Kazakhstan	A. Ryabtsev
Kyrgyz Republic	B. Mambetov
Republic of Tajikistan	K. Koimdodov
Turkmenistan	T. Altiev
Republic of Uzbekistan	A. Jalalov

PROGRAM OF CONCRETE ACTIONS ON IMPROVEMENT OF ECOLOGICAL AND SOCIAL-ECONOMIC SITUATION IN THE ARAL SEA BASIN FOR 2003-2010 (ASBP-2)

I. Introduction

To overcome ecological crisis and improve social-economic situation in the Aral sea basin, the heads of State of Central Asia in 1993 have established IFAS.

In October 2002 in Dushanbe they have decided upon development of new program within IFAS framework, approved its main provisions and commissioned EC IFAS jointly with ICWC and SDC under coordination with governments to develop "Program of concrete actions on improvement of ecological and social-economic situation in the Aral sea basin for 2003-2010".

II. General information about the Aral sea basin

Central-Asian countries having ancient cultural and economic links cover territory with common natural features. Natural conditions are formed by high mountains of Pamir and Tyan-Shang, vast deserts and steppes, large rivers like Amudarya and Syrdarya and closed depressions Caspian and Aral sea.

Region is rich in natural and power resources: oil, gas, uranium, gold, etc. Modern market economy in the countries is growing. Growth is found in agrarian, transport, mining and other sectors.

All countries are located in single ecological space of the Aral sea basin. Ecosystem of the region is very sensitive to anthropogenic impacts due to arid conditions. Extensive economy and significant population growth rate caused various regional ecological and socio-economic issues including global Aral crisis. Life and development in the region depends on water resources.

Since 1960 till 1990 in the Aral sea basin big scale programs of new land development were implemented that led to irrigated area and water diversion increase. Water inflow to the Aral sea sharply reduced, its level fall down by 21m and water surface reduced by 2 times.

Economic losses connected with climatic changes, fishing reduction and more than 4mln.ha irrigated land degradation as well as biodiversity losses account for several billions US dollars.

Consequences impacted living standards and health of more than 5millions people living in Amudarya and Syrdarya delta. Poor people, women, children became the first victims of ecological crisis.

III. Review and analysis of implemented projects and programs since 1994

One of main IFAS activities is public awareness about Aral sea catastrophe and organizing funding of socio-economic and ecological programs in the region.

In January 1994 the Heads of State have approved "Program of concrete actions on improvement of ecological situation in the Aral sea basin for nearest3-5 years with regard for social-economic development (main directions)" (ASBP-1). It was prepared by local specialists with support of UNDP, UNEP, WB, GEF, EBRR, ADB, TACIS, German Fund KFW, Kuwait Fund, ERA, USAID, etc. major goals of this program were as follows:

- Stabilization of environment in the Aral sea basin;
- Rehabilitation of Priaralie environment;
- Perfection of basin water and land resources management methods;
- Establishing managerial structures for program planning and implementation.

Activity within ASBP was divided into two stages. Preparatory stage duration was 3-5 years and cost near 30mln.US$. Implementation stage duration was planned for 10-15 years with funding in amount of 500-750mln.US$. Eight components were included in the program.

Upon completion of the main part of preparatory stage in 1997 CA countries and international organizations financing this program made joint review and proposed recommendations on the second stage of the program:

- Main stress to be made on implementation of the projects giving prompt recovery;
- Highlight most visible practical results;
- Develop coordinated police and action program at national and regional level in water and natural resources management in order to reduce water diversion from Amudarya and Syrdarya by 15%;
- Strengthen activity in public awareness creating conditions for police perfection.

Simultaneously, analysis of the program realization shows that main restriction is both lack of funding and weak inter-sector coordination and control from IFAS.

Activity to overcome crisis is being performed by the Central-Asian republics:

- In the Republic of Kazakhstan Strategic development plan up to 2010, State program on poverty reduction for 2003-2005, national environmental action plan, state programs «People health», «Drinking water», «Education», «Science», «Healthy life style», demographic policy have been accepted and implemented.
- In Kyrgyz Republic long-term strategy «Integrated base for Kyrgyz Republic development up to 2010», National strategy of poverty eradication, Concept of transition to sustainable development up to 2010, state programs on health protection, education, environment protection have been accepted and implemented.
- In the Republic of Tajikistan Mid-term program of agrarian sector development up to 2005 года, State Ecological program up to 2006, National action program to combat desertification, Strategy of health protection up to 2005, National program «Clean water and sanitation», State environmental program, National program on risk mitigation under natural disasters, program «Youth of Tajikistan», Program of cotton growing development for 2002-2005, EBRR Strategy in Tajikistan for 2003 – 2005, National Action plan on mitigation of climate change consequences have been accepted and implemented.

- In Turkmenistan Strategy of socio-economic transformation up to 2010, national;, program of nature protection, National program of Priaralie rehabilitation, Program of combat desertification, Strategy and action plan on biodiversity maintaining, State program «Health» have been accepted and implemented.
- In the Republic of Uzbekistan National program of sustainable development, National program of tourism, National environmental action plan, Aral sea program (WB/UNDP/UNEP), National strategy and action plan on biodiversity maintaining, Subregional plan to combat desertification (SRAPCD), UNDP and Government environmental program, National program of human capacity development have been accepted and implemented.

Research within the INTAS project «Evaluation of socio-economic consequences of the Aral sea shrinking» is being continued. Factors caused Priaralie degradation are determined and analyzed. Categories of social and economic direct and indirect damages are defined. Preliminary losses calculation and assessment are made. Based on obtained results bidding is worn (jointly with Dutch company Resource Analysis) in NATO program "Science for Peace" and work is started on the project "Integrated water resources management for wetland creation in Amudarya delta".

Research is completed within the project "Development of the Aral sea basin potential", on base of which model tool is created for interaction of water resources, socio-economic development and environment in Central Asia for decision-makers. Based on this model forecast has been made for 2030 under different scenarios.

Water resources

Water issue in Central Asia is aggravating with time. Particularly socio-economic and ecological aspects are key issues in the region. Differences in seasonal water and power resources and misbalance in their distribution create conflict situations and impact economy of the region.

In spite of diversion decrease at the end of 90-es, level of effective water resources use is unsatisfactory and is complicated by imperfect system of water resources management.

In order to solve above issues, range of regional and national programs in water resources rational use and environment protection are being implemented:

- «Main provisions of national and regional strategy of water resources management»;
- «Water and land resources management» (EC TACIS);
- «Water resources and environment management in the Aral sea basin» (GEF);
- «Rational and effective use of water and power resources in Central Asia - SPECA» (EEC UN);
- «Perfection of natural resources management in CAR» (USAID);
- «Clan water and sanitation»;
- «Wetland restoration in Amudarya delta»;
- «Regulation of Syrdarya channel and Aral sea northern part - SYNAS»(WB);
- «Creation of new system for melting water flow forecast in the Aral sea basin» (USAID);

Following projects foreseen by ASBP were not implemented:

- «Development and introduction of single information system for water resources account and use»;
- «Development of water quality improvement principles»;
- «Water and ecological research for environmental improvement in flow formation zone».
- «System of observation of hydrological cycle in the Aral sea basin-HYCOS».

Mountain ecosystems

Present status of mountain ecosystems is characterized by many socio-economic issues and excessive utilization principle. One of the most serious problems is necessity to preserve water resources within their formation zone and flow restoration in mountain ecosystems. Ecosystems together with water basins and glacio-sphere represent common ecological system of the region. Important stage in ecosystem preservation is strategy "Regional cooperation in sustainable development of mountain regions in Central Asia" (ABRD), which main priority is organization and coordination of integrated research in monitoring regime.

Land degradation

Land degradation issue is caused by anthropogenic activity and nature-climatic factors.

Significant part of land resources is subject to desertification and vegetation cover change, sands deflation, water and wind erosion, soil and water pollution. These factors lead to change of soil functions decreasing their economic meaning.

In Central-Asian region national and regional programs to combat desertification are being developed:

- «Map of anthropogenic desertification in the Aral sea basin» (scale 1: 250000);
- «Natural resources management with local population participation»;
- «Support of national program to combat desertification of agriculture in Tahta (Tashauz)».

Biodiversity maintenance

Most part of the region in result of anthropogenic load (forest cutting, water deficit, irrigation, steppe plowing sharply changed. Main changes resulted in flora and fauna population reduction and tugai forest disappearance.

Environmental legislation remains imperfect. It is connected with absence of common ecological standards.

Presently, project «Development of eco-network as a base for long-term ecosystem preservation in Central Asia» is being implemented. Its task is to develop eco-regional scheme of protected areas development in CAR countries.

Following regional and national projects on biodiversity are being implemented:

- «Western Tyan-Shang biodiversity preservation» (GEF);
- «Preservation of priority wetlands as habitat for migrating birds» (GEF);

- «Preservation of saiga and its habitat on ways of migration and living» (GEF);
- «Preservation and rehabilitation of Bukhara deer» (WWF);
- «Preservation of globally significant wetlands and migration corridors for stork and other migrating birds in Asia» (ICF, UNEP);
- «Preservation in-situ of mountain agro-biodiversity» (GEF).

IV. Analysis if current status and trends in the Aral sea basin

Socio-economic situation

Population social situation in the region

Post-Soviet period in Central-Asian countries is characterized by deep socio-economic and ecological crisis. Poverty (especially in rural area), population growth, unemployment and diseases, life expectancy reduction are the most critical issues. Poverty hinders economic development: in 1999 more than 40% were poor.

Governments undertake efforts to increase population income, reform agriculture, create working places, develop rural infrastructure. Conditions for small and medium business development are established (Uzbekistan, Tajikistan and Kazakhstan), programs and strategies to combat poverty are being realized (Uzbekistan, Tajikistan, Kazakhstan, Kyrgyzstan). Since January 19993 Population of Turkmenistan use natural gas, water, electric energy and salt free of charge, prices on municipal and transport services.

Common for most countries is low level of population vulnerable groups, women, youth and pensioners social protection. Unemployed women constituted by the end of 2002 53 % in Kyrgyzstan and Tajikistan, 60-64 % - in Kazakhstan and Uzbekistan. Specific weight of young people (in age of 29-30) in 1999 amounted for 30-36 % in Kazakhstan and Kyrgyzstan, 60-62 % - in Tajikistan and Uzbekistan.

Population health

Ecological issues (air pollution, water scarcity, lack of sanitation) caused population health aggravation. This problem is particularly critical in Priaralie and adjacent areas. In epicenter of catastrophe it is highest indicator of infant and mother mortality, lowest life expectancy, highest tuberculosis, anemia, silver and kidney diseases that leads to genetic fund destruction.

Status is aggravated by lack of medical measures, diseases monitoring and deficit of medicines.

Drinking water supply

Most part of rural population of Central Asia use water from irrigation canals containing various salts, fertilizers, pesticides and other agricultural pollutants. Low quality and lack of drinking water is a reason for infection diseases. Following factors impact drinking water supply:

- technogenic pollution of water sources;
- ageing water and sanitation pipelines and facilities;

- imperfect mechanism of pricing policy in drinking water supply.

Situation with drinking water is especially critical in Uzbek Piaralie. Population of Karakalpakstan is provided by taped water by 56,8 %. From 24 to 100 % water does not meet quality standards.

In Kazakh Priaralie drinking water supply has not been solved as well. Rural population is provided by taped water by 28-30 %, 15-18 % use water from decentralized sources and rest population use water from open reservoirs.

Ecological situation

Irrational economic activity in the basin led to ecosystems destruction.

Mountain ecosystems degradation

Mountains are subject to both natural disasters (earth quakes, landslides, mud flows, flood. etc.) and anthropogenic impacts (forest cutting, overgrazing, wrong economic activity, etc.). Uncontrolled tourism and hunting make significant damage to mountain ecosystems.

In result of unregulated anthropogenic load on mountain ecosystems, natural dominating plants change, soil degrade, surface hydrothermal regime changes, renewable resources exhaust including glaciers melting.

Pollution of water objects

Major sources of water objects pollution are collector-drainage, industrial and municipal effluents.

Annually, to the Amudarya and Syrdarya channel about 33-35 км³ saline water and untreated collector-drainage, industrial and municipal waters are released.

Last time water sources pollution by radioactive and toxic wastes.

Crisis of Priaralie natural systems

During last 40 years desertification process encompassed more than 4mln.ha. Most intensive desertification is found in landscapes adjacent to Amudarya and Syrdarya delta.

Major reasons of Priaralie ecosystems degradation:

Natural: climate aridity, natural salt reserves in alluvial deposits, soil deflation and erosion, salt-dust transport from dried seabed.

Anthropogenic: soil pollution by agro-chemicals, secondary salinization, mono-culture, humus reduction, livestock wastes, municipal wastes, collector-drainage effluent, overgrazing, forest cutting, irrigation releases, river and reservoir water salinity growth.

Loss of biodiversity

Progressing anthropogenic press (anthropogenic transformation of vegetation, fires, forest cutting, hunting and overgrazing) led to destruction of biological links in natural ecosystems. Most part of rare species of fauna and flora are being disappeared.

Air pollution

Major sources of air pollution

Stationary: industrial enterprises, power plants release more than 150 toxic matters including most toxic conservative organic pollutants (pesticides, gexachlorbenzol, dioxin and furan).

Mobile: major pollutants released by transport are as following: nitrogen oxide, carbon oxide, hydrocarbon, gasoline, aldegide.

Use of ethylene gasoline leads to high lead concentration in the air that is very harmful for people health. Transport releases 90% of lead.

Natural: major sources of air pollution are Kyzylkum and Karakum deserts and dried seabed. Annually, near 43mln.t salt is blown up from the Aral sea basin and settle over the area of 1,5–2,0 mln. km², making damage to agricultural lands.

Water-related situation

Aral sea basin possesses big water and power resources but their distribution over territory is uneven. To manage water resources large water reservoirs and water works were built. Set of measures was undertaken by new independent states: in 1992 ICWC has been established. ICWC is responsible for regional water policy development, water use limit control, reservoir operation mode regulation, transboundary water conservation organization, monitoring and information exchange on base of regional information system.

Simultaneously, ICWC decisions are not always fulfilled due to imperfect legal base, weak technical equipment, etc. main water-related issues are concentrated in river low reaches suffering in dry years from drought. In spite of undertaken efforts, water distribution remains uneven, particularly between downstream and upstream. This requires effective management mechanisms and rules directed at sustainable water distribution including ecological releases especially in dry years.

In Syrdarya basin four riparian countries conclude agreement on annual water resources allocation as well as water intake limits for each canal. These limits are corrected depending on water availability. Thus, there are no contradictions in water allocation but disputes appear because of wrong forecast or measurements. BWOs need equipment for water account and communication.

To ensure balance between power needs of Kyrgyzstan and irrigation needs of downstream in 1998 framework agreement on Syrdarya water-power resources utilization. Since this time, water releases from Toktogul reservoir meets downstream needs and Kazakhstan and Uzbekistan provide Kyrgyzstan with fuel.

Big water volume from Toktogul reservoir reach Chardara reservoir but downstream Syrdarya capacity is not enough to pass water due to ice blocking. In result, more than 30

км³ accumulated in Arnasai depression in Uzbekistan. The World Bank allotted money to Kazakhstan for this issue solution and the Northern Aral stabilization

More than 51 % return water are disposed in to the rivers, 33 % - into depressions, only 16 % is re-used for irrigation. On base of collector-drainage and return water several hundreds of water reservoirs are created. Largest are Aidar-Arnasai (30km^3), Sarikamish (20 km^3), Dengizkul, Solyonoye, Sudochie, etc. Right Babk Collector construction is required to dispose saline water into the Aral sea.

Irrigated area in Central Asia amounts for 8mln.ha including more than 5mln.ha saline lands. Because of agro-technical measures violation, bad technical state of irrigation network and reclamation state of irrigated lands their productivity is decreasing. More and more lands are characterized by shallow ground water of high salinity, salinization, soil erosion and degradation, unproductive water losses in the fields.

Artificial drainage is necessary on 5.5mln.ha irrigated lands but its construction is postponed, repair and rehabilitation work is almost stopped. Land reclamation issues require urgent measures on its improvement, rational water use and existing irrigation and drainage network rehabilitation.

Due to long dams and reservoirs operation their parameters changed and reliability reduced. Most dams need urgent measures to improve their safety. Within WEMP project pilot projects for dams rehabilitation and modernization have been developed.

Because of trees cutting within watersheds negative processes like floods, mud flows, landslides and droughts occur. There is significant potential for forestation within catchments area and deltas.

Environmental monitoring

Regional environmental monitoring network mostly developed in mid-80-es presently significantly reduced. Network density is 0,12-0,90 points per 1000 km^2.

Hydrometeorologic observation network in the region is equipped by aged devices and communication means. Observation in high mountains is absent that prevents to assess snow and ice supplies in the mountains. Reduced snow metering activity leads to information quality worsening. Lack of observations does not allow provide all concerned organizations with necessary information.

Observation over avalanches and mud flows does not cover all dangerous areas.

All specialized observations on Fedchenko and Abramov glaciers and Sarez lake are ceased.

Presently, observations in the Aral sea itself are also stopped.

Environmental pollution observation network sharply reduced. Surface water should be observed with new equipment. Mobile laboratories are worn and aged.

Regional scientific research in climate change, Aral sea basin hydrological and hydrochemical regime and methodical recommendations are also cut.

V. Priority directions of ecological and socio-economic situation improvement in ASBP-2

At Dushanbe Heads of State meeting «Main directions of Program of concrete actions on ecological and socio-economic situation improvement in the Aral sea basin for 2003-2010» were approved. Below proposals over priorities are presented.

1. Development of agreed mechanisms of integrated water resources management in the Aral sea basin

Goal is to develop package of agreements for regulation of water resources joint use and protection with regard for socio-economic development of the region.

Concrete measures orient countries of Central Asia to joint activity based on common approaches, effective methods and mechanisms. This implies inter-sector links, common objectives and interests, consensus and compromise.

2. Water objects rehabilitation and water and land resources use improvement

Goal is to rehabilitate irrigation and drainage systems.

There are projects aimed at technical perfection and reconstruction of irrigation and collector-drainage systems of regional meaning, ensure dam and reservoir safety, especially Sarez lake right bank and Kairakkum reservoir. Set of reclamation measures will be developed to improve water and land resources use efficiency. Alternative tasks of Syrdarya flow regulation will be also developed within the two projects: «Rehabilitation of irrigation facilities of interstate meaning» and «Development of measures on modernization of drainage systems in countries of the Aral sea basin».

3. Perfection of environmental monitoring systems

Goal is to perfect environmental monitoring systems in order to obtain more reliable environmental data and more effective use of regional possibilities for water, ecological and socio-economic issues solution in the basin.

For this is necessary:

- Regional database establishing on water resources to predict flow;
- Development of transboundary water monitoring system in the Aral sea basin;
- Perfection of monitoring system of snow-ice reserves of the region;
- Development of regional model for climate changes impact on water resources in the basin.

4. Program to combat natural catastrophe

Priority objective is preventing water and wind erosion; bank enforcement measures; forest restoration within catchments area and Priaralie; flood control measures.

Central-Asian republics are subject to active impact of various natural phenomena, which number grew last years. In result, these countries bear significant losses and human victims.

Development of measures on preventing, liquidation and minimizing damage will reduce consequences of natural disasters.

5. Program of promoting social issues solution

Priority objective is improvement of socio-ecological situation for population living in the Aral se basin. For this is necessary:

- Facilitate realization of health protection program in the countries of Central Asia;
- Promote realization of population living standard increase and new working place creation program;
- Promote safe drinking water supply program realization;
- Develop system of ecological education on base of principle of continuity for sustainable development of the region;
- Interaction on NGOs in Central Asia and effective public participation in Aral sea basin issues solution.

6. Strengthening technical and legal base of interstate organizations

Priority objective is perfection of interstate organizations (EC IFAS, ICWC, DSC and two BWO: "Syrdarya" and "Amudarya") through improvement of technical and legal base.

Status of technical and legal base of interstate organizations does not meet modern level that make more difficult to manage water particularly in dry years.

Important condition for effective activity of interstate organizations is perfection of regional information system, introduction of automatic systems, automation equipment installation, strengthening legal and financial status, perfection of legal norms and rules of their activity.

7. Development and realization of regional and national environmental programs in flow formation zones

Priority objective is preservation of mountains and glaciers through study of factors influencing glacier mountain ecosystem degradation and glacier shrinking.

8. Development and realization of regional and national environmental programs on rational water use in economic sectors of Central-Asian countries

Priority is presented by one direction (objective) approved by the Heads of State of Central Asia: "Rehabilitation of irrigation and drainage systems and irrigated lands productivity increase in Central Asia".

Priority VIII objectives are as follows:

- Development and realization of water conservation projects;
- Rehabilitation of flood plane – tugai national park "Tigrovaya balka" at expense of Amudarya flow regulation by Nurek reservoir;
- Integrated water resources management in Amudarya and Syrdarya lower reaches;
- Water-related situation improvement in Nukus city.

To realize these objectives single information space, extension services network and pilot project realization in each republic. During project final version completion following major principles were taken:

- Maximum account of opinions and points of view from the republics and authors submitting projects;
- Project succession in accordance with previously realized programs like GEF, SPECA, EPIC, ADB, TACIS, etc.;
- Priority of regional directions over national ones under simultaneous representation of national interests as agreed (summarized) national ones.
- Excluding project duplication.

Totally 5 projects are presented in priority VIII.

9. Development and realization of international program of sanitary-ecological improvement of Priaralie settlements and natural ecosystems

Priority objective is to facilitate realization of the projects dedicated to Priaralie natural ecosystems rehabilitation. Special attention should be paid to measures on preventing salt-dust transportation from the Aral sea dried bed.

10. Development of international program of ecological sustainability and biological productivity rehabilitation

Project objective is to promote realization of projects devoted to natural ecosystems ecological sustainability and biological productivity rehabilitation and increase sustainability of the Aral sea aquatic ecosystems.

For this is proposed:

- Providing ecological releases in Amudarya and Syrdarya delta;
- Definition of economic capacity of the Aral sea basin aquatic ecosystems;
- Observance of water protected zones' regime;
- Assessment of extreme load on ecosystem;
- Interaction with regional programs and projects on biodiversity preservation.

11. Concept of sustainable development in the Aral sea basin

Priority objective is definition of regional goals system for sustainable development and major directions of their realizations (including mechanism of coordination, financing and participation).

For this it is necessary to develop and accept program document on single policy in rehabilitation and sustainable development in the Aral sea basin.

12. Regional action program to combat desertification

Priority objective is mitigating desertification consequences through measures of desertification combat and development of alternative economic activities. Support of Central-Asian program for desertification combat.

13. Wetlands development in Amudarya and Syrdarya downstream

Priority objective is wetlands maintenance in rivers' lower reaches by means of shallow water bodies network and regulated lake systems creation as well as their protected areas.

14. Rationalization of saline drainage water use

Priority objective is to assess collector-drainage waters within the basin and elaborate specific measures on water quality and quantity management for their utilization.

VI. Conceptual directions of sustainable development in the Aral sea basin

Main principle of sustainable development concept formation is accepting system of sustainable development regional objectives and main directions of their realization (including mechanisms of coordination, financing and public participation), on base of which basin strategy of water resources will be formulated with regard for economic, social and ecological conditions.

Analysis pf key issues of the region allows formulate long-term goal of its development – increase population well-being and provide healthy life for population in harmony with the nature.

In accordance with this goal, sustainable development priority directions are as follows:

1. Elaboration of regional convention on ecological security and sustainable development.
2. Development of interstate relations to reach sustainable development, when use of water and power resources will satisfy economic and ecological interests of present and future generation.
3. Improvement of social-economic conditions including:

- Population health protection;
- Increasing population living standard. Providing equitable access to land, water and other natural resources, knowledge and credit resources;
- Development of education and culture.

4. Strategic economic planning and management with regard for ecosystem restrictions, providing sustainable functioning of vital aquatic ecosystems.
5. Development of contractual relations, activation of inter-sector social and global partnership and strengthening basic potential of sustainable development.
6. Providing wide public access to decision making on issues of the basin development. Information transparency.
7. Regional cooperation as protection against globalization negative impacts.
8. Perfection of economic and financial mechanisms for sustainable development.
9. Attraction of investments, involvement of all levels business for sustainable development of the region.

VII. Tools for program implementation

Positive experience of international programs (Baltic-21, IWRM-Mekong, etc.) witnesses about necessity to work out a mechanism for program support including:

- Coordination mechanism;
- Financial mechanism. Actions within framework of plan can be financed at expense of internal, regional and international sources, by means of state funding or though special financial lever as well as system of grants and loans;
- Mechanism of legal support. Necessary actions should be based on intergovernmental agreements and national legislations. Common approach should be elaborated to legislative and methodological provision of environment protection and monitoring;
- Process monitoring;
- Training and education;
- Link with other programs;
- Public participation.

Eliminating any of listed elements leads to decrease of program efficiency.

VIII. Concept of ASBP-2 program's projects

Preliminary social evaluation of local communities living on adjacent to protected areas should important element of the program implementation. Social activity during project implementation must be starting point for evaluation and monitoring as well as further assessment of needs, priorities and local beneficiaries.

Concept of project proposals worked out by working groups and inventories of project proposals at the national level are presented in annexes.

ANNEX

INVENTORY OF REGIONAL PROJECTS AND TECHNICAL PROPOSALS FOR CENTRAL ASIA OVER ASBP-2 PRIORITES

1. Development of agreed mechanisms for integrated water resources management in the Aral sea basin

1.1. Draft agreements and rules on water resources management in Syrdarya river basin with regard for all consumers interests and long-term river flow regulation

Background

Water-related and ecological issues of the Aral sea basin requires complex approach including social-economic development and all sectors: water, power, environment and the Aral sea itself. Special attention should be paid to concrete issues, which solution could minimize interstate contradictions, preparation of legal base and mechanisms of joint interstate water works operation and water resources management ensuring mutually beneficial cooperation between the countries.

Main shortcomings in BWO "Syrdarya" functioning are as follows:

- interests of power engineering, irrigated agricultureне and environment related to reservoir cascade regime are not coordinated;
- BWO does not control river water quality in full volume;
- existing limitation of BWO action zone does not provide effective water resources management along the river up to the Aral sea;
- water protected areas along the river are not specified and uncontrolled.
- there are no state financial commitments in joint water resources management and use in the Syrdarya river basin.

These factors require new principles in water management and interstate water infrastructure maintenance.

New principles should be realized as a package of interstate agreements regulating rules of joint water resources management, use and protection. These rules must contain mutually beneficial regime of all reservoirs ensuring stable flow distribution among all consumers with regard for long-term flow regulation, growing demand and requirements to its quality as well as economic mechanism of water use. They should contain instructions on water resources management for equitable water allocation in interests of all countries and natural Syrdarya complex including northern part of the sea during years of different water availability.

Objectives:

1. Work out on base of international water law and national legislations draft agreements on joint water management, use and protection in Syrdarya basin.
2. Work out and coordinate rules of water management in Syrdarya basin.
3. Improve frame agreement of 1998 implementation.
4. Increase water-related objects operation efficiency.

1.2. Draft agreements and rules of water resources management in Amudarya basin with regard for all consumers interests and long-term river flow regulation

Background

Water-related and ecological issues of the Aral sea basin requires complex approach including social-economic development and all sectors: water, power, environment and the Aral sea itself. Special attention should be paid to concrete issues, which solution could minimize interstate contradictions, preparation of legal base and mechanisms of joint interstate water works operation and water resources management ensuring mutually beneficial cooperation between the countries.

Main shortcomings in BWO "Amudarya" functioning are as follows:

- disproportion in water consumption between middle and lower river reaches;
- BWO does not control river water quality in full volume;
- water protected areas along the river are not specified and uncontrolled.
- there are no state financial commitments in joint water resources management and use in the Syrdarya river basin.

New principles should be realized as a package of interstate agreements regulating rules of joint water resources management, use and protection. These rules must contain mutually beneficial regime of all reservoirs ensuring stable flow distribution among all consumers with regard for long-term flow regulation, growing demand and requirements to its quality as well as economic mechanism of water use. They should contain instructions on water resources management for equitable water allocation in interests of all countries and natural Syrdarya complex including northern part of the sea during years of different water availability.

Flow losses in river channel, reservoirs and irrigation network should be taken into account. System of channel losses standardization can be effective tool for rational water allocation without conflicts. This system must be introduced in river flow regulation practice for middle and lower reaches over the countries and balance sites. For each country "allowable losses" should be defined, which must be regulated by special mechanism for water intake limits re-distribution among the countries.

Objectives:

1. Work out on base of international water law and national legislations draft agreements on joint water management, use and protection in Amudarya basin.
2. Work out and coordinate rules of water management in Amudarya basin.

1.3. Development of agreements on common aspects of water resources management in the Aral sea basin

Background

Water-related and ecological issues of the Aral sea basin requires complex approach including social-economic development and all sectors: water, power, environment and the Aral sea itself. Special attention should be paid to concrete issues, which solution could minimize interstate contradictions, preparation of legal base and mechanisms of joint interstate water

works operation and water resources management ensuring mutually beneficial cooperation between the countries.

Interstate agreements on water management should be elaborated in accordance with international water law with regard for local traditions and experience.

Existing interstate agreements and documents do not encompass all questions of transboundary water management. Within framework of this project it is necessary to prepare a package of common agreements on information exchange, ecological regulation, common organizational issues as well as interstate arbitrate. Legal support should be included in normative technical documentation determining common aspects of water use and consumption and allowable anthropogenic impact on environment. Common agreed rules of decision preparation, acceptance and implementation should be developed.

Objectives:

Develop package of documents regulating specific aspects of common water management on base of international water law and national legislations. These specific rules (agreements) must be complementary to the basin agreements and ensure their implementation.

1.4. Development of separate provisions of water resources use and protection strategy: economic mechanisms of transboundary resources management and feasibility study for water-power consortium establishing (WPC); models and databases

Background

Existing draft water strategy does not contain many important provisions on water use and protection. In particular, mechanism of transoundary resources sustainable management as well as WPC documentation preparation should be improved. In result of development and introduction of the mechanism of flow regulation cost sharing between the states water resources use and water-related objects operation efficiency will be increased.

For regional coordination of national water policies and strategies based on modern technologies it is necessary to continue adaptation to the regional system of water management of existing basin models and databases. Potential of already realized modeling projects (ASBOM, ASB-MM, etc.) should be used. Specialized training can serve as starting point for successful models utilization.

Objectives:
1. Development of economic mechanisms for cost compensation for flow regulation by interstate reservoirs.
2. Development of WPC feasibility study.
3. Adaptation of basin models and databases to existing system of water resources management and prospective development tasks.

1.5. Feasibility study to ground Rogun hydropower plant construction

Background

Within SPECA project Rogun power plant is recognized as regional priority project. WB mission considered it and came to conclusion about necessity of its project consideration and coordination as interstate object by all republics.

Objectives:

Grounding Rogun power plant effectiveness. Definition of mutual interests in this power plant construction and operation.

1.6. Definition of ecological releases and economic capacity of aquatic ecosystems in the Aral sea basin

Background

For normal ecosystems functioning it is necessary to define their optimal needs for water. To determine opportunities for goods and services provision by ecosystems assessment of their capacity is necessary.

Objectives:
1. Assessment of aquatic ecosystems economic capacity.
2. Ecosystems provision by optimal water volume.

2. Rehabilitation of water-related objects and improvement of water and land resources use

2.1. Project of technical measures on Sarez lake safety provision

Background

Unique Sarez lake with volume17,5 km^3 and dam of 500m high is created in 1911 in result of mountain slope failure. Lake water balance is maintained at expense of filtration though dam body. But this equilibrium is sustainable enough: water level was constantly growing due to natural dam compaction and siltation.

Certain danger of dam failure exists due to right bank landslide and wave creation. This shows necessity of further dam study and technical measures undertaking to strengthen its safety.

Objectives:
1. Development of project for Sarez lake monitoring.
2. Development technical measures on Sarez lake safety improvement.

2.2. Rehabilitation of interstate irrigation structures in the Aral sea basin

Background

There are 88 hydro structures on Amudarya river including 36 head water intakes, 341km of interstate canals, 167 gauging stations, etc. In Syrdarya basin there are 198 hydro structures including 189 gauging stations, 225 km of interstate canals, etc.

Wear of capital assets is 65 %. Hydraulic structures (structures, mechanical equipment, electric equipment, means of communication, interstate canals) technical state aggravation requires rehabilitation.

Objectives:

Rehabilitation of interstate irrigation structures in Amudarya and Syrdarya basin.

2.3 Development of measures on drainage systems modernization and workability restoration

Background

From total irrigated area of 8,0mln.ha near 5,5-5,7mln.ha are covered by artificial drainage including 1more than 175 th.km of horizontal drainage (145,4 th.km on-farm network). Perfect drainage covers about 2.0mln.ha (795 th.ha – vertical drainage with 8.5 th.wells).

In years of normal operation drainage systems provided relatively high reclamation background regulating soil water-salt regime and irrigated lands balance, except river downstream made of heavy soils. Highest reclamation effect is provided by perfect drainage under minimum water for leaching and unit production. Last years perfect drainage is stopped because of expensive power and materials.

Presently, vertical drainage operation in Kazakhstan and Tajikistan is practically suspended; in Uzbekistan vertical wells are operated with less duration compared with project due to expensive energy and pumping equipment. During last decade intensity of repair-rehabilitation activity sharply declined, especially on in-farm systems. Minimization of cost for drainage operation led to sharp decline in system workability, aggravation of irrigated land reclamation state reflected in land salinization and water logging, growth of ground water salinity and decline in crop yield.

During last 10 years, soil and water productivity significantly reduced due to reclamation state worsening. Urgent measures are needed on existing drainage network workability restoration. In areas of insufficient drainage additional drainage construction should be done.

Objectives:

Evaluation of state-of-art of all links of drainage system, definition of major reasons of drainage workability reduction and development of set of organizational-technical measures on its modernization providing optimal management of water-salt and ecological-reclamation processes on irrigated lands.

2.4 Reconstruction of interstate Ozyorny and Daryalik collectors

Background

Systems of collectors are being built since 1952. Because of drainage outflow increase from Khorezm oasis, collector capacity is being constantly increased. Total length of interstate collectors is 668 km. Annual drainage outflow including Turkmenistan amounts for 1900 mln m^3. Systems serve about 1 mln.ha in two adjacent states. Due to shallow ground water land reclamation state and crop yield reduced at least by 25%. Technical-economic ground should be corrected and negative impact of shallow ground water must be eliminated.

Objectives:

Improvement of irrigated land reclamation state within Dashhovuz veloyat, Turkmenistan, irrigated lands in Uzbekistan and increase of agricultural production effectiveness on the area of 1mln.ha.

2.5 Perfection of water and land resources use and their productivity increase

Background

By the beginning of XXI century irrigated area in the Aral sea basin reached about 8mln.ha, from which 5mln.ha subject to salinization and rest subject to erosion. At the same time, are favorable for irrigation amounts for 32mln.ha. Before 1990 in conditions of intensive agro technique (crop pattern, seed selection, soil tillage, fertilizers application, irrigation regime) with drainage rather high crop yield was obtained. One hectare productivity varied within 1200-2500$US. Presently, agricultural production is performed on lands with shallow saline ground water, erosion and degradation, lack of fertilizers and technologies, irrigation-drainage system degradation and soil reclamation state aggravation. Uncompleted economic reforms, weak incentives for most part of farmers make water and land productivity low. Now, one hectare productivity reduced down to 500-750$US.

Objectives*:*

Land and water productivity survey and assessment, definition of actual reasons for its reduction (quantitatively) and development of measures on irrigated lands and irrigation water productivity increase under limited inputs.

2.6 Providing dam and reservoir safety (2 objects in each state).

Background

Due to long period of dam operation their parameters changed, sustainability and reliability reduced. Simultaneously, lack of appropriate mechanism and approach to their safety, maintenance and joint operation provision negatively impact water resources management.

Objectives:

To reach set objective it is necessary to solve the following tasks:

- to assess dam and reservoir technical state and safety in CAR countries;
- approve inventory and program of their rehabilitation, mechanisms of further operation and maintenance.
- equip them with modern devices for technical state control and account.

- establish single database and modern monitoring system as well as dam and reservoir safety criteria.
- establish in each state special fund for emergency situation and develop mechanism of their use.
- establish common rules and methodology for definition of dam and reservoir safety based on GEF project Component C “Dam safety” and continue this activity.

2.7 Analysis of possibilities to increase Kairakkum reservoir capacity

Background

Presently, largest in Syrdarya basin Toktogul reservoir in Kyrgyzstan works in power mode in winter. In this condition, Kairakkum reservoir capacity increase could improve water availability for irrigated lands in Uzbekistan and Kazakhstan.

Objectives:

Definition of technical possibility and economic expediency to heighten Kairakkum dam and increase its capacity to improve water-power resources use efficiency.

3. Perfection of environmental monitoring system

3.1 Establishing regional data bank of water resources for flow prediction

Background

Eliminating existing shortcomings in water resources management at the regional level can be reached though further development of tools for right decision making including establishing regional water resources data base and information system.

Main task of this program is establishing on base of modern technical and communication means single unified information system of flow formation and forecast, assessment of various aspects of its utilization and measures on achieving potential productivity and sustainable management and control.

Hydrological forecast success in big extent depends on available information and its quality. Along with development of hydrological forecast growing volume of information play important role. Establishing regional bank of data of water resources should be directed at provision of complex continuous flow forecast system (short-, medium-, long-term). It is necessary to work out and introduce “Agreement on establishing regional and national database of water resources and information system of flow formation and forecast, water resources use protection in Amudarya and Syrdarya basin”.

Objectives

- -establishing regional and national database of water resources and information system of flow formation and forecast, water resources use protection in Amudarya and Syrdarya basin
- receiving basic data for regional economic analysis;
- preparing analytical information as a base for regional decisions;

- establishing regular communication and information exchange between organizations – participants;
- preparation of monthly, annual and long-term data base of water resources management;
- arrangement of data collection and exchange between national data bases.

3.2 Development of transboundary water monitoring system in the Aral sea basin

Background

In Central Asia almost all large rivers are transboundary. Creation of 5 independent states in the Aral sea basin changed point of view on transboundary water resources because their quality change cost of unit in downstream and upstream belonging to different states. In this conditions issue of optimal water distribution is very important. This issue solution without monitoring system is impossible. Simultaneously, monitoring system must be based on common observation network with representative indicators of hydrological regime and water quality. It is necessary to define inventory of common for region and local indicators determined by local sources of pollution.

Establishing common observation network and indicators based on specific features of watercourse and environment as well as source of pollution and its self-cleaning ability is information base for transboundary river flow prediction.

Mostly river flow is formed in Tajikistan and Kyrgyzstan. Its use for different purposes is performed both in these countries and Uzbekistan, Turkmenistan and Kazakhstan. Equitable water distribution is impossible without water account, quality assessment and permanent control over its utilization. Traditionally, each hydromet service performs flow account and analysis on own rivers transferring necessary data to other services. Presently, this system is degrading due to lack of equipment and personnel. International assistance (25 hydro posts reconstruction) is insufficient.

Objectives:

For transboundary water monitoring system development it is necessary:

- define common observation network and ground representative inventory of regional and local controlled indicators of transboundary monitoring;
- define parameters (terms, observation frequency) and establish single methodological and technical provision of transboundary monitoring;
- create bank of hydrological data as a part of common bank;
- issue hydrological annual digest «Transboundary waters» as united publication of all countries of the region;
- issue hydrological quarterly bulletin «Transboundary waters» together with SANIGMI, KAZNIIMOSK, NGMS;
- set up system of inspections on transboundary rivers, canals and collectors with control measurements;
- establish methodological transboundary center including SANIGMI and KAZNIIMOSK.

3.3 Rehabilitation and development of hydrometeorological observation network in the Aral sea basin

Background

Regional hydrometeorological network does not meet needs of water-related organizations. Compared with 1980-1985 (period of network maximum development) number of stations reduced by 66%. In result of this, many large river basins are not covered by observations. Hydrometeorological observation network density is Региональная 0,2-0,9 points per 1000 km^2. Network is equipped by morally and physically worn equipment and communication. Lack of observations does not permit to define snow stock in the mountains that significantly reduced quality of hydrological information.

In result, large territories are not covered by hydrological, meteorological and snow metering observations. All special observations on Abramov, Fedchenko glaciers, Sarez lake Aral sea and Priaralie have been stopped. Water quality observations require new equipment and mobile laboratories.

Objectives:

1. Rehabilitation and development of environmental monitoring in the Aral sea basin to determine current climatic situation, river flow and its regime ensuring Amudarya and Syrdarya flow regime improvement.

2. Integrated assessment of environmental pollution in the Aral sea basin.

3.4 Perfection of snow-ice resources monitoring system

Background

Largest glaciers are located in the mountains of Central Asia. Glaciers are second after snow melt source of river flow. They are natural accumulators of purest fresh water that is very important for the region. Glacier lakes are permanent threat to highlands. Disruption and quick emptying of these lakes cause economic damage and human victims. Thus, glacier monitoring is one of most important tool of management, forecast and prevention of natural phenomena. Last glaciers observations were performed in 1980. Due to global warming glaciers were subject to significant changes. Satellite data is insufficient to evaluate entire situation. Remote sensing is a tool allowing solve this task successfully.

Objectives:

Program main goal is glacier and lake monitoring by means of digital satellite information of high resolution. Monitoring includes two purposes: definition of glaciers and lakes using satellite images of high resolution (ASTER, Landsat, Spot), their assessment and specification using GIS technology.

3.5 Development of regional climatic model and climate changes impact on water resources in the Aral sea basin

Background

River flow in Central Asia is formed at expense of snow melting and depends on air temperature and precipitation. Climate change causes flow changes and will impact irrigation water amount. Atmosphere and ocean circulation global models' outputs are most convenient tool for regional climatic scenarios, which, in turn, serve as a base for regional evaluations of vulnerability and adaptation to climatic changes.

But this information has low spatial resolution (3° or 330km along equator) that is major limiting factor for wide utilization of these models utilization. Using hydrodynamic models with high resolution for closed areas (regional climatic models - RCM) is one of ways to describe regional climate in details.

For more reliable evaluation of climatic changes it is necessary:

- use most advanced global and regional climatic models;
- perfect methodology of climatic changes assessment impact on river flow based on flow formation mathematical model;
- adaptation of new climatic scenarios to river flow models;
- conduction of numerical experiments on water objects potential vulnerability and their regime;
- evaluation of ice storage in the mountains of Central Asia and their possible changes;
- reaction of glaciers and snow storage to possible climatic changes.

Objectives:

1. Development f methodology and computer model for river flow regional assessment (Aral sea basin) under flow forming factors with regard for possible climatic changes.
2. Most reliable scenarios of climatic changes to evaluate climate changes impact on natural resources and economy.
3. Development of statistical interpretation methods.
4. Assessment of river flow changes under different climatic scenarios are being developed by climatologists in new options.
5. Reliability of possible changes evaluation in the regional climatic system.

3.6 Rehabilitation and development of special observations on Abramov and Fedchenko glaciers

Background

Presently, observations are not being conducted on Abramov and Fedchanko glaciers. These stations are unique because their information is necessary for prediction of river flow in the basin. Existing regional network of meteorological stations is insufficient especially for mountainous territories.

Objectives:

1. Restoration and development of special observations on Abramov and Fedchenko high mountain stations for definition of current conditions of climate formation, assessment of hydrometeorological and climatic conditions.

2. Evaluation of environmental situation in the Aral sea basin.

4. Program of combat with natural disasters

4.1 Project on prevention of water and wind erosion and cost protecting work.

Background

Preventive measures aimed at minimization of damage caused by mudflows, landslides and avalanches are strategic directions of combat with erosion, desertification and biodiversity maintenance in mountain and pre-mountain zones.

Active impact on mudflows allows regulate solid flow and minimize damage reflected in river and irrigation systems siltation.

In case of global warming activity of rain driven mudflows will grow. Regulating documents could lower costs of preventive measures. Natural conditions and character of land and water resources use create potential danger of soil erosion. About 75% of agricultural lands are subject to wind activity and 20% to water erosion particularly on slopes.

Irrigation erosion is developing where wrong irrigation technique (high duties, bad leveling, furrow steep slope) is applied. In the end of 70-es set of special anti-erosion measures were developed. Presently, these schemes need correction and then can be used during anti-erosion activity planning.

Objectives:
1. Increasing anti-mudflow and anti-erosion measures effectiveness.
2. Providing population security.
3. Reducing preventive measures cost.
4. Creating new working places for people living in high mountains.
5. Specification of anti-erosion measures volume, succession and cost.
6. Organizational measures.

4.2 Coast-protecting works and land, settlements protection from mudflows and floods

Background

In connection with global warming, sharp changes in water resources formation take place in Central Asia. In result, droughts and water scarcity, river shoaling and water tract capacity decrease became more frequent. During flood riverside lands are inundated that negatively impact economy.

Objectives:
1. Develop three-dimensional mathematical model for two-phase flow under river channel deformation. Run the model and work out special software for civil engineer-designer. Give recommendations on its utilization for coast protecting measures analysis.
2. Defining river channel, coast-protecting and channel regulating structures state-of-art.
3. Assess river channel capacity.
4 Selection of type and construction of coast-protecting measures.

4.3 Rehabilitation of forest and pasture fund in zone of flow formation

Background

There is wind and water erosion within flow formation zone due to lack of forests and pastures. Forests and high grass protect soil and water, regulate run-off and climate.

Objectives:
1. Increase area covered by forest including coast-protecting planting.
2. Regulate pastures grazing to protect grass.

4.4 Developing Aral sea dried bed

Background

Salt-dust storm occurs during near 300 days a year. More than 75mln.t of sand, dust and salt is lifted into atmosphere and fall out on irrigated lands of Priaralie (520kg/ha). New Aralkum desert has already covered 2mln.ha of arable land and led to degradation of pastures, tugai forests and other vegetation. Forest stripes should soften ecological situation in Priaralie.

Objectives:
1. Creation of forest protecting stripes to prevent salt and dust transfer from dried seabed.
2. Protection of agricultural lands from moving barkhan sands.

4.5 Forest preservation and rehabilitation in Naryn and Chatkal basin

Background

There are coniferous and deciduous forests along Naryn river and its tributaries. Since 1930 till 1988 forest massifs in Kyrgyz Republic reduced almost by 2 times or by 513,3 th.ha. Presently, forest covered area continue to reduce. One of the reasons is timber use as firewood due to gas and coal deficit. Also trend of forest ageing occur: old forests account for 49,9 % or 350,3 th.ha. These forests become source of diseases and pests. During last 55 years forest area in Naryn province significantly reduced: in 1998 it was 105.5ha or 46.6% compared with 1930. This negatively impacted Naryn river water availability.

Within Jalalabad province from Toktogul reservoir to confluence with Syrdarya Naryn river runs at altitude of 500-600 m. Its flow is recharged by Khoja-Ata, Kara-Darya, Chichkan tributaries originating from walnut forests. By 01.01.1998 forest area amounted for 274974 ha including Tyan-Shang – 8049ha, abies – 3365ha, hardwood – 6240ha, walnut – 33200ha,

pistachios – 32464ha, apple trees – 14885ha, almonds – 978ha and others – 117446ha. Forests are growingly subject to fire.

Objectives:
1. Increase forest covered area in Naryn flow formation zone.
2. Improve forest status.
3. Increase area of coast-protecting plantations.
4. Reduce area of old forest and rejuvenate all forest massifs.
5. Eliminate source of harmful insects.
6. Increase catch of nuts, pistachios, apples, etc.

4.6 Project of flood control and flow regulation activity

Background

Peak flow is accompanied by channel erosion, land inundation and buildings destruction. On most of rivers flood control and flow regulation activity is needed. Erosion is especially intensive on rivers with easy eroded channel and banks. Erosion causes damage, which prevention requires certain activity.

Objectives:
1. Definition of river channel state-of-art near diversion points.
2. Assessment of river channel and large canals' capacity providing sediments transportation.
3. Selection of type and construction of erosion preventing structures.
4. Definition of river channel state-of-art and their basins as well as flood protecting measures.
5. Assessment of flood formation.
6. Selection of type and construction of flood preventing structures.
7. Flood protecting and regulating measures conduction on water objects.

4.7 Prevention, eliminating and minimizing damage from natural disasters

Background

Central-Asian republics are subject to active impact of different natural disasters. About half of all known natural disasters are found in CAR. According to WMO, natural disaster frequency increased during recent years. Preventive and adaptive measures could reduce damage from natural disasters. According to calculations, mortality coefficient after 30 minutes is 0,12, after 1 hour – 0,34, after 12 hours – 0,68, after 24 hours – 0,9 and more.

Objectives:
1. Development of set of measures on prevention, elimination or minimizing damage with regard for geographic, climate and economic conditions of the Aral sea basin.
2. Territory zoning on degree of susceptibility to natural disasters.

5. Program of assistance to social issues solution in the region

5.1 Development of inter-sector economic collaboration in joint rational land, water and fuel-energy resources utilization

Background

Current social-economic conditions are characterized by weak inter-sector links at interstate level. This factor is decisive one and requires development of new approaches to water-power resources management as well as irrigation structures operation with regard for agrarian sector and ecosystem needs.

Objectives:

Assistance in elaboration and signing multilateral agreements within framework of interstate initiatives on water-power, agrarian and transport consortiums establishing with attraction of transnational corporations' investments and industrial-financial groups.

5.2 Development of regional specialization and cooperation system in agrarian sector

Background

Population growth and agriculture productivity reduction present serious threat for CAR food security. Due to lack of arable lands and land degradation rational land use is very important. Naturally, growing needs in food require revision of attitude to agriculture and economic policy.

Objectives:

Development of the regional specialization and cooperation system taking into account WUA establishing in agrarian sector.

5.3 Strengthening cooperation of international trade and economic organizations

Background

Presently, one of limiting factors in social-economic progress in the region is lack of cooperation in trade, science and culture.

Objectives:

1. Analysis and development of bilateral and multilateral trade-economic agreements.
2. Strengthening regional cooperation between trade and economic organizations and formation of sustainable development culture.
3. Support regional scientific cooperation for sustainable development.

5.4 Development of regional transport infrastructure

Background

After independence gaining management decentralization took place in all sectors of transport infrastructure. Centralized system collapse led to barter destabilization, contradictions in economic interests, custom barriers and transportation and consumer goods cost increase.

Objectives:

Assistance to living standards increase and poverty reduction at expense of the regional transport infrastructure development.

5.6 Stabilization of demographic situation in the region

Background

Low living standard, malnutrition, lack of public health services, low quality of drinking water salt and dust storm as a consequence of ecological equilibrium violation and environment degradation led to life expectancy reduction, public health aggravation, population growth rate decrease. New economic forms, lack of technical and financial means increase unemployment and poverty. Ecological refugees as a new kind of emigrants appear. Hundreds of thousands people escape from desert zone. Negative social-economic situation activate desertification process, vegetation and land resources exhaustion.

Objectives:

Improvement of ecological situation in the region, development of the regional approaches and national strategies.

5.7 Development of educational programs on civil sector strengthening

Background

Educational program will be a component of common sub-regional program aimed at urgent educational needs satisfaction in Central Asia. There is close link between education and sub-regional “Program of concrete actions on improvement of ecological and socio-economic situation in the Aral sea basin for 2003-2010” (ASBP-2) and Central-Asia initiative on sustainable development of Central Asia.

It is worthy to note that there is experience in educational programs implementation for sustainable development in Central Asia. NGO play important role in such projects and their participation is necessary.

Objectives:

Assistance to creation of sub-regional network in educational system for sustainable development based on principles of inter-sector inter-branch partnership.

6. Strengthening technical and legal base of interstate relations

6.1 Strengthening technical and legal base of interstate organizations, development of regional information system of water resources management in the Aral sea basin

Background

Important condition of effective activity of interstate organizations – EC IFAS, ICWC (SIC, Secretariat, KMC, BWO «Amudarya» and BWO «Syrdarya») and SDC (SIC, Secretariat) is strengthening their legal and technical base. It is necessary to strengthen institutional potential of interstate organizations including coordination mechanism, financial mechanism, mechanism of legal support, monitoring, education and training, link with other programs and public participation.

Important task is perfection of the regional information system with extension of its functional abilities through introduction of new information levels (with transition from region to state, oblast, separate irrigation systems with regard to IWRM introduction, information reliability increase, broadening circle of information users, stable information exchange, service, etc. One of elements of information system development is transition to integrated methods of management and system allotment with advising opportunities. According to ASBP-1 results, technical state of interstate water works does not meet modern requirements. Water account and communication means state-of-art is unsatisfactory. Automation, information processing and storage systems are local.

Objectives:

1. Assistance to institutional potential building.
2. Strengthening ASBP-2 monitoring.
3. Strengthening legal and financial status of interstate organizations, perfection of legal base and its implementation.
4. Improving access to information and public participation.
5. Strengthening technical base of interstate organizations.
6. Feasibility study development for technical perfection of water resources management on base of modern information system, automation dispatching and data collection, telecommunication and monitoring.
7. Introduction of information systems and SCADA.
8. Perfection and development of regional information system.

7. Development and implementation of regional and national programs of environmental protection in flow formation zone

7.1 Perfection of the network of hydro-glaciological monitoring in CAR countries and glaciers (flow formation zone) preservation

Background

Glaciers are very important for Central Asia because they are source of fresh water for the region. Two major water arteries - rivers Amudarya and Syrdarya - originate from Pamir and Tyan-Shan mountains located in Kyrgyzstan and Tajikistan. Natural weather and cli-

mate variations and anthropogenic activity impact glaciers state-of-art. As a consequences, hydro-thermal regime of mountainous systems: according to glaciologists, glaciers' area reduced by one third during last 35 years.

Objectives:

Study of glacier impacting factors dynamics and development of measures on negative impact reduction.

7.2 Mitigating risk from natural disasters in vulnerable mountainous regions of Central Asia

Background

Mountains are subject to both natural catastrophes (earth quakes, landslides, avalanches, mudflows, floods, etc.) and anthropogenic impact (forest cutting, overgrazing, air and land pollution, and industrial activity in mountains. Highest threat of natural disasters belongs to seismic active zone on the crossing of Pamir and Tyan-Shan ridges.

More than 10000 earth quakes, 100000 landslides, thousands of avalanches, mudflows and floods are observed annually in this region. Along with growing anthropogenic load negative impact of these events is also growing. Human activity can potentially strengthen negative impact of earth quake as in case of Gissar earthquake in 1999. Wide agricultural terracing destabilizes mountain slopes and led to landslides. More than 30% of slopes are subject to landslides. Besides, Central-Asian seismologists think that large hydraulic structures like water reservoirs can change seismic structure and increase seismic activity and risks along joint fissures. Undoubtedly, natural catastrophic events can't be prevented but, at the same time, their consequences can be minimized by proper planning of human activity in the region.

Objectives:

Development of set of measures on minimizing impact of natural disasters (landslides, mudflows, earthquakes) in mountainous regions.

8. Development and implementation of regional and national rational water use programs in economic sectors of Central-Asian countries

8.1 Development and implementation of water conservation pojects

Background

Development and implementation of water conservation programs in Central Asia is one from most prioritized directions of irrigated agriculture productivity increase and environment protection, water deficit reduction and collector-drainage system operation.

Objectives:

Propaganda and introduction of advanced water saving technologies in water sector of Central Asia. Development of water conservation programs and pilot projects; their economic grounding.

8.2 Vakhsh river flow regulation by Nurek water reservoir with regard to "Tigrovaya balka" flood-plane tugai reserve interests

Background

"Tigrovaya balka" reserve normal functioning was provided by annual flooding in peak flow period. Nurek water work construction with reservoir of 10,5 km^3 capacity changed natural river flow regime with peak flow and flood cessation. Simultaneously, Nurek power plant annually unproductively releases near 2km^3. This volume utilization in interest of reserve will help to restore its normal functioning.

Objectives:

Optimization of Nurek water work operation and development of technical measures on "Tigrovaya balka" reserve rehabilitation.

8.3 Integrated water resources management in the Aral sea basin

Background

There is high time for transition from administrative-territorial to integrated principle of water resources management (IWRM) in the Aral sea basin. It should be understood that this is only common approach to perfection of management structure within governmental governance maintaining and developing national water governance systems at all levels.

Objectives:

Introduce at various levels of hierarchy (irrigation system, WUA, farm) IWRM based on hydrographic principle (organizational and technical measures).

Demonstration of IWRM advantages from point of view of irrigation system normal operation, even water supply for all users and water productivity increase.

8.4 Construction of main collector and subsurface drainage in Nukus districts №21, 22, 23

Background

Nukus is administrative, industrial and cultural center of Karakalpak Autonomous Republic. Canal Kyzketken crossing the city is a source of irrigation for northern part of the republic. Highest ground water table is observed in spring-summer period along canal and in natural depressions. Shallow saline ground water causes buildings destruction, secondary soil salinization and ecological degradation. Low permeability and low slopes result mostly in water evaporation and transpiration by plants

Objectives:

Construction of main collector and subsurface drainage is necessary for preventing ground water rise, drainage water disposal and soil reclamation.

9. Development and implementation of international program of sanitary-ecological rehabilitation of settlements and natural ecosystems in Priaralie

9.1 Assistance in implementing national pilot projects for population provision with safe drinking water

Background

One of factors determining population health and life expectancy is access to safe drinking water and adequate sanitation. Presently, population suffers from low level services in water supply and sanitation. Most part of supply and sanitation systems should be rehabilitated.

Objectives:

Assistance to mechanisms introduction, which will lead to institutional reforms and "Clean water" program implementation all over the basin with private sector involvement. Such changes are aimed at existing capacities effectiveness improvement through water supply to settlements in profitable and effective manner.

9.2 Perfection of diseases prevention system in ecologically unfavorable zones

Background

Along with social-economic decline share of ill people is increasing. According to "Medicines suns frontiers", tuberculosis annual growth is 35-40 %.

Objectives:
1. Finding ill people at early stage of disease by means of total clinical examination, particularly in rural locality and X-ray photography by mobile units.
2. Establishing monitoring system in zones of crisis.

9.3 Regional measures on vital medicines provision

Background

Blood donor service is one of most important links of health care services in each country. Presently, it provides only minimum needs and does not create necessary reserve in case of emergency.

Scale of Aral sea crisis and its long-term consequences negatively impacted population health. During recent 10 years anemia disease grew by 550 times, urolithiasis by 30 times, infection diseases are growing.

Objectives:
1. Supporting pharmaceutical industry at local level.
2. Assistance to regular and timely provision with vital blood components.
3. Assistance to continuous provision of hospitals with quality and cheap infusion solutions.

9.4 Development of strategy for Priaralie people genetic fund preservation

Background

People health depends on environment including clean water, sanitation and sound food. Infant mortality and life expectancy are major indicators of people health. Compared with 1992 infant mortality before 5 decreased in all CAR countries including Priaralie, first of all, because of low birth rate. Simultaneously, absolute indicators remain very high: each 50^{th} child from 1000 does not live to 1 year and each 30^{th} to 5 years. Most people in Priaralie because of unemployment, malnutrition and poverty can not improve their social status. It results in immunity decrease and pathological consequences.

Objectives:

Genetic monitoring of Priaralie peoples.

9.5 Development of voluntary product and production certification system

Background

Presently, agricultural production does not meet the world quality standard due to lack of certification and standardization. Because of lack of incentives, producers are not interested to produce ecologically pure certified agricultural production.

Objectives:

Elaboration of agricultural production development using high processing technology and agricultural production certification.

9.6 Development of infrastructure of mountainous territories and eco-tourism

Background

One of most important problem in the mountains is providing sustainable human activity in this area. Severe natural conditions combined with danger of natural phenomena are main limiting factors of economic development of these territories. Situation is aggravated by bad communications and their expansive operation. That's why, labor productivity and production profitability are lower compared with plains. Incomes of similar farms are lower compared with the plains. Eco-tourism and recreation are reserves for population income increase.

Objectives:

Successful solution of mountainous population issues is possible in case of:

- development of transport communication providing year round functioning;
- development of scientific-grounded legal base for protection of population rights including compensation measures;
- legal provision of wider population participation in natural resources management and development;
- priority development of social infrastructure.

9.7 Assistance to population in adaptation to market conditions

Background

Deepening Aral sea crisis and its consequences negatively impact social-economic situation in the region. Consequences of severe drought of 2000-2001 even more aggravated situation. According to foreign researches, ecological crisis makes damage of $US200mln/yr. Unemployment level is very high and officially is not registered. Given project supposes to make more active business activity through micro-credits allocation.

Objectives:

Development and introduction of micro-credit programs to make more active business activity.

9.8 Tugai forests and pastures preservation in Amudarya and Syrdarya delta

Background

Unexampled development of irrigated agriculture in the Aral sea basin exceeded ecosystem capacity and led to its destruction and catastrophic ecological consequences. Tugai forests in flood plain subject to especially high stress. Their area reduced during last decade from 150 to 22-23th.ha. This process continues until now. River flow regime change also impacts forest degradation. Flora and fauna population directly depends on ecosystem state. Ecosystem destruction led to significant biodiversity reduction.

Objectives:

- development of measures on tugai forest and pastures preservation in Amudarya and Syrdarya delta;
- forest rehabilitation in flood plains Amudarya and Syrdarya delta;
- development of integrated program of their rehabilitation;
- monitoring of natural forest reserves, nurseries, etc.

9.9 Development of measures to prevent salt-dust transportation from dried seabed

Background

In1985 – 86 under sea level altitude 41 m Big and Small seas were separated. This led to creation of new desert with salt supply in top layer about 1bln.t. Aeolian processes activation became one of main negative factors for adjacent agricultural lands. Experimental field investigations showed that salt and dust is transported at distance of 500-600km.

Objectives:

- -preventing salt-dust transportation from dried seabed;
- -study of ground water and soil cover of seabed;
- -phyto-reclamation works on dried seabed.

9.10 Development and realization of measures on atmospheric air transboundary pollution reduction

Background

Atmospheric air is one of major environmental components. It regulates climate, thermal and energy conditions. Its pollution is caused by natural and anthropogenic sources as well as geographic and climatic conditions. Karakum and Kyzylkum deserts and dried seabed are natural sources of pollution. Industrial and transport sources gave to atmosphere in 1999 7mln.t of pollutants.

Maximum emission belongs to Kazakhstan – 43,7 %; then Uzbekistan – 31,4 %; Turkmenistan -19,9 %; Kyrgyzstan – 3,3 %; Tajikistan – 1,7 %. Analysis showed that most large pollutants are sulfur dioxide and carbon-hydrogen from fuel-energetic sector. This sector is the largest producer of carbon dioxide and methane creating green house effect and global warming.

Metallurgy and mining are large polluters by gas admixtures and heavy metals. Chemical industry pollutes ammonium salpetre, nitrogen oxide, ammonium, phenol, organic solvents. Construction and cement production emit much dust. Main reason for high pollution is lack of treatment: aged gas-dust treatment plants catch about 30%. Besides, production technology does not meet modern requirements an need modernization. Motor transport contributes 60-90% of pollutants in the cities: most part of nitrogen oxide (90%), carbon oxide (70%) and flying carbon-hydrogen (100%).

Objectives:

Development of measures to reduce air pollution level. Umbrella project includes several regional components:

- development of regional register of emission and pollutant transport;
- inventory of stable organic pollutants emission sources;
- monitoring of pollutants emission by large industrial enterprises in transboundary aspect.

9.11 Creation of fish nursery in Muinak rayon

Background

Fish production was main sector of economy in Muinak rayon (more than 80%). In result of drought 2000-2001 all lakes in Amudarya delta have dried up. In 2002 due to project “Creation of local water bodies along sea shoreline in Amudarya delta” realization it became possible to create a base for fishery on the area of 37.8 th.ha.

Objectives:

Creation of specialized fish farms for fish breeding in Muinak rayon. Water supply will be made from Mezhdurechie reservoir along Marinkinuzyak canal. This project will allow to increase fish production, improve its quality and create additional working places.

10. Development of international program of ecological sustainability and biological productivity rehabilitation

10.1 Waste management and reduction its negative impact on transboundary water-courses in Central Asia

Background

Analysis of current state of waste treatment requires take into account general changes in economy. Since 1991 economic decline started, which stopped only in 1995. Decline was accompanied by structural changes characterized by decrease in industry an growth in trade and services. It is worthy to note, that this decline developed on background of continuously growing able-bodied population (in spite of growing migration from the republic). It can be explained mostly be transition to market economy. Analysis revealed the following issues:

- there are no garbage processing plants in the region;
- existing dumps do not meet sanitary requirements;
- there are no centralized polygons for toxic industrial wastes disposal;
- there is no waste classification;
- waste utilization and re-use technologies are not introduced;
- measures on eliminating potential threat of radioactive waste depositories are not undertaken.

There are 130 waste depositories consisting radio nuclides, heavy metals (cadmium, zinc, lead) and other toxic matters. Along with toxic matters depositories, there are many rock dumps subject to transport by water and wind. Power engineering is also one of main polluter. In spite of population and number of small enterprises growth, waste volume reduced that is caused by aggravation of waste collection system functioning. At the same time, in agriculture waste volume increase is observed but these wastes are almost fully used within agricultural production cycle as cattle fodder or organic fertilizer.

Objectives:

Set of measures development on waste minimization and utilization in Central Asia.

Umbrella project includes several regional components:

- development of regional program «Waste management»;
- providing ecological security in Syrdarya, Zerafshan, Chu and Amudarya basin under transboundary impact of waste depositories and rock dumps;
- creation and widening capacities on industrial solid waste utilization located in transboundary river basin;
- Regional network of more clean production centers development.

10.2 Rehabilitation of ecosystems in Amudarya basin

Background

Significant diversity of flora and fauna species depends on pre-water ecosystems, which destruction led to diversity reduction.

Objectives:

Development and realization of measures on water use optimal technologies utilization.

11. Development of sustainable development concept for the Aral sea basin

11.1 Development of inter-sector economic cooperation in joint water-power and land resources rational use

Background

Since main goal of the program is prevention of social-economic crisis can be achieved only within the framework of sustainable policy, concept of sustainable development in the basin as one of priority directions of «Program of concrete actions in the Aral sea basin for 2003-2010» has been approved.

In Nukus (1995), Issik-Kul (1995), Almaty (1997), Ashgabat (1999), Dushanbe (2002) declarations transition to the sustainable development policy, integrated approach, ecosystem and integrated management of natural and water resources was declared.

In Johannesburg Summit (2002) all countries confirmed once more their commitments on national and sub-regional strategies development. Main principle of ASBP concept is system of regional development goals and main directions of their realization (including mechanisms of coordination, financing and public participation), on base of which, with regard to economic, social and ecological conditions, Aral sea basin will be developed (Agenda 21 ASBP). ASBP-2 concept is based on its priority directions approved by the Heads of State and sub-regional and national reports, strategic documents, statistical data, etc. Upon ASBP-2 approval it is planned to start development of strategy (ASBP agaenda 21) in detail for long-term period.

Objectives:

Development single long-term conceptual base for regional programs development, Agenda 21 preparation support for sustainable development at local, sectoral, national and regional level.

12. Regional program of combating desertification

12.1 Combating desertification, elaboration of alternative options of economic development

Background

Land degradation in result of erosion, pollution, deforestation, salinization, etc. is caused by both natural-climatic factors and human activity. Recent years overgrazing is increasing, arable lands fertility is decreasing due to removal of nutrients with irrigation and rainfall waters, erosion and salinization, cropped area and crop yield are decreasing, soil and water pollution aggravates.

Significant part of land resources is subject to desertification, vegetation degradation, sand deflation, soil pollution by industrial and municipal wastes, toxic matters, etc. These factors lead to soil function change, its properties worsening and value decrease. Desertification leads to economic decline in rural locality and reduce income, diseases dissemination and life expectancy reduction.

Objectives:

Set of measures development on desertification and land degradation combat in Central Asia. Given project is directed at introduction of alternative kinds of economic activity in order to reduce economic pressure on land and vegetation resources and population well-being increase.

12.2 Land degradation preventing and rehabilitation in the Aral sea basin

Background

Land degradation in result of erosion, pollution, deforestation, salinization, etc. is caused by both natural-climatic factors and human activity. Recent years overgrazing is increasing, arable lands fertility is decreasing due to removal of nutrients with irrigation and rainfall waters, erosion and salinization, cropped area and crop yield are decreasing, soil and water pollution aggravates.

Significant part of land resources is subject to desertification, vegetation degradation, sand deflation, soil pollution by industrial and municipal wastes, toxic matters, etc. These factors lead to soil function change, its properties worsening and value decrease. Desertification leads to economic decline in rural locality and reduce income, diseases dissemination and life expectancy reduction.

Analysis showed following major issues in land degradation:

- secondary salinization and water logging under irrigated farming;
- irrigation induced soil erosionи in mountainous and pre- mountainous regions;
- -overgrazing;
- deflation and technogenic desertification under land agricultural and industrial development;
- pollution and soil fertility losses under agro-chemicals application, industrial and municipal wastes;
- soil salinization caused by the Aral sea shrinking.

Objectives:

It is necessary to survey lands and define trends of their degradation.

13. Wetlands development in Amudarya and Syrdarya lowlands

13.1 Wetlands development in Syrdarya delta

Background

In connection with the sea retreat, existing Syrdarya channel has been washed out and deepened, lakes were not regularly inundated. In natural conditions water bodies productivity was supported under inundation as follow: lakes – 69 th.ha, wetlands – 59 th.ha, meadow hayfields – 81 th.ha. Aral-delta ecosystem does not exist more, lakes dried up, fishing is stopped, meadows are dried up too, delta desertification started. Part of lakes is planned to be inundated by earthen dikes and dam "Aklak" construction. In the future second dam "Raim" construction is planned for guaranteed lakes inundation. But taking into account limited water resources and lack of backwater from the sea, regulation of water level in delta is not guaranteed.

There is need for regulating dams and structures. For that, scheme of water regime regulation is foreseen. Within this scheme, priority projects development and realization on dams and regulating structures construction as well as Northern sea rehabilitation are planned.

Objectives:

1. Making conditions for delta lakes water regime regulation.
2. Realizing measures on partial rehabilitation of delta bio-productivity and socio-economic conditions improvement.
3. Making water body near Aralsk with stable water horizon both in dry and wet years.
4. Providing free navigation in Northern sea during ice-free period.
5. Improvement of ecological situation in city of Aralsk and in Northern sea coastal zone.
6. Working places making and unemployment reduction in Aralsk city.

13.2 Wetlands development in Amudarya delta

Background

Since the Aral sea shrinking beginning, desertification prevention becomes one of main goals. In the beginning of 90-es in order to improve ecological situation small water bodies creation has been started close to settlements of Muinak rayon but then they were stopped. Project is directed at wetlands preservation in lowlands through network of small water bodies , regulated lake systems and local experimental sites on wetland preservation and their biodiversity maintenance.

Objectives:

Project foresees urgent measures on engineering regulation of water regime and Mezhdurechie capacity increase, lake system rehabilitation in Muinak rayon with further entire delta rehabilitation. Such strategy takes into account existing financial limitations and water resources deficit.

14. Saline collector-drainage water use rationalization

14.1 Management of transboundary return water in the Aral sea basin. Collector-drainage water regulation and utilization. Measures on collector-drainage water quality improvement for its re-use to cover water deficit

Background

There are 35-36 km^3 collector-drainage and waste water annually released into the rivers or local depressions – lakes and wetlands. In result of this, river water quality in middle and lower reaches aggravated that caused land salinization and threat to population health. Water salinity and pollution in desert depressions are growing, water and coastal ecosystems are degrading. Mainly collector-drainage water is transboundary one: water formation occurs in one state and its transit and pollution - in another. Under growing water deficit

Under growing water deficit drainage water could be additional source. But its quantity is unstable and quality can create new issues in places of its re-use. Drainage water impact on agro-landscape will lead to agricultural production decline. That's why, integrated assessment of drainage water quantity and quality, conditions and regime of its formation, forecast for various development strategies.

Objectives:

Establishing system of transboundary return water management providing river water quality natural biodiversity in desert depressions (water bodies and lakes) and utilization of secondary water resources as well as development of scientifically-ground measures on hydro-ecosystems and agro-landscapes on base of saline drainage water re-use.

14.2 Turkmen Lake of Golden Century completion.

Background

Main issues, which Turkmenistan faced are as follows:

- drainage water release to Amudarya and as consequence irrigation water worsening in lower reaches where lands of Turkmenistan and Uzbekistan are irrigated;
- negative impact of collector-drainage water released from Uzbekistan through collectors Daryalik, Chagat-Atabent and Ozerny on irrigated lands of Dashovuz veloyat;
- Sarikamish lake area increase due to excessive water coming along interstate collectors;
- due to water recipients absent for drainage water from irrigated lands of Labap, Mary, Ahalsk and Balkan veloyats provisional decision has been made to release this water in Karakum desert where pastures were flooded.

Realization of Turkmen Lake of Golden Century project will allow use more rationally internal drainage outflow and improve ecological situation. Total length of collector system is more than 2650km and command area is 2240 th.ha. Total area of irrigated lands to be reclaimed exceeds 2mln.ha. lake construction has been started since 2000 at expense of state budget. Presently, part of water-pipes and head structures has been completed.

Water supply to the lake along open canal is planned for nearest 2-3 years.

Objectives:

Improvement of ecological situation in Turkmenistan and in Amudarya lower reaches avoiding drainage water release to Amudarya, Tejen, Murgab and Central Karakum and increasing irrigated land productivity.

WORLD WATER WEEK IN STOCKHOLM

On August 10-16, 2003 in Stockholm 13th international water forum has been held. Since 1991 each August lead water specialists come to Sweden capital to take parting the World Water Week. Within the framework of this Week, symposia and other events are being carried out where practical, political and scientific aspects of water resources effective management are considered.

By efforts of Stockholm International Water Institute annual forum is transformed into picturesque water festival involving fairs, concerts, exhibitions under slogan of water conservation.

Main theme of Symposium within framework of Water Week 2003 was formulated as follow: "Security of drained basin: balance of production, trade and water use".

Official opening started on August 11, 2003 with plenary session. Session was opened by Dr. Ulf Ehlin who gave word to Stockholm Institute Director Andreas Bertel for official inauguration of Water Week. He underlined that present water situation aggravation makes to take into account diversity of impacts on ecosystems. "Everybody lives in basin! Everybody has right on water, on nature conservation for his descendants as a memory of previous generations and previous prosperity! But this requires huge investments, additional investments in water sector and basin management!" Swedish government in person of the Minister of Environment Lena Sommestad greeted 1200 participants from more than 100 countries. "Understanding basin unity from position of needs satisfaction, pollution prevention and balance of possibilities and needs is main line in Swedish government behavior…"

After Johannesburg water remain major priority for Swedish government like rest of European continent…Sweden organized Stockholm Forum as a mean of cooperation with all organizations all over the world. This organization started to work in joint water resources use in Middle East – Israel, Jordan and in Asia - Pakistan, India. Along with transboundary issues, Swedish Home supports water supply as the first priority reducing number of people not having access to safe water and sanitation.

Norway Minister Berge Brende, Chairman UN Commission on Sustainable Development made key presentation. "In time of Johannesburg we added one important aspect – it is necessary to think about water disposal when you think about water supply but it is not only water supply and sanitation – it is unity of all nature protection measures in the basin regarding drainage basin state-of-art. IWRM was recognized as main direction of water movement because it both strengthens water management and security…

Irrigation in developing countries is main consumer and the Aral sea is an example what can happen. UN has this year big problems but only opportunity to show its power is to cope with environmental issues especially in water scarce regions. It will show power and importance of UN. Tranboundary water is another problem, which should not be closed but be a problem of relations between upstream and downstream".

Major issues were discussed within framework of eight seminars.

Seminar № 1 – "Strategy of water flows management" where prof.Torkil Jonch-Klausen from Denmark was a Chairman. Seven oral reports and6 posters were presented. It worthy note speech of James Pittock, "Live Water" program Director from Wild Life Fund, the Netherlands.

He declared that even in the Netherlands water diversion doubled during last 40 years, bio-diversity index reduced for the same period from 1 to 0.7. He gave definition to eco-region as water and land space, which consists of completed assembles of different eco-populations with area of their dissemination. For many eco-regions he and his team studied peculiarities of hydro-ecological state coming out deep analysis of fauna and flora. For example, In Central Asia nobody links water and environment, everybody says about water use. From this point of view, suggested methodology is very interesting to demonstrate in different basins including Central Asia.

Well known in our region Dr.Patricia Wouters presented report "International water right in basin security". Her position is that "water laws" should fix principle "water for all". For this she proposed "model of water laws assessment" and presented interesting and universal, from her point of view, approach to water right assessment.

Seminar № 2 – "Link between basins management and local plans of action and national policy" under chair of prof.Azit Biswas from Mexico. Fourteen oral presentations and 6 posters were presented; among them some papers from CIS countries: Natalia Davidova, Russia (report on Volga river where registration is being done without water specialists participation); Kuznetsov, Ukraine (report on Dnepr); U.Abdullaev and A.Voronov and G.Khasanhanova, Uzbekistan (Links between basin management and national water plans).

Young scientist from Germany Kai Vehler presented report about wrong approach to Amudarya downstream water resources management.

Seminar № 3 – "Climatic variability, water systems and management options" under chair of Bill Kosgrove, Canada. Seven oral reports and 4 posters were presented. Modern trends in climate variability and necessary measures for water management adaptation to these changes were presented.

Seminar № 4 – "Food security under climatic variability" under chair of prof. Ausaf Rahman, USA. Seven oral reports and 5 posters were presented. Solutions on agricultural production increase under climate variability were presented.

Seminar № 5 – "Water pollution prevention as a measure for ecosystems protection" under chair of prof.Tabet Chiuta, Zimbabwe. Eight oral reports and 6 posters were presented. Prof.R.Kulmanov from Uzbekistan presented poster "Problems of water-land resources sustainable development in Uzbekistan".

Seminar № 6 – "Flows monitoring, understanding and management in watersheds" under chair of Pit Odendaal, SAR. Six oral reports and 5 posters were presented. R.Torynnikova (UzGidromet) presented poster "Status and trends in water quality management in Syrdarya basin"

Seminar № 7 – "Role of virtual water market right management" under chair of prof.Peter Rogers, USA. Seven oral reports and 1 poster were presented. One from key reports was made by prof.Peter Rogers, professor of Harvard University: "Virtual water flow and agricultural trade". Its main idea is –the world can feed itself even under current water supply level. "Water selling" as food import will amount according to different evaluations from

685 km^3 (Rogers) to 1148 km^3 (FAO). Report caused wide discussion because forecast on price of agricultural production is too optimistic – already now under water scarcity prices on agricultural production increase by several times on internal market (we have similar examples when in dry years rice price is 3 times higher compared with the world one). Dr.Mohale, former director of India Water Commission presented report "IWRM in India". It stipulates that IWRM structure can't be typical: in each case it should be adapted to water users' interests and take into account management structure and methods as well as interrelations between provinces and local self-governance peculiarities.

Seminar № 8 – "Urban development and industrial growth management in the basin perspective" under chair of Antony Milburn, Great Britain. Five oral reports and 1 poster were presented. It worth to note, that competition was carried out among posters. Poster from Kenya "Poverty reduction and social development through IWRM realization" has won this competition. Winner obtained invitation with full coverage of all expenditures. One from brightest events was water prize awarding. Prize was established by Stockholm Water Fund (21 states) in 1991 and values 150th.$US. Prize is annually awarded by His Majesty King of Sweden Karl XVI Gustav in Stockholm municipality. In 2003 this prize was awarded to prof.Peter Vilderer from Munich Technical University for "New approach to realization of sustainable water management systems in urbanized zones".

Within framework of symposium several special seminars were conducted in parallel outside main program. On August 10 seminar for young specialists (up to 20 years old) on theme "Water basin security – virtual water market application and subsidies for agricultural production at regional, national and local level" was held. Young specialists from 25 countries presented their reports. Prize of 5th.$US for best report was awarded by Her Majesty Princess of Sweden Victoria to pupil from SAR Clair Rade for water saving in garden demonstration.

Special seminar "Aral sea present and future" was held on August 10 before official symposium opening. Seminar was organized by Japan Global Infrastructure Fund (GIF) because Aral sea issues were not enough stressed at the Third World Water Forum in Kyoto in March 2003. Moreover, GIF representatives expressed their insufficiency for not giving them a word in the Forum. According to GIF opinion, concerned parties last years did not present new ideas and did not take any commitments for nearest future. Group of specialists from Uzbekistan – R.Giniatullin, U.Abdullaev and G.Khasanhanova took parting symposium by special GIF invitation.

On August 12 seminar "Dialogue – Climate and Water" under chair of Bill Kosgrove where new program of the regional projects under auspice of GWP and International Dialogue Council was presented. Among 12regional presentations most detailed developed was program for the Aral sea basin (authors: V.Dukhovny, V.Sokolov, N.Agaltseva and V.Prihodko). Program leader Henkvan Sheik from Holland noted that "this presentation should be example for other regions".

On August 14-15 8th annual GWP meeting was held. V.Sokolov, Chairman of RTC GWP Central Asia and Caucasus (Uzbekistan), S.Aknazarov, RTC member (Kazakhstan Eco-Forum) and Maryam Makarova (Ministry of Environment, Georgia) took part in this meeting. GWP strategy for 2004-2008 was main subject of discussion. Strategy general provisions and details for each of 12 regions (including Central Asia and Caucasus) were discussed. Main strategy content is its support for practical measures on IWRM principles re-

alization at various levels and in different conditions. At GWP Steering Committee meeting on August 15 working programs and budgets were approved for all 12 regions. GWP program for Central Asia and Caucasus for 2004 will be funded from central budget in amount of 200 th.$US. Other details of this meeting can be found on site www.gwpforum.org.

In last day of forum seminar of Stockholm International Water Institute was held where decision has been made to carry out next Forum on August 15-24, 2004 on theme “Drainage basin management: regional approaches to food and security of urbanized territories”. First announcement will be officially circulated in the beginning of 2004.

More detail information about World Water Week can be found on site www.siwi.org.

THE THIRD GENERAL ASSEMBLY OF THE WORLD WATER COUNCIL

(Marseilles, France, September 29 – October 2, 2003)

Background

Following principles of Dublin Declaration of 1992 and according to decisions of Ministerial Conference on potable water supply and environment conservation, which was held in March, 1994 in Noordwick, the Netherlands (which were approved by Sustainable Development Commission and UN General Assembly), the World Water Forum concept was adopted. International Water Resources Association (IWRA) on the meeting in Cairo in 1944 established special committee on preparation for the World Water Council (WWC) formation. This Committee gathered first in Montreal (Canada) in March 1995, and then in September of the same year in Bari (Italy). These two meetings defined WWC mission and goals, which was formally established in Marseilles on 14 June 1996. WWC actions are oriented on own Statute based on French Law of 1of July 1901. WWC headquarters is located in Marseilles (France), and its activity is funded at the expense of membership fees and partially financial support on part of French Government and the World Bank.

WWC goals are:

- identification of critical water problems of local, regional, and global significance on base of available assessment of water situation on the Earth;
- increase of awareness of critical water problems at all decision-making levels – from high level officials to wide public;
- ensure forum for establishing general strategic vision on integrated water resources management on sustainability basis as well as promote implementing effective policy and strategy all over the world;
- provide recommendations and appropriate information for organizations and decision-makers on development and implementation of complex policy and sustainable water management strategy with taking into account social and environmental factors as well as gender equality;
- contribute in transboundary water problems' solution.

Thus, WWC is a think-tank providing organizational feed-back for requirements of integrated actions of big number of agencies and institutions involved in water management in the whole world. It is implemented by organizing and conducting WWFs as well as issuing journal "Water Policy".

The First World Water Forum was held in March 1997 in Maraquesh (Morocco). There responsibility and mandate were defined for development of global "Vision for Water, Life, and Environment in 21" (Global Water Vision).

The Second World Water Forum was held in March 2000 in the Hague (the Netherlands), where 120 ministries and above 5500 participants from 156 countries took part. The WWF-2 adopted Global Water Vision – necessity of making water everybody's business.

The WWF-3 was held in March 2003 in Kyoto, Shiga, and Osaka (Japan). This Forum gathered above 2000 participants from the whole world. Two fundamental documents were pre-

sented there: “Global water actions – to make water flowing for all” and “Water Funding for all”. Moreover, there hundreds initiatives were put forward.

The third General Assembly earlier (for 31 of August 2003) WWC included 300 members (216 active ones having the vote and 84 non-active - observers) representing 45 states and big range of international organizations. In period between General Assemblies WWC activity is executed by WWC Board – 36 members elected by voting on General Assembly.

The Third General Assembly

Extraordinary WWC General Assembly, where above 75% of active members attended, was held on 30 September, 2003. Its conduction was caused by necessity of bringing changes in WWC Constitution. Need in revision is connected with institutional changes directed on ordering WWC activity that, in turn, was caused by changes occurring in common water situation in the world. The World Bank was initiator of such revision. Within frameworks of extraordinary General Assembly following decisions were adopted:

WWC work bodies were also changed:

abolished: Executive Committee, Financial Committee, Program Committee, Committee on relasionships, Regional Center and Committee on membership, World Water Committee Fund, as well as all temporary WWC workbodies;

established: two permanent committees – Committee on organizations and management and Committee on Science and Technologies; Commission on juridical and financial affairs; Advisory Committee as well as «Water Policy» Journal Board.

Some changes were brought in reforming regional and thematic WWC centers.

WWC Board was changed – to transform it to more representative body (over sectors and in geographical aspect).

Appropriate changes were made in election processes in all above mentioned WWC bodies.

WWC membership fees structure was also revised. Beginning since 2004 membership fees amount will be established basing on amount of GDP per capita.

WWC membership fees amount from 2004, USD

GDP per capita (US$)				
< 1000	1000-2500	2500-7500	7500-20000	>20000 and international
300	500	700	900	1100

Appropriate changes were brought in WWC Constitution and Statute.

Within extraordinary WWC meeting frameworks the Board meeting was held, where the issue of conducting WWF-4 was considered. As it was reported to meeting participants – according to results of considering three applications for WWF-4 conduction in March 2006

from Canada, Turkey, and Mexico – by a majority of the Board members Mexico was selected as the place of next WWF conduction.

The next Third WWC General Assembly, where 77% active members attended, took place on 1 and 2 of October 2003. The first plenary meeting started with scandal – delegation from Turkey (29 active members), having protested against selecting Mexico as place of WWF-4, left Assembly. On their opinion, elections were conducted with procedure violation. Rest 62,5% active members composed demanded quorum (50%) for Assembly legality.

The Assembly considered following agenda issues:
- adoption of 3-year report about WWC activity;
- approval of financial and audit statements for 2000, 2001, and 2002 years;
- adoption of WWC work program for 2004-2006 years.

Moreover, Assembly participants took part in three parallel workshops on following themes:
1. Water funding for all – requirements and benefits.
2. Progress assessment – WWC policy development and implementation.
3. How organize the 4th World Water Forum and other global events.

In final Assembly part elections of 20 new members for WWC Board (within rotation frameworks) took place. Forty-two candidates from 18 states were presented. According to secret voting results Prof. V.A. Dukhovny, SIC ICWC Director, was elected as one of 20 newly elected members.

On October 2, at once after the 3rd General Assembly closing (at 19.00 p.m.) WWC Board meeting in its new staff was held. V.I Sokolov, SIC ICWC Deputy Director, took part in this meeting by proxy of Prof. V.A. Dukhovny absent because of sickness.

According to agenda following issues were considered at WWC Board meeting:
1. Presentation of new WWC Board members and their approval.
2. Election of new WWC President and two vice-presidents. The Board members expressed deep appreciation and gratitude for its fruitful work to the first WWC President PhD Mahmood Abu-Zeid, Minister of Irrigation and Water Resources of Egypt, who has been in this position for two years. William Kosgrow (Canada) was elected unanimously as WWC President for 3 years. Benedito Braga (Brazil) and Loik Faushon (France) were elected as WWC vice-presidents.
3. Elections of new WWC committees' chairmen.

Finally, it was decided to conduct next WWC Board meeting in March 2004 in Mexico city – having accepted polite invitation from Mexico National Water Commission.

ABOUT ICWC DELEGATION PARTICIPATION IN 54TH IEC ICID SESSION

The 54th Session of International Executive Committee (IEC) of International Commission on Irrigation and Drainage (ICID) was held on September 14-19, 2003 in Montpellier, France. IEC is a supreme regulatory ICID body, which consists of president, 9 vice-presidents, and representatives from 101 state-ICID members.

At own sessions IEC considers aspects of scientific and technical activity implemented within ICID frameworks, including its administrative-executive and financial functions fulfilled permanently by acting Secretary in Central Office, New-Delhi (India). One of the main IEC objective – review and approval of the reports, recommendations, and working committees' plans (committees, working groups and expert groups with total number about 30) on different issues of irrigation, drainage, and flood control in regions of Asia, Africa, America, and Europe.

IFAS Board member, ICWC member, First Deputy Minister of Agriculture and Water Resources of Uzbekistan, Chairman of Uzbek National Commission on Irrigation and Drainage A.A. Jalalov, and SIC ICWC Deputy Director, ICWC Training Center Director, P.D. Umarov (leaving by proxy of SIC ICWC Director Prof. V.A. Dukhovny invited to this session).

ICWC Delegation took part in the work of specific working group on Aral Sea basin (ST-ARAL) conducted by ICID vice-president Prof. Ch. Madramotoo. The Chairman and other members of specific working group expressed a big regret about illness and absence of deputy chairman of specific working group Prof. V.A. Dukhovny and wished him to get better as soon as possible and come back to ICID family.

In response A.A. Jalalov thanked the Chairman and the members of specific working group and gave brief information on current Aral Sea basin problems, recent International Forum on Fresh Water and "Program of Concrete Actions on improvement of environmental and social-economic situation in the Aral Sea basin (ASB) for period 2003-2010", which was held in Dushanbe. According to meeting agenda other issues were considered too – inclusion of other ICWC members in ASB specific working group staff – representatives of Kazakhstan, Kyrgyzstan, Tajikistan, and Turkmenistan, ICID membership fees payment.

Representing ICWC members A.A. Jalalov promised to help in decision making of these issues up to the next session on technical irrigation and drainage IPTRID program, which is being implemented under FAO and will be held on 5-11 of September 2004 in Moscow.

IPTRID/FAO representative H. Denecke reported about that SIC ICWC jointly with MacGill University (Canada) and Wallingford Hydrology Research Institute (UK) executed the project "Sustainable irrigated agriculture strategy with economically acceptable investments in ASB drainage", on which it is planned to organize special workshop at the end of this year in Tashkent with involvement of the representatives from World Bank, CIDA, and other donor organizations. A.A. Jalalov offered to associate this workshop with the next ICWC meeting that will facilitate participation of all rest ICWC members.

Reporting on further IPTRID program initiatives H. Denecke informed about results of IX ICID International Drainage Workshop, which was held on 10-13 of September 2003 in

Utreht (the Netherlands), where also the project "Sustainable irrigated strategy with economically acceptable investments in ASB drainage" was approved, and proposal of application to ICID about selecting place of the next X ICID International Drainage Workshop organization – Central-Asian region, was supported. The meeting participants decided to discuss this proposal on the drainage working group meeting, which has to be held next day.

Under discussion of issues of capacity increase in ASB region training program of high and middle level experts from water organizations of Central Asia, implemented by SIC ICWC jointly with MacGill University, was reported about. In result of this discussion conducted works and efforts on organizing ICWC Training Center branches in Osh and Urgench have been approved. Also it was recommended to accelerate works on opening other sub regional branches in purpose of decentralization and further training activity extension.

A.A. Jalalov presented final report on situation in water resources management in Central-Asian region as well as implemented in Uzbekistan reforms on introducing integrated water management. This report attracted big attention of the meeting participants, which ended by lively discussion.

Drainage working group meeting was presided by PhD U.F. Vlotman (International Reclamation Institute – ILRI, the Netherlands). As permanent monitors of this working group ICID vice-president, Prof. Ch. Madramotoo and IPTRID/FAO H.Denecke took part in the meeting activity.

According to meeting agenda along with such issues as joining of new working group members, review of published papers and papers under preparation for publication, interaction between drainage working group and other groups, development of database on drainage. The report of PhD Vlotman was discussed on results of IX ICID International Drainage Workshop (10-13 of September 2003, Utrecht, the Netherlands), where 120 experts from 25 world countries took part.

The main goal of this workshop – to discuss role and place of drainage in integrated water resources management (IWRM). Utrecht Declaration adopted on this workshop paid special attention to formulating plan of actions, which included also issues of drainage policy development in ASB in section 2: "Drainage – IWRM tool". Specific subject of working group discussion was the issue of next X ICID Drainage Workshop place in 2006. Representative of Finnish ICID Mr. R. Peltomaa suggested to make Estonia a place of next workshop in honor of its joining European Union. Alternative proposal was made by ICID vice-president Ch. Madramotoo and IPTRID/FAO H. Denecke to adopt Central Asia as a place of the workshop, motivating that there the project on elaborating drainage strategy is implemented, and in the end of 2003 the workshop integrating with ICWC meeting will be held.

After discussion it was decided to prepare proposal in written form, and to adopt final decision on 55th ICID Session in Moscow.

Elections of ICID vice-presidents became main event of 54th IEC ICID Session last day.

According to ICID Statute in this year three-year term of three vice-presidents' authorities should expire – Prof. Ch. Madramotoo (Canada), Dr H. Malacho (Australia), Dr Sun-kuk Kwun (Korea), and instead of them on presentation of National Committees of state-ICID

members ICID Secretary selected and included in bulletin for secret voting following 5 nominees:

1. O. Chukayev (Macedonia)
2. V. Dukhovny (Uzbekistan)
3. R. Zheyaslan (India)
4. O. Myaint (Mjanma)
5. A. Vidal (France)

According to results of conducted voting ICID vice-presidents for three years following persons were elected: V. Dukhovny (Uzbekistan), R. Zheyaselan (India), and A. Vidal (France).

ABOUT «IWRM-FERGHANA» PROJECT

Activity "Water and land use efficiency at farm level". On 15 of September 2003 in WUA "Akbarabad" (Kuva rayon, Ferghana oblast) the workshop "Experience in effective irrigation and land treatment measures on increasing land and irrigation water efficiency" was held.

The project oblast monitor A. Fazylov opened the workshop. He greeted all participating farmers, thanked them for that in spite of their business they had found time for participation in such an important for farmers workshop. He expressed special gratitude to involved women-farmers and said that for the first time in this rayon on similar meeting women were active and constituted almost half of all participants.

Oblast executor on Ferghana oblast F. Rasulov presented the report "New institutional water management structure and its role for equitable water allocation and water efficiency increase ". He briefly touched the issues of water use and allocation at oblast level, the current problems in water sector of agriculture as well as significance of new institutional structures in effective water allocation at farm level. He told about main project aspects, underlined its importance for agriculture and water resources management within frameworks of agricultural and water reformation conducted in Uzbekistan.

Sh. Mukhamejanov and S. Nerozin in their report on theme "IWRM-Ferghana Project experience in water and land efficiency increase on demonstration plots" based on data of the first year monitoring (2002) told the farmers about shortfalls in private farms regarding irrigation water use and land treatment. Further they showed ways and opportunities of agricultural crop yield increase as well as effective irrigation water use in private farms. They demonstrated water management and account approaches, field certificates, and optimal technological irrigation schemes.

Engineer of the private farm "Khozhalkhon-ona-khozhi" I. Ganiyev told about monitoring organization in p/f "Khozhalkhon-ona-khozhi" and obtained results. On example of the private farm he shared experience of effective irrigation water use as well as land treatment application.

The farmer of this private farm B. Boltaboyev has demonstrated irrigation technique and planning sheet of land treatment.

The farmer M. Tozhiboyeva from p/f "Malikakhon" raised unstable water availability problem, and this problem is the main reason of yield loss.

After short break the workshop participants visited p/f "Turdiali", Kuva rayon. Engineer of this farm M. Mirzaliyev has shown demonstration plot, water metering devices, evaporator, told about carried out measurements and monitoring, shared with experience of effective irrigation water use as well land treatment application.

On the field the farmers were interested in water metering equipment, water discharge calculation methodic, regimes, dates, norms, and types of applied fertilizers, non-irrigation cultivation amount, vermin control and prevention issues. The discussion was held, in which the farmers, project experts, oblast and rayon project executors took part.

COMPLETION OF THE PROJECT "AUTOMATION OF UCHKURGAN WATERWORKS' GATES" FUNDED BY SWISS GOVERNMENT

The Project "Automation of Uchkurgan Waterworks' gates" funded by Swiss Government has been completed successfully. Last month final examination was carried out, and final trench was implemented.

Total project duration: 01.01.2001 - 30.09.2003

Budget: 335 000 Swiss Francs.

Objective: automation of 25 gates on Uchkurgan Waterworks at Naryn River in north part of Ferghana Valley.

Project executors – BWO «Syrdarya», SIC ICWC, company «Sygma» (Kyrgyz Republic) under financial support of Swiss Development Cooperation agency (SDC). Works on Uchkurgan Waterworks were fulfilled with using experience from automation of Chirchik and Pakhtaabad waterworks funded by USAID under the project "Natural resources management".

Uchkurgan Waterworks plays important role in water distribution on the most part of Ferghana Valley through following main canals: Big Ferghana Canal, Khalkabad, North Ferghana Canal.

Result and impact:
1. Improved control and monitoring providing more accurate (in amount and time) water distribution over main canals.
2. Improved communication and information exchange between finite users (farmer) and waterworks' manager.
3. Report on test period (June 2002 –September 2003) prepared by BWO "Syrdarya" and SIC ICWC shows rather satisfactory system operation.
4. Hydropower located upstream Uchkurgan Waterworks under peak power generation causes high drops of waterworks discharge. These fluctuations can be balanced and smoothed by automated regulation system with positive economic effect.

WORKSHOP «INTEGRATED WATER RESOURCES MANAGEMENT– INTER-SECTORAL AND INTERSTATE APPROACHES»

The workshop under program "Integrated water resources management – inter-sectoral and interstate approaches" was held on 3-7 November in ICWC Training Center. In this workshop experts of oblast, rayon, and basin water organizations, research institutes and NGOs took part.

Workshop participants elaborated recommendations for IWRM implementation in region:

The participants noted that for current moment regional organization are not having sufficient status, which allows carrying out successful activity in region. On their opinion, it worth to stipulate also water organizations' rights at national level as well as users' rights. To provide integrated water management legal base should be prepared, which could give an opportunity of IWRM implementation in CAR. IWRM dissemination at regional level calls the parties to join international conventions – as, for example, "Conventions on conservation and use of transboundary waterways and international lakes". In some countries certain property type for agricultural organizations still doesn't exist that, to some extent, hampers effective WUA activity.

Concrete measures recommended by the participants are:
- improvement of water legislation, investment and tax policy directed on promoting for IWRM principles implementation;
- development of clear ground for water users' concern about water conservation;
- clear definition of rights and responsibilities of agricultural organizations according to property types;
- improvement of WUA legal base.

Public participation in providing effective water use plays important part. In connection with this public access to information promotes increase of water users awareness and trust to water management reforms. NGO involvement in public notification process provides public participation process development. To form public opinion of careful water use many levers can be used such as:
- water companies and specific measures;
- specific radio and TV programs;
- free access to data.

The participants underlined following specific measures in this field:
- organization of regional conferences, workshops on different aspects of water management and sectors concerning issue of IWRM concept ensuring with NGO involvement;
- preparation and dissemination of materials of IWRM concept background for wide public awareness in region with NGO help;
- encouragement of process of public council development on water issues, consisting of representatives of different water user levels;
- establishment of public basin regulation council;

- organization of series of seminars in above-mentioned fields for broader disseminating IWRM concepts.

The participants noted that in water economy of CAR states the trend of some IWRM principles' introduction exists, for example, transition to basin water management principle. But economical situation of states doesn't allow providing of sustainable water economy development. Lack of finances creates many problems to water workers.

Having orientation on sustainable water economy development, the participants put forward following practical proposals on improvement of economical and technical sector supply:

- definition of certain mechanisms and funding sources, formation of basis for financing attraction from these sources;
- gradual replenishment of WUA technical service.

The workshop participants recommended following measures for providing water conservation:

- use in practice revision acts on water use between rayons and oblasts;
- develop water users' encouragement mechanism for water saving in the form of bonus in size of public costs for water resources formation, release from taxes, and other additional material stimulus;
- development of service centers for farmers on providing consulting services in fields' certification and water efficiency increase;
- vide use of information technologies and programs in planning and supervision of agricultural lands' water consumption;
- strict observance of irrigation and drainage requirements;
- organization of on-farm water account and irrigation regime observance.

HYDROPOWER NEWS

Reconstruction of hydropower Dniepro-1[1] has been completed

In the Ukraine reconstruction of 6 units of one of two hydropower plants of Dniepr River water sector – Dniepro-1. Turbine rotor blades and entrance blades, regulators, excitation system, control and protection systems of each from six units were replaced. Hydropower capacity increased by 42 MWt.

Dniepr River water sector includes reinforced concrete dam of height 52 m with emergency spillway intended for discharge 22 300 m3/sec, and hydropower Dniepro-2 with capacity 888 MWt operating since 1975. Firstly hydropower Dniepro-1 was ut into operation in 1932 with installed capacity 648 MWt.

During the Second World War the dam and hydropower Dniepro-1 were seriously damaged. After war the plant was equipped with Francis' turbines, six of which were installed by LMZ (Russia) and three – by Newport Newsy (USA).

Since that moment each water works at Dniepro-1 was operated 280-320 x 10^3 hours. By present time the equipment has been critically deteriorated, its performance parameters declined, and costs for its maintenance significantly increased. Moreover, during operation period in result of strong cavitations water wheels were seriously damaged.

Main developer of given reconstruction program is company "Ukrgidroproject Ltd". Such leading Ukrainian manufacturers as "Turboatom", "Elctrotyazhmash", and "Zaporozhtransformator", supplied hydropower and hydro-mechanical equipment. To supply with electric equipment and control system, international auction was conducted. Finally ABB and Alstom won this tender. Under Swiss Government support Swiss companies "Alfa" and "Haefeli Trench" installed disconnectors and instrument transformers.

Works carried out at Dniepro-1 constitute the first program stage on large-scale reconstruction of the Ukrainian hydro powers, implemented since 1996 under World bank financial support. The second stage will last to 2012.

Automation of Kentucky hydropower[2]

Kentucky hydropower was constructed recently and is the eighth in the list of 29 plants, which should be automated by Tennessee Valley Administration (TVA). From the beginning of June 2002 operators were demanded for round-the-clock control in connection with full control system functionality, which provides opportunity of remote control and monitoring for Supervisory Administration at TVA Power Trade Center locating in Chattanooga, Tennessee.

The work was started in 1997, and by 2005 transition of all 29 plants to automated control system is planned. Six other plants (Wilber/Watoga, Wilson, Great Waterfalls, Hivassi,

[1] The International Journal on Hydropower and Dams, Vol. 9, issue 6, 2002
[2] The International Journal on Hydropower and Dams, Vol. 9, issue 6, 2002

Watts Bar, Bun, and Wiler) are currently in different development and/or introduction phases of control system.

Voith Siemens Hydro Power Generation of York, (Pennsylvania, USA) is the main contractor on ACS installation as well as fulfillment of associated works. Currently under project this company is in close cooperation with TVA engineers to provide overall control system, develop techniques and software, and introduce automated system.

Design elevation reaching on Shamaldysay[3]

Recently at hydropower Shamaldysay with capacity 240 MWt, whcih is under construction in Kyrgyzstan, dam head water lining and modernization up to design elevation 574 m were completed. Moreover, bridge basement concreeting was ended. Installation of lever and beams for downstream reservoir, concreeting of left-bank wall, and finally, providing access for downstream reservoir workers should be carried out only.

Shamaldysay is located in Naryn River lower reaches between Uchkurgan hydropower reservoir and Tashkumyr hydropower, which, in turn, is located to south from Tashkumyr town. Nary River water collector is located in Tien Shan mountains and surrounded by Akshirak, Borkoldoy, Atbash, Kyrgyz, Talas, and Ferghana mountains with height 4000-5000 above see level.

This hydropower construction was started in 1984 under leadership of USSR Ministry of Power. Its main task is to provide power generation on base of hdyrpower flow regulation located upstream. Hydropower project includes following components:

- rock-fill dam with height 42 m with reservoir capacity 40,9 x 10^6 m^3;
- hydropower with three units with capacity 80 MWt, which will produce on average 902 GWt/h annually;
- bottom spillway with maximal flow rate 3090 m3/sec;
- connecting block between hydropower spillway and left bank;
- power distribution through transmission lines 110 kwt and 220 kWt up to substation Kristall located at distance 3 km.

The project is planned to launch in 2004.

Opening of Center on Water Resources in Syria[4]

Recently Syrian minister of irrigation and Ambassador of Japan in Syria opened Tore (Tishrin, Syria) Center of information on water resources, which costs 1 mln USD.

This Center founded under Japanese International Cooperation Agency support will be source of statistical data on seven water basin in Syria.

The first step in forming integrated water resources network will be establishment of Center branch in each basin to solve water lack and pollution problems basing on reliable data.

Syrian Government is planning to get 10 mln USD more from Japanese grant for further center supply with proper equipment.

[3] The International Journal on Hydropower and Dams, Vol. 9, issue 6, 2002
[4] The International Journal on Hydropower and Dams, Vol. 9, issue 6, 2002

China plans to double its hydropower capacity by 2010 [5]

China reported that up to 2010 it will invest 36 bln USD to double its present hydropower capacity in attempt to replace plants, which burn coal, and, hence, significantly pollute environment. On opinion of Chan Dongping, deputy Director General of State Power Corporation, which is the largest enterprise in the country, hydropower capacity during next 8 years will increase up to 150 th. MWt. He said that new plants will replace present ones, which burn coal, produce 4/5 of total power amount in the country and are one of the largest air polluters. He also noted that new hydropower plants could be simply financed by obtaining loans from state banks, since high costs for their construction make them less attractive to investors.

New dams can be constructed, mainly, on the rivers flowing through highlands in poor western provinces such as Unnan and Sichuan, which government is trying to develop. To fund construction, China will use money from electric power sale, produced by existing water sector.

"It is easy to impel state banks allocate money as a loan, but when the number of dams increases, and they will help funding of other projects, it won't be necessary no more," - Chan said.

Mekong River Commission was awarded for the best river management[6]

On the river symposium of current year, which is annually held in Brisbane, Australia, Mekong Commission was awarded with International Teess Award for the best river management.

International Award for the best management, which confirms excellence in river management, is the largest prize among such kind- of awards in the world for amount 100.000 Australian dollars (56.028 USD). In the first time award is given for river management shared by developing countries.

Mekong Commission is international river basin administration formed in 1995 on agreement between governments of Cambodia, Laos, Thailand, and Vietnam. This Commission assists state-participants in basin planning and development as well as transboundary water problems' solution for population living in Mekong lower reaches in number above 60 mln. Management by the largest fresh water fish-husbandry in the world, navigation, and flood control and mitigation are main directions in Commission activity.

Annual International Award Tiess ceremony for the best management has been held since 2000. Before it was given for Mercy River management in Great Britain and Grand River management in Canada. In this year the list of nominees includes organizations regulating Danube River, which crosses European countries, Fu-Nan River in China, Umber in Canada, and Kissimmi in USA.

[5] The International Journal on Hydropower and Dams, Vol. 9, issue 6, 2002
[6] The International Journal on Hydropower and Dams, Vol. 9, issue 6, 2002

Aga Khan Fund promotes Pamir infrastructure restoration[7]

World Bank and Aga Khan Fund for Economy Development (AKFED) integrated for investment of 26 mln USD in the project on hydropower generation and transmission in Tajikistan.

This project established under support of Tajikistan Government will promote formation of new power company "Pamirenergiya" for producing and supplying power in Gorno-Badakhshan region located in Pamir mountains. As AKFED workers reported, the region is poorly supplied with electric power because of aging hydropower structures, and its power system is almost destroyed. During decade 250 th. Inhabitants of Gorno-Badakhshan region have been using firewood to heat and cook, and thus brought significant damage to the wood cover of the region and created critical situation of internal pollution.

The Fund will help "Pamienergiya" company to complete construction of hydropower Pamir-1 located in 25 km from Khorog town as well as increase capacity from 14 to 28 MWt. This company will also implement maintenance works at hydropower with capacity 8 MWt, located in Khorog itself, and reconstruction of two other plants in Vanj and Namrangut, located further appropriately to the north and south from Khorog.

"Pamirenergiya" will also improve structures on transmission and distribution as well as install regulatory device on near lake to provide proper water flow in winter period, when requirement for water reaches its peak. Companies "Pamirenergiya" will obtain all assets available in public utility "Bark-i-Tajik", and will be responsible for supplying 30 th. people with electric power and broadening permanent customers' staff.

Settlement announced to decommission Powerdale[8]

PACIFICORP HAS ANNOUNCED that its Powerdale hydroelectric project on the Hood river in Oregon, US, will be decommissioned and portions of it removed beginning in 2010, under an agreement reached on 6 June 2003.

The cooperative agreement among PacifiCorp, state and federal resource agencies, the Confederated Tribes of the Warm Springs Reservation of Oregon, American Rivers and the Hood River Watershed Group, was welcomed by US Governor Theodore R. Kulongoski.

"I'd like to commend all parties to the settlement process for working together to reach common ground,' said Governor Kulongoski. 'Constructive, collaborative settlement talks like these are the model for how difficult natural resource issues should be handled.'

The 6MW Powerdale hydroelectric project - which was first put into operation in 1923 - is owned by PacifiCorp and can serve the needs of about 3000 typical residential customers. Powerdale's federal operating license expired in 2000, and rather than accepting a new license, PacifiCorp approached parties to the licensing process to see if an alternative to a new license could be negotiated.

"We believe this agreement is in the best interests of our customers because Powerdale will

[7] The International Journal on Hydropower and Dams, Vol. 9, issue 6, 2002
[8] Water Power & Dam Construction, July 2003

continue to operate for several more years providing low-cost power," said Judi Johansen, chief executive officer for PacifiCorp. "But at the same, time the agreement supports the long-term objectives of the resource agencies and other interest groups in the Hood river basin".

If PacifiCorp had chosen to accept a new operating license, Powerdale's future economic viability was doubtful. A new license would have come with more-restrictive operating conditions, and the plant would have also required a considerable amount of new capital investment to keep it operating for the next 30 to 50 years. The company determined that it made more sense for its customers to close the plant in 2010 and use its capital resources for other more cost-effective generating sources.

The Powerdale project now has a small diversion dam with an operating fish ladder. Water is conveyed via a 4.8km long flow line to the downstream power house close by where the Hood river flows into the Columbia river.

A fish-counting station connected to the dam's fish ladder is owned by the Bonneville Power Administration and operated by the Oregon Department of Fish and Wildlife and the Confederated Tribes of the Warm Springs. The facility is critical to fish research that will help with salmon and steelhead recovery efforts in the basin. For this and other reasons, the agreement permits continued project operation until 2010, at which time the dam will be removed.

"We are pleased that the parties were able to reach agreement that meets everyone's interests," said David McAllister, Orleans's DFW habitat division administrator. "This agreement ensures restoration of the Hood River and protection of riparian habitat for fish and wildlife".

The fish ladder, which was installed when the dam was built, continues to allow the sorting of fish at the station as well as passage of anadromous fish into the upper Hood river basin.

PacifiCorp will not be required to install new fish screens for operations through 2010. However, all other operating measures that would have been required in a new license will be in effect until the project is decommissioned. Further, the project will be closed each year between 15 April and 30 June to ensure protection of downstream-migrating juvenile fish.

This agreement demonstrates that we can work together and do what is right for rivers and the fish, wildlife, and people who depend on them. We commend PacifiCorp for its leadership. The Hood river will be healthier thanks to the improved flows and fish passage,' said Brett Swift of American Rivers.

Investment in Bureisky hydro in 2004[9]

UNIFIED ENERGY SYSTEMS (UES) says it plans to invest USS256M in the construction of the Bureisky hydroelectric power plant in Russia's Far East in 2004, according to the Interfax news agency.

The first and second generating units of 185MW capacity each will be commissioned at the plant this year, with a third unit of the same capacity to be commissioned next year.

[9] Water Power & Dam Construction, July 2003

UES has submitted a request to the Federal Energy Commission for the fixing of a tariff for electricity produced at the Bureisky plant of US$0.0130.020 per kWh over the next six months.

The plant, when completed in 2007, will have a total installed capacity of 2000MW, generating an annual average of 7.IB kWh of electricity.

Controlling the Nile[10]

Neil Ford reports on the ongoing struggle for control of the Nile waters.

THE NILE and its tributaries have long played a key role in the development of eastern Africa, firstly by enabling the creation of Egypt itself and now by providing a major source of energy for much of the region. Egypt has long attempted to maintain control of the Nile waters for its own use but a rapid increase in population pressure in the Nile Basin over the past 30 years has prompted other states with territory within the watershed to push for a reallocation of resources. Now, at last, it seems as if the Egyptian government is prepared to negotiate a redistribution of the Nile waters, in a move that could encourage the construction of new hydroelectric power plants along the length of the Nile Valley.

The present division of the Nile waters is based upon a series of colonial agreements which were largely determined outside Africa. Under a 1902 agreement with Great Britain, Ethiopia agreed to refrain from interfering with the river, in order to protect the flow of water into Egypt. A second agreement in 1929, under which the East African countries of Kenya, Tanzania and Uganda all agreed not to take water from the Nile, was facilitated by the fact that Great Britain was the colonial ruler of all three territories.

The construction of the Aswan dam caused a breakdown in relations between Egypt and Sudan, prompting the Egyptian government to recognize some Sudanese rights to the river. A third agreement was therefore signed in 1959 between the two governments, allocating 55.5Bm3 of water per year to Egypt and 18.Bm3 to Sudan, whilst effectively excluding the other Nile states from this vital resource.

All of these treaties remain in force today and access to the Nile and its tributaries for power generation, agriculture and other requirements is legally restricted to Egypt and Sudan. In practice, however, several other countries already have hydroelectric power plants on the river system and no legal action has been forthcoming. However, the threat of legal action by the two northern Nile countries may have been a factor in dissuading further projects on the river during the 1990s.

Egypt's reluctance to loosen its grip on the river's resources is quite understandable. The Nile is important to Egypt not just with regard to hydroelectric power production, but because the river feeds an entire nation. The agriculture of the Nile Valley relies on the river to such an extent that the 4% of the country's land surface, comprising the Nile Valley and Delta, is able to support 98% of the Egyptian population. Without the Nile there would be no Egypt.

While the river is important to the Cairo government on both an emotional and economic level, the Nile offers the most obvious source of new power generating capacity in several countries to the south. Sudan and Uganda are both developing new hydroelectric power

[10] Water Power & Dam Construction, July 2003

plants on the river, while the China National Water Resources and Hydropower Engineering Corporation is managing the construction of the US$224M Tekeze hydroelectric scheme in Ethiopia. It is difficult to predict whether Egypt would have any success in blocking such schemes and this uncertainty may have forced the country to the negotiating table. The level of its dependency on the river and its location downstream from the other Nile states means that it is the most vulnerable and has the most to lose.

Ten countries hold territory within the Nile watershed: Egypt, Sudan, Eritrea, Ethiopia, Uganda, Kenya, Tanzania, Rwanda, Burundi and Democratic Republic of Congo (DR Congo). Around 160M people live in the Nile Valley, a figure which the World Bank predicts will double by 2025. Not only will these people place greater pressure on water resources for household use and agriculture, but increased population is certain to translate into increased demand for power. Moreover, the more general trend of improving power coverage in Africa is certain to require increased generating capacity in the region. According to Antoine Sendama, a coordinator at the Nile Basin Initiative (NBI), 98% of Egyptians have access to electricity generated on the Nile, in comparison with Kenya, where less than 10% of the population have access to any type of electricity.

Pressure upon Egypt from other Nile governments has come in a political form, as well as through their plans for new hydroelectric plants. The Kenyan, Tanzanian and Ugandan governments have all voted to renegotiate the 1929 agreement, while some Ugandan MPs have suggested charging Egypt for the supply of clean water.

Ethiopia's exclusion from the current official partition of Nile waters is even more remarkable. The Blue Nile and River Atbara, which provide around 85% of the Nile's volume, are both sourced in the Ethiopian Highlands. Now that the decades of civil war and conflict with Eritrea have come to an end, the government in Addis Ababa has promised to turn its attention to developing domestic infrastructure, including the construction of several new hydroelectric plants.

THE NILE BASIN INITIATIVE

Egypt's readiness to negotiate and other countries' determination to draw up a new agreement have culminated in several new organizations being set up to promote Nile cooperation and has injected new confidence into the NBI, which acts as an umbrella organization for other efforts in the region. Through a variety of projects, the NBI is seeking to 'to achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin water resources'.

Based in Entebbe in Uganda, NBI membership includes all ten Nile Valley states. Under the organization’s Eastern Nile Subsidiary Action Programme (ENSAP), 13 dams are to be constructed in Ethiopia with the aim of creating 590,000ha of new agricultural land. The head of the hydrology department of the Ethiopian ministry of water resources, Kidane Asefa, estimates that the project will cost around US$400M, most of which will be provided by donors. Hydroelectric power projects are also expected to be included in the dam plans but these will obviously require additional financing.

However, the organization may be being over-optimistic with regard to the scope of the projects it has planned. World Bank President James Wolfensohn has said: 'The World Bank will be prepared to underwrite a substantial share of those investment needs and along with

the international community will seek to provide whatever level of financing can be effectively absorbed.' At least US$3B worth of investment has been scheduled on a range of projects but donor funding has yet to reach a fraction of that level. Moreover, while several interim agreements have been signed by the NBI member states, the main agreement:

- which has been promised for almost a year
- has not been forthcoming.

The construction of new hydroelectric power plants in Africa has also been encouraged by increasing co-operation in the African power sector. A series of power pools around the continent will enable power trading and new transmission lines are completed almost every year. While the great drawback of hydroelectric power production in Africa is the seasonal and erratic nature of rainfall in most countries, the creation of regional or even continent-wide power grids will encourage the sale of electricity from seasonally power-rich areas to seasonally power-poor regions, particularly given that different parts of the continent receive rain at different times of the year.

While water politics plays a role in determining the success of new hydroelectric schemes, other factors have generally played a more important role in deciding the success or otherwise of Nile schemes. The Bujagali project in Uganda, for example, has been opposed both on environmental grounds and because of fears that it is not economically viable. Concerns have also been raised over the details of the power purchase agreement (PPA) and over how the construction companies involved were able to secure the contract without a full bidding process.

The Ugandan government seems keen to see the plant built. The Ugandan minister for energy and mineral development, Sayda Bumba, says: “As far as the Bujagali issue is concerned, the project has been certified as environmentally acceptable. The people at the Nile Basin have not raised any objections. Neighboring countries have not objected”. Under the terms of the take or pay deal, the government is obliged to purchase all power produced at a set tariff, even if there is not sufficient demand.

However, while the project's opponents may be right to argue that there will be insufficient demand within Uganda, neighboring Kenya and Tanzania are both crying out for additional power supplies and transmission links in the region are already being improved in preparation for more power exports from Uganda. Bujagali aside, other hydroelectric projects in Uganda are progressing and Alstom has already begun work on installing the final 40MW turbine at the Kiira plant.

While Bujagali has attracted most of the headlines, the biggest hydroelectric project planned on the Nile is actually the US$1.73B Hamdab dam project at Merowe, north of Khartoum. While the dam will control flooding in northern Sudan, the 1200MW power plant will vastly increase the country's current generating capacity of 580MW. However, the government has not indicated the new plant's level of generating capacity when the Nile waters are at their lowest. Capacity at the existing Rosairis hydroelectric plant is halved by the end of the Ethiopian dry season.

It is expected that around US$700M will be spent on the construction of the Hamdab plant between now and the scheduled opening date in 2009. The council of ministers of water affairs of the Nile Basin (NILE-COM) has approved the plans, while the Abu Dhabi Fund for Development, the Arab Fund for Economic and Social Development, the Kuwaiti Fund for Economic Development and the Saudi Fund for Economic Development have jointly agreed

to fund US$780M of the project's costs.

OUTLOOK

While Egypt retains control of 80% of the Nile waters under existing agreements, the International Court of Justice in The Hague or any other possible court of arbitration in a dispute would be unlikely to look kindly on the present arrangement. Under the system of uti possidetis, African states agreed to adopt and maintain international treaties signed by the former colonial powers, but a partition of resources which allocates absolutely nothing to eight of the ten Nile powers would surely be open to challenge.

The Egyptian government has therefore surely acted sensibly in agreeing to a negotiated settlement. The Hamdab and Tekeze hydroelectric schemes will probably go ahead with or without Egypt's support, so with pressure on water resources likely to increase over the next decade, it is as well that the ten states begin co-operating on water use now rather than waiting until shortages become permanent and neighboring states have adopted entrenched positions.

Moreover, improved cross-border cooperation in the African transmission sector makes the creation of a single power pool that includes all the Nile states increasingly likely. Power pools in North and East Africa are already under development, while a settlement of the conflict in Sudan would enable the construction of a link between Egypt and East Africa. As a result, all the states of the region could benefit from hydroelectric plants, wherever they are located on the Nile.

If and when a final agreement on the redistribution of the Nile waters is finally reached, it is difficult to predict the impact upon new dam and hydroelectric power plant construction. Countries gaining a bigger share may decide to channel their new freedom into irrigation schemes, while others are likely to combine power generation with agricultural necessity. The stumbling block in each case is obviously financing, but whatever form the final agreement takes, it is likely that an increasing number of dams will be built. If agreement is not reached, the region faces a bleak future, with a growing risk of resource conflict.

Colorado water supply initiative launched[11]

As part of the State of Colorado's (USA) effort to prepare for its future water needs by better management of its water resources, the Colorado Department of Natural Resources (DNR) and the Colorado Water Conservation Board (CWCB) have launched the Statewide Water Supply Initiative (SWSI). Through SWSI, for the first time, Colorado, will conduct a forward-looking supply and demand analysis and recommend solutions to meet current and future needs for water.

G. Walcher, Executive Director of the DNR, said that the 18-month intensive process was perhaps the most inclusive and public in Colorado's history. The primary goals are to identify future demand in every region, and identify potential solutions. Such solutions include improving existing facilities, adding new storage, conservation measures, and non-structural alternatives such as water exchanges.

[11] NEWS Hydropower and Dams, Issue 5, 2003

SWSI was scheduled to begin in August with a series of public meetings in each of the eight major river basins throughout Colorado. Throughout the course of the project there will be more than 70 public meetings, including numerous technical roundtables in each river basin for complex analysis of engineering, forecasting and other water management issues. These meetings will provide a forum for citizens to provide substantial public input into the water needs of their area, and possible solutions.

With a drought of such major proportions, and the ever-increasing demands on Colorado's water resources for recreation, environmental purposes, municipal use, and agriculture, the need for such a comprehensive analysis as SWSI is evident. The US Department of the Interior predicts a water crisis by the year 2025, when water supplies in Colorado will be inadequate to meet demands even in normal water supply conditions.

SWSI will create a common understanding of Colorado's water issues by incorporating the perspectives and input of all local people, bringing together the diverse interests of agriculture, industry, the environment, recreation and municipalities. Through the process, SWSI invites public input and will make it as easy and convenient as possible for all citizens to make their opinions known to State leaders.

Afghans get solar-powered clean water[12]

A solar-powered water treatment installation has been provided for a Kabul high school, to provide clean water to the school and community residents, by Empower Consultants, Inc, a development consultancy based in New Zealand and specializing in community infrastructure, according to a report in Wind Energy Weekly. Empower received funding from the Government of New Zealand, and the Afghan Ministry of Rural Reconstruction and Development provided engineers and support staff to the project.

The power system consists of a Bergey XL. 1 1 kW wind turbine on a 14 m tilt-up tower, a 280 W photo-voltaic panel, a small battery bank, and an inverter. The water treatment technology is based on the generation of ozone, which is highly effective in the treatment of harmful organisms in water. A supply of about 160 W will generate 2 g/hour of ozone. Treatment on a batch basis and lots of 500 1 are treated and dispensed at a time.

Most communities are using the system to treat around 2000 to 40001 of drinking water per day.

The consultants have also installed two Bergey 1 kW wind turbines for water treatment, one in Parwan and the second in Kapisa. By eliminating fuel requirements and generator maintenance, the logistics burden for military or relief agency sponsors is greatly reduced. These small hybrid systems are easy to ship and install; a 1.2-kW hybrid unit can typically supply 3-5 kWh of electricity a day, enough energy for the manufacture of ozone or to power small refrigerators, or lighting for a small community, school or clinic.

At the time of going to press, 11 stand-alone systems had been installed. They include systems in the villages, in the districts of Parwan, Wardak and Kapisa. These communities are home to thousands of refugees returning home from Pakistan and Iran, following the demise of the Taliban regime.

[12] NEWS Hydropower and Dams, Issue 5, 2003

Russia acquires electric energy from Kyrgyzstan

RAO “EES Rossii” started to implement electric energy supply from Kyrgyzstan to Russia through power system of Kazakhstan. According to RAO leadership report, appropriate contract was signed between affiliate company of power holding “Inter RAO “EES” and power company “Electrical stations of Kyrgyzstan”. Electric energy supplied to Russia is produced on Toktogul hydropower. Power holding administration reported officially that according to expert estimates, total power supply amount from Kyrgyzstan in next two months can reach 800 mln kWt/h. The power holding considers that cheap electric power import produced by Toktogul hydropower to Russia will promote improvement of FOREM cost balance. RAO “EES” Department on relations with media mass underlined that the project implementation became possible due to parallel power systems’ operation of Russia, CIS states, and Baltic states.

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