

## MINUTES

### Training workshop

#### **“Approaches to efficient water resource management by BWO Amudarya and its territorial branches in the context of climate change”**

May 4-5, 2017, Urgench, BWO Amudarya

Participants: 40 people, including 13 females

On May 4-5, 2017, a training workshop “Approaches to efficient water resource management by BWO Amudarya and its territorial branches in the context of climate change” was held under the PEER project “Transboundary Water Management Adaptation in the Amudarya Basin to Climate Change Uncertainties” at BWO Amudarya Training center in Urgench. This project is implemented by SIC ICWC in cooperation with BWO Amudarya and Analytical Agency “Ynanch-Bepa” (Turkmenistan).

The workshop was held to:

- present results of the first project year and discuss future plans
- instruct the staff of BWO and its territorial branch in approaches to efficient water resource management in the context of climate change
- organize practical training on the tools (models): planning zone model and crop water requirements calculation model.

Representatives of the central office and territorial branches of BWO Amudarya from Tajikistan, Turkmenistan, and Uzbekistan (Upper Amudarya, Middle Amudarya and Lower Amudarya Administrations, Upradik, and Dashoguz Directorate), academic teaching staff and students of the Khorezm State University, Khorezm Rural Advisory Support Service (KRASS), Director of the Analytical Agency “Ynanch-Bepa”, as well as SIC ICWC research team took part in the workshop.

SIC ICWC Director Prof. V.A.Dukhovniy and BWO Amudarya Deputy Head Saparbayev M. welcomed the participants.

**The introductory session** was opened by Prof.V.A.Dukhovniy on the topic “*Climate change and water resources*”, where he focused on the global and regional trends in climate change and the adaptation measures He underlined the importance of IWRM and water conservation as the basis for adaptation in Central Asia. It is particularly important that flow losses in the Amudarya River currently exceed those of the Soviet period by 3-4 km<sup>3</sup>. Thus, the improvement of flow accounting will allow reducing the losses.

Then Mrs. G.Tilyalova, BWO Amudarya Deputy Head, presented the report “*Improvement of water resource management in the Amudarya River basin in the context of water scarcity*”. She mentioned difficulties related to water use planning, lack of data on all Amudarya River tributaries, and frequent differences between the forecast and actual data that prevents changing cropping patterns in April after clarification. Several hydraulic structures have not handed over to BWO Amudarya up to present. In this context, the importance and relevance of the PEER project research was highlighted, particularly:

- considering climate change scenarios and its impact on river flow and water consumption norms;
- exchanging information with Hydromets (national forecast-actual data);
- exchanging data with Tajikistan on HEPS operation regimes (planned-actual);

- considering river channel losses (inclusion of the relationships into balance calculations that allow taking into account losses in space and time).

Ms. G.Tilyalova highlighted the need for a tool (model) for operative (daily) flow management in the Amudarya River that could be developed based on the PEER project results.

At the end of the introductory session, Mr. A.Sorokin, head of the project modeling team, made a presentation on “Aims and tasks of the workshop”, where he presented the results derived in the first stage of the project and aims and tasks for the next stage “Numerical experiment”.

**The second session** “Presentation of the project results” was dedicated to the first year of the project implementation - “Research stage”.

Mr. A.Sorokin made three presentations: “*Water balance of rivers and planning zones in the Amudarya River basin in 2010-2015*”, “*Flow of rivers in the Amudarya River basin for 2020-2050: considering climate change effect*”, and “*Efficiency of flow regulation in the Amudarya River basin: current status and prospective changes for 2020-2050*”. A special attention was paid to effective water resource management in the context of climate change and growing water scarcity in summer and to increased water use in Afghanistan. Operation regimes of HEPS were presented in the context of requirements for hydropower production, irrigated agriculture, and aquatic ecosystems.

PEER project economist Mr. Sh.Mumionov made the presentation “*Development scenarios for planning zone in the Amudarya River basin for 2020-2050: population, agrarian sector, and innovations*”, where he presented basic tasks and criteria for producing the forecast of agricultural development in the planning zone of the Amudarya River basin until 2050, forecast demographic indicators, increased demand for food, forecast of change in areas under crop, yield, gross crop harvesting, forecast of livestock number and production. Calculations of changes in cropping patterns until 2020 for the Khorezm planning zone are based on parameters set the long-term agricultural development strategy in Uzbekistan: Program for agricultural reformation and development for 2016-2020 and Program for further development of raw materials base, recycling of fruit and vegetables and meat and dairy products, increase of food production and export in 2016-2020.

Project programmer Mr. G.Solodkiy made two presentations. In the presentation “*Climate change scenarios for 2020-2050*”, he spoke about the REMO model and the need to validate the model output against field observations. In the presentation “*Ways for improving management of water demand in the context of climate change and assessment of crop water requirements for 2020, 2050*”, he presented methods for incorporating climate change in calculations of crop water requirements and underlined the importance of development and implementation of methods and tools for operative calculation of water requirements. He also presented water requirement calculation methods based on the sum of effective temperatures. The calculation results for planning zones indicate to decreased water requirements and to possibility for earlier sowing of main crops and more efficient use of double-season crops.

Many analysts consider the water allocation system in the Amudarya River basin as inflexible and poorly responding to on-going changes. In her presentation “*Level of adaptability of the water allocation system in the Amudarya River basin to changing conditions: legal and institutional aspects*”, Ms. D.R.Ziganshina demonstrated successful adaptation of water allocation system to the changes in the past 25 years in the Amudarya River basin. She also mentioned problematic issues of adaptation, particularly, during extreme water years.

Director of the Analytical Agency “Ynanch-Bepa”– project partner – Mrs. G.Nurmukhamedova in her speech underscored the need to involve stakeholders and the public in management processes. She also gave some examples of the best water management practices in Turkmenistan.

The representatives of Tajikistan, Turkmenistan, and Uzbekistan ended the session with sharing specifics of work of the BWO Amudarya territorial branches.

**The third session** “Approaches to modeling” started with presentation by A.Sorokin and I.Ergashev “*Information resource of the PEER project: database structure, interface, web-site, and demonstration*”. They presented how to handle the web-site (Cawater-info.net) and the project database located on the web-site (using the Khorezm planning zone as an example ).

Then R.Khafazov and I.Ergashev presented the “*Planning zone model: methodology, testing, and demonstration*”, where they demonstrated the modules of water balance, irrigated agriculture output calculation, and socio-economic assessment. By the example of the Khorezm planning zone, the module of testing the simulated and actual data on the planning zone was presented.

In an interactive mode, handling of input and output indicators was demonstrated through the water balance calculation module and the task of innovative irrigation technique. The operation of the modules for irrigated agriculture output calculation and socio-economic assessment were also demonstrated by crop and planning zone as a whole.

Finally, Mr. G.F.Solodkiy presented the “*Model of crop water requirements calculation: methodology, testing, and demonstration*” including calculation of groundwater contribution, effective precipitation.

Then under moderation by Prof. V.A.Duhovniy, the discussion was held and recommendations were drafted for adaptation and project result dissemination.

## **BASIC OUTCOMES OF THE TRAINING WORKSHOP**

1. Climate change is a pressing issue which manifests in temperature rise, increased and more frequent extremes, as well as in potential growth of water consumption in the basin.
2. The forecasts of climate change, as well as more modern forecasts based on the REMO scenarios reveal that the Amudarya River basin is mostly vulnerable as the expected average annual water scarcity would be 6-9 km<sup>3</sup> in 2050, including increased water diversion by Afghanistan.
3. In this context, the task of BWO Amudarya and its territorial branches is to oppose to this water scarcity through the set of water conservation measures both along the main water courses and the national water management systems, particularly:
  - improvement of the accuracy of forecasts (both short-term and long-term ones);
  - improvement of the accuracy of accounting of water distribution between water users and consumers and better implementation of flow releases plan;
  - reduction of channel losses to the level of 1990;
  - reconsideration of water consumption norms taking into account changed soil and hydrogeological characteristics, as well as using new FAO methods adjusted by SIC ICWC to account for groundwater; and
  - joint activities on water conservation by all water agencies, etc.

4. As to adaptation to climate change, it is of importance to build and strengthen capacity of water agencies, including information provision and exchange based on openness, transparency, and trust, as well as raise awareness among water users.
5. The analysis of legal framework regarding transboundary water management reveals that it is enough flexible and allows adapting the management system to changes expected in view of climate change. This framework should be enhanced through a set of rules and procedures directly bound to basin conditions.

**Upon the results of workshop, its efficiency was assessed:**

*On the first question* of the Questionnaire “Please, assess the workshop usefulness for your work”,

- 61 % of respondents consider the workshop topics as interesting and useful for their work;
- 33 % of respondents consider some issues as useful for them;
- 6 % of respondents have refrained from answering this question.

*On the second question* “Which workshop topics were mostly interesting to you?” the respondents have chosen:

- “Level of adaptability of the water allocation system in the Amudarya River basin to changing conditions: legal and institutional aspects”;
- Information resource of the PEER project: database structure, interface, website, and demonstration.

They also have mentioned:

- Water balance of rivers and planning zones in the Amudarya River basin for 2010-2015;
- Flow of rivers in the Amudarya River basin for 2020-2050: consideration of climate change;
- “Development scenarios of a planning zone in the Amudarya River basin for 2020-2050: population, agrarian sector, and innovations”;
- “Efficiency of flow regulation in the Amudarya River basin: current status and prospective changes for 2020-2050”;
- Planning zone model: methodology, testing, and demonstration.

*On the third question* “What topics would you like to know more during the next workshops?” the respondents mentioned:

- Forecast of flow, water availability, and losses in the Amudarya River reaches;
- Water allocation by states along the Amudarya River and its reaches;
- Technologies and approaches that would be in demand by BWO Amudarya in the nearest future and need for training;
- Experience of other countries in efficient water resource management in the context of climate change;
- Issues related to improvement of transboundary water management in the Amudarya River.

The respondents wished the workshops to be held in language that is more understandable for an ordinary person. It is hard to understand such terms as “decomposition of context diagram”, “conceptual model”, “diagram of the node tree”, and abbreviated terms.

*On the fourth question* “of which focus areas are important to reinforce for efficient adaptation of water management to climate change in the Amudarya River basin?”, the respondents mentioned all topics mentioned in the Questionnaire. Some of them added the following ones saying they were pressing issues in their activity:

- Ease of access to their own water management sites located on the territories of other states. Facilitation of passage through border crossings for business trips; if possible, renew the system of “Identity card” under ICWC that would provide more mandates and quickly solve routine matters.
- Frequent visual communications with colleagues from other countries.
- Reconstruction and automation of pre-existing gauging stations along the Amudarya River. Reconstruction of pre-existing Nijniy Pyandj (Lower Pyandj), Tigrovaya Balka, and Khirmandjou gauging stations.
- For permanent and major repair and examination of the underwater constructions, time bucket for approximately one month is required as there has been year-round operation since obtaining independence.
- In cooperation with design organizations, development of operation rules for the Amudarya River.
- In cooperation with scientific and research organizations, development of a program for identifying losses in each BWO branch (river section).
- Addressing issues related to reconstruction of head structures located in Turkmenistan.
- Improvement of work of the hydrochemical laboratory that currently assesses water quality only by turbidity ([ndu.bvo@list.ru](mailto:ndu.bvo@list.ru))
- What people living in the Amudarya River basin should expect under the water scarcity of 20-40%, taking into account that now they have normal water consumption.