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INTERSTATE COORDINATION WATER COMMISSION OF CENTRAL ASIA
SCIENTIFIC-INFORMATION CENTER

ACTIVITY REPORT

on the project "Support to the network of Russian speaking water management organizations of countries in Eastern Europe, the Caucasus and Central Asia and organization of a network conference in Tashkent, November 2018"

Tashkent - 2019

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1. Introduction

The main objective of the Project is promoting contacts and extending information exchange among water professionals in the countries of Eastern Europe, Caucasus, and Central Asia through the enlargement of membership of the established and maintained Network of Water Management Organizations of EECCA countries and the enhancement of the exchange of information and accumulated experience.

Work done by SIC ICWC for the reporting period:

1. Organized and held the international conference of EECCA water management organizations "Water for Land Reclamation, Economic Sectors and Natural Environment in the context of Climate Change" (6-7 November 2018, Tashkent, Uzbekistan)
2. Published two issues of the collection of EECCA NWO papers "Water for Land Reclamation, Economic Sectors and Natural Environment in the context of Climate Change" and "Water for Land Reclamation, Economic Sectors and Natural Environment in the context of Climate Change. Part 2"
3. Regularly updated and maintained web-site of the Network
4. Contributed to the development of the knowledge base on the CAWater-Info portal as one of the main components of NWO EECCA activity
5. Supported "Atlas of water-management and environmental organizations in EECCA countries"

2. Project activity during the reporting period

During the reporting period, the following activities were accomplished:

2.1. Task I. Organization of a two-day conference of the water management organizations from Eastern Europe, Caucasus and Central Asia

The International Conference "Water for Land Reclamation, Economic Sectors and Natural Environment in the context of Climate Change" was organized and held in Tashkent on 6-7 November 2018. The Conference brought together 57 participants from Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Uzbekistan, France, Sweden and Switzerland. At the close of the Conference, the participants adopted resolution, which stated the Network's plan of activity for the next years.

The Conference was organized with the additional support from IFAS Agency in Uzbekistan, the International Network of Basin Organizations and the Water Partnership of Uzbekistan. This helped to invite and support participation of more non-resident participants.

As part of preparation to the Conference, all necessary organizational and logistic matters were successfully addressed (e.g. organization of accommodation, transportation, meals, hands-out).

The main topics addressed at the Conference included:

- strategy of survival in the face of imminent water scarcity,
- transboundary water cooperation: how to ensure irrigation, energy and nature nexus in the context of climate change,
- water conservation and rational nature use,
- cooperation of regional organizations in the Aral Sea Basin (IFAS-ICWC-ICSD) in searching for additional water reserves,
- building capacities of water-management, basin and land reclamation organizations.

The opening remarks and welcome speeches were delivered by:

- **Sh.Khamraev**, Minister of Water Management, Uzbekistan
- **Prof. D.Kozlov**, President of EECCA NWO
- **Yu.Videnina**, International Network of Basin Organizations
- **B.Hajiev**, UN Economic Commission for Europe

At the beginning, the participants observed a minute of silence to the memory of one of the founders and first President of EECCA NWO Academician Polad Adjievich Polad-Zadeh.

Minister of Water Management of Uzbekistan Sh. Khamraev congratulated the participants on tenth anniversary of the Network of water-management organizations of the EECCA region. The Minister underlined that sharing experience under umbrella of the Network contributes to better management and use of water resources in Uzbekistan, based on modern approaches and best practices of country-members, as well as on conventional knowledge in given sphere.

Uzbekistan faces new emerging challenges before water resources management in Central Asia. Those include: population growth, increasing food demand, industrial development, climate change, intensified glacier melting, and many other anthropogenic factors.

The Ministry of Water Management is responsible for coordination of all kinds of water users and achievement of water-related sustainable development goals by 2030.

Last years, Uzbekistan has undergone great changes as a result of reforms initiated by the President of Uzbekistan Sh.Mirziyoyev.

Agricultural diversification is underway to reduce substantially production of water intensive crops. Irrigation systems are modernized and reconstructed. Large-scale efforts are made in reclamation of land, improvement of collector and drainage system, and laser leveling of fields. Uzbekistan is a pioneer in implementing integrated water resources management principles.

The Uzbek government pays particular attention to introduction of water-saving technologies in all economic sectors, including in irrigation. Thus, recently, new water-saving technologies were adopted on more than 480,000 ha of irrigated land (12% of the total irrigated area). It is planned to introduce such advanced technologies on more than 40% of irrigated land in the nearest five years.

Executive Secretary of EECCA NWO **Prof. V.Dukhovniy** is his key report on **"Prospects of available water supply and food security in the EECCA countries: Aral Sea Basin case-**

study" demonstrated growing global challenges that affect also the development in the EECCA countries:

- Weak and unstable economic development and uneven growth.
- Diminished attention to the water sector and outdated methods applied.
- Lack of well-informed strategic planning and actions for the future.
- Insufficient collaboration and cooperation.
- Weakening and even destruction of educational, research and development capacities.
- Orientation to the West, although influence of the East increases.

Hence, there is an acute need for addressing the nature-food-energy-climate nexus through mutually agreed trade-offs in the area of transboundary water management.

In this context, the future tasks of EECCA NWO are as follows:

- Build national and regional strategies, while taking into account:
    - development prospects and priorities;
    - climate change;

- interests of Eurasian cooperation;
- opportunities offered by and interests of the China's "One Belt, One Road" Initiative;
- linkage with European interests in the protection of Arctic ice.

- Create an EECCA think-tank in support of decision and policy making.
- Contribute to harmonization of national, regional and global long-term interests.
- Build a strategy of intensive development while reducing load on the nature.
- Ensure regular exchange of information, promote new ideas and solutions, and support open and trustful cooperation on the way to achieving sustainable water supply in our countries.

Particular attention should be paid to research efforts, dissemination of best practices, exchange of knowledge and achievements, particularly, in the area of space applications and other RS-based tools, development of new scientific awareness of the current geopolitical situation and for search of solutions aimed to achieve water, food and environmental security and sustainable development.

SESSION 1:

STRATEGY OF SURVIVAL IN THE FACE OF IMMINENT WATER SCARCITY

The Director of International Training Center on Safety of Hydrotechnical Constructions Prof. S.Ibatullin made presentation on "**Prospects for the 2040s – what is the scale of water scarcity we can expect?"**

The objective of the regional survival strategy is ensuring such development that meets the current needs and, at the same time, does not endanger the needs of future generations.

Here, two lines of conduct of country leaders and decision makers are notable:

1 – readiness to act (sometimes at risk) in search for resources; this is active leadership, i.e. proactive work.

2 – lowering of society's demands to reduce risks (outsider attitude).

Water scarcity has been observed in all countries all over the world in the recent years; however, most intensively growing water scarcity is characteristic for Central Asia. Over the last 35 years, available water supply per capita decreased from 4,500 to 2,150 m^3 a year in the Aral Sea Basin, i.e. more than two times (for comparison, only by 25% in Europe). Added by unfavorable forecasts concerning lowering of water content (by 12-15 %) in our major watercourses – the Amu Darya and the Syr Darya – due to glacier melting and given the expected increase in water withdrawal by Afghanistan for its irrigation needs, it becomes evident that our countries face the region's viability challenge.

New initiatives of the Uzbek President Sh. Mirziyoyev on joint hydropower construction combined with the proposal of the Kazakh President N.Nazarbaev on revival of the idea of the Central Asian water-energy consortium is a powerful stimulus for full-fledged water cooperation. Main large-scale power projects in Central Asia will seem to be viable only if

export markets outside the region are accessible. In the context of the above mentioned, the idea put forward by V. Dukhovniy and J. Schutter on the establishment of an expert platform as an independent think-tank is very relevant and seems promising for the development of regional integration strategies. If we manage to bring together analysts in the spheres of water, economy, ecology, energy, and agro-business and involve active donors (WB, SDC, GIZ) together with UNESCO and UNECE, it could be possible to make useful intellectual investments in the future of our countries.

For Central Asia, achievement of food security as a sustainable process is in the center of the regional survival strategy.

It is necessary to develop the strategy based on the whole picture and vision, appropriate tools, target indicators, and a road map.

The road map is to include the following points, among others:

1. Strategic base and long-term planning.
2. Regional institutes and procedures.
3. Improved legal and regulatory framework.
4. Creation of a single information space.
5. Education and capacity building.
6. Elaboration of economic aspects of water-energy consortium.
7. Implementation of IWRM as a green development tool.

8. Optimization of cropping patterns and agrarian division of labor in the region.

9. Reduction of industrial water use.

10. Automation of water infrastructure in the Amu Darya and the Syr Darya Basins (SCADA system).

11. Water quality management and ecosystem protection.

12. Small hydropower and renewable energy development.

13. Adaptation measures.

Prof. Nadejda Prokhorova, Director of RosNIIVH, presented **"Development of water sector in Russia – priority for science and technology development?"**

As part of research efforts undertaken by RosNIIVH under the state assignment, a number of scientific recommendations on the procedure were drafted for new strategic documents to improve and strengthen water governance.

The Inter-departmental working group on climate change and sustainable development at the Russian President's Administration started working; however, adaptation actions in the Russia's water sector leg behind the society's current needs in light of sustainable development goals.

The below measures need to be undertaken to mitigate effects of climate change:

- bring adaptation measures to the Russia's Water Strategy;
- increase investments into cost-effective and adaptive water governance;
- maintain inter-sectoral and multidisciplinary cooperation at national and global levels in the sphere of water use and protection management;

- create effective monitoring mechanisms, based on indicators developed by the UN Statistical Commission;
- ensure wider access to information: better water management implies transparency, accountability and participatory decision-making;
- generate new knowledge in Earth sciences that will contribute to sustainable water development.

A.Nazariy (SIC ICWC) presented report "**Future of the Amu Darya Basin in the context of climate change and other global changes**" on behalf of A.Sorokin.

The Scientific-Information Center of ICWC implemented the Project "Transboundary Water Management Adaptation in the Amu Darya Basin to Climate Change Uncertainties".

The general aim of the work was to build resilience to the impacts of climate change on transboundary water management in the Amu Darya Basin countries. To this end, a comprehensive research was carried out to study water resources management in the transboundary Amu Darya River Basin for the longer term in the context of climate and other changes and taking into account national plans of irrigated agriculture and hydropower development.

The project activities included, among many others:

- assessment of potential changes in hydrological regime and crop water requirements due to climate change;
- study of scenarios of long-term flow regulation by large reservoirs with hydropower and of their effect on river hydrology and available water supply of irrigated land and aquatic ecosystems in the basin;
- assessment of crop water requirements in the context of climate change and flow regulation and, based on national agricultural and hydropower development plans, introduction of innovations and water saving technologies.

General project conclusions: The future will require better legal framework. The interests of the riparian countries differ and the current agreements fail to ensure appropriate regulation of all existing concerns. There exist a number of agreements between Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan that set only an order of the current annual water use rules among these countries and lack provisions for future potential changes.

The reporter also presented a number of recommendations on adaptation, among which:

- optimization of cropping patterns;
- Shifting from energy (maximal energy generation in autumn-winter) to energy-irrigation (maximal generation throughout the year) mode of operation of the Nurek HPP and organization of seasonal transfers of energy between the countries as part of the common energy market;
- Lowering of flow losses in the river channel through organization of all-round water record keeping, improvement of flow forecasts and operational management, and control over open-channel losses;
- Transfer to hydro-ecological management, i.e. enhanced monitoring of water withdrawal and also water discharge for environmental needs;
- Elaboration and agreement of multiyear flow regulation rules;
- Improvement of information exchange mechanisms and tools at the interstate level.

S.Aganov (POO "Tebigi Kuvvat") made a report on the **"Impacts of climate change on the water sector and adaptation measures for risk mitigation**".

Water sector is the most of important and more vulnerable economic sectors in Turkmenistan. As stated in the first country national report on climate change (2006), Turkmenistan is among the regions that could suffer to larger extent from global warming. And country's irrigated agriculture would be affected most of all.

The expected increase in air temperature and decrease in annual precipitation as a consequence of climate change, first, will affect river runoff and hydrograph. Preliminary estimations indicate to more than 30% lowering of local river runoff.

Growing water scarcity due to climate change calls for further enhancement of legal and regulatory framework in the water sector of Turkmenistan. Additionally, irrigation water use methods need to be revisited and irrigation systems have to be modernized to improve their performance.

The Turkmenistan's National strategy of climate change (2012) shows that:

- average annual air temperature increases by 0.18-0.2°C in decade.
- the air temperature is predicted to increase by about 2ºC by 2040 and 6-7ºC by 2100 in Turkmenistan
- by 2100, rainfall will decrease by 8-17 %.
- Amu Darya river runoff will decrease by 10-15 %.
- occurrence of extremes is predicted to increase: floods and mudflows (10% a year), storms (5% a year), strong heats (1.6% a year).

The total amount of flow decrease would be about 2400 Mm^3, and the difference in evaporation against the present level would be 150 Mm^3. Given the projected increase in crop irrigation norms by approximately 13 %, irrigation water requirements would increase by 3000 Mm^3.

Generally, about 5.5 billion m^3 will be needed additionally. Consequently, potential damage due to shortage of water could be estimated at $20,523 M. Estimates over 15 years show 3.8 Mt of wheat harvest losses and 3.2 Mt of cotton harvest losses. This estimation excludes yield damage due to deterioration of land.

To prevent such negative situation, a number of adaptation measures are developed for compensation of water scarcity caused by climate change.

Assessment of adaptation measures in the water sector shows that it would be possible to prevent the estimated damage of $20.5 billion if contribute $15.4 billion in adaptation.

A.Fazylov (IWP and HE of AS RT, Tajikistan) reported on the **"Importance of reservoirs for multipurpose water regulation and management under strained water budget in the Central Asian region".**

The key factors that impact water management in Central Asia include: climate change; population growth; deteriorated water infrastructure; safety of hydraulic structures; and potential increase of water withdrawal by Afghanistan.

The reporter underlined climate change among major challenges before the Central Asian countries. Climate change poses a serious threat for the whole natural and economic complex in Central Asia, including for water and land resources. In this context, especially

discouraging forecast is with respect to global warning. According to observation, the main cause of climate change in CA is the substantial increase in surface air temperature.

The following changes and effects can be expected in Central Asia: the average air temperature would increase by approximately 1.7°C by 2050, with the resulting increase in evaporation; runoff of many rivers would increase through melting of glaciers roughly by 2080 and then would start decreasing. Higher temperatures and glacier shrinkage will lead to shift of permanent frost to upper altitudes that, in turn, could mobilize glacial drift and increase sediments in rivers; flow variability will grow from year to year and, thus, drier and wetter years will become more frequent on average.

In light of the threat of glacier melting, the Government of Tajikistan adopted a decree on "The plan of measures for implementation of the State Program on study and preservation of glaciers in Tajikistan over 2010-2030."

In 2018, a Center for Glacial Studies was established at the Tajik Academy of Sciences.

In the present context of strained water balance in the Central Asian region, reservoirs re-distributing river runoff in time and space are becoming especially important.

One problem hampering good operation of reservoirs is sedimentation. The latter affects the whole reservoir, starting from upper parts and moving gradually to dam.

It is found that stoppage of Roghun HPP construction would lead to gradual sedimentation of Nurek HPP and, in the long-term, would affect safety of the whole waterworks facility and cause serious problems in regulation of the Vakhsh River.

On the contrary, completion of the Roghun hydroscheme is expected to slow down filling of the Nurek reservoir and, hence, facilitate flow regulation over prolonged period of time. Besides, this will allow postponing reconstruction of the flood bypass system because of lower sediment load and prolonging the lifetime of Nurek HPP. As long as during 115 years of operation of Roghun HPP, the reservoir will get sediments. Upon completion of this cycle, Roghun HPP will be operated as an in-stream power plant and regulation will be provided by Nurek, assuming that the total annual discharge of sediments equals 100 Mm^3. Here, Nurek HPP will be operated as compensating structure, while Roghun HPP will serve as energy compensator.

At present, regulation capacities are insufficient in Central Asia. This issue needs to be solved at the interstate level through elaboration and adoption by the riparian countries of flow regulation rules for the Amu Darya and the Syr Darya and their main tributaries. Additionally, multiyear flow regulation is needed in the basin for guaranteed water supply.

SESSION 2:

TRANSBOUNDARY WATER COOPERATION: HOW TO ENSURE IRRIGATION, ENERGY AND NATURE NEXUS IN THE CONTEXT OF CLIMATE CHANGE?

Ch.M. Uzakbaev (independent expert, Kyrgyzstan) presented his report on "**Intersectoral and interstate integration – the basis for agreed actions for mutually beneficial water use".**

The reporter underlined that the Central Asian countries had quite reach experience in joint work on solution of interstate water problems in the Aral Sea Basin and in joint use of energy. And this was proven by all the states. The following main achievements were noted: three agreements between the countries at the level of heads of states and two framework agreements on water management affirmed the political will to cooperation. This was mirrored in conflict-free allocation of water resources among the riparian states as long as during last 25 years. The established effective mechanism made an invaluable contribution to peace and stability in the region.

Region's specific characteristics and growing water demand call for all-round transfer to water saving and water demand management as the only prerequisite for future development in the region. Accordingly, there is a need for coordination of all levels of management hierarchy in order to minimize losses.

Additionally, in their joint communiqué the Heads of IFAS Founding States committed to address a need for the establishment of a sustainable regional mechanism for multipurpose use of water and energy resources in Central Asia. It seems that time has come to develop joint measures in line with the principles of equal rights and sustainable development and on the basis of international law. The above mentioned implies clear recognition of each state's rights and obligations, while understanding a need for minimizing water use through application of location-specific technologies.

Deputy Director of SIC ICWC **D. Ziganshina** in her report on **"Enhanced scientific cooperation on water and sustainable development"** underlined a new political impetus to such cooperation. A new era requires cooperation to go "*beyond water"* with sustainable development, security and socio-economic prosperity as the main perspectives.
The first step towards such a new cooperation framework should be taken on the level of academic and research institutions – it is therefore proposed to establish a Central Asian Research Platform on Sustainable Development, Security and Future Studies. The aim of such a platform is strengthening analytical and expert capacities in the region in support of new integration processes, where water plays the key role.

Main objective: to prepare scientifically based conclusions and recommendations in order to catalyze policy shifts and unlock opportunities for transformative solutions under sustainable development principles.

A group of institutes of strategic studies is proposed as a governing and coordinating board with the support of the UNRCPD.

Members and partners may be:

- academia and research institutes of CA countries;

- CA regional organizations;

- international organizations and foreign partners.

The key economic sectors and matters to be addressed by the platform would include water sector and agriculture, energy, environment, trade and security.

The main focus is on multidisciplinarity, i.e. coverage of engineering, social and humane sciences.

The platform is to provide well-grounded recommendations and innovative solutions in

support of decision making.

B.Hajiev in his presentation on **"EU water initiatives and national policy dialogues"** informed the participants about UNECE activities as part of the EU Water Initiative.

The European Union's Water Initiative (EUWI) launched in Johannesburg in 2002 aims to coordinate development aid efforts in the sphere of water. UNECE and OECD were assigned strategic partners for implementation of EUWI in Eastern Europe, Caucasus and Central Asia. EUWI is implemented in the region on the basis of national policy dialogues (NPD) that serve as platforms for discussions and promotion of water policy reforms.

UNECE is a partner on promotion of IWRM, including transboundary river basin management on the basis of the Water Convention and the Protocol on water and health.

Since 2016, activities in six countries of the EU's Eastern Partnership have been carried out under the EUWI + East program together with the consortium of countries, which includes Austrian environmental agency and French International Office for Water. Currently, there is gap in financing actions in CA, except for some activities in Kyrgyzstan and Tajikistan financed by Finland through FinWaterWEI II and in Kazakhstan supported by the UNDP green economy project.

International expert **B. Libert** made a report on **"Water-food-energy-ecosystem nexus in SPECA countries in view of sustainable trade"**.
The SPECA program of work covers river basins of the Sava River, the Syr Darya River, the Soca River, the Drina River and Northwest Sahara aquifer. The SPECA Working Group on Water, Energy and Environment provides guidance.

The reporter showed assessment of water-food-energy-ecosystem nexus (water for energy, water for food and land, energy for water, energy for food and water, food and land for energy, food and land for water) using the Syr Darya River Basin as a case-study, discussed main intersectoral challenges, future scenarios and possible solutions identified.

The President of EECCA NWO **Prof. D.Kozlov** presented his report on **"Issues of transboundary water use in the Irtysh Basin and prospects of hydraulic engineering in the region"**.

Despite active political relations and cooperation between Russia, Kazakhstan, and China, the water-related situation in transboundary waters of the Irtysh Basin is far from being positive. In addition to heavy industrial growth and active urbanization, the current agriculture poses major threats to water resources. A range of measures was proposed for compensation of the large-scale impact on Irtysh runoff: re-regulation of flow to achieve relatively acceptable water regime; reduction of irrigation water use through advanced irrigation methods; monitoring and inventory of surface water and groundwater; improvement of water treatment technology; etc.

As a whole, joint hydrotechnical and water management activities of China, Kazakhstan, and Russia will allow substantially raising attractiveness and effectiveness of the international infrastructural initiative "One belt, one road".

Director of the Kazakh branch of SIC ICWC **Prof. N.K.Kipshakbaev** presented the report on **"Water cooperation among the Central Asian countries".**

In 2017, the Central Asian countries celebrated 25th anniversary of water cooperation in the Aral Sea Basin. Such cooperation is maintained by the country governments and the interstate bodies of IFAS. However, further development of cooperation is restrained by a number of shortcomings:

- National water management organizations are not interdepartmental coordination

bodies on water use and protection;

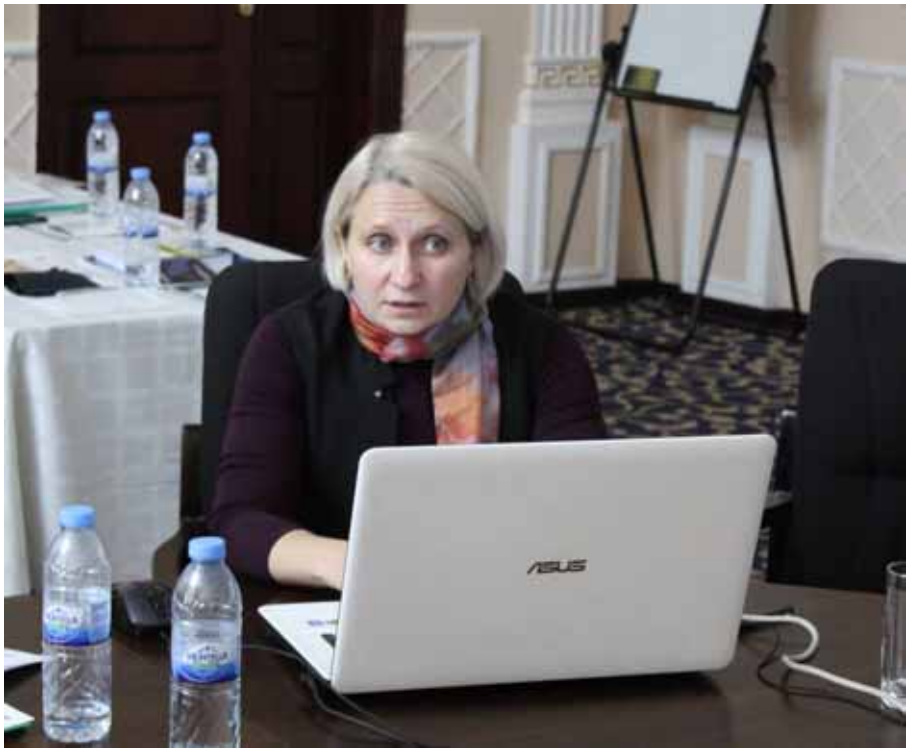
- Regional (interstate) institutions usually function separately and their activities are not coordinated;
- There is no general coordination of regional programs and projects approved by the Heads of Central Asian States;
- Development of regional projects to address topical issues of water cooperation has been suspended.

As mentioned during the Summit held in Turkmenistan this year, the Heads of States consider IFAS as a universal platform for interactions in the region and express their willingness to improve the institutional and legal framework of IFAS for development of an effective and sustainable institutional mechanism, which will be able to timely respond to new challenges and maintain mutually beneficial cooperation aimed at saving the Aral Sea, improving the natural environment in Prearalie and the Aral Sea Basin, using and protecting transboundary watercourses, etc.

Deputy Director of the Central Research Institute for Comprehensive Use of Water Resources **S.Dubenok** presented **"Expericence in transboundary cooperation and basin management in the Republic of Belarus"**.
Particularly, she listed major strategic documents that govern water management in the Republic of Belarus:

- National strategy of sustainable socio-economic development in Belarus up to 2030 (NSSD-2030);
- Socio-economic development program of the Republic of Belarus for 2016–2020;

- Environmental strategy up to 2025;
- National action plan for green economy development up to 2020;
- Water strategy for a period up to 2020; and,
- State sub-program “Clean water” 2016-2020.



A number of national measures have been taken for achievement of Sustainable Development Goals by 2030. The main principles of water use and protection in the Republic of Belarus are enshrined in the Water Code, which is effective since 2015.

Now, transition to basin management is underway: basin councils (Dneprovsk, Western Bugh, Pripyat) have been established; river basin management plans (RBMP) are revised and finalized.

The inventory of surface water bodies of the Republic of Belarus is drafted. This work includes identification of the list of surface water bodies by data from water fund and expeditions; creation of GIS-layers of the water bodies; full description, including surface water usage; filling a special section with the collected data in the information system of the State Water Cadastre.

Deputy Director of the Information-Analytical Resource Center at the Ministry of Water Management of Uzbekistan **V. Akhmadjonov** reported on “**Topical issues related to the legal framework for water cooperation in Central Asia**”.

One of the key elements of cooperation between the Central Asian countries is the joint management and reasonable use of water resources in the Aral Sea Basin.

The region possesses solid institutional and legal framework. Generally, the existing legal framework of regional water cooperation in Central Asia enables addressing the water sharing issues in the region. This was proven by conflict-free water allocation between the countries in the region during 25 years.

However, there certain problems also exist in water sharing at the regional level that require improvement of the legal framework.

Deputy Head of BWO Syr Darya **Sh. Talipov** in his report on "**Ensuring stability and safety of hydraulic structures in Central Asia for climate change mitigation and adaptation**" demonstrated the importance of stability and safety of hydraulic structures for environmental balance in CA. At the same time, it is thought that large hydropower stations are environmentally friendly and generate cheap energy. Such approach and understanding made it possible to exclude large hydropower projects from the list of structures that are subjected to state environmental expertise. However, even energy experts have no clear and generally accepted understanding of what parameters and operation regimes of the reservoirs of high-head hydroelectric station can be considered environmentally friendly or adverse. In this context, adoption of such definition, which makes the essence of natural and anthropogenic processes during regulation of watercourses and operation of reservoirs clear, and putting in practices of compliance assessment to determine that reservoir parameters and operation regimes meet the criterion of environmental health constitutes a problem.

Thus, processes that occur as a result of construction, by environmentally ungrounded designs, of high-head hydroelectric stations and their reservoirs can be treated in full measure as corresponding to the term “environmental catastrophe”.

Taking into account the main factors of environmental impact when constructing dams of high-head hydroelectric stations and the processes affecting environmental security during operation of such structure, it is necessary to set the limits of such impact and develop environmental protection measures to control the above mentioned processes.

SESSION 3:

WATER CONSERVATION AND RATIONAL NATURE USE

Prof. Ya.Pulatov (Institute of Water Problems, Hydropower and Ecology of the Academy of Sciences of the Republic of Tajikistan, Tajikistan) presented his report on **“Water conservation and joint actions of the countries for efficient water use, regulation of natural resource use as the main tool of cooperation”.**

The water sector, particularly land reclamation and irrigation sub-sectors are among important contributors to the Sustainable Development Goals, including food security, rural employment, and socio-economic development in general in the Central Asian states.

In the context of growing water scarcity, it is imperative to ensure rational irrigation water use by improving land and hydromodule zoning, developing and applying science-based irrigation scheduling, re-estimating crop water requirements, applying advanced water-saving technology, improving land, implementing "green" technology in irrigation and integrated water resource management at national and regional levels.

Thus, the reporter outlined the importance of water conservation for rational and efficient water use, showed methods of water conservation and listed relevant recommendations. He also presented results of the research work on rating of water use, revision of crop water requirements and irrigation scheduling in the Central Asian states and showed new methodological approaches to water rating in irrigated agriculture.

N.A.Sukhoy, Chairman of the Non-governmental Partnership "Russian Union of Water and Land Reclamation Experts", presented report on "**Land improvement in the Russian Federation and issues of water management in this context".**

Two strategic tasks must be achieved in the agrarian sector of Russia:

1. Implementing the National Food Security Program

Currently, the country is entirely self-sufficient in grain, rice, oil, fish, meat (excluding beef), milk (75%), vegetables (78%), and fruits and berries (80%). The objective is to achieve full self-sufficiency in basic foodstuffs.

2. Increasing food export potential.

Russia is one of the world leaders in sales of wheat. The country also exports oil, meat, rice, poultry, and fish. Food export is planned to be increased up to $US 40-45 billion a year.

In this context, besides economic measures, it is foreseen to put unused agricultural land in cultivation (80 million ha is used out of 120 million ha) and modernize and rehabilitate the irrigation and drainage system.

The main reasons of the deteriorated irrigation and drainage system were the loss of on-farm network (45%) during privatization, of pumping stations (30%) and of irrigation equipment (about 70%).

It should be mentioned that in 2011-2017 precipitation was high and some crops were not irrigated at all.

At present, a Program for Agricultural Land Reclamation until 2025 is being developed. The focus areas of the Program include modernization of the existing irrigation and drainage systems and creation of next-generation systems using science-based innovation technologies, which minimize unit water and energy inputs per product.

At the same time, performance of main canals is expected to be not less than 0.98, that of inter- and on-farm network – 0.97 and 0.98, respectively; and land use efficiency is to be not less than 0.9. It is also foreseen to use low-volume and low-energy consuming irrigation equipment and management information system for water allocation and use.

Despite planned measures for promotion of water-saving technology, the problem of water supply to irrigation systems will increase in the future. Particularly, a complicated situation is expected in the European part of Russia. Water resources are almost depleted in the Volga, Don, Kuban, Samur, and Terek River basins. Even given the current substantially decreased level of water withdrawals for irrigation, there is a problem with water supply in many regions. For instance, only 140 thousand ha out of 240 thousand ha of rice fields are irrigated in the Kransodar Krai (region). The situation is complex in the Crimea, where considerable part of irrigation systems was left without water due to cutting of the North Crimea canal.

In this context, measures are planned to increase water contents in the rivers, restore design capacity of regulating reservoirs, harmonize intersectoral water use, and improve environmental health of water bodies. Additionally, options for intern-basin water regulation are examined.

Acad. B.M. Kizyaev (VNIIGiM, Russia), **Agricultural water supply in the context of water shortage and water pollution problem**

Problems of water supply in the south of European part of Russia, Western Siberia and other regions due to water shortage and aridization of climate will require integrated and science-based solutions in the nearest future. Research and preliminary evaluation reveal that a share of flow in northern rivers can be diverted to improve primarily drinking and household water supply in the above-mentioned regions, and in some cases for irrigation purposes.

Consequently, for justification of river flow re-distribution it is necessary to:

- thoroughly justify water needs in the regions experiencing water shortage
- study alternative water sources
- take into account ecosystem-based approach, which ensures ecological sustainability of river basin
- justify flow re-distribution on interdisciplinary basis
- justify and introduce modern engineering solutions related to water transportation and construction design and technology
- involve scientific society in search for possible ways of solution

- improve the state and management of water systems

In this context, it is recommended to:

- Develop an Interstate Water Strategy and Master Plan for Integrated Water Resources Use in the EECCA countries.
- Establish an International Scientific Center (Working Group) under the auspices of EECCA NWO to scientifically justify re-distribution of flood water of the Siberian rivers to the Ural region and Central Asia. This Group should include scientists from Russia and Central Asia.
- Recommend EECCA NWO leadership to consider a special item "Water availability of the Republic of Crimea" at its next conference.

Sh.Sh.Mukhamedjanov (SIC ICWC) made the presentation on "**Water conservation in the Central Asian states: past experience and future targets"**

In the Central Asian states, water conservation is regulated by laws, sub-laws and legal codes, which oblige water users and relevant agencies to follow water conservation principles when managing and using water resources at all levels.

The reporter provided information on the usage of water and application of water-saving technology in Kazakhstan, Turkmenistan, and Uzbekistan.

For wider development of water conservation, all countries in the region should:

- implement water-saving technologies: drip irrigation, sprinkling, portable flexible tubes, polyethylene film over furrows, etc.;
- maintain close relations and cooperation on exchange of information, achievements, and innovations in water saving;
- set national indicators of water-saving.

K.A.Anzelm (South Kazakhstan Hydrogeological and Land Reclamation Expedition, Committee for Water Resources of the Ministry of Agriculture of Kazakhstan) reported on "**Experience in applying water-saving irrigation technologies in the Southern Kazakhstan"**

In the Republic of Kazakhstan, 1.481 million ha out of 2.2 million ha was used in 2016; and water-saving irrigation technology was introduced on 205.1 thousand ha.

The state supports implementation of advanced water-saving technologies.

In this context, the Decree of the President No420 of 14 February, 2017 stipulates adoption of the State Program for Development of Agro-industrial Complex of the Republic of Kazakhstan over 2017-2021. It envisages promotion of modern water-saving, soil-protective, and ecologically safe irrigation technology (recovery of investments up to 30%).

Under the State Program for Agro-industrial Complex a master plan on "Water conservation as a basis of technological breakthrough in irrigated agriculture" was approved to provide farmers with necessary technical, legal, and economic knowledge.

At the Summit of the Heads of IFAS founding states, Mr. N.Nazarbayev, President of Kazakhstan spoke on irrigation water saving by implementing modern technology, for

instance, drip irrigation, which reduces water discharge by 50-60% and increases productivity 4-5 times.

The reporter also presented a range of measures to successfully implement drip irrigation in the Turkestan province.

B.O.Askaraliev (Kyrgyz National Agrarian University, Kyrgyzstan) made presentation on "**Challenges of water resource management in irrigation systems of Kyrgyzstan"**

The presented showed information on the state of irrigated land and irrigation fund of the Kyrgyz Republic. Particularly, currently, 90 thousand ha are in unsatisfactory condition and 30 thousand ha were not used in the last three years due to poor land condition, lack of funds for purchasing seeds, soil treatment, etc.

Major problems in water management are high water losses (30-40%), insufficient monitoring, lack of reforms for implementation of IWRM/basin principle, lack of funds for capital repair of hydraulic facilities, and low qualification of staff.

A special focus was on water training.

To improve the quality of training, it is needed to:

- equip laboratories with modern control and measurement devices;
- procure licensed software for engineering calculations when preparing bachelors and masters;
- gradually transfer to water use planning, taking into account indicators of unit water inputs;
- revisit irrigation scheduling and hydromodule zoning and turn to large-scale implementation of high-intensive crop technologies, drip irrigation, sprinkling, etc.
- enhance cooperation under EECCA NWO.

S.S.Alikhodjaeva (Cotton Agrotechnology, Seed and Selection Research Institute, Uzbekistan) presented "**New water-saving varieties of cotton**"**.**

The reporter presented the results of selection of productive and environmentally yieldable cotton variety that meets all requirements for new varieties and satisfies the demands of industry and the textile manufacture. This variety allows increasing productivity of raw cotton and cotton fiber under extreme conditions and expanding areas for cotton growing without additional capital investments. Profitability of irrigated hectare will increase in farms, and irrigation water volume will decrease 2 times (from 2,500 m^3 to 1,300 m^3). Saved water can be used for growing other crops. Environmental and social situation will also be improved in the region.

SESSION 4:

COOPERATION OF REGIONAL ORGANIZATIONS IN THE ARAL SEA BASIN (IFAS-ICWC-ICSD) – SEARCHING FOR ADDITIONAL WATER RESERVES?

A.Rejepov (IFAS Executive Committee) reported on "**Cooperation of EC IFAS with international organizations"**

The IFAS Board held its meeting on 30 January 2018 and made the following decisions:

- approved the Work Plan of EC IFAS, which envisages development of the Framework Convention on Environmental Protection for Sustainable Development in Central Asia, taking into account the Sustainable Development Goals, Paris Climate Agreement, Batumi Initiative on Green Economy, and UN Environmental Conventions.

- approved the Plan of preparation to the Summit of Heads of the Central Asian states, where the Parties confirmed their commitment to fulfilling previously agreed decisions on joint and integrated management and rational use of water resources and environmental protection in the Aral Sea basin. During the Summit, the Heads of State underlined the need to consider a possibility of developing a Special UN Program for the Aral Sea basin, as well as expressed readiness to further improve organizational structure and legal framework of IFAS, cooperate on implementation of regional programs and projects aimed at environmental recovery of the

Aral Sea basin, protection of transboundary watercourses, socio-economic development, etc.

- development of the Aral Sea Basin Program -4 (ASBP-4). The main objective of the Program is improving water-related, environmental, and socio-economic situation in the region in cooperation with international partners. To develop this Program, two Regional working groups were established.

EC IFAS actively cooperates with international organizations to develop ASBP-4.

In their turn, international partners highlighted the key role of IFAS in this process and other programs as a platform for dialogues and coordination of activities between the Central Asian states on water resource management, ecological and social and economic sustainability.

International organizations and donor-partners expressed readiness to review proposals and funding opportunities, support the development of programs, and provide consultations.

To increase its coordinating role, IFAS intends to actively participate in the strategic organization and planning of regional and international policy.

V.I.Sokolov (GEF Agency of IFAS, Uzbekistan) made presentation on "**Fresh impetus for regional cooperation in the Aral Sea Basin".**

The Summit of the Heads of IFAS founding states held in Turkmenistan in August 2018 demonstrated that environmental health of shared rivers in Central Asia and the Aral Sea problem again were brought to the top of agendas of the national leaders against the background of "warming" of general political climate in the region.

An important item of the current regional agenda is the reformation of the IFAS system.

Uzbekistan stands for strengthening this multilateral platform of interactions and cooperation and turning it into an effective coordinating body in the sphere of water and sustainable development.

For the IFAS to become more effective, it is necessary to ensure full participation of Kyrgyzstan in the Fund. Hence, special attention should be paid to the issues raised by the Kyrgyz President during the Summit. Consensus and efficiency should be based on the ability to hear each other and gradually bring positions closer as not all the points raised by the Kyrgyz side are unambiguous.

Current contradictions in position of the countries concerning the structure of IFAS should be resolved.

The Interstate Commission for Water Coordination (ICWC) should be refocused on considering consolidated opinion of energy, irrigation, and water agencies.

The image of ICWC should be strengthened, and cooperation should be established between water and energy sectors, as well as between ICWC bodies and hydrometeorological services of the Central Asian states.

Cooperation between ICWC and ICSD should be enhanced for joint development of measures aimed at environmental improvement of water bodies, including upper catchment zones.

The reporter also underlined a need for development and enhancement of information and analytical capacities of IFAS as the integral part of regional cooperation platform (consultations, trade-off mechanisms, h of priorities, principles, and mechanisms for coordination of water sharing, joint target planning, etc.).

G.V.Stulina (SIC ICWC) made a report on "**Combatting desertification and conserving natural environment in Prearalie".**

The reported noted that the problem of drying up of the Aral Sea is among environmental priorities that should be addressed without delay since its consequences are of continental character. This was confirmed again at the Summit of the Heads of IFAS founding states in August 2018.

SIC ICWC experts by processing satellite data revealed further decrease in water level of the Eastern Aral Sea by 0.8 m in September 2011, i.e. from 28.4 m to 27.6 m. Consequently, water volume decreased twice and was estimated at 3 km³. Water level of the Western Aral Sea remained the same at 27.8 m and water volume – 53.27 km³. The total area of dried seabed is approximately 6 million ha, and this area extends from year to year.

In total, SIC ICWC organized 9 expeditions to the dried seabed of the Aral Sea and the adjacent territory and studied environmental and soil conditions of the area, assessed status of artificial plantations, and described relief.

The studies showed that ecosystem changes in the coastal zone were caused by two processes:

- formation and extension of new soil on the exposed seabed;
- desertification of the delta area in Prearalie.

Moreover, desertification led to: reduced lake and delta area; lowering of water tables; increased salt and dust transport; soil cover degradation; expansion of solonchak and sand; decreased reed and tugay area; and, further aridization of climate.

Hence, the reporter underlined that it was necessary to immediately implement a full set of measures to lower environmental tension in the region. To this end, a guiding document is needed to demonstrate real situation on the dry seabed of the Aral Sea in the recent time.

Finally, the reporter listed the main tasks for environmental preservation in that region:

1. Continuous monitoring of and control over processes on the dried seabed of the Aral Sea;

2. Provision of national and regional authorities, as well international donors with information, on regular basis, on changes in the state of the dried seabed of the Aral Sea and the Amu Darya delta;

3. Assessing situation with Prearalie wetlands;

4. Developing recommendations for prevention of negative effects in the Amu Darya delta and on the dried seabed of the Aral Sea;

5. Searching ways to mitigate environmental degradation and restore biodiversity in the Amu Darya and Syr Darya deltas.

R.M.Korobov (Eco-Tiras, Moldova) presented the report on "**The status of small rivers in Moldova threatens water security in the context of climate change"**

The hydrographic network of Moldova is comprised of 126 small rivers. In the context of climate warming, with increasing prevalence of evaporation over precipitation, intensive pollution and lack of water protection areas, small rivers are subjected to intensive drying. As a result, most small rivers in Moldova have become unsuitable for use. This seriously affects the general status of ecosystems in the country.

Unfortunately, not only low-water content contributes to unfavorable conditions of small rivers. They are mostly subjected to pollution, transformation and drying up. Those rivers are sometimes on the verge of extinction. The main reason is the unauthorized construction of artificial water bodies and presence of multiple pollution sources from which wastes are discharged into both permanent and temporary watercourses, as well as unsustainable land use. The problem is aggravated by the fact that land holders illegally divert water for personal needs or for artificial ponds. Thus, channels of small rivers are changed. They are left without sources and tributaries; water is evaporated or "goes" deeper.

To better understand consequences of climate and anthropogenic impacts on surface water in small river basins, develop adequate solutions in response to challenges and problems, and make reasonable solutions on adaptation, special research efforts were carried out. Some of the results are as follows:

1. Existing problems are aggravated, especially with regard to water quantity and quality

2. Original characteristics of runoff change. This may radically modify ecological and hydrological characteristics of water.

3. Shift in the present role of climate change from "catalyst" to "driver" of water changes, with much worse impacts as compared to previous anthropogenic interventions.

4. Increased risks of:

- direct impact, such as floods and droughts
- indirect impact, such as changes in water cycle that result in environmental degradation, with negative consequences on social and natural systems.

N.Shakhimardonova (Institute for Strategic and Regional Studies at the President of the Republic of Uzbekistan) presented "**Initiatives of the Republic of Uzbekistan for mitigation of the Aral Sea crisis".**

At the initiative of the President Shavkat Mirziyoyev, Uzbekistan undertook important steps to improve environmental situation in Prearalie. As the President stated the Aral Sea catastrophe is not a problem of one country or one region but of the world community at large.

Uzbekistan as a founding state of IFAS pays great attention to strengthening IFAS's activity. During its first chairmanship in IFAS (1997-1999), Uzbekistan made all efforts to develop the legal framework of IFAS, establish ties and cooperation with international organizations and financial institutions to ensure sustainable development in the Aral Sea basin.

Today, Uzbekistan works on mitigation of the Aral Sea catastrophe not only under umbrella of IFAS but also on bilateral basis. Water cooperation with neighboring countries has been intensified in the last two years.

Taking into account the global character of the Aral Sea catastrophe, a special Trust Fund for the Aral Sea and Prearalie was established upon the initiative of Uzbekistan under the UN auspices. Its main objective is coordinating efforts, attracting funds and implementing target programs and projects, including on health protection, environmental balance in Preralie and rational water use in the region. The recent Summit of the Heads of State in Turkmenistan demonstrated integrity of the Central Asian states in resolving regional issues and also gave new impetus to cooperation in the sphere of environment and water.

The Summit allowed developing a common platform for solution of the Aral Sea problem not only in form of improved water supply but also as the large-scale afforestation on the dried seabed of the Aral Sea. The President of Uzbekistan proposed to organize joint interdisciplinary research, including on the base of the Scientific Information Centers of the Interstate Commission for Water Coordination and Interstate Commission for Sustainable Development. Development of such mechanism will improve the understanding of prospective development of water management and use in the region and accelerate real actions of managers from water-related sectors towards improved adaptability to increasing water scarcity. Science should integrate and become the development vector. At the same time, this will promote public participation and practical implementation of integrated water resource management.

SESSION 5:

BUILDING CAPACITIES OF WATER-MANAGEMENT, BASIN AND LAND RECLAMATION ORGANIZATIONS

Yu.Kh. Rysbekov (SIC ICWC) **"Water professional development system in the Central Asian countries as an integral part of sectoral capacities"**
Clear deterioration in the sphere of professional development became noticeable in the last decades.

In early 90-s, professional development was a part of the general education system, had stable financing and centralized governance, etc. At present, there are substantial problems and difficulties in this regard. For example, no clear and strict standards on periodicity of training courses and number of people that need training are available. There is lack of financing, especially at the regional level. It is problematic to select formats and methods of training, provide necessary teaching aids and hands-out. Another problem is the low interest of trainees in professional development since there is no clear linkage between professional development and career development and salary.

By decision of the Interstate Commission for Water Coordination in Central Asia, the water professional development courses were established at SIC ICWC in 1999. Later, in 2000, a Regional training center was established with the support of CIDA. More than 100 training courses were held for water staff in 2000-2012. About 3300 Central Asian specialists have got training. Additionally, training centers were created at water-management organizations in Kazakhstan (Almaty), Kyrgyzstan (Bishkek, Osh), Tajikistan (Khojent), and Uzbekistan (Andizhan, Urgench, and Fergana).

Since by expert estimates the situation in water professional development system is similar for all the CA countries, the following recommendations were developed:

- Active involvement of water practitioners in development of training materials and as trainers;
- Development of training materials in native languages;
- Application of innovative teaching and training methods, including e-learning;
- Exclude one-size-fits-all approach to training courses. Training materials should be relevant for target audience and linked to current issues;
- Introduction of lifelong learning.

This refers to both regional and national levels.

Yu. Videnina (International Office for Water, France) **“EUWI+East Project: operational tasks in river basins, activities of basin committies and stakeholder participation”**
The European Union Water Initiative Plus for the Eastern Partnership (EUWI +) is a 4-year project implemented by the consortium of member states (Austria and France) and OECD and UNECE in 2016-2020. The main objective of the project is to support partner countries in bringing their national policies and strategies into line with the EU Water Framework Directive and other multilateral environmental agreements. The project is implemented for 6 countries of the Eastern Partnership – Armenia, Azerbaijan, Belarus, Georgia, Moldova, and Ukraine. The project budget is 24.5 million Euro.

More specifically, the project works on the development of river basin management plans, improvement of legislation, and development of communication strategies with participation of stakeholders.

Lessons learnt:

1) New type basin organizations are needed.

2) Information and awareness raising are required to ensure real participation of local stakeholders in river basin management.

3) Communication strategy is needed.

V.I. Sokolov (IFAS Agency, Uzbekistan) **“Economic and mathematical tool WHAT-IF developed by the World Bank to build and analyze different scenarios for the Aral Sea basin development: prospects for its application in our work”**
WHAT-IF is a multisector hydro-economic model, which considers the water-energy-food nexus from the viewpoint of economic well-being. The target function is maximizing

economic well-being under certain restrictions, such as fixed environmental water demand (i.e. achieve maximum possible economic value of water under certain restrictions). The general objective of the model is to support policy dialogue between riparian states and/or different sectors. The model helps to build and analyze scenarios and storylines and can solve and answer the questions of policy makers and researchers related to investment portfolio and managerial actions.

Sh. Zaitov (SIC ICWC) **"Capacities of basin organizations (BWO Amu Darya and BWO Syr Darya) for development of a single modernized online information system for efficient and transparent operational activity "**

BWO Syr Darya has experience in automated control and monitoring of hydrostructures.

The systems provide: automatic regulation of water level and discharge; remote measurement (telemetry) of levels, discharge and gate opening; continuous collection, primary processing, storage and transmission of information on conditions and technological parameters of structures; recording water salinity; and, automatic detection of failures of mechanical equipment.

One of problems is the low stability of discharge along transboundary rivers at the border of Uzbekistan and wide daily flow variations of the Naryn River (water releases from the Naryn hydropower cascade) at Uchkurgan waterworks facility, from which several large canals take origin.

Practices of BWO Syr Darya demonstrated high effectiveness of the automation and control systems. Accuracy of flow regulation and maintenance of preset water discharge increases (more stable water supply), water record-keeping errors decrease from 5-10% to 2-3%, and non-productive water losses become lower.

The main difficulties in operational management of transboundary water in the Aral Sea Basin that the two basin organizations face are connected with the lack of:

a) reliable forecasts on river and reservoir water balances; information on hydrological series changes in lower reaches; control over water withdrawal quotas along the rivers on ten-day basis;

b) transparent information system of the Aral Sea Basin countries, sharing and exchange of current information between water agencies in the region;

c) information platform for water record-keeping and analysis.

For the effective information system, BWOs need more consistent efforts in building their capacities, especially in part of forecasts, monitoring and assessments on daily basis.

Sh. Kenjabaev (SIC ICWC) **"Improved data and information exchange between key organizations to develop capacity of land reclamation expeditions. GIS-Meliorative cadastre Platform"**

Recently, the large-scale efforts have been taken in Uzbekistan to reform and modernize agriculture and the water sector, improve land reclamation and irrigation, increase land fertility and yields. However, there are a number of organizational and infrastructural issues in land reclamation expeditions. For instance, many organizations perform monitoring and have data as part of their mission, but there is no a single system for presentation of the data in geospatial format.

In this context, it is necessary to develop a platform "Geographical information system – State meliorative cadastre". Development of such a platform will help to:

- plan appropriate measures for full and efficient use of water and land in irrigated farming;
- perform day-to-day management of meliorative systems and their operation;
- organize and carry out monitoring;
- maintain meliorative systems;
- plan and take appropriate measures for repair, improvement and reconstruction of meliorative structures;
- monitor appropriately conditions of irrigated land;
- effectively interpret spatial information for the purposes of decision making;
- improve access to data, information, scientific literature and knowledge;
- build capacities of land reclamation expeditions, etc.


HOTEL

RESOLUTION
EECCA NWO INTERNATIONAL CONFERENCE
"Water for Land Reclamation, Economic Sectors and Natural Environment in the context of Climate Change"

The participants of the Conference held within the framework of the Eastern Europe, Caucasus, and Central Asia Network of Water Management Organizations (EECCA NWO) on 6-7 November 2018 in Tashkent addressed the current matters of land reclamation and water supply in economic sectors and for the natural environment in the context of climate change. They also summarized the results of the Network's activity over the past year and discussed tasks for the future.

The participants presented in-depth reports and exchanged opinions in the following focus areas:

- strategy of survival in the face of imminent water scarcity,
- assessment of the impacts of geopolitical changes;
- transboundary water cooperation: how to ensure irrigation, energy and nature nexus in the context of climate change,
- water conservation and rational nature use,
- cooperation of regional organizations in the Aral Sea Basin (IFAS-ICWC-ICSD) in searching for additional water reserves,
- building capacities of water-management, basin and land reclamation organizations.

Having summarized results of the discussion, the Conference participants have decided the following:

- Stress that the *current challenges* that the EECCA countries face, including climate change, potential increase of river water withdrawal by neighboring countries (Afghanistan, China, Iran), population growth, and changing economic and social behavior patterns require that *appropriate and timely adaptation measures* be taken.

- In this context, it is important to elaborate long-term (2030-2050) *water strategies* for each country and the region as a whole, proceeding from ongoing changes. Additionally, all EECCA countries need to develop a common line of conduct aimed at sustainable and peaceful development that would be based on the wider *science engagement* in the solution of pressing problems of sustainable development, including water, energy, environment and security, and the regular and systematic *building capacities* and raising awareness.

- Support an initiative on the establishment of an *independent think-tank* involving experts from concerned sectors and disciplines to develop scientifically grounded decisions and recommendations for decision makers. Organize a lead group for drafting of a roadmap for the establishment of such a think-tank and take poll among EECCA NWO members on topics and directions of future activity of this platform.

- Unite efforts in inventing, adopting and developing environmentally friendly energy- and water-saving technologies, increasing regional and inter-regional cooperation in the sphere of water saving and sound transboundary water use, while simultaneously ensuring intersectoral harmonization.

- Activate *climate change* direction at the global level, also as part of implementation of the Work program 2019-2021 of the UNECE Convention on protection and use of transboundary watercourses and international lakes and the activity of its Task Force on water and climate and the global network of basins dealing with adaptation. Given the complicated environmental and geopolitical situation, ask representatives of the Russian Federation in EECCA NWO to talk with the Russian leadership concerning consideration of a possibility of cooperation with a European Arctic Group for reopening of the discussion on possible diversion of a water share of Siberian rivers at expense of its discharge into the Arctic Ocean and usage of this share for Central Asia and desert areas in Mongolia, Eastern Siberia and China.

- Underline the role of the Paris Pact on Water and Adaptation to Climate Change in the Basins of Rivers, Lakes and Aquifers that offers a number of practical adaptation measures, among which:
  - adaptation in the water sector to climate change, including at the river basin;
  - strengthening of governance;
  - adequate financing.

- Note with satisfaction *effective and fruitful activities of EECCA NWO* over the past 10 years. With the support of the UN Economic Commission for Europe (UNECE), the Government of the Russian Federation, the Scientific-Information Center of ICWC and the International Network of Basin Organizations, the Network contributed to exchange of ideas, information and best practices on different aspects of water related activity and promoted unity and mutual understanding among professionals from various sectors and countries in the region.

Key activities and events organized by the Network in 2017-2018 included:

- Conference of the EECCA water-management organizations "Challenges of River Basin Management in the context of Climate Change" (18-19 May 2017, Moscow, Russia);
- International science and practice conference "The 25 years of water cooperation in Central Asia: lessons learnt and future outlook" (23-24 November 2017, Tashkent, Uzbekistan);
- International science and practice conference "Transboundary cooperation in Central Asia – security, stability and well-being of the entire region" (7 September 2017, Almaty, Kazakhstan);
- All-Russian water congress "Water resources in Russia for sustainable development, ecological security and health" (27-30 June 2017, Moscow, Russia);
- First Aral International Forum of Sustainable Development (30-31 May 2017, Kyzylorda, Kazakhstan);
- Network's publications, including the collection of scientific papers "Challenges of River Basin Management in the context of Climate Change";

- maintenance of the Central Asian knowledge portal - CAWater-Info (cawater-info.net) - as part of the system of uniform tools for implementation of IWRM that are adapted to specific conditions of water management in river basins with different water stresses in arid and semi-arid zones of EECCA countries;
- Development of an on-line "Atlas of water-management and environmental organizations in Eastern Europe, Caucasus and Central Asia."
- Strengthen efforts of the Network's members in the following focus areas:
- Organization of joint interdisciplinary research in the spheres of water management, land reclamation and nature protection;
- Further development of information space in the above mentioned spheres, including exchange of information on best practices and sharing lessons and knowledge;
- Organization of training workshops and study tours to explore best practices and share experience and knowledge in the area of water management and land reclamation,
- Development of extension services and knowledge hubs (regional and national ones) to render assistance to water users at different hierarchical levels;
- Taking advantage of cooperation, coordination and exchange of information with National water policy dialogues in the EECCA countries;
- Engagement of other basin organizations in the Network's activity.
- Note that the exchange of knowledge would be more productive and the knowledge base on water, economy and irrigated agriculture would be strengthened if donors provide wider support.
- The next conference of the Network is to be held in 2019 on "Science and innovations for water security" at part of the XV International scientific-practical symposium and exhibition "Clean Water of Russia 2019", which will be held in Yekaterinburg under the slogan "Water security as a factor of sustainable development".
- Acknowledge:
- UNECE and the International Office for Water/International Network of Basin Organizations (INBO) for assistance provided to the Network, including in organization of this Conference;
- The Government of Russia for its long-term support of the Network's activity;
- SIC ICWC, IFAS Agency for implementation of the Aral Sea Basin projects and National Water Partnership of Uzbekistan for assistance in organization of the Conference.

Tashkent

7 November 2018

2.2. Task II. Exchange of knowledge and experience between existing water information systems and organizations in Russia, Ukraine, Moldova, Belarus, Central Asia, and South Caucasus

The web-site (www.eecca-water.net) is maintained to support activity of the Network of Water Management Organizations in EECCA countries. The web-site sections were filled with information from the Network's members and from open Internet sources during the reporting period. The following sections are accessible on the web-site:

- News
- Events (*information about workshops, conferences, work meetings*)
- Articles
- Publications (*information about published books, brochures, monographs, etc.*)
- Periodicals (*information about published journals and newspapers*)
- Information products
- Water economy history
- Brief information about the Network's members (profiles)

NWO EECCA web-site

All sections of the web-site were updated regularly during the reporting period. The average visits of the web-site were 200-250 persons a day.

64 records added to the Atlas of water-management and environmental organizations in Eastern Europe, Caucasus and Central Asia created as part of the project last year. (http://atlas.cawater-info.net/base/index)

2.3. Task III. Preparation and publication of a collection of scientific papers

As assigned, in the course of activity we collected the papers from the EECCA NWO members and published a collection of scientific papers titled "**Water for Land Reclamation, Economic Sectors and Natural Environment in the context of Climate Change**"[1]. The paper version of the Collection of papers was disseminated during the Conference. E-version of the Collection is available on the EECCA NWO web-site and on the CAWater-Info Portal (http://www.eecca-water.net/content/view/15373/12/lang,russian/)

This collection contains the following papers:

He who looks ahead will master the road
Dukhovniy V.A.

[1] The collection of papers was issued with the support of the Project and, partially, with SIC's support

The EECCA Network of water management organizations: Decade of the Network's activity
Beglov I.F., Belikov I.V.

Impacts of climate change on the water sector and adaptation measures for risk mitigation
Aganov S.Ye.

Second volume of the Collection of papers was compiled upon completion of the Conference. "**Water for Land Reclamation, Economic Sectors and Natural Environment in the context of Climate Change. Part 2"**[2]. E-version of the Collection is available on the EECCA NWO web-site and on the CAWater-Info Portal (http://www.eecca-water.net/content/view/15753/12/lang,russian/)

This collection contains the following papers:

Problems and ways to improve the quality of irrigation services at the local level
Mirzaev N.N.
Environmental management as a guarantee of water security
Mommadov B.A.

[2] The collection of papers was published with the support of the International Network of Basin Organizations

On water professionals development system in the Central Asian countries
Rysbekov Yu.Kh.

Absorption of previously used and newly irrigated land in agriculture
Klochko V.Yu.

Future of the Amu Darya Basin in the context of climate change and other global changes
Sorokin A.G., Nazariy A.M.

Importance of reservoirs for multipurpose water regulation and management under strained water budget in the Central Asian region
Fazylov A.R.

Initiatives of the Republic of Uzbekistan for mitigation of the Aral Sea crisis
Shokhimardonova N.

Expericence in transboundary cooperation and basin management in the Republic of Belarus
Dubenok S.A.

Topical issues related to the legal framework for water cooperation in Central Asia
Akhmadjonov V.

Research results on exploring the possibility of Fenix cotton variety production under nature-climatic conditions of Crimea
Seitumerov E.E.

2.4. Task IV. Development of hierarchical classification system of the "Water in Central Asia" Knowledge Base

The following publications were digitized:

1. Kostyakov A.N. "Basics of land reclamation" (1927) 773 pp.
2. Bochkaryov Ya.V., Gankin M.Z., Ovcharov Ye.Ye. "Basics of automatics and automation of work processes in hydrotechnical amelioration" (1969) 393 pp.
3. Surin V.A. "Mechanization and automation of gravity surface irrigation methods" (1970) 58 pp.
4. "Watering machines and equipment" (1986) 64 pp.
5. "Studying and modeling of water facilities and structures under catastrophic and emergency conditions"/SANIIRI transactions (1985) 160 pp.
6. Zhurin V.D., "Hydraulic calculations using discharge and velocity characteristics" (1924) 41 pp.

7. “Improvement of irrigation water quality” / VASKHNIL Collection of research papers (1990) 193 pp.
8. “USSR-Asia and Africa: irrigation and drainage development projects” (1976) 212 pp.
9. “Simulating crop growth and productivity” (1986) 320 pp.
10. “Recommendations on irrigation technique and design of irrigation network for complex reliefs of submountain regions (Parkent Canal area)” (1982) 40 pp.
11. “Recommendations on drafting on-farm water use plans and their fulfillment” / Bocharin A.V., Sanaev B.M. (1988) 86 pp.
12. “Guidelines on elaboration of regional master plans to combat desertification” / Zonn I.S., Vladimirov V.V. (1981) 87 pp.
13. “Water quality control: Reference book” / Altunin V.S., Belavtseva T.M. (1993) 369 pp.
14. “Full assessment of surface water quality” / Collection of papers (1984) 146 pp.
15. Kondrashev S.K. “Irrigated farming and water use in the Khiva oasis”. Report on hydromodule surveying in the Amu Darya Basin over 1914 (1916) 401 pp.
16. Demtchenko Ya.G. “About flooding of the Aral-Caspian lowland to improve climate in the riparian countries” (1900) 143 pp.
17. Recommendations for assessment of usability of drainage water for irrigation in the Khorezm province (1992) 50 pp.
18. A.Kursish “Hunger Steppe. Review of irrigation in the North East of the Steppe” (1913) 102 pp.
19. Guidelines for studying drift sand patterns and distribution (1888) 16 pp.
20. Vasiliev V.A. “Review of hydraulic engineering work in the Murghab region” (1915) 98 pp.
21. Kondrashev S.K. “Water use in Shirabad and Surkhan valleys of the Bukhara Khanate (1918) 58 pp.
22. B.N.Kandiba “River regulation” (1927) 353 pp.
23. Offengenden S.R., Papadiadi A.D., Yarushin M.I. “Operation of hydro land reclaiming systems” (1962) 496 pp.

A new subsection 1.1.1.1.5 “Inter-basin flow transfers” (proceeding from recommendations of the Conference) was created in the hierarchical classification system of the knowledge base.

The following items translated into English:

- 8.1. Integrated water resources management (IWRM). Basic concepts
  - 8.1.1. Basic IWRM principles
    - 8.1.1.1. Public participation

        - 8.1.1.2. Hydro-geographical organization
        - 8.1.1.3. Accounting of all kinds of water
        - 8.1.1.4. Accounting of all kinds of water users
        - 8.1.1.5. Gender
        - 8.1.1.6. Ecological sustainability (consideration of ecological requirements)
        - 8.1.1.7. From water supply management to water demand management
    - 8.1.2. Institutional measures
        - 8.1.2.1. Improvement of the institutional framework
        - 8.1.2.2. Improvement of the system of incentives
        - 8.1.2.3. Improvement of the system of rules
        - 8.1.2.4. Irrigation management transfer (IMT)
- 8.2. Water supply and water use governance
    - 8.2.1. Governance functions and levels
    - 8.2.2. Governance entities
    - 8.2.3. Stakeholders
    - 8.2.4. Types (forms) of governance
    - 8.2.5. Water supply and water use governance in WUA
- 8.3. Water supply and water use management
    - 8.3.1. Management functions and levels
    - 8.3.2. Management entities (water organizations)
    - 8.3.3. Organizational set-up of water-management organizations
    - 8.3.4. Staffing of water-management organizations
    - 8.3.5. Financing of water organizations
    - 8.3.6. Water supply and water use management in WUAs
- 8.4. Water governance and management tools
    - 8.4.1. IWRM planning
        - 8.4.1.1. Water vision
        - 8.4.1.2. Water strategy
        - 8.4.1.3. IWRM plan
    - 8.4.2. Social mobilization
    - 8.4.3. Training

- 8.4.4. Monitoring and evaluation
  - 8.4.4.1. Monitoring indicators
  - 8.4.4.2. Monitoring tools
  - 8.4.4.3. Monitoring objects and levels
  - 8.4.4.4. External and internal evaluation
- 8.4.5. Financial tools
- 8.4.6. Information systems

Annex 1

AGENDA
International Conference of the Eastern Europe, Caucasus, and Central Asia Network of Water Management Organizations (EECCA NWO)

WATER FOR LAND RECLAMATION, ECONOMIC SECTORS AND NATURAL ENVIRONMENT IN THE CONTEXT OF CLIMATE CHANGE

5 November (Monday) 2018 – arrival of participants. Accommodation in the hotel Golden Valley

6 November (Tuesday) 2018 9.00 – 18.00. Venue – Hotel Golden Valley

08:30 Registration

PLENARY SESSION

09:00 Official opening

Welcome speeches:

- **Sh.R.Khamraev**, Ministry of Water Resources of Uzbekistan
- **Prof. D.V.Kozlov**, EECCA NWO President
- **Yu.Videnina**, International Network of Basin Organizations
- **B. Hajiyev**, UNECE

Key reporter:

Prof. V.A.Dukhovniy, Outlook of available water resources and food security in the EECCA countries: Aral Sea Basin case-study

SESSION 1: STRATEGY OF SURVIVAL IN THE FACE OF IMMINENT WATER SCARCITY

Moderator: **V.I. Sokolov**

Key reporters:

Prof. S.R. Ibatullin (Kazakhstan), Prospects for the 2040s – what is the scale of water scarcity we can expect?

Presentations of country representatives on key aspects: climate change challenges, increase of water withdrawal (Afghanistan, China, Iran), population growth; changes in economic structure and social needs; how can the region's countries oppose to those challenges?

Prof. N.B. Prokhorova (RosNIIVH) Modernization of water sector in Russia – priority for science and technology development?

A.G.Sorokin (SIC ICWC) Future of the Amu Darya Basin in the context of climate change and other global changes

S.E. Aganov ("Tebigi Kuvvat", Turkmemistan) Impacts of climate change on the water sector and adaptation measures for risk mitigation

A.R. Fazylov (IWP and HE of AS RT, Tajikistan) Importance of reservoirs for multipurpose water regulation and management under strained water budget in the Central Asian region

Discussion

11.00 – 11.30 Coffee-break

SESSION 2: TRANSBOUNDARY WATER COOPERATION: HOW TO ENSURE IRRIGATION, ENERGY AND NATURE NEXUS IN THE CONTEXT OF CLIMATE CHANGE?

Moderator: **Prof. V.A.Dukhovniy**

Key reporters:

Ch.M. Uzakbaev (Kyrgyzstan), Intersectoral and interstate integration – the basis for agreed actions for mutually beneficial water use

D.R. Ziganshina (SIC ICWC) Enhanced scientific cooperation on water and sustainable development

Presentations of country representatives on key aspects: Cooperation tools, joint regulation regimes: energy, irrigation, nature protection; cooperation-based nexus; clear obligations of the parties; public participation; excessive hydropower capacities – base for coordination; involvement of hydropower, hydrometeorological services and aquatic environment sector in activities of IFAS and ICWC

B. Hajiyev (UNECE) Water-Food-Energy-Ecosystem Nexus: implementation of decisions identified for the Syr Darya River Basin and national water policy dialogues in the countries

B. Libert (international expert, Sweden) Assessment of water-food-energy-ecosystem nexus

Prof. D.V.Kozlov (EECCA NWO President, Russia), Issues of transboundary water use in the Irtysh Basin and prospects of hydraulic engineering in the region

Prof.N.K.Kipshakbaev (Kazakhstan) Specific measures for climate change adaptation in the Aral Sea basin

S.A.Dubenok (CRICUWR, Belarus) Expericence in transboundary cooperation and basin management in the Republic of Belarus

V.Akhmadjonov (Information-Analytical and Resource Center at the MWM Republic of Uzbekistan) Topical issues related to the legal framework for water cooperation in Central Asia

Sh.G. Talipov (BWO Syrdarya) Ensuring stability and safety of hydraulic structures in Central Asia for climate change mitigation and adaptation

Discussion

13.00-14.00 Lunch

SESSION 3: WATER CONSERVATION AND RATIONAL NATURE USE

Moderator: **Acad. B.M. Kizyayev**

Key reporters:

Prof. Ya.E.Pulatov (IWPH&E of the AS of the RT, Tajikistan), Water conservation and joint actions of countries for efficient water use, regulation of natural resource use as the main tool of cooperation

N.A.Sukhoy (Association of land reclamation and water engineers, Russia) On land improvement in the Russian Federation and issues of water management in this context

Presentations of country representatives on key aspects: revision of water requirements; analysis of losses along main canals and systems; lowering of losses; improvement of water accounting and forecast accuracy; automation of flow metering and regulation; remote sensing in water accounting

Acad. B.M. Kizyayev (VNIIGiM, Russia) Agricultural water supply in the context of water shortage and water pollution problems

Sh.Sh.Mukhamedjanov (SIC ICWC) Water conservation in the Central Asian states: past experience and future targets

K.Murodov (Ministry of Water Resources of Uzbekistan) Achievements of the Republic of Uzbekistan in the field of land reclamation and water management

K.A.Anzelm (Turkestan Hydrogeological and Land Reclamation Expedition, Committee for Water Resources, Ministry of Agriculture, Kazakhstan) Experience in applying water-saving irrigation technologies in the Southern Kazakhstan

B. Askaraliyev (Kyrgyz National Agrarian University) Challenges of water resource management in irrigation systems of Kyrgyzstan

S.Alikhidjaeva (Uzbekistan) New “water-saving” varieties of cotton

N.N.Mirzaev (SIC ICWC) Problems and ways to improve the quality of irrigation services at the local level

V.Yu. Klochko (Design Institute Kazgiprovodkhoz) Involvement of used and newly irrigated lands in agriculture

Discussion

15.30 – 16.00 Coffee-break

SESSION 4: COOPERATION OF REGIONAL ORGANIZATIONS IN THE ARAL SEA BASIN (IFAS-ICWC-ICSD) – SEARCHING FOR ADDITIONAL WATER RESERVES?

Moderator: **Prof. S.R. Ibatullin**

Key reporters:

A. Redjepov (EC IFAS) Cooperation of EC IFAS with international organizations

Presentations of country representatives on key aspects: use of collector-drainage water, wastewater and return water for irrigation; achieving water-related Sustainable Development Goals; water conservation and sanitary-environmental releases; sustainability of delta ecosystems; adaptation to climate change

V.I. Sokolov (Agency GEF of IFAS, Uzbekistan) Fresh impetus for regional cooperation in the Aral Sea Basin

G.V.Stulina (SIC ICWC) Combatting desertification and conserving natural environment in Prearalie

R.M.Korobov (Eco-Tiras, Moldova) The status of small rivers in Moldova threatens water security in the context of climate change

N. Shakhimardonova (Institute of strategic and regional studies under the President of the Republic of Uzbekistan) Initiatives of the Republic of Uzbekistan for mitigation of the Aral Sea crisis

Discussion

19.00-21.00 Dinner at restaurant “GAP”

7 November (Wednesday) 2018 9.30 – 13.00

SESSION 5: BUILDING CAPACITIES OF WATER-MANAGEMENT, BASIN AND LAND RECLAMATION ORGANIZATIONS

Moderator: …

Key reporters:

Yu.Kh. Rysbekov (SIC ICWC) Unlocking scientific and technological capacities of water-management and land reclamation organizations as a big source of untapped water and land reserves

Presentations of country representatives on key aspects: professional development; improvement of information exchange; knowledge base; advisory service; water diplomacy, etc.

Yu.Videnina (INBO, France) EUWI+East Project: operational tasks in river basins, activities of basin committies and stakeholder participation

V.I. Sokolov (Agency GEF of IFAS, Uzbekistan) Economic and mathematical tool WHAT-IF developed by the World Bank to build and analyze different scenarios for the Aral Sea basin development: prospects for its application in our work

Sh.Zaitov (SIC ICWC) Capacities of basin organizations (BWO Amudarya and BWO Syrdarya) for development of a single modernized online information system for efficient and transparent operational activity

Sh.Kenjabaev (SIC ICWC) Improved data and information exchange between key organizations to develop capacity of land reclamation expeditions

Discussion

11.00 – 11.30	Coffee-break
11.30 – 13.00	Wrap-up and approval of resolution
13.00-14.00	Lunch

14.30-16.00 Meeting of the Initiative group of the Central Asian expert club (think-tank) on water security, sustainable development and regional integration

Annex 2

List of participants

EECCA NWO Conference

Water for Land Reclamation, Economic Sectors and Natural Environment in the context of Climate Change

Tashkent (Uzbekistan), 6-7 November 2018

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