

Project name*

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

Family/Last Name of PEER applicant*

Dukhovniy

Institution*

Scientific-Information Center of the Interstate Commission for Water Coordination of Central Asia

Reporting Period Start Date*

11/1/2015

Reporting Period End Date*

04/30/2018

Section 1: Financial Report**Financial Report***

The annual financial report ([which may be downloaded here](#)) should be prepared by your financial person and uploaded below:

Receipts

Please upload below your receipts (if required) in a single document

Section 2: Technical Summary**Summary of Activities During Reporting Period***

Please describe what has been accomplished on your PEER project during the reporting period, outlining the activities that were undertaken and specifically discussing achievements in relation to the milestones or targets set in the original PEER work plan. Please highlight activities from the past year in this section as space is provided in Section 10 to provide an overall summary of the project results and activities.

From 11/1/2015 to 09/30/2016 all planned research activities was completed under the first (preparatory period) and second (research period) stages of the project. Particularly:

- Water management problems in the Amu Darya Basin studied, research methodology, scenario building and assessment methodology, and scheme of scenario combination developed;
- Data for research and numerical experiments collected and analyzed;
- Work on improving ASBmm model completed, including developing new planning zone model developed, database and modifying the model interface. This work help to complete a calculation tool for numerical experiments. The model was created in line with the IDEF family of methods for complex systems (Function Modeling, Information Modeling) developed in the U.S. This model is designed for those who deal with future planning and scenarios of irrigated agriculture development in riparian states,
- Country development programs in water sector and energy sector (for Tajikistan) analysed to formulate alternative scenarios (2020-2055), including combination of scenarios of climate, water resources (hydrological series), cropping patterns and innovations (that underlie water requirements and land productivity), demands in industry and drinking water supply, and, finally, operation regimes of large reservoir hydroschemes plus environmental restrictions,
- Crop water requirements calculated by using the model REQWAT developed by SIC ICWC on the base of FAO CROPWAT model. This allowed building scenarios of unit crop water requirements for all planning zones (provinces) in the riparian countries, with account of climate impact (REMO 0406 scenario). Positive effects of temperature rise manifested in shorter growing season prevents from further increase in water requirements,
- Probable water development scenarios in Afghanistan studied, volumes and options of reduction of runoff in the rivers flowing in Afghanistan and forming the Panj and the Amu Darya Rivers defined,
- Legal and institutional frameworks of water management in the Amu Darya Basin analysed,
- One working meeting (26 October 2016) and two training workshops (29 December 2016 in Tashkent and 4-5 May 2017 in Urgench) held,

- The developer of the planning zone model Mr. R.Khafazov visited Johns Hopkins University on 13-23 October 2016 to demonstrate the model developed on the base of US technologies during the project.

From 10/1/2016 to 11/12/2017 all planned research was completed under the third stage (numerical experiments) and major part under the fourth stage (dissemination) of work. Particularly:

- We completed numerical experiments using the models that produced results on comprehensive assessment of future basin development (2020-2055), including: assessment of climate impact on water requirements and available water resources, including water for irrigated land and aquatic ecosystems, based on a combination of scenarios of agricultural development, alternative hydroscheme operation regimes, and growing water withdrawal by Afghanistan,
- Recommendations were developed for adaptation to climate change, management of transboundary water resources, usage of positive climate effects on crop water requirements, and legal and institutional aspects,
- Project database was developed and filled with data from 2010 till 2015 and indicators for 2020-2055, i.e. output of scenario-based modeling of basin development (access to database via the Interface),
- A few policy briefs were prepared for decision makers to cover the following issues: strategic planning and assessment of development in the Amu Darya Basin for 2020-2055; principles of water allocation in the basin; mechanisms of quick response to ongoing climate change; examples of ICWC actions in practice; and, recommendations for improvement of adaptation potential of the current water allocation system,
- Major results of the PEER project were presented and widely disseminated at the Central Asian International Scientific-Practical Conference “The 25 years of Water Cooperation in Central Asia: Lessons Learnt and Future Outlook”, which was held on 23-24 November 2017 in Tashkent,
- The project results were uploaded on the project web-site in form of reports, publications, and presentations. The web-site is hosted by the CAWater-Info Portal (www.cawater-info.net/projects/peer-amudarya) and consists of the following sections (in Russian and English): Home, About, database, and Knowledge base (maps, monographs, articles, reports, reference books). A project leaflet was prepared as well.

From 12/1/2017 till 04/30/2018, the fourth stage (dissemination) was completed and research findings fine-tuned. Particularly:

- The book “The Future of the Amu Darya Basin in the context of Climate Change” was published. It summarized and systematized the key project findings, such as the existing system of interstate water management in the Amu Darya Basin, future development in the basin until 2050, including climate change and its impact on water supply and demand, proposals for flow regulation by reservoir hydroschemes, measures for improvement of water, land and energy productivity, and proposals on improvement of legal framework of cooperation,
- The final project workshop was held in Tashkent on 31 January - 1 February 2018. During the workshop the PEER Project results were presented and discussed with key stakeholders, including comprehensive assessment of development in the riparian countries of the Amu Darya Basin and their respective individual zones by 2050 and adaptation measures to climate change in the basin. Potential follow-up of the Project (adaptation and dissemination of its approaches and tools in other basins) and further cooperation with partners and donors were addressed as well.
- The project findings have been presented at four sessions of the world’s biggest water-related event, organised by the World Water Council - 8th World Water Forum in Brasilia that was held in Brasilia from 18 to 23 March.
- A technical tour to the Itaipu Dam that was jointly constructed and operated by Brazil and Paraguay was organised to study this successful experience of benefit sharing and draw lessons for the Amu Darya. A special brochure, with translation of all relevant documents into Russian, was prepared and widely disseminated.

- Final chapters of legal and institutional assessment has been completed, including examples of benefit sharing mechanisms from other river basins, outline of draft agreement on Amu Darya, and guidelines on developing draft agreements with reference materials.

Section 3: Stakeholder Events

Project Events*

Please complete and upload the below spreadsheet detailing the events organized by the project. 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. If there are no events to report for this quarter, please note it in the spreadsheet.

The [spreadsheet template](#) can be downloaded here.

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

10

During the reporting period, how many females participated in the events you organized?*

106

During the reporting period, how many males participated in the events you organized?*

365

Section 4: Research Team

Please provide the following demographic information on the number of students and others involved on the project research team.

Female Undergraduate Students (BA, BSc)*

0

Male Undergraduate Students (BA, BSc)*

0

Female Master's Students (MA, MSc)*

0

Male Master's Students (MA, MSc)*

1

Female Doctoral Students (PhD)*

0

Male Doctoral Students (PhD)*

0

Female Postdoctoral Scholars*

0

Male Postdoctoral Scholars*

0

Female Research Assistants/Project Employees.*

Please do not include researchers listed above.

0

Male Research Assistants/Project Employees*

Please do not include researchers listed above.

0

Additional Research Team Information*

Please use [this spreadsheet](#) to provide additional details on student members of your research team.

Section 5: Educational Impacts

Discuss new courses or degree programs created (if any) or changes to existing course curricula.*

Please only include developments that occurred during the reporting period.

During presentations of the project results in conference and other events, our researchers were approached by two universities and a center of professional development in Uzbekistan.

Currently we are discussing formalities how to integrate the project results into curricula and lecture materials of these educational institutions.

After the presentation of the project findings in Geneva during global workshop "Water allocation in transboundary basins: A global workshop on the status and good practices" organised on 16-17 October 2017 by UNECE, it was a request from University of Geneva to record a short lecture on this subject for e-learning distance course on International Water Law. A lecture "Historic water allocation in the Amu Darya basin: achievements and challenges" based on PEER project findings was prepared, recorded and included into distance learning e-course delivered globally by the University of Geneva.

Also, at SIC ICWC Regional Training Center that serves 5 Central Asian countries we are currently developing a new educational module Water and Climate Change which will substantially build on the PEER project results

During the reporting period how many new or updated courses or degree programs did you develop?*

0

Number of female students participating in new or updated courses.*

0

Number of male students participating in new or updated courses.*

0

Section 6: Research Outputs

Please provide the number of international patent applications submitted in the past year.*

0

Please provide the number of national patent applications submitted in the past year.*

0

Please list the patent details.*

N/A

Peer-reviewed Publications and Proceedings*

Please list the research products you authored or co-authored about your PEER science project. The list should be limited to peer-reviewed products that were published or accepted for publication during the reporting period. Provide full reference citations for all journal articles, technical reports, books or book chapters (written or edited). Please include the list of authors, full title of item and publication in which it appeared, volume number, page numbers, and date.

N/A

For each type of published technical document, please list the number of each type and the full references in the boxes provided below:

Peer-reviewed Journal Articles*

0

Of this total, number of journal articles published with U.S. PEER Partner.*

0

Journal References

N/A

Link to Journal Reference #1

Link to Journal Reference #2

Link to Journal Reference #3

Peer-reviewed Proceedings*

This is defined as manuscripts that went through a panel review process and were published as part of a technical conference.

1

Of this total, number of proceedings published with U.S. PEER Partner.*

0

Proceedings References

Amu Darya - the Great River on the Threshold of Signature Decisions (Prof. Dukhovniy V.A., Dr. Ziganshina D.R., Sorokin A.G.). Proceedings of the International Water and Climate Summit, 23-25 October 2017 Rome, Italy

Link to Proceedings #1

<https://www.riob.org/en/node/4099>

Link to Proceedings #2

Peer-reviewed Books/Book Chapters*

0

Of this total, number of books published with U.S. PEER Partner.*

0

Book References

N/A

Other peer-reviewed publications*

0

Other Publication References

1. Collection of selected agreements on water resources management in the Amu Darya River Basin. SIC ICWC, Tashkent 2017, 111 pp. http://www.cawater-info.net/library/rus/amudarya_2017.pdf
2. Sorokin A.G., Sorokin D.A, Ergashev I. "Approaches to formulation of effective river basin water management strategy in Central Asia", Stulina G.V., Solodkiy G.F. "Estimation of crop water

requirements in irrigated land of the Khorezm oasis in the context of climate change" in the Collection of scientific papers of the Eastern Europe, Caucasus, and Central Asia Network of Water-Management Organizations, Issue 10 "Challenges of river basin management in the context of climate change", Tashkent, SIC ICWC, 2017.-208 pp.

http://www.cawater-info.net/library/rus/ecca_papers_collection_vol_10_2017.pdf

3. Collection of scientific papers on the occasion of the 25th Anniversary of the Interstate Commission for Water Coordination in Central Asia / Edited by Prof. Dukhovniy V.A.– Tashkent: SIC ICWC of Central Asia, 2017. – 212 pp.

This Collection contains papers of project executors:

- Sorokin D.A. "Modeling runoff transformations in the Amu Darya River";

- Muminov Sh.Kh., Gojenko B.V., Umarova N.Kh. "Forecast of agricultural development in the Amu Darya Basin until 2050: Case study of the Republic of Uzbekistan".

http://cawater-info.net/library/rus/25_icwc_scientific_papers.pdf

4. "The Future of the Amu Darya Basin in the context of Climate Change", editor Prof. V.A.Dukhovniy - Tashkent: SIC ICWC of CA, 2018 -328 pp.

<http://www.cawater-info.net/projects/peer-amudarya/pdf/peer-amudarya-final-book.pdf>

5. Stulina G.V., Solodkiy G.F. "Assessment of crop water requirements in Amu Darya River Basin", in INBO Newsletter N° 26 - March 2018

<https://www.riob.org/en/documents/inbo-newsletter-ndeg-26-march-2018>

Other Research Outputs

Please describe other research outputs (not peer-reviewed)

This could include white papers, blogs, web platforms, or other tools they are using to disseminate your research.

The PEER project website was designed for popularization and enhanced visibility of the Project. It contains several sections, such as "Home", "About", "Database" (water resources, infrastructure), and "Knowledge base" (maps, monographs, papers, reports, references) in Russian and English. The project website is hosted by the CAWater-Info Portal on: www.cawater-info.net/projects/peer-amudarya.

A number of policy briefs and press releases have been prepared and disseminated. Targeted messages have been sent to relevant national ministries and agencies in Tajikistan and Uzbekistan on various aspects of the project. A brochure "The Itaipu Dam - benefit sharing on joint construction and operation between Brazil and Paraguay", with translation of all relevant documents into Russian, has been sent to all key ministries and institute of strategic studies.

Technical Research Presentations*

Please list research presentations made at conferences or technical meetings on projects or work funded under your PEER project. After your description, please enter the total number of presentations below. Please include all technical presentations given during the reporting period including those already reported in quarterly reports; provide the title and date for each.

The following presentations by the research team highlighted the activities funded under this PEER project:

"An introduction to international water law" (D Ziganshina), Training workshop, GIZ, 17/05/16, Tashkent

- “An overview of two global water conventions: 1992 UNECE Water Convention and 1997 UN Watercourses Convention” (D. Ziganshina), national seminar on ‘The role of two global water conventions for promotion of integrated water resources management and transboundary cooperation in Central Asia’, 22/05/16, Tashkent
- “Introduction to the PEER project on Transboundary Water Management Adaptation in the Amudarya Basin to Climate Change Uncertainties and its preliminary findings” (Prof Dukhovniy V.), High-Level Symposium on SDG 6 and Targets: Ensuring that no one is left behind in access to water and sanitation, 9-11/08/16, Dushanbe
- “Status of information on the Aral Sea Basin: on the way toward the single information space” (Prof. Dukhovniy V.), “Studying alternative water and hydropower development scenarios in the Aral Sea riparian states through computer modeling” (Sorokin A.), WB “Central Asia Water Future Forum and Expo”, 19-23/09/16, Almaty
- “An introduction to international water law” (D.Ziganshina), 7th Central Asian Leadership Programme on Environment for Sustainable Development, 27/09/16, Almaty
- “Adapting to climate change in the Amudarya basin: dealing with droughts” (D. Ziganshina), 14th International Conference “Europe-INBO 2016”, 19-22/10/16, Lourdes, France, http://www.cawater-info.net/projects/peer-amudarya/pdf/ziganshina_oct2016_en.pdf;
- “Looking back at 25 years of transboundary water cooperation in Central Asia: the role of international law” (Dr. Ziganshina D.), Roundtable «Promoting the effectiveness of international water law in support of security and peace», 26/10/16, Geneva
- “Approaches to formulation of effective water management strategy in Central Asia” (Sorokin A., Sorokin D., Ergashev I.), International scientific-practical conference “Challenges and prospects of effective water management against a backdrop of globalization”, 11-12/04/17, Tashkent Institute of Irrigation and Mechanization
- International Conference “Challenges of River Basin Management in the context of Climate Change” Prof. Dukhovniy V., Stulina G., Tilyavova G. (BWO Amudarya), 18-19/05/17 Moscow
- “Historic water allocation in the Amudarya basin: achievements and challenges” (D.Ziganshina), UNECE Global workshop on water allocation in transboundary basins, 16-17/10/17 Geneva.
- “Amudarya - the great river on the threshold of signature decisions” (Prof. Dukhovniy V., Ziganshina D., Sorokin A.), International Summit "Water and Climate - Meeting of the Great Rivers of the World" 23-25/10/17, Rome
- International Conference "From Regional Cooperation to Global Peace and Security on the Issues of Ensuring Security and Stability in Central Asia", 10-11/11/2017, Samarkand
- Central Asian International Scientific-Practical Conference “The 25 years of Water Cooperation in Central Asia: Lessons Learnt and Future Outlook” 23-24/11/17, Tashkent:
 - Dr. Muminov Sh. "Agricultural Development Forecast Scenarios for the Amudarya River Basin for 2050" (based on PEER Project results), roundtable 1: "Transboundary water cooperation as an important driver of food, energy, and environmental security in Central Asia" <http://www.cawater-info.net/projects/peer-amudarya/pdf/muminov-1117.pdf>;
 - Sorokin A. “Transboundary Water Management Adaptation in the Amudarya Basin to Climate Change Uncertainties (based on PEER Project results)”, roundtable 2: “Integrated water resources management as a tool for ‘green growth’ and adaptation to climate change” <http://www.cawater-info.net/projects/peer-amudarya/pdf/sorokin-1117.pdf>;
 - Dr Ziganshina D. “International Law, Diplomacy and Water Resources in Central Asia”, roundtable 3: “Improving legal framework of water cooperation and promoting water diplomacy as a prerequisite for good neighborly relationship between the Central Asian countries” http://www.cawater-info.net/projects/peer-amudarya/pdf/ziganshina_1117.pdf;
- 8th World Water Forum in Brasilia, 17-23 March 2018, the Project results presented in 4 sessions:
 - Side-event «Transboundary water cooperation for food, energy and environmental security in Central Asia» (presentation “25 years of water cooperation within the ICWC in Central Asia: Achievements and tasks for the future”)
 - Session 8.a.2: Education and training on water are not costs but investments

- Session 9.b.2: Monitoring, assessment, data and knowledge sharing in transboundary basins (presentation “Adaptation to climate change in the Amudarya basin: data, information and knowledge sharing imperative”)

- Special session "Water-Food-Energy-Ecosystems Nexus as a Tool towards SDGs in the CACENA Countries"

http://www.cawater-info.net/projects/peer-amudarya/8wwf_17-23-03-2018.htm

Number of technical presentations made*

21

Section 7: Professional Development

Please list new research grants you received in the past year. These are grants where you are the PI or CO-PI. If another member of your research team received a grant to continue the research conducted under the PEER grant, please include that as well.

Research Grant Details*

Please list grants received in the past year besides PEER, including the source and amount.

SIC ICWC:

- continued the Project “Support to the network of Russian speaking water management organizations and organization of an information water conference” with the help of UNECE, 30 December, 2015-31 August, 2017, \$ US 43,973;

- since 2015 to 2017 implemented the project “Assessing land value changes and developing a discussion-support-tool for improved land use planning in the irrigated lowlands of Central Asia” (LaVaCCA). 141,890 Euro were used in 2015-2017 for project purposes;

- since 2015, has been implementing the project “CAWA 3 – The Water Use Efficiency Monitor for Central Asia (WUEMoCA)” together with the University of Wurzburg under support of the German Federal Foreign Office; 150,452 Euro were used in 2015-2017 for project purposes;

- implemented E-Learning short-term course on legal and policy issues related to water resources management in Central Asia and ways for its improvement; WB, 2014-2015, \$ US 12,000;

- implemented the project CRP 1.1 “Improving water use efficiency through innovative technologies in irrigation and farming in cereals, potato, vegetables, horticultural and fodder crops”, ICARDA CAC, 2014-2015, \$ US 96,900;

- implemented the project “CRP on water, land and ecosystems/Managing irrigation-drainage systems to sustainably enhance productivity in Fergana Valley, Central Asia”, ICARDA CAC, 2014-2015, \$ US 47,440.

- implemented “Capacity and needs assessment of institutions responsible for training provision” as part of EU Programme “Sustainable Water Resources Management in rural areas in Uzbekistan”, Technical Capacity Building component, 30 June – 30 November 2017, \$ US 55,000;

- in 2017 implemented a sub-contract under the EU Project "Promotion dialogue for conflict prevention related to environment, water nexus issues in Central Asia: Central Asia Water-Nexus Cooperation (CAWECOOP)", 65,390 Euro.

Please provide the number of new research grants you received in the past year.

Number of new international grants/research funding*

5

Number of new local research grants/research funding*

3

Total Amount Awarded (USD).*

684,234

Was your PEER grant helpful in securing this additional funding?*

No

If so, please describe how the PEER project contributed.

N/A

Personal Development*

Please list the awards or other form of public recognition received, professional associations joined, and leadership positions during this reporting period.

- Prof. Dukhovniy Director of SIC ICWC was awarded the commemorative badge “Ozbekiston mustaqilligiga 25 yil” (the 25th Anniversary of Uzbekistan’s Independence) established by the presidential degree dated 1 July 2016 and given for the substantial contribution to strengthening of independence, building of economic, political, social, scientific, and intellectual capacities and defense potential of the country; for maintaining integrity of national frontiers; for democratic reforms, maintenance of friendship and harmony between nations, peace and stability; development of national culture and arts; fostering of good-health and advanced generation, etc.
- At the 7th session of the Meetings of the Parties to the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes in November 2015 Dr. Ziganshina was elected to serve as a member of the Implementation Committee under this Convention from 2015 till 2018.
- In March 2016, Dr. Ziganshina became a member of the Asian Society of International Law and European Society of International Law.
- Prof. Dukhovniy was awarded the Breastplate of Honor by the Executive Directorate of IFAS in Kazakhstan for the long-standing contribution to development of interstate water relations during the International Scientific-Practical Conference "Transboundary cooperation in Central Asia - security, stability and wellbeing for the whole region", which was held in Almaty (Kazakhstan) in September 7 2017

Number of awards/public recognition received.*

3

Number of professional societies joined.*

1

Section 8: Outreach and Potential Development Impacts

Outreach and Collaborations*

Please describe any collaborations, connections, or activities developed with USAID, government agencies, community groups and nongovernmental organizations, or private companies interested in implementing the results of your project.

The ways of fostering collaboration in areas addressed by the Project were discussed with potential partners during many large events such as International Conference on Eurasian food security and nutrition network (29 February - 2 March 2016, Bishkek), a meeting of Central Asian regional organizations (10-11 March 2016, Almaty), the High-Level Symposium on SDG6 and Targets: Ensuring that no one is left behind in access to water and sanitation (9-11 August 2016, Dushanbe) and during a trip of SIC ICWC programmer to the Johns Hopkins University, Department of Earth and Planetary Sciences (13-23 October 2016, Baltimore, USA).

There is an initial agreement and great potential for 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 on potential positive effects of climate change through changes in plant vegetation periods to the benefit of double-season crops. The principal investigator updated top officials from the Ministry of Agriculture and Water Resources of the Uzbekistan on the positive impacts of this collaboration.

We also revitalized contacts with partners from the Netherlands (UNESCO-IHE and Water Partners Foundation) in cooperation with whom the ASBmm model – the main analytical tool of the project - was developed. The partners are interested to learn on new developments in modeling by the Project and its adaptation to the Amudarya basin specifics.

The project team also collaborates with the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes under the implementation of its Programme of work for 2016–2018, in particular programme area 4 “Adapting to climate change in transboundary basins”. Of particular relevance for this area are the findings of the legal and institutional analysis of transboundary water governance in the Amudarya in the context of changing climate undertaken under the Project.

The project team actively promotes the research results in communication with governmental officials, academicians, development practitioners and the wider audience (see Technical Research Presentations).

A roundtable to review implementation of the PEER Program was held at the U.S. Embassy in Uzbekistan on the 3rd of April 2017. The U.S. Ambassador Pamela Spratlen in her opening remarks has underlined the importance of adaptation in the Aral Sea basin countries to climate change on the basis of cooperation. She has expressed a hope that the current conditions offer wider opportunities for better interactions between the riparian countries. In this context, research activities of local scientists in cooperation with the U.S. peers will be beneficial. The PEER program grantee-institutions based in Uzbekistan (IWMI, SIC ICWC, CAREC, UNCAWR/ICBA) presented their project results.

Following meetings have been held at SIC ICWC with:

- Lovejoy A., Head of economic development division (Regional Mission in Almaty). Information on main project events and progress was presented (29 March 2016);

- Verstraeten I., USGS, Thomas C., Second Secretary from the US Embassy in Uzbekistan, Biryukova E., ESTH Assistant of the US Embassy in Uzbekistan. The participants discussed the possibilities for scientific cooperation in the areas of land reclamation and fishery restoration, drinking water availability in the Amudarya Delta, groundwater issues, geology and minerals, mitigation and adaptation strategies, development of a gender water network in Central Asia (23 February 2017);

- Najib D., Senior Program Officer National Academy of Sciences International Affairs and Jason R. Porter, Research Advisor, USAID. Work progress, logistical and financial matters were discussed (7 April 2017);

- Abriola L., the Presidential Science Envoy and Director of the Tufts Institute of Environment. She made a presentation on “Groundwater Contamination: Progress and Perspectives on Restoration and Risk Reduction”. Then the brief information on the projects implemented under PEER Program was presented by the representatives of IWMI, SIC ICWC, CAREC, and UNCAWR / ICBA. Claire Thomas, Ekaterina Biryukova and Haley Smith from the Embassy also took part in the meeting (9 June 2017);

- Dubrovsky K., Chief of Regional ESTH Office in Central Asia, Zhumabayeva G., Scientific affairs specialist of the Regional ESTH Office in Central Asia, Schein J. from Water infrastructure division, US EPA, and representatives of the US Embassy in Tashkent. The PI presented the mission, tasks and activity of SIC ICWC. Project expert Sorokin A. presented the main results and recommendations of the project. Then, dissemination of the project results and recommendations have been discussed (8 November 2017).

Please indicate the number of meetings with the following organizations that took place with regard to applications of your research during the reporting period:

Private Companies*

0

Please provide the names of the companies you met with.

N/A

Community Groups or Non-Governmental Organizations*

0

Please provide the names of the organizations you met with.

N/A

Government Agencies*

7

Please provide the names of the government agencies you met with.

Local USAID Mission*

1

Potential Development Impacts (Evidence to Action)*

Please describe your progress toward achieving development impacts from your PEER project.

The main approaches and outcomes of this Project were fully aligned with USAID's development objectives, which are to build resilience to climate change impacts on transboundary water management and to enhance regional water cooperation through generation of better data and knowledge and more effective policy and decision making.

The Project made contribution to addressing controversial issues related to water and energy resources: through the analysis of alternative operation regimes of the Vakhsh cascade of hydroelectric power stations (HEPS), the ways for consensus-building, for generation of regional and national benefits throughout the basin, and perspectives for advancement were demonstrated.

The Project showed a number of options of irrigated agriculture development: various cropping patterns; scope and rates of adoption of innovation technologies to improve productivity and save irrigation water for each state and the basin as a whole.

The Project rendered support to the regional institution BWO Amu Darya and its territorial branches by assisting in approaches to improvement of transboundary river water management and water demand management in the context of climate change and other factors (Afghanistan, Golden Age Lake, HEPS operation regimes).

The Project contributed to enhancement of regional water cooperation by improving data quality, developing analytical tools, and generating basin specific knowledge.

The Project showed advantages of the regional consensus-based approach to development in the region that would decrease deficit and losses of electricity and irrigation water.

If the recommendations of the project are implemented, the Amu Darya Basin would be adaptable (under “soft” climatic scenarios) to secure more or less sustainable country development on a number of indicators.

During the reporting period, was your data or research used to inform a policy or program?*

For example, a new product was developed as a result of your PEER research, a policy document was developed based on your research, your research informed a private sector strategy document or NGO program, or the local USAID mission incorporated activities related to your research into their programming.

Yes

Please describe in what way your data or research was used to inform a policy or program.

Example 1: Based on the results of your research, you identified methods for conserving tuna fisheries in your region. An NGO in your region has written a conservation strategy that reflects the findings from your research. In January 2016, the NGO hired a new staff member to oversee the implementation of the fishery conservation recommendations.

Example 2:(Technology)Through your research you have been able to identify the optimal substrates to digest and clean wastewater and create energy, leading to the creation of a very robust bioreactor. Seeing the preliminary results of the bioreactor, the national government, with support from a consortium of palm oil companies, funded you to design a similar reactor for use in the palm oil industry.

Example 3: You are training agricultural extension workers how to implement farming practices that prevent erosion.

As part of the Project, decision-makers were provided with a number of policy briefs on key issue, including basin development, assessment of opportunities, selection of priorities to gain more political flexibility. Particularly, the following policy briefs were prepared <http://www.cawater-info.net/projects/peer-amudarya/knowledgebase.htm>:

- “Towards strategic planning of development in the Amu Darya River Basin” – gives the analysis of schemes and methods in support of future water development vision in the region and studies prospects for application of strategic resource planning and management mechanisms,
- “Assessment of development in the Amu Darya River Basin for 2020-2055” – describes the main project results from numerical experiments,
- “The adaptation potential of the current water allocation system in the Amu Darya River Basin” – describes structure and principles of water allocation in the basin and mechanisms of quick response to current changes and provides recommendations for the enhancement of adaptability of the water allocation system,
- “Towards better water management in the Amu Darya River Basin” – gives the data on consequences of climate change for water resources and recommendations of regional institutions for tackling the problem of water accounting, setting norms for water losses and regarding the rules of transboundary water management,
- “Planning zone model” – gives brief description of the planning zone model (<http://cawater-info.net/pzm/basic/web>), which is included in the set of models ASBmm (<http://asbmm.uz>),
- “PEER Project Database” – brief description of the Project database and interface that enables access to a significant part of project data on objects, indicators and scenarios of development in the Amu Darya Basin for 2020-2055 against the situation in 2010-2015.

The Project's materials were used in the book "The Future of the Amu Darya Basin in the context of Climate Change", which:

- provided a number of recommendations for land, water and hydroenergy management in the Amu Darya Basin and for better adaptability of the management system to climate change and other future challenges;
- gives proposals on the improvement of the legal framework of cooperation between the countries in the region.

The project findings are used in training seminars organised by SIC ICWC Regional Training Center in cooperation with national and basin water management organisations for water professionals at all levels. Lectures delivered elsewhere also include the findings of this research.

Please indicate at what level the program or policy change is being made.*

- Local or municipal level
- Regional level

If your research has been implemented, please describe positive outcomes observed.*

For example, 10,000 children receiving new treatment, farmers in 10 villages using new method/seed variety, etc.

An open project web-platform was developed and included all project outputs, such as database, different reports, publications, and minutes of project meetings and training workshops.

The positive effects of the conducted training for the staff of water-management organizations consisted in building their analytical capabilities for water management and planning. Additionally, they have got skills in handling the Project database and the planning zone model developed during the project under the ASBmm set of models.

Besides, meetings were held with representatives of relevant ministries, educational institutions, regional and basin organizations, international organizations and development partners to develop and coordinate actions for further improvement of water management and enhancement of regional cooperation in the Amu Darya Basin.

Meetings were held with mass media in order to bring a common view of regional challenges and ways for their solution, raise public awareness about potential consequences of climate change and mitigation measures.

The Project implementation contributed to capacities of the riparian countries in the Amu Darya Basin for effective water resources management and establishment of a platform for scientific collaboration as a means of trust-building in the region. Thanks to the project efforts, the scientific community has got a

unique experience in applying a brand new adaptation approach that ensured maximal approximation to real conditions during modeling and filling of data gaps.

Fostering an attitude of care towards water following the traditional rules and customs must become our common objective. Water is a sacred thing that needs to be conserved and protected.

Section 9: Additional Information

Additional Comments

Please note any other comments you have regarding your PEER project or the PEER program itself.

By 2050, one should expect water shortage in the Amu Darya Basin within 6-9 km³ on average annual basis. Among major factors that potentially affect water supply and intra-annual distribution of water resources are population growth in the riparian countries, potential growth of water use in Afghanistan, operation modes of large reservoirs with hydropower, and climate change.

Climate change is one of most important factors that should be taken into account in water use planning (revision of water use norms and consideration of positive effects of climate change on plant growing, etc.), water assessments (correction of hydrographs) and water management.

Given the periodical droughts in the future, effective water demand management, involving water saving and innovations should be among major means for survival. The main targets of agrarian policies in all the riparian countries should be food security (FSD scenario) and export orientation (ESA scenario).

The riparian countries of the Amu Darya Basin should maintain interstate cooperation and, based on this, organize more effective joint work for coordination of their actions in basin water management.

National water and energy strategy documents should lay down responsibilities of the countries for soonest development of comprehensive joint decisions in the fields, where the interests of national economic sectors intersect.

Requirements of hydropower and irrigation to flow regimes in basin's rivers are and will be in conflict. This could be settled through wiser management of large reservoir hydroschemes following the mutually agreed principles and rules that are based on resource-saving and consensus and through the improvement of reliability of hydrological forecasts. This would allow transferring to planning of multi-year regulation of the Amu Darya.

The effectiveness of adaptation measures will depend on governance policies, i.e. activity of state authorities in the area of interstate and external relations, determining interests and development priorities of economic sectors, including hydropower, irrigated agriculture and aquatic environments.

Shaping of public opinion in the riparian countries and implementation of democratic principles in water management through involvement of water stakeholders is important for promoting cooperation concepts in the basin.

Supplementary Information

If applicable for this reporting period, please attach copies of project-related workshop or conference agendas, course curricula developed, summaries of research data collected, or articles about the project appearing in newspapers, journals, or web sites.

Section 10: Cumulative Impacts and Results

Have you published any of your datasets or used open data platforms? If so please provide a link. *

During the Project, the database and the interface were developed to present the project research results. Currently, this resource is located on SIC's server and accessible via Internet on <http://cawater-info.net/peer/> (authorization is needed). The database contains historical data, the data of the base period (2010-2015), which was used in the analysis of trends and in modeling, as well as the information derived from numerical experiments, i.e. assessment of basin's future based on indicators. It was proposed to use the NASA system LandDataAssimilationSystems <http://ldas.gsfc.nasa.gov/> for lacking hydrological and climate data (particularly, for the planning zone model) and several climatic models for the analysis of crop water requirements (REMO Model <http://www.remo-rcm.de/>, WCRP CORDEX http://www.cordex.org/index.php?option=com_content&view=article&id=89&Itemid=498 + NASA NEX-GDDP <https://nex.nasa.gov/nex/projects/1356/>).

Please provide an overall summary of your project results and impacts.*

Please also complete the following key indicators reporting the number achieved since your PEER project began:

The key project result is improved understanding and awareness of the impact of climate change on water availability and management in the Amu Darya. The wealth of new data and research was generated to help stakeholders be better prepared for climate change impacts by showcasing options for more sustainable water management - adapting to negative impacts and harvesting positive impacts of climate change in the basin.

The project findings have been uploaded on an open-access web-site. In particular, a number of policy briefs were prepared for decision makers, including on:

- strategic planning and assessment of development in the Amu Darya Basin for 2020-2055; analysis of schemes and methods for grounding of future water development vision in the region,
- analysis of country development programs in water and energy (for Tajikistan) sector. This allowed building alternative scenarios of basin development (2020-2055) and their combinations,
- recommendations for better adaptability of water allocation in the basin,
- mechanisms of quick response to current climate changes,
- recommendations of BWO Amu Darya for tackling the problem of water accounting, regarding the rules of water management for the Amu Darya River and its tributaries, setting rates of water losses,
- recommendations for the improvement of coordination between the countries, territorial branches, consumers and users of water resources (hydropower, irrigation, environment),
- description of the Project DB and the interface that enables access to the project data on objects, indicators and scenarios of development in the Amu Darya Basin for 2020-2055 against the situation in 2010-2015,
- description of the Planning zone model, which is included in the set of models ASBmm, developed as part of the Project as an analytical tool for perspective planning of water demands of economic sectors (irrigated agriculture, industry, drinking water supply, etc.) in the basin in the context of climate change and other challenges (demography, anthropogenic impact on water, ecology).

The book “The Future of the Amu Darya Basin in the context of Climate Change” was published. This book systematized prospective development in the Amu Darya Basin until 2050, including:

- assessment of climate change (based on REMO 0406 scenario) and its impact on water resources and crop water requirements,
- assessment of Afghanistan's water sector development scenarios – volumes and modes of reduction of flow along the Afghanistan's rivers that form the Panj and Amu Darya, proposals on regulation of flow by reservoirs and HEPS showing possible ways of water and energy cooperation in the basin, by which the operation modes of HEPS agreed by the riparian countries provide maximum benefit to all, i.e. maximal generation of energy and reduction (liquidation) of water shortage in dry years/seasons through long-term flow regulation by reservoirs,
- measures to improve efficiency and productivity of water and land in the context of climate change, including proposals for changes of cropping patterns, innovations (drip irrigation, etc.), correction of crop irrigation depths and dates, encouragement of water conservation,
- proposals on the improvement of the legal framework of cooperation between the countries in the region,
- rationale for regional approach to development, which is based on regional water-energy security, sustainable development, and consensus and enables decision makers to be more flexible and economically literate.

The project contributed to strengthening regional cooperation by improving knowledge base and enabling more active interactions between researchers and policy makers from Central Asian countries. A collection of selected agreements concerning the water management matters in the Amu Darya was published and included: major multilateral agreements between the Central Asian countries, institutional documents, and bilateral agreements between Turkmenistan and Uzbekistan. Outlines of a new basin agreement and supporting documents have been prepared.

The project helped to disseminate knowledge and create linkages among researchers for further collaboration as well as between researchers and local stakeholders. Special value-added of the project was to build capacity of partnering organisations in joint implementation of this project through exchange of experiences and improved human potential in implementing future research projects.

The project findings have been already included and will be included in future training curricula developed by the Regional Training Centre at the PI's organisation.

Total number of males who served on the research team.*

15

Total number of females who served on the research team.*

8

Total number of patents received (approved by the relevant patent office).*

0

Number of PEER reviewed publications resulting from your PEER project.*

0

Please upload all PEER related publications that have resulted from the project.

If the documents are too large, please email your publications to your grant manager.

Section 11: Future Plans

Describe your plans for continuing your research.*

It is planned to continue research initiated in the Project. Particularly, efforts are to be made to disseminate the developed approaches and tools in other basins. It is proposed to include this research in the Aral Sea Basin Program 4 (ASBP-4) and submit it to USAID and the World Bank for consideration of possible financing.

Particular attention in new projects should be paid to the improvement of water accounting accuracy and lowering of water losses in all chains of water distribution and management (from river channel, main canals to irrigation network and field) as those are the main reserves for compensation of future water shortages.

In short term, it is necessary to develop a basin strategy for the Amu Darya, a package of regulatory documents and rules for water management in the basin (including shift to multiyear flow regulation by reservoirs), procedures for agreement upon operation modes of hydroschemes, and mechanisms for on-line data exchange.

The Project showed that current agreements did not address all issues of transboundary water sharing in the Amu Darya Basin. Inflow to the Aral Sea is not guaranteed. It is necessary to lay a basis for conclusion of future agreements on water allocation with Afghanistan, on rationing of open-channel losses of water, regulation of flow in collecting drains and support of lake ecosystems in the basin.

It is important to regularly and systematically build capacities of water-management organizations, including provision of information, open and regular exchange of data and information, education of water users and consumers, and training of the staff of water-management organizations at all levels.

It is necessary to promote integrated water resources management, including measures and procedures of social control, water conservation and effective water and energy use by building consensus between hydropower and irrigation. The first priority measure includes the organization of Basin Council among representatives of local authorities, hydropower owners, environmentalists and other direct water stakeholders of BWO Amu Darya, i.e. provincial and local managers of water-management organizations in situ in order to ensure participatory management and involve stakeholders in planning and control over water use and decision making in the context of growing water shortage.

If you plan on continuing your PEER research project, how do you plan on funding this research?*

For example, is your university giving you a small grant to continue this work, have you found funding through your USG partner, a private sector company, your local government, etc.)?

We are thinking of including a follow-up research in the Aral Sea Basin Program 4 (ASBP-4) and submit it to USAID and the World Bank for consideration of possible funding.

Do you plan to continue to collaborate with your US partner and, if so, how?*

For example, on future manuscripts, continuing the current research, formulating new research projects, etc.

Continuing the current research, formulating new research projects

Have you established any other networks, working groups, or partnerships as a result of PEER?*

Yes

If so, please describe future plans for these partnerships and what you hope to gain from them.

Contacts with the U.S. partners are to be maintained and strengthened. During the visit of SIC's expert Mr. Khafazov to Johns Hopkins University, he discussed with Mr. B. Zaitchik (Hydroclimate Research Group) possibilities of cooperation in the following areas:

- application of a few climate models for analysis of crop water requirements (REMO Model

<http://www.remo-rcm.de/> + WCRP CORDEX

http://www.cordex.org/index.php?option=com_content&view=article&id=89&Itemid=498 + NASA

NEX-GDDP <https://nex.nasa.gov/nex/projects/1356/>);

- use of the NASA Land Data Assimilation Systems <http://ldas.gsfc.nasa.gov/> to get needed hydrological and climate data for the planning zone model.

Save Follow Up

PEER related publications that have resulted from the project

1. Amu Darya - the Great River on the Threshold of Signature Decisions (Prof. Dukhovniy V.A., Dr. Ziganshina D.R., Sorokin A.G.). Proceedings of the International Water and Climate Summit, 23-25 October 2017 Rome, Italy,

<https://www.riob.org/en/node/4099>

Collection of selected agreements on water resources management in the Amu Darya River Basin. SIC ICWC, Tashkent 2017, 111 pp.

http://www.cawater-info.net/library/rus/amudarya_2017.pdf

2. Sorokin A.G., Sorokin D.A., Ergashev I. "Approaches to formulation of effective river basin water management strategy in Central Asia", Stulina G.V., Solodkiy G.F. "Estimation of crop water requirements in irrigated land of the Khorezm oasis in the context of climate change" in the Collection of scientific papers of the Eastern Europe, Caucasus, and Central Asia Network of Water-Management Organizations, Issue 10 "Challenges of river basin management in the context of climate change", Tashkent, SIC ICWC, 2017.-208 pp.

http://www.cawater-info.net/library/rus/ecca_papers_collection_vol_10_2017.pdf

3. Collection of scientific papers on the occasion of the 25th Anniversary of the Interstate Commission for Water Coordination in Central Asia / Edited by Prof. Dukhovniy V.A.– Tashkent: SIC ICWC of Central Asia, 2017. – 212 pp.

This Collection contains papers of project executors:

- Sorokin D.A. "Modeling runoff transformations in the Amu Darya River";

- Muminov Sh.Kh., Gojenko B.V., Umarova N.Kh. "Forecast of agricultural development in the Amu Darya Basin until 2050: Case study of the Republic of Uzbekistan".

http://cawater-info.net/library/rus/25_icwc_scientific_papers.pdf

4. "The Future of the Amu Darya Basin in the context of Climate Change", editor Prof. V.A.Dukhovniy - Tashkent: SIC ICWC of CA, 2018 -328 pp.

<http://www.cawater-info.net/projects/peer-amudarya/pdf/peer-amudarya-final-book.pdf>

5. Stulina G.V., Solodkiy G.F. "Assessment of crop water requirements in Amu Darya River Basin", in INBO Newsletter N° 26 - March 2018

<https://www.riob.org/en/documents/inbo-newsletter-ndeg-26-march-2018>

6. Policy briefs, <http://www.cawater-info.net/projects/peer-amudarya/knowledgebase.htm>

- “Towards strategic planning of development in the Amu Darya River Basin” – gives the analysis of schemes and methods in support of future water development vision in the region and studies prospects for application of strategic resource planning and management mechanisms,
- “Assessment of development in the Amu Darya River Basin for 2020-2055” – describes the main project results from numerical experiments,
- “The adaptation potential of the current water allocation system in the Amu Darya River Basin” – describes structure and principles of water allocation in the basin and mechanisms of quick response to current changes and provides recommendations for the enhancement of adaptability of the water allocation system,
- “Towards better water management in the Amu Darya River Basin” – gives the data on consequences of climate change for water resources and recommendations of regional institutions for tackling the problem of water accounting, setting norms for water losses and regarding the rules of transboundary water management,

- “Planning zone model” – gives brief description of the planning zone model (<http://cawater-info.net/pzm/basic/web>), which is included in the set of models ASBmm (<http://asbmm.uz>),
- “PEER Project Database” – brief description of the Project DB and interface that enables access to a significant part of project data on objects, indicators and scenarios of development in the Amu Darya Basin for 2020-2055 against the situation in 2010-2015.

7. The book “The Future of the Amu Darya Basin in the context of Climate Change”, <http://cawater-info.net/projects/peer-amudarya/pdf/peer-amudarya-final-book.pdf>

8. A brochure "The Itaipu Dam - benefit sharing on joint construction and operation between Brazil and Paraguay"
<http://www.cawater-info.net/projects/peer-amudarya/pdf/itaipu.pdf>

EVENTS ORGANIZED BY SIC ICWC

Event Title	Event Description	Event Organizer(s)	Event Date(s)	Participant Description	Number of Females	Number of Males	Costs of event in US dollars (PEER/USAID funding used)			Cost of event in US dollars (non-PEER/non-USAID funding sources)		
							Instruction costs	Travel costs	Participant costs	Instruction costs	Travel costs	Participant costs
Work meeting on the PEER Project "Transboundary water management (TWM) adaptation in the Amu Darya basin to climate change uncertainties"	During the meeting, which was held in SIC ICWC premises, the participants discussed project progress, agreed on the coordination of actions among the project key personnel and the approaches to be used for scenario building and modeling		March 24, 2016	PI, project partners from SIC ICWC, BWO Amu Darya, Turkmenistan and invited persons	5	15	-	-	-	-	-	-
Field visit to Amu-Bukhara basin irrigation system administration	Present the project activities to local stakeholders and gain relevant data and information from basin water organizations	SIC ICWC	February 24, 2016	Leaders and staff of BISA (local stakeholders)	2	8	-	-	-		34,7	53,95
Field visit to Lower Amudarya basin irrigation system administration (Khorezm)			March 5-7, 2016		1	6	-	-	-		229	182
Field visit to Lower Amudarya basin irrigation system administration (Karakalpakstan)			April 7-11, 2016		1	5	-	-	-		150	245
Workshop on the "Transboundary water management adaptation in the Amudarya basin to climate change uncertainties" project	At the workshop, the outcomes were summarized for stage I -Planning and designing stage II - Research Tasks were set for stages III and IV	SIC ICWC	October 26, 2016	Participants-SIC ICWC staff, BWO Amudarya and invitees	4	16	643	232	845			

Workshop on the "Algebraic modeling language GAMS is a simulation tool for the tasks of PEER"	The participants were represented by SIC ICWC staff and invitees. They discussed relative issues and made decisions on activities for the second year of the project, including optimization of scenarios. GAMS was approved as the main tool for optimization solutions	SIC ICWC	December 29, 2016	Participants-SIC ICWC staff and invitees	3	11	0	0	0			
The training workshop "Approaches to efficient water resource management by BWO Amudarya and its territorial branches in the context of climate change"	The training workshop was held at the Training Center of BWO Amudarya in Urgench to: - present results of the first project year to project partners and beneficiaries and discuss the tasks related to preparation of recommendations for adaptation and the dissemination; - instruct the staff of BWO and its territorial branches, partners, lecturers, graduate and postgraduate students in approaches to efficient water resource management in the context of climate change; - provide practical training on the DB and models developed or improved by the Project	SIC ICWC	May 4-5, 2017	Staff of central office and territorial branches of BWO Amudarya from Tajikistan, Turkmenistan and Uzbekistan (Upper Amudarya, Middle Amudarya and Lower Amudarya branches, Upradik, and Dashoguz Directorate); lecturers and students of Khorezm State University, Khorezm Rural Advisory Support Service (KRASS), Director of Director of the Analytical Agency "Ynanch-Vepa", SIC ICWC research team	13	27	272	2095	4067			
Exhibition booth dedicated to project results of the Project "Transboundary water management adaptation in the Amudarya basin to climate change uncertainties", at Exhibition "Water Technologies and Industry – WATER-2017" organized as part of the the Central Asian International Scientific-Practical Conference "The 25 years of Water Cooperation in Central Asia: Lessons Learnt and Future Outlook"	Project materials and key results were presented at the exhibition booth	ICWC	23 November, 2017	The exhibition was visited by representatives of embassies (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Germany, China, Russia, Switzerland, France, Israel, Turkey, US, European Union), 17 international organizations (WB, ADB, UN, GIZ, OSCE, TIKA, IGRAC, UNESCO, ICID, USAID, IWMI, Geneva Water Hub Platform for International Water Law Faculty of Law, INBO, ICARDA-CAC, ASIS FES, Hydrosolutions, SDC) and 9 regional organizations (SIC ICWC, BWO Amudarya, BWO Syrdarya, CAREC, RHS, etc.), 6 higher education institutions from CAR and Europe (TIHAME, UMED, TASI, KGU, Kazakh branch of MSU, Swiss Federal Institute of Technology), NGOs (GWP CACENA, Community association "Suvchi", Youth Union of Uzbekistan), 10 research and design institutes, water-management organizations and others	45	182	500					

<p>Final workshop "Transboundary Water Management Adaptation in the Amudarya River Basin to Climate Change and Future Challenges: Tools and Recommendations"</p>	<p>The main objective of the workshop was to discuss with key stakeholders the PEER Project results on comprehensive research and assessment of development in the riparian countries of the Amudarya basin and their respective individual zones by 2050 in the context of climate change. There was exchange of future plans with key national, regional, and international partners in order to undertake coordinated and complementary actions for the improvement of water management and enhancement of cooperation in the Amudarya basin</p>	<p>SIC ICWC</p>	<p>Janury 31 – February 1, 2018</p>	<p>Participants of the workshop were represented by ministries and departments in Uzbekistan, Ministry of Energy and Water Resources (MEWR) of Tajikistan, regional organizations (IFAS Executive Committee, BWO Amudarya and its territorial branches in the riparian countries, BWO Syrdarya, SIC ICWC and its branch in Tajikistan, and CAREC), Analytical Agency "Ynanch-Vepa" (Turkmenistan), Institute for Strategic and Inter-regional Studies under the President of the Republic of Uzbekistan, Tashkent Institute of Irrigation and Agricultural Mechanization Engineers (TIAME), National University of Uzbekistan, US Embassy in Tashkent, and key international partners (ADB, GIZ, SDC, and IWMI)</p>	<p>13</p>	<p>53</p>	<p>3508</p>	<p>3770</p>	<p>8882</p>			
<p>8th World Water Forum «Transboundary water co-operation for food, energy and environmental security in Central Asia»</p>	<p>The session focused on transboundary water cooperation, discussions between different stakeholders took place to share experiences, examine good practices, lessons learned and face the challenges down the road. The benefits of transboundary water cooperation and water sharing, improved opportunities for economic development, as well as the development of ecosystems and knowledge.</p>	<p>SDC, CAREC, IFAS, SIC ICWC</p>	<p>21 March 2018 Brasilia</p>	<p>Official representatives of Central Asian countries in Interstate Fund for Saving the Aral Sea, the heads of national water authorities from Kyrgyzstan, Turkmenistan, Tajikistan and Uzbekistan, officials from regional organisations, members of national delegations form Central Asian countries, development partners and widely audiance of the 8th World Water Forum</p>	<p>19</p>	<p>42</p>		<p>2997</p>	<p>1583</p>			

Students on Research Team

First Name	Last Name	Date Student Joined Team					
Kadirov	Timur	November 1, 2015	April 30, 2018	National Research University Higher School of Economics	B.20, Myasnitskaya str., Moscow, 101000, Russian Federation	Master Student	Research area "Applied mathematics and informatics" as part of the Data science program. Kadirov Timur in the project was responsible for development of the economic mathematical model and crop optimization calculations for individual provinces in riparian countries.