

Project name*

Transboundary water management adaptation in the Amudarya basin to climate change uncertainties

Family/Last Name of PEER applicant*

Dukhovniy

Reporting Period Start Date*

10/01/2016

Reporting Period End Date*

12/31/2016

Quarterly Project Summary*

Please provide a brief summary of project activities carried out during the reporting period, including specific events, ongoing research, planning, and data-gathering activities. You should include PEER project-related events from the previous quarter, only if you did not include them in your previous quarterly report or if this is the first report you have submitted on your project

During the reporting period (October 1, 2016 – January 1, 2017), the following progress was achieved.

1. October 13-23, 2016 - Business trip of a SIC ICWC programmer (R.Khafazov) to Johns Hopkins University, Department of Earth and Planetary Sciences (Baltimore, USA).
2. Two events were organized:
 - Workshop on “Transboundary water management adaptation in the Amudarya basin to climate change uncertainties” project (October 26, 2016, Tashkent) to sum up the results of the first year of the project
 - Workshop on “Algebraic modeling language GAMS is a simulation tool for the tasks of PEER” (December 29, 2016, Tashkent).
3. Activities under the third stage of the project (Numerical experiment) were started, in particular on the task “conduct series of simulation for different scenarios (climate, water resources, HEPS operation, innovations, water requirements) for 2016-2055”.

During a trip to the USA, R.Khafazov demonstrated the planning zone model, which is based on IDEF family of methods and developed under the PEER project. He also received some suggestions from Johns Hopkins University staff regarding to further improvement of modeling, use of remote sensing methods and climatic models and data (NASA Land Data Assimilation System, etc.). These suggestions were discussed by the project team at an event on October 26, 2016 and December 29, 2016 when discussing organizational issues for 2017.

At the workshop held on December 29, 2016, it was decided to analyze new climatic scenarios (CORDEX, <http://www.cordex.org/>; NEX _ NASA Earth Exchange, <https://nex.nasa.gov>, etc.) proposed by American partners of the project in addition to the REMO scenario in terms of their acceptability given our conditions and compare them with REMO. It was also decided to conduct additional research on optimization of cropping patterns; the research is incorporated into the task “Conduct series of simulation for different scenarios”; a special group comprised of experts involved in the project was established; it will be responsible for optimization calculations.

In November-December, preliminary work was performed for the “Numerical experiment” stage, task “Conduct series of simulation for different scenarios”, namely preparation of input data on trends for 2016-2055, filling of these data into database, making testing calculations, and final calculations related to assessment of climate change effect on crop water requirements in the planning zones of

Turkmenistan (this work was performed after receiving soil maps and ground water levels for planning zones in Turkmenistan).

Project Events*

Please list all events that you organized and held during the reporting period. Events include workshops, conferences, short courses, and stakeholder outreach events. Technical presentations given at events organized by others should not be included in this section. Please also complete the [template provided here](#) and upload it below.

October 13-23, 2016. A trip of R.Khafazov, SIC ICWC programmer, to the Johns Hopkins University, Department of Earth and Planetary Sciences (Baltimore, USA). The results of the first year of the project, methodological approach to modeling by SIC ICWC (IDEF family of methods), planning zone models (function part, interface and database) were presented to the US partners of the project. The use of planning zone model via interface (located at <http://asbmm/uz:2016/>) was presented. The University staff made some suggestions related to the modeling, use of remote sensing methods to acquire input data for the planning zone model, climatic models to analyze crop water requirements, and NASA Land Data Assimilation System to acquire the missing climatic and hydrological data.

October 26, 2016. Workshop on the “Transboundary water management adaptation in the Amudarya basin to climate change uncertainties” project. The participants were represented by SIC ICWC staff, BWO Amudarya and invitees. At the workshop, the outcomes were summarized for stage I – Planning and designing and stage II – Research. Tasks were set for stages III and IV. The agenda incorporated the following issues: outcomes of the first year of the project (A.Sorokin), information provision of the project – data sources, database, GIS, project web-site (D.Sorokin, R.Toshpulatov, etc.), specifics of the Amudarya River management in the national territorial administrations (BWO Amudarya Director M.Makhramov, A.Nazariy), constructing hydrological runoff series (A.Sorokin), scenarios for agriculture development in the Amudarya basin (Sh.Muminov), climate change effects on plant development stages (G.Stulina), modeling crop water requirements (G.Solodkiy), legal and institutional framework (D.Ziganshina, V.Dukhovniy), coordinating actions between executors, and harmonizing approaches to construction of scenarios and modeling.

December 29, 2016. Workshop on the “Algebraic modeling language GAMS as a simulation tool for the tasks of PEER”. The participants were represented by SIC ICWC staff and invitees. They discussed the ways to organize project activities in 2017, including optimization of scenarios. GAMS was approved as the main tool for optimization solutions.

During the reporting period, how many events did you organize in total?*

2

Total number of females that participated in these events.*

7

Total number of males that participated in these events.*

27

Major Equipment Purchased

Please list any major equipment purchased during the reporting period, such as computers, lab equipment, etc. It is not necessary to list supplies or reagents purchased.

No equipment was purchased during the reporting period

Outreach and Collaborations*

Please describe any connections or collaborations developed with parties outside of your organization interested in implementing the results of your project, such as USAID staff, government agencies,

community groups and nongovernmental organizations, or private companies. Please describe these collaborations

The project team actively promotes the research results in communication with governmental officials, academicians and development practitioners. There is continuous effort to make available the project results and approaches to the wider audience. For example, information about our PEER project was shared at 11-th meeting of the Working Group on Integrated Water Resources Management under the UNECE Water Convention, 18-19 October 2016, Geneva, Switzerland, when Dr Ziganshina made an intervention on item 9 of the agenda Adapting to climate change in transboundary basins to comment draft strategy for future work on climate change adaptation in transboundary basins under the Convention.

*Please indicate if you have met with the organizations listed with regard to the your PEER project. *Only meetings discussing research findings and applications should be included.*

USAID Local Mission

Government agencies in your country

Community groups or non-governmental organizations

Private companies

Not applicable

Technical Research Presentations*

Please provide details regarding all research presentations made at conferences on projects or work funded under your PEER project. After your description, please enter the total number of presentations below.

Two technical research presentations have been made at conferences on work funded under our PEER project

1. 14th International Conference "Europe-INBO 2016", 19 - 22 October 2016, Lourdes, France: Dr. Ziganshina's presentation "Adapting to climate change in the Amudarya basin: dealing with droughts" at Roundtable 3: Adaptation to Climate Change: resources management, scarcity and drought. Please, refer to the project web-site for this presentation www.cawater-info.net/projects/peer-amudarya/

2. Roundtable «Promoting the effectiveness of international water law in support of security and peace» organised by Geneva Water Hub in the World Meteorological Organisation on 26 October 2016 in Geneva, Switzerland: Dr. Ziganshina's presentation "Looking back at 25 years of transboundary water cooperation in Central Asia: the role of international law"

Number of technical presentations made during the reporting period.*

2

Potential Development Impacts (evidence to action)*

Please provide an update on any new potential development impacts. For example, a new product is being developed as a result of your PEER research, a policy document is being created based on your research, or your research is informing a private sector strategy document or NGO program.

In October 13-23 2016, during the business trip to the Johns Hopkins University, Department of Earth and Planetary Sciences (Baltimore, USA), SIC ICWC programmer Mr. R.Khafazov demonstrated the application of IDEF family of methods for design of the function and information models of planning zones and basic means and methods for development of the server and client parts of the model. Then the use of planning zone model was demonstrated through client interface available at <http://asbmm.uz:2016/>. The audience noted the efficient application of IDEF family of methods for design of the function and information models for the conditions of the Aral Sea and up-to-date web-

technologies for development of the server and client parts of the model, and underlined the systematic and comprehensive approaches used for design and development of the planning zone model, a wide set of not only hydrological indicators, but also socio and economic ones.

IDEF family of methods (IDEF0, IDEF1X) will be used not only for solution of research tasks on adaptation of planning zone model (PZm) of ASBmm to the Amudarya basin, but also for the modeling of climate and anthropogenic effects on the Aral Sea basin in the future. This is an important scientific potential created by the PEER project for the region.

Challenges

Please give explanations on any particular difficulties that have arisen during the quarter (visas, funds transfers, problems purchasing equipment, etc.).

Main challenge related to the project implementation is the lack of some information on individual zones in Turkmenistan. Particularly, there were problems to access information on soil maps and ground water levels to calculate crop water requirements in the planning zones in Dashoguz, Lebap provinces and Garagumdarya PZ (Karakkum canal). This information was acquired in October 2016 and calculations were carried out in November-December 2016, with the reconstruction of algorithm for data preparation and calculation methods beforehand (because data for Turkmenistan significantly differ from the same data for Uzbekistan).

Future plans*

*Please give a detailed summary of your plans on the project for the coming 3-6 months (including training or outreach events, field work, **exchange visits**, purchasing of equipment, etc.). Please note: if your project is scheduled to end in the next 3-6 months and you will need a no-cost extension, please include that request in this section and make sure to e-mail your grant manager as well regarding the extension request*

The immediate task of the PEER project in January-March 2017 is to carry out activities related to the third stage of the project (Numerical experiment). Tasks set for this stage:

- Conduct series of simulation for different scenarios (climate, water resources, HEPS operation, innovations, water requirements) for 2016-2055,
- Assessment of impact of climate change & HEPS operation and Afghanistan on water resources & river balance, water availability for river sites and aquatic ecosystems,
- Assessment of impact of climate change & HEPS operation and water requirements on water balance and agriculture sector of provinces, crop production.

It planned to comprehensively assess prospects for development in the provinces of countries and Amudarya basin in general, including main economic sectors, particularly irrigated agriculture, hydropower, and aquatic ecosystems in Prearalie in context of expected climate changes. Three scenarios for agriculture development will be studied. These are oriented on preserving current trends, food security (import substitution) and high-yield products for export.

In April-May, in cooperation with GWP-CACENA it is planned to organize the training on the tools (models) and outcomes of the project for the BWO staff and students of institutions and universities in Uzbekistan. Moreover, an attempt will be made to optimize cropping pattern based on chosen criteria – this work will be performed for some parts of the basin countries.

By April-June 2017, it is planned to fulfill these tasks and start working on the task “Develop proposal on water management under climate change”. This task includes principles of water management for 2016-2055 & legal issues, search consensus "Resources - needs" in a changing climate and other issues. The development of proposals on water management in context of climate change will consider

the results of numerical experiments, scientific results of the project and proposals by organizations responsible for water management in the Amudarya basin (first of all, by national offices of BWO Amudarya).

In parallel, from January 2017 it is planned to start working on the fourth stage of the project (Dissemination), particularly on producing new knowledge & data. On the website, it is planned to post information related to the outcomes of the third stage, including the modeling, search of optimal solutions on water and land management in context of climate change and global challenges. Information on the research outcomes and process will be posted for decision-makers in the form appropriate for them.

Additional information

*Please include additional information that you would like to share with us, for example if you have published any journal articles or made conference presentations on your project results. Please list reference citations, but **please do not include detailed research analysis or raw data.***

The project seeks to answer a topical question - “How can we manage water resources of the Amudarya in the future (2030, 2050) in the context of climate and other anthropogenic changes, without compromising future water consumption and avoiding significant damages to water consumers in the lower reaches and delta which exists today, in low-water periods, ?”. It is obvious that one of the ways to solve the problem is to increase the level of multi-year and seasonal regulation in the Amudarya basin, bearing in mind the regulation not only for energy production purposes, but also for environmental and irrigation purposes as a compensator for potential increase of water withdrawal in Afghanistan and negative climate change impact on natural flow hydrograph. This will demand starting negotiations with further legal arrangements among riparian countries on:

- multi-year flow regulation by reservoirs,
- joint water accounting in the Amudarya River basin and reduction of channel losses in the rivers and reservoirs,
- ensuring the preservation of aquatic ecosystems in the Southern Prearalie (Amudarya River delta),
- joint commitments and water saving measures in the irrigation systems.

In case of irrigation development in Afghanistan, by 2050 up to 6 km³ of water may be withdrawn in the Amudarya River basin (along the Kunduz and Kokcha rivers). Moreover, hydrograph of the river may insignificantly change in terms of annual volume and significantly – in terms of inter-annual volume. The PEER project indicates to these challenges and allows finding reserves by rational flow regulation, water saving measures and managing water demand, mainly for crops growing. Reduction of water consumption (and simultaneous increase of productivity) may be achieved through innovations, decrease in growing period of plants (as a result of positive effect of warming), as well as optimization of cropping patters. One more way is the operation of big hydroschemes with HEPS in energy-irrigation regime in the basin. This will allow reducing water scarcity along the Amudarya channel during the low-water periods.

Photos

If available, please upload photos highlighting your project. The photos will be added to your PEER project page and may be shared with USAID.

Upload a file

[5 MiB allowed]

- foto: Minutes PEER 26/10/2016 _ 29/12/2016

Documents:

Please upload any relevant documents (agendas, papers, posters, etc.) in a single file, if available.

Upload a file

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- Minutes PEER 29/12/2016
- Minutes PEER 26/10/2016
- Report Khafazov trip to USA