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*

04/01/2016

Reporting Period End Date*

06/30/2016

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.

This report provides a brief summary of project activities during the period from April 1st till June 30th, 2016. Overall, the project activities in this period were aimed at

- data collection to conduct high-quality research activities;
- further improvement of the ASBmm model as the principal tool to forecast and assess possible changes in the hydrological regime of the Amudarya and its impact on irrigated agriculture and hydropower production due to climate changes;
- analysis of future development strategies for different planning zones including possible changes in agriculture, hydropower and associated with them economic sectors;
- modeling of climate change impacts on the growth of crops and water requirements taking into account positive outputs in terms of growth in crop productions;
- modeling rural sector changes under impact of different scenarios of crop pattern.

During the reporting period the project team continued work on **adaptation of the ASBmm model (position 2.1.).** Particularly, it finished the water balance assessments for planning zones in Amudarya basin (resources versus their use) for the period of 2010-2014, completed the assessment of channel losses and return flow in Amudarya River reaches over 2010-2014 and of flow regulation by reservoirs and HPP in the basin over 2010-2015. Existing information gap on Turkmenistan was partially filled through the data collected by the project expert from Turkmenistan as well as through the data from open sources.

Under position 2.2. (Analysis of country development programs) the team analyzed strategies of agricultural and water sector development for the long-term in the Amudarya basin countries (information on Turkmenistan will be updated as far as it becomes available). Based on the analysis, three scenarios of province development in Amudarya basin countries were built: business as usual; food security; and, agricultural product export orientation. Analysis of the Tajik hydropower sector development programs was completed. This work included also analysis of plausible scenarios of energy demand in Tajikistan (winter and summer) and options to meet this demand. Assessment of future return flow in Turkmenistan in context of construction of Golden Lake was made as well.

Under position 2.3. work is underway on modeling of crop water requirements in context of climate change.

Under position 2.4. (Modeling runoff series in context of climate change) the assessment of climatic scenarios and their impact on water resources was completed.

For position 2.7 (Study of legal & institutional framework) Review of existing legal and institutional framework for transboundary water management in Amudarya basin (Task 2.7) was made. Preliminary results of the analysis were discussed during two workshops dedicated to international water law in May 2016:

- National workshop on "The Role of Two Global Water Conventions in Promoting Integrated Water Resources Management in the Republic of Uzbekistan and Maintaining Transboundary Cooperation in Central Asia", 11 May 2016, Tashkent;
- Training workshop on integrated water resources management and international water law as part of the GIZ Project "Strengthening Regional Water Cooperation in Central Asia by Building Capacities of BWO Amudarya, BWO Syrdarya and their branches", 17 May 2016, Tashkent.

To popularize the project and increase its visibility, the project web-site is updated regularly http://cawater-info.net/projects/peer-amudarya/index.htm, and a project leaflet was prepared.

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.

Several field visits have been conducted to present the project activities to local stakeholders and gain relevant data and information from basin water organizations in Uzbekistan. Thus, the principal investigator - prof Victor A. Dukhovny had meetings in basin irrigation system administrations in Bukhara (February 24, 2016), Khorezm (March 5-7, 2016) and Karakalpakstan (April 7-11, 2016).

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

3

Total number of females that participated in these events.*

4

Total number of males that participated in these events.*

19

Major Equipment PurchasedPlease 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 continues building collaborations with various partners.

In particular, we revitalized contacts with our partners from the Netherlands (UNESCO-IHE and Water Partners Foundation) in cooperation with whom the ASBmm model – the main analytical tool of our project - has been developed. Our partners are interested to learn on new developments introduced into the model by the PEER project and its adaptation to the Amudarya basin specifics.

Seeing great potential in the updated version of the ASBmmto assess and simulate various development options for the Amudarya with a view of assisting stakeholders to create mutually acceptable and sustainable solutions, SIC ICWC in a consortium with local and international partners submitted a project proposal to the Bureau of Oceans and International Environmental and Scientific Affairs' Office of Conservation and Water at the U.S. Department of State for a program on international water cooperation. The overall goal of the proposed project is to restore trust and facilitate shared understanding among key stakeholders to reinforce cooperative processes over shared waters in the Amudarya basin (*water diplomacy*). A primary objective is to lay the groundwork for enabling inclusive transboundary water governance arrangements in the Amudarya basin through strengthening key institutions involved (BWO "Amudarya", its territorial units and provincial water management organizations in Tajikistan, Turkmenistan and Uzbekistan) and creating platforms for multi-stakeholder engagement on IWRM.

The project team also collaborates with the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention) under the implementation of its Programme of work for 2016–2018, in particular programme area4 "Adapting to climate change in transboundary basins". Of particular relevance for this area will be the findings of the legal and institutional analysis of transboundary water governance in the Amudarya in the context of changing climate undertaken under the PEER project.

There is an initial agreement and great potential in the future cooperation and joint implementation of the ADB-funded program on water security improvement in the Amudarya basin aimed at increased water saving. This program can be enriched by the work of the PEER project experts (Dr. Stulina and Mr. Solodkiy) on gaining positive benefits from the changing climate through adjusting crop patterns and vegetation period to grow secondary cash crops. The principal investigator Prof. Dukhovny updated top officials from the Ministry of Agriculture and Water Resources of the Uzbekistan on the positive impacts of this collaboration.

Please indicate if you have met with the organizations listed with regard to the oyour 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

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.

Dr. Ziganshina presented an overview of two global water conventions – 1992 UNECE Water Convention and 1997 UN Watercourses Convention - to water professionals, experts from other relevant ministries and parliamentarians at a national seminar on 'The role of two global

water conventions for promotion of integrated water resources management and transboundary cooperation in Central Asia" held on May 22, 2016 in Tashkent in partnership between SIC ICWC and the Ministry of Agriculture and Water Resources. Dr Ziganshina also made presentations at the training workshop organized by GIZ for representatives of basin water organizations from Tajikistan, Uzbekistan and Turkmenistan on May 17, 2016 in Tashkent. Presentations at both events were partly built on materials prepared under this PEER project.

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.

Research innovations that come from and further developed by this PEER Project:

- assessment of climate changes and hydrological consequences in the Amudarya basin is based on a new climate scenarios REMO presented by the Wurzburg University, Germany for all Central Asia. Given that this generic model did not account local specifics and tendency of local climate, it was tested that the REMO model can be adapted to any points in Central Asia through a network of weather stations located in airports. This provides quite a dens net for calibration;
- defining water requirements for different crop patterns that can be grown in Amudarya basin taking into account climate forecast and making smart use of temperature growth in irrigated agriculture (initial scientific framework developed in Stulina, G. and Solodkiy, G. (2015) The Effect of Climate Change on Land and Water Use. Agricultural Sciences, 6, 834-847.http://dx.doi.org/10.4236/as.2015.68081). Crop patterns allow reducing significantly crop water requirements. These methods have been used in large scale first time in the PEER project;
- searching optimal scenarios for crop patterns against crop patterns in the business as usual scenario with orientation at food security scenario and export oriented scenario. The findings of the PEER project will provide a basis to recommend crop patterns for each planning zone in the project area.

Challenges

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

Although the project activities have been implemented according to the agreed action plan, there were also some challenges in its implementation. The project seeks to analyze social, economic, political, environmental and agricultural situation and future trends in the Amudarya basin in a systemic way. To this end, pieces of information from different sources on various subjects have to be accumulated, processed, and converged into a coherent picture to illustrate possible transformation trends in the Amudarya river basin. This proved to be a challenging task for a number of reasons.

First of all, there is a lack of open source access to data related to hydrology, soil, hydrogeology, climate and other natural conditions; even when data exists; it has to be double checked due to its low accuracy and reliability. Degree of openness and transparency of information differs from a country to a country that makes it difficult to compare data across the countries and present its findings in a coherent way. Complications in access to information at the national level also created some delays in its collection.

Second, assessment of information related to the strategic directions of countries' development was complicated by a large degree of uncertainty in political, financial and economic conditions. This is especially so with respect to the planned construction of hydropower facilities on transboundary rivers such as the Rogun dam and a number of smaller projects and the dependence of their construction on foreign investment and riparian's non-objections.

Third, the future trends in agricultural development of the countries were difficult to grasp through the single analytical approaches due to still ongoing process of agricultural restructuring and lack of long-term systems for perspective planning in agriculture development in almost all countries of the basin. The situation in planning zones (administrative units divided according to their specific natural and socio-economic characteristics) across Uzbekistan is more or less clear in terms of hydrology and land restructuring that allows predicting future trends and recommending innovations in reducing vegetation period for certain crops. The situations in Tajikistan and Turkmenistan are less predictable (even more so in Afghanistan) that hampers the sound computing future options.

To address these challenges, the project team had several informal face-to-face meetings to collect and verify existing data and information. Thanks to close collaborative relations with colleagues from other countries and aspiration to get the whole picture, the project team did it best to collect as much reliable information as possible.

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.

Based on the completed assessments, the work will be continued on changing the set of models **ASBmm** under **position 2.1**. in order to extend the simulation period up to 2050 (architecture, database, algorithms). This adaptation is to be completed in September 2016. The upgraded version of ASBmm is to be ready by 30.10.2016.

Under position 2.3. in September 2016, it is planned to assess crop water requirements in context of climate change (REMO scenario and data) for 9 provinces (planning zones) in Amudarya basin.

Next quarter, it is planned to finish work on **modeling of river runoff series** in context of effects of climate change on river water volume and regime of rivers in Amudarya basin for 2020-2050 (**position 2.4**).

Also, next quarter the project team will prepare **alternative scenarios of HPPs operation** in Amudarya basin for 2020-2050 **(position 2.5**) and will study main limitations for future development of Amudarya basin, including demands of Afghanistan, Amudarya delta lakes, and the Aral Sea (**position 2.6**).

Under position 2.7 it is planned to complete in August 2016 the extended analysis of the legal and institutional framework for transboundary water management in context of climate change, including global Water Conventions, experiences from other countries and regions.

Organization of a **workshop** to discuss results of the preparatory and research stages and train the research team and students in modeling approaches in order to start the stage of numerical experiments **(position 2.9.)** was planned for October 2016; however, funds for this workshop were built into the second project year budget. Therefore, in October, it is planned to hold a workshop to train the project team and key partners for a limited quantity of participants. The workshop costs will be covered by money allocated for the kick-of meeting. The larger workshop, where a wide circle of researchers and decision makers will be invited, is to be held at the beginning of the second project year.

For **popularization and better visibility** of the project, the following actions are planned:

- document the results of the preparatory stage and the research stage in form of a brochure (due date - 1.09.2016);
- attend and discuss the project findings at the 6th workshop on Adaptation to Climate Change in Transboundary Basins and the eighth meeting of the Task Force on Water and Climate under the UNECE Water Convention (13-15 September 2016 in Geneva);
- present the project, its approaches and preliminary findings in various events at national and international levels;
- prepare a collection of research papers based on the project materials.

Within next 6 months (in October 2016) it is planned that our software engineer (Khafazov Ruslan) will **visit our partners in the US** to present our methodological approach, exchange experiences and get advice on improving our approaches. In particular, it is envisaged:

- to present IDEF methodologies (IDEF0, IDEF1X) to deal with research tasks of the PEER Project on adaptation of the planning zone model (PZM) of the ASBMM system to the Amudarya basin;

- to study modeling methodologies and instruments used at the Morton K. Blaustein Department of Earth and Planetary Sciences; study possibilities to apply the gained knowledge for the PEER Project purposes; establish scientific collaboration between SIC ICWC and the Morton K. Blaustein Department of Earth and Planetary Sciences.

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 expert – Dr Dinara Ziganshina – took part in Regional workshop “Empowerment of women in sustainable management of water resources in Central Asia and Afghanistan" held on 16-18 June 2016 in Almaty. The workhop was organized by the Central Asia Regional Environment, Science, Technology, and Health Office based at the U.S. Embassy in Astana as well as the USGS. The event provided an excellent opportunity for women scientists from Central Asia and Afghanistan – including ones involved in the PEER program – to engage and

discuss possible avenues to help empower women in critical decision making regarding access to water and enhancing job opportunities.

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

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Documents

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

Upload a file

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