EUROPEAN UNION

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Central Asia Nexus Dialogue Project: Fostering Water, Energy and Food Security Nexus Dialogue and Multi-Sector Investment

WEF Nexus Project Ideas

Investment portfolio

October 2019

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ABBREVIATIONS AND ACRONYMS

ASBP	Aral Sea Basin Programme
BMZ	German Federal Ministry of Economic Cooperation and Development
BWO	Basin Water Organization
CA	Central Asia
CAR	Central Asian Region
CAREC	Regional Environmental Centre for Central Asia
CDS	Collector Drainage System
CMA	Control and Measuring Apparatus
DRR	Disaster Risk Reduction
EC IFAS	Executive Committee of the International Fund for Saving the Aral Sea
EPNA	Especially Protected Nature Area
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
HTFs	Hydrotechnical Facilities
ICSD	Interstate Commission for Sustainable Development
ICWC	Interstate Commission for Water Coordination
IFAS	International Fund for Saving the Aral Sea
IsWG	Inter-sectoral Working Group
IUCN	International Union for Conservation of Nature
SCADA	Supervisory Control and Data Acquisition
SDGs	Sustainable Development Goals
SIC	Scientific Information Center
SNNR	State National Nature Reserve
TWR	Transboundary Water Resources
WEF	Water-Energy-Food
WRM	Water Resource Management

OVERVIEW AND INTRODUCTION

Nexus Principles:
Principle 1 – Equitable and balanced weighting
Principle 2 – Leaving no one behind
Principle 3 – Political commitment to international agendas
Principle 4 – Strengthen cross-departmental and multi-sectoral cooperation
Principle 5 – Enhancing mechanisms for data exchange and modelling
Principle 6 – WEF Nexus Capacity Development
Principle 7 – Inclusive and participatory multi-stakeholder approach
Principle 8 – Financing schemes and investments
Principle 9 – Considering the broader context of the natural resource governance system
Principle 10 – Sustainable and efficient resource use
Principle 11 – Furthering peace and preventing conflict

(Source: Global Nexus Secretariat)

BACKGROUND

The Central Asia Nexus Dialogue Project: Fostering Water, Energy and Food (WEF) Security Nexus Dialogue and Multi-Sector Investment in Central Asia (the Nexus Dialogue in CA Project) is part of the Phase I of the Global Nexus Regional Dialogues Programme, co-funded by the European Union (EU) and the German Federal Ministry for Economic Cooperation and Development (BMZ). The Nexus Dialogue Project in CA is implemented by the Regional Environmental Centre for Central Asia (CAREC) in partnership with the International Union for Conservation of Nature (IUCN) and with the support of the Executive Committee of the International Fund for Saving the Aral Sea.

The overall objective of the Nexus Dialogue in CA Project is to support Central Asian countries and regional institutions in sustainable development and regional cooperation with the aim to create a multi-sectoral enabling environment to facilitate sustainable and climate-resilient investments for increased water, energy and food security in Central Asia. The ultimate goal of the Nexus project is to prepare the ground for investments within the EU Nexus Dialogues Programme (Phase II) which is expected to start in 2020.

As stated by the Global Nexus Secretariat,[1] "the Sustainable Development Goals (SDGs), adopted by the 2030 UN Agenda for Sustainable Development, are indivisibly connected with each other. The same holds for the specific objectives on climate change mitigation and adaptation according to the Paris Agreement adopted under the UNFCCC. These connections allow finding effective and efficient solutions to tackle the world's problems. SDG 6 (water), 7 (energy) and 2 (food security) are not only closely connected to each other but also eminently important for the Nexus approach."

United Nations Department of Economic and Social Affairs in the Critical Role of Water in Achieving the Sustainable Development Goals: Synthesis of Knowledge and Recommendations for Effective Framing, Monitoring, and Capacity Development[2] report suggest the following: "Water is an enabler, indeed a requirement, for achieving all the core SDGs. Development of water resources and making water available is a key ingredient for agricultural and broader economic growth." It also demonstrates the interdependence of water and other sectors, as well as the role water plays in achieving the SDGs.

Taking the above into account and following the Resolution of the Executive Committee of the International Fund for Saving the Aral Sea (EC IFAS), dated 30 January 2018, to launch the development of the fourth edition of the Aral Sea Basin Programme (ASBP-4), Mr Oliver Cogels, Senior Water Policy Advisor to the European Commission, initiated the readjustment of the Nexus Dialogue in Central Asia Project to seize the "unique window of opportunity" for integrating the WEF security Nexus into the ASBP-4 planning process, and with that help achieving security in the WEF Nexus in Central Asia.

[1] https://www.nexus-dialogue-programme.eu/about/nexus-and-the-sdgs/

[2] https://sustainabledevelopment.un.org/content/documents/6185Role%20of%20Water%20in%20SD%20Draft%20Version%20February%202015.pdf

PURPOSE

The ultimate objective of this publication is to prepare the reader for further discussion and help project idea initiators to find support for further elaboration and implementation of their projects.

This document should be viewed as an introduction to the complex approach to resolve transboundary challenges (covering two or more countries) and their significance in the overall socio-economic development of the region, beyond a single-issue perspective.

PORTFOLIO FORMAT

This document consists of two main sections:

1) Overview and introduction: Provides background information on the project, its structure, the project ideas selection process and long-term impact.
2) Programme Directions: There are three programme directions, which correspond to the ASBP-4 thematic focus areas. Each Programme direction has a number of project ideas with numbers corresponding to their original ASBP-4 sequence numbers. Each project, in turn, has "a one-page" summary that puts forward main details about the project, and "a detailed project document" as submitted for ASBP-4 review.

ABOUT ARAL SEA BASIN PROGRAMME (ASBP) [3]

The Aral Sea Basin Programme (ASBP) is a mechanism to solve water, socio-economic and environmental issues in the Aral Sea Basin, thereby, fulfilling a core objective of EC IFAS. ASBP is a key long-term action programme for the region that includes a list of both national and regional projects in the field of sustainable development with a particular focus on managing water resources and protection of the environment. This reflects and is in line also with the goals of the WEF Security Nexus approach. The Central Asia Nexus Dialogue Project has supported IFAS to turn ASBP-4 into a broader investment programme to catalyse innovative, blended solutions.

In January 2018, the Heads of the Central Asian States decided to start the preparation of the Fourth Aral Sea Basin Programme (ASBP-4). Like previous iterations of the ASBPs, ASBP-4 will present a list of priority projects submitted and jointly approved by the five Central Asian countries. ASBP-4 focusses on four main directions: (1) Integrated water resources use; (2) Environmental protection; (3) Socio-economic development; and (4) Improvement of institutional and legal instruments. The list of projects that are eventually included into ASBP-4 is negotiated first among national, followed by regional ASBP working group discussions. Project proposals are screened at national level with the help of experts supported by the Central Asia Nexus Dialogue Project and other donors. Successful proposals that fulfil the agreed selection criteria are then submitted to the regional ASBP working group. National ASBP working groups are made up of representatives of key ministries from all relevant sectors enabling multi-sectoral dialogue on priorities. At regional level, regional ASBP working group bring together EC IFAS representatives, ICSD, ICWC, working group experts and a small number of representatives from international organisations, including CAREC. Donor meetings are also organised in parallel, in order to attract investments for projects selected under ASBP.

SELECTION PROCESS

While keeping Nexus principles in mind, Project Ideas were selected based on the following criteria:

1) The project covers two or more WEF sectors;
2) The project is of regional or transboundary character;
3) The project is relevant to regional and national development priorities;
4) The project has the potential to be a large-scale regional (transboundary) project of about USD 20 million; and,
5) The project has a clearly defined owner/initiator.

Following the Resolution of the Executive Board of IFAS (30.01.2018) to launch the development of the ASBP-4, as discribed above, large-scale multi-sectoral investment projects were based on the previous Aral

[3] Meyer, K., Issakhojayev, R., Kiktenko, L., Kushanova, A. (2019), *Regional Institutional Arrangements Advancing Water, Energy & Food Security in Central Asia*, Belgrade, Serbia: IUCN

Sea Basin Programe's list of projects. The Regional Project Expert Team long-listed the project which complied with the criteria above and had a potential to include Nexus principles during further emaboration.

The long-list was presented to the project's Regional Steering Committee members, who helped to identify the short-list of the Nexus Project Ideas. Using a scoring card developed by the Project Team to assess the potential of these project ideas to contribute to the water, energy and food security of the countries, as well as their compliance with national and sectoral development priorities.

With the help from the Project team the short-listed project ideas were further elaborated and introduced into the regional ASBP-4 pipelines for further discussion by the Regional Working Group on ASBP-4.

As it stands now, the Investment Portfolio includes following Nexus Project Ideas:

Programme Direction 1: Integrated Water Resource Use:

- Project 1.1: Modernization and introduction of SCADA and sustainable exploitation of hydrotechnical facilities in the Syr Darya River Basin;
- Project 1.2: Enhancing the reclamation condition of irrigated land in the Amu Darya and Syr Darya River Basins;
- Project 1.3: Safety of dams and other hydrotechnical facilities in Central Asia: development of the potential and regional cooperation;
- Project 1.4: Improvement of the WRM in the Amu Darya River Basin through the rehabilitation and modernization of the water facilities and interstate legislative framework.

Programme Direction 2: Environment Protection:

- Project 2.1: Rehabilitation of the Aral Sea ecosystem to combat desertification and land degradation;
- Project 2.2: Integrated disaster risk management in the Aral Sea Basin.

Programme Direction 3: Social and Economic Development:

- Project 3.1: Ensuring sustainable water and power supply to rural communities of Central Asian countries;
- Project 3.2: Integrated development of eco-and agro-tourism with elements of ethno-tourism in protected natural areas of the Aral Sea basin.

PROGRAMME DIRECTION 1: INTEGRATED WATER RESOURCE USE

PROJECT 1.1 «Modernization and introduction of SCADA and sustainable exploitation of hydrotechnical facilities in the Syr Darya River Basin»

Key project information:

Project initiator: Water Basin Organization "Syr Darya".
Involved countries: Under consideration.
Implementation: WBO "Syr Darya", SIC ICWC.
Developers: LLP "Sigma Automatic" (Tashkent), PKTI Vodoavtomatika (Bishkek).
Budget: $USD 10 378 000.
Timeline: Four years of implementation.

Background: The Syr Darya River Basin hosts over 25 million people. Irrigated agriculture constitutes the main water consumer and supplier of local employment. The Syr Darya River is also a vital source of fresh water for industry, individual households and the ecosystem and drains into the Aral Sea.

The WBO "Syr Darya" is the operational arm of the ICWC put in charge of the exploitation of over 200 Hydrotechnical Facilities (HTFs) of interstate importance in the Syr Darya River Basin. Additionally, the WBO "Syr Darya" oversees the water transportation, drain transformation in the water reservoirs and water supply to water users, monitors and controls water allocation and compliance with withdrawal limits in four riparian states (Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan) as agreed twice a year.

Water resources allocation is a main challenge faced by Central Asia. The Syr Darya basin lacks properly functioning automated control system (such as Supervisory Control and Data Acquisition (SCADA)), due to its absence or being outdated in some facilities. Without reliable data managing transboundary water resources and ensuring compliance with water withdrawal limits will remain a challenge. In light of the aging infrastructure, including of collector-drainage systems, the importance of effective water management and supervision is ever-growing. The SCADA control system offers superior value for money and is proposed to be introduced more comprehensively in the Syr Darya Basin, which is in line with the Joint Communiqué of the Council of Heads of State - founders of the IFAS, signed on August 24, 2018 in Turkmenistan.

Project objective: Installation or modernization of existing SCADA systems in transboundary HTFs of interstate importance in Syr Darya River Basin to ensure transparency and accuracy of water withdrawal by the riparian states through the following activities:

- Assessing the existing SCADA systems in HTFs, followed by modernization of the SCADA in 6 HTFs and installation of the new SCADA in another 12 HTFs;
- Establishing an information and research center in the WBO "Syr Darya" premises with required equipment to monitor and control compliance with water withdrawal limits;
- Equipping the regional offices of the WBO "Syr Darya" in Kazakhstan, Kyrgyzstan and Uzbekistan with equipment, communication and power supply systems and water measuring devices;
- Providing TA and capacity building to WBO "Syr Darya" staff on the use of the introduced equipment.

Project location *(subject to negotiation and identification by interested countries):* It is expected that the project will work along transboundary rivers of Naryn, Kara Dariya, Chirchik and Syr Darya.

Expected results:

- Water supply to irrigated lands increases by 13-14%, consequently crop productivity increases by 30%;
- Accurate data on water availability in the river basin is readily available to key decision makers;
- Deviation from the agreed water allocation schedule do not exceeding 10%;
- Technological parameters and criteria for the reliability of the technical condition of the at least 40 HTFs are within acceptable limits;
- 18 HTFs of interstate importance monitor and control water allocation through SCADA systems.

DETAILED PROPOSAL DOCUMENT FOR PROJECT 1.1

Focus

1. Integrated water resource use

Stakeholder state(s)

Kazakhstan, Tajikistan, Uzbekistan

Project code

Project title (and location)

Project 1.1 Upgrading and introduction of an automated water resource management system and sustainable operation of hydro-technical installations of interstate significance in the Syr Darya River Basin

Submitted by

BWO Syr Darya and S.R. Ibatullin expert team based on the list of non-executed ASBP-3 projects; with the assistance of the EU Central Asia Nexus Dialogue Project. Project operator: Central Asian Regional Environmental Centre (CAREC). Liaison: Ms. Ludmila Kiktenko (lkiktenko@carececo.org)

Project operator(s)

BWO Syr Darya, SIC ICWC

Required funding	Source and type of funding
$10,378,000	Means of IFIs: grant (17%); loan (83%).
Project duration	**Designed by**
4 years after the start of funding	Sigma Avtomatik LLC (Tashkent City, 15 Shota Rustaveli, ph./fax: +998 71 256 44 24, e-mail: info@sigmapro.uz); PKTI Vodoavtomatika (Bishkek City, 720055, 4a Toktonaliyev St., ph./fax: +996312 541 150, e-mail: pkti@elkat.kg); BWO Syr Darya (Tashkent City, 11 Karasu-4 Microdistrict, ph./fax: +998 71 265 82 46, e-mail: aral@BWOsyrdarya@mail.ru).

Brief description and rationale (including location)

Project goals: i) upgrading and introduction of an automated water resource management system (Supervisory Control and Data Acquisition, SCADA) at hydro-technical installations (HTIs) in the Syr Darya River Basin, including their fitting with the complete set of processing equipment necessary for the system's proper operation, as well as building the information and resource capacity for the supervision of water intake limits registered online via the SCADA System; and ii) enhancing the operational reliability of HTIs by way of technical upgrading necessary for their uninterrupted operation.

The following actions are proposed to achieve the aforementioned goals: i) assessment of the SCADA System currently in use at existing HTIs with its subsequent upgrading at 6 HTIs and installing the SCADA System at 12 other HTIs; ii) creating a modern information and resource center at BWO Syr Darya Head Office fitted with corresponding processing equipment for the supervision of water intake limits by water consumers; iii) equipping BWO Syr Darya territorial subsidiaries in stakeholder states (water consumers) with the now lacking special devices, support equipment, modern and stable

communications and power supply systems, water-measuring devices and hardware; iv) conducting table-top and field trainings for over 200 technical and administrative staff operating target HTIs with the aim of introducing advanced operation methods, utilizing the supplied modern equipment and using advanced technologies.

The implementation of the proposed project will significantly increase the distribution efficiency and transparency of transboundary water resources (TWR) among stakeholder states in the Syr Darya River Basin; the HTIs of interstate significance operated in the Syr Darya River Basin will be operated more reliably and smoothly in the long term, thus, ensuring the secure functioning of social and industrial facilities as well as safe accommodation of the populations residing in the zones of retaining structures; the competencies of the HTIs' responsible personnel will correlate with the necessary performance standards associated with the supplied modern equipment and hardware.

Rationale: In the Syr Darya River Basin, there operate multiple HTIs of interstate significance characterized by the high extent of responsibility as to their grades, categories and degrees of the potential risk of accidents. They are managed by BWO Syr Darya (regional organization) as an executive body of the Interstate Commission for Water Coordination (ICWC) in Central Asia responsible for managing the water resources of the Naryn, Kara Darya, Syr Darya and Chirchik Rivers, monitoring and controlling the distribution of water from these rivers among the riparian states as per the water limits up to the border of the Republic of Kazakhstan – Chardara Water Reservoir – coordinated twice a year by ICWC, as well as for releasing the water downstream for feeding the Aral Sea and Aral Sea area.

The Syr Darya River Basin is one of the largest in the region but is still lacking a properly functioning automated control system. Most often, the automatic systems currently in use are either outdated or require modernization. Water allocation is one of the main issues in Central Asia. In absence of a database and SCADA System, TWR management and control of compliance with water consumption limits constitute difficult tasks. Thus, effective water resource management (WRM) in the context of the increasingly obsolete infrastructure, including collector drainage systems (CDSs), is critical. Out of all available solutions, SCADA represents the most cost-effective and efficient instrument.

Over 25 mln people live in the Syr Darya River Basin. According to the UN estimations, in the future the region's population will annually increase by an average of 2.5%. The catchment's water resources amount to approximately 37 km3. Absolute indicators of water resources and irrigated land per capita have been decreasing drastically due to demographic growth and industrial development. At the same time, the Aral Sea Basin is characterized not only by water shortage, but also frequent high flows and floods causing considerable economic, social and environmental damage to the countries sharing the region.

However, the SCADA System currently operated by BWO Syr Darya at certain HTIs of interstate significance requires extensive upgrading (due to failure of components and software obsolescence), as well as deploying SCADA System at other facilities (requiring repair and replacement of some of the elements of lifting devices and uninterrupted power supply equipment) currently not covered by the system.

The lack of a modern IT-based database at BWO Syr Darya complicates TWR operational management and control of water intake limits, including management of the SCADA System currently operating at some HTIs the effective functioning of which is associated with large flows of operational information and its relevant use.

In addition, due to the long-term operation of HTIs of interstate significance (built in the 1970-80s and earlier) the servicing fleet of machinery necessary for cleaning the irrigation facilities has become obsolete as well. Because of that and the lack of capital repairs and upgrading of the HTIs, the level of operational technical reliability of these installations has significantly decreased. The overall situation is aggravated by the lack of modern and robust communications and power supply systems, water-measuring devices and hardware. The upgrading and deployment of SCADA at HTIs located within the Syr Darya River Basin – proposed within the framework of this project – will allow raising the effectiveness of water management against the background of outdated infrastructure and growing water demand in the catchment. SCADA installation requires prior assessment of the condition of mechanical and electric equipment as well as uninterrupted power supply systems and – if necessary – their repair or replacement depending on maintainability and resource capacity. Thus, the introduction of the SCADA System will

ensure both TWR efficient distribution and enhancement of the operational reliability and overall technical condition of target HTIs.

Project location *(subject to coordination and identification by riparian countries)***:** The Syr Darya River Basin, transboundary rivers (Naryn, Kara Darya, Chirchik and Syr Darya), HTIs of interstate significance (TBD by riparian countries).

Contribution to water, energy, food and environmental security: In Central Asia and in the Syr Darya Basin, stability and uniformity of water supply is the cornerstone of the water-energy-food-environment nexus, especially considering the coverage scale. The mean annual volume of water resources regulated by BWO Syr Darya amounts to 19.2 bln m3, including 13.6 bln m3 during vegetation period and 5.6 bln m3 during inter-vegetation period. The area of land irrigated by these water resources amounts to 1 773 thousand ha in Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan.

Fitting hydro-posts with SCADA (water management and accounting) will guarantee equitable distribution of water, decrease unproductive losses of water resources, increase transparency of water intakes and releases at transboundary hydro-posts, thus, enhancing agricultural production in the catchment's lower reaches.

Likewise, large and especially important HTIs on the books of BWO Syr Darya located on transboundary waterways provide for necessary measures against high flows and floods causing the threats of water-logging and flooding, thereby preventing extensive damage to environment, public and other facilities.

Essentially, these are the factors characterizing the project's contribution to water, energy, food and environmental security.

Required cooperation and contribution by neighbouring state(s): The project goals may be achieved only under the condition of political support and active engagement of country experts representing the riparian sharing the Syr Darya River Basin. The project does not target deploying SCADA at all HTIs (over 200) administered by BWO Syr Darya, but only at most important HTIs of interstate significance. The choice of target HTIs should be made and coordinated by stakeholder states.

The project's goals fully correspond to regional priorities. The already signed official documents repeatedly refer to cooperation and joint actions in the sphere of transboundary resource management, including:

- Joint Communique of the Council of IFAS Founding States of August 24, 2018 (Turkmenbashi City): "The Parties note the importance of the arrangement among the heads of water management organizations of the IFAS founding states on carrying out joint actions on engaging donors with the aim of automating the hydro-posts across the Syr Darya River Basin";
- Agreement "On cooperation in the sphere of joint management of use and protection of interstate water sources" among Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan as of February 18, 1992 (Alma-Ata City);
- Agreement on the use of hydro-power resources of the Syr Darya River Basin among the Government of the Kazakhstan, Government of the Kyrgyzstan and Government of the Uzbekistan of March 17, 1998 (Bishkek City);
- The Charter of BWO Syr Darya on arranging solutions for fulfilling the tasks of executing the supervisory control of the Syr Darya River Basin water resources, operational control of observance of water intake limits and submission of monthly water resources balances to the members of the Interstate Commission for Water Coordination (ICWC) in CA, as well as adjusting the water intake limits in case of changing river flow with subsequent coordination by ICWC Members;
- Other bilateral interstate agreements between Central Asian countries.

In particular, in the Joint Communique of the Council of the Heads of IFAS Founding States of August 24, 2018 signed in Turkmenbashi City, Turkmenistan:

- The Presidents highlighted the need for further development and strengthening of the relations of equal and mutually beneficial cooperation on the use and protection of interstate waterways in the spirit of centuries-long friendship of the nation's bound by deep historical roots, community of culture, customs and traditions;

- Considering the mutual interest of the Parties in integrated and rational use of hydro and power resources of Central Asia, the Heads of states noted the importance of hydro-power facilities under construction on transboundary waterways for the benefit of all countries of the region and according to international principles and norms supported by the states of the region and for fostering social and economic development of the Aral Sea Basin.

Expected project outcomes and measurable indicators (including in relation to stable access to water, energy and food): By deploying and upgrading SCADA at large and especially important HTIs of interstate significance in the Syr Darya River Basin, the project will positively impact transboundary water and power cooperation and coordination of joint actions in the context of the growing water resource deficiency.

The project's implementation will result in a more "transparent" and open TWR distribution among water-consuming states of the Central Asian region (CAR). It will be achieved via the enhancement of water management and water accounting systems, as well as the establishment of an information system, upgrading of water management infrastructure, increasing the efficiency of water use for irrigation and power generation in the region, reducing flood risk, increasing ecosystem resilience and cadre potential.

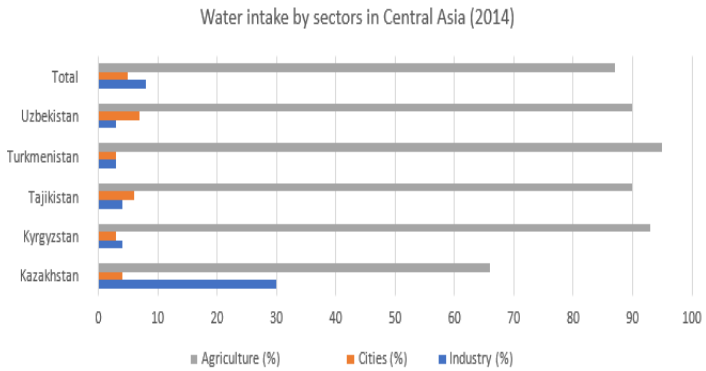
Sustainability indicators:

- Increased water supply to the irrigated land in the CAR thanks to 13-14% saving of irrigation water and, respectively, increased (up to 30%) crop productivity and incomes of water users;
- Availability of objective and continuous data on free resources in the Syr Darya River Basin allowing to make most informed, optimal and/or close to optimal decisions on re-distribution of flood streams in the average volume of up to 30-40% and, respectively, lowering social, economic and environmental damage by absorbing floods;
- Achieved deviation from the agreed schedule of water supply not exceeding 10%;
- Process parameters and criteria of technical reliability and condition of not fewer than 40 HTIs are within allowable limits;
- Objective control over the operating modes of 18 HTIs of interstate significance and their reliable, uninterrupted and long-term (not less than 25 years) operation;
- Training of operational staff and responsible experts (not fewer than 100 people) on using the supplied hardware and modern technologies.

PROJECT 1.2 «Enhancing the reclamation condition of irrigated land in the Amu Darya and Syr Darya River Basins»

Key project information:

Project initiator: Not yet defined.
Involved countries: Under consideration.
Budget: To be developed.
Timeline: To be developed.



Background: Land degradation rates in Central Asia are increasing due to adverse impacts of climate change in the context of unsustainable agricultural practices, the expansion of crop production to fragile and marginal areas, inadequate maintenance of irrigation and collector-drainage systems (CDSs) networks, and overgrazing. As a result, major types of land degradation in the region are soil erosion in the rainfed and mountainous areas, and loss of vegetation, desertification or detrimental change in the vegetation composition in the rangelands. Furthermore, more than 47.5% of irrigated lands of Central Asia are affected by secondary salinization.

Irrigated agriculture employs around 30 million people in CA and profoundly contributes to rural livelihoods, food security and economic development in the region. Land degradation, loss of soil fertility and worsening reclamation condition negatively affect crop productivity. Annual cost of land degradation in CA is estimated to be approx. USD$ 6 bln, most of which due to rangeland degradation (4.6 bln USD), followed by desertification (0.8 bln USD), deforestation (0.3 bln USD) and abandonment of croplands (0.1 bln USD).

The irrigation system in Central Asia is one of the largest in the world and was built during the Soviet Union between 1950 and 1980. However, since the collapse the CDS infrastructure has seen little maintenance. The area equipped for irrigation is between 8 and 10 mln hectares of land. Irrigated agriculture is the largest water user, consuming nearly 80-90% of all available water resources. But efficiency and productivity of water use remains poor with field water use efficiency varying from 55 to 70 percent, largely attributable to the inadequate conditions of CDSs. Increasing the efficiency of irrigation water use is essential for supporting rural livelihoods, producing sufficient food for the growing population, and producing commodity crops, that are important to the national economy and continuing social and economic development.

This is particularly urgent in the context of the estimated increase in water demand by 40% over the next 10-15 years due to demographic growth and continuing rate of infrastructure obsolesce in the region. At the same time, climate change is projected to reduce available discharge of the main rivers due to the sharp shrinkage of glaciers.

Project objective: Decrease soil salinity and improve environmental and reclamation condition of irrigated land in the Aral Sea Basin by (i) modernizing CDSs; (ii) cleaning and repairing of inter- and on-farm CDSs; (iii) conducting capital and operational preventive leaching of saline lands to prevent rise of groundwater levels; (iv) managing dual regulation systems; and (v) introducing water-saving and soil-protective technologies.

Project location: *Subject to negotiation and identification by interested countries.*

Expected results:

- Reclamation condition of irrigated land in the region have improved;
- Efficiency of collector and drainage and irrigation systems has increased;
- Crop productivity increases;
- Income of water user increases;

- Water efficiency is 1.5-1.7 times higher, including as a result of re-use;
- Irrigation water is saved.

DETAILED PROPOSAL DOCUMENT FOR PROJECT 1.2

Focus

1. Integrated water resource use

Stakeholder state(s)

Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan

Project code

Project title (and location)

Project 1.2 Enhancing the reclamation condition of irrigated land in the Amu Darya and Syr Darya River Basins

Submitted by

S.R. Ibatullin expert team based on the list of non-executed ASBP-3 projects; with the assistance of the EU Central Asia Nexus Dialogue Project. Project operator: Central Asian Regional Environmental Centre (CAREC). Liaison: Ms. Ludmila Kiktenko (lkiktenko@carececo.org)

Project operator(s)

Project operator is currently absent. The project idea is open for initiation. The information below was prepared by the expert team and is subject to review, revision and addition by an interested initiator of the project idea.

Required funding	**Source(s) and type(s) of funding**
Project budget TBD at the project preparation phase	
Project duration	**Designed by**
10 years after the start of funding	

Brief description and rationale (including location)

The project aims to decrease the salinity of soils in the Aral Sea Basin, improve the environmental and reclamation condition of irrigated land, and prevent the escalation of degradation and desertification which, in their turn, will facilitate the long-term increase of agricultural efficiency.

In order to achieve the aforementioned goals, the following actions are planned for execution *(TBD by the riparian countries in the Syr Darya and Amu Darya River Basins and project designer)*: i) upgrading irrigation and collector-drainage systems (CDSs); ii) allocation of operating costs for cleaning and repairing inter- and intra-farm CDSs; iii) carrying out capital and operational preventive flushing of salinized land to prevent ground water rising; iv) management of double wedge regulation systems, and v) deployment of water-efficient and soil-protection technologies.

Rationale: The need to implement the project is justified by the amplifying land degradation and desertification, rising ground water table, land salinization and bogging, sharp deterioration of soil fertility

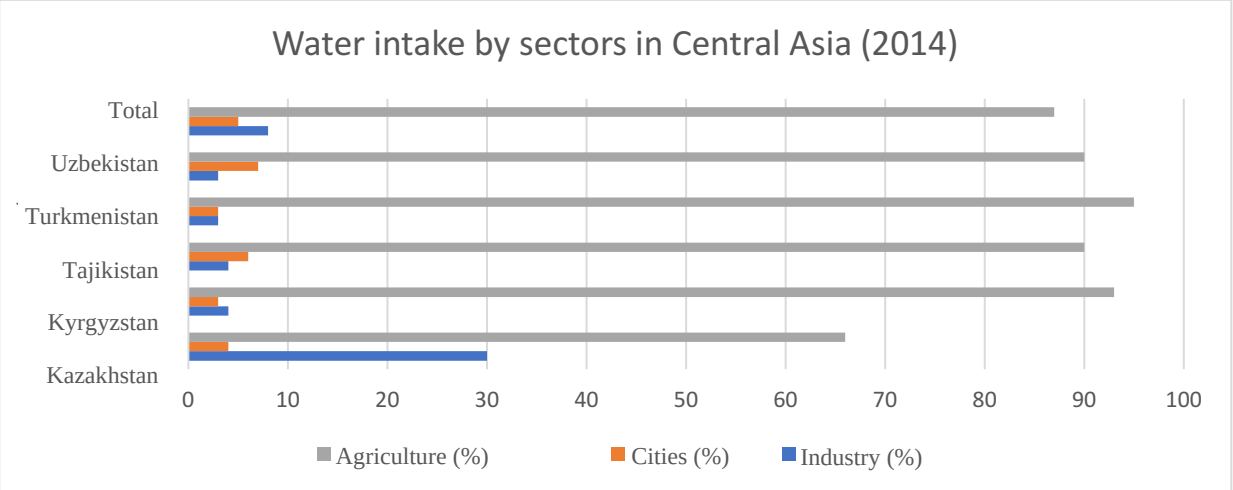
and reclamation condition, low efficiency and drainage capacity of CDSs, which negatively affect crop productivity. Climatically, most of Central Asia (CA) is located in arid and semi-arid zones with natural evaporation considerably exceeding precipitation. Thus, about 90% of the Central Asian region's (CAR) territory receives less than 400 mm of rainfall a year: 191 mm in Turkmenistan, 264 mm in Uzbekistan, 344 mm in Kazakhstan, 533 mm in Kyrgyzstan, and up to 691 mm in the mountainous areas of Tajikistan. Over 40% (or more than 3/4) of the CAR's territory is occupied by desert lowlands (Kazakhstan - 32%; Kyrgyzstan - 0%; Tajikistan - 20%; Turkmenistan - 67%; Uzbekistan - 42%). Without irrigation the majority of this land would turn into desert.

At present, CA countries possess one of the largest irrigation systems in the world built during the former Soviet Union in the 1950-80s. In 2010, it covered 8.1 mln hectares of land. The biggest share of irrigated land belongs to Uzbekistan (53%), Turkmenistan (22%), Tajikistan (9.8%), Kazakhstan (9.1%) and Kyrgyzstan (5%).

About 25 mln residents in the CAR – mainly rural communities – directly or indirectly depend on irrigated agriculture. Its contribution to the economies of certain countries amounts to 10-40%. Over 40% of the region's residents are involved in this sector. For example, in Uzbekistan about 25% of GDP and 32% of employment as well as 70% of domestic trade fall on agriculture.

Irrigated agriculture is the largest water user in the region consuming nearly 80-90% of all available water resources (see the table below). At the same time, more than 70% of irrigated land is used for cultivating water-intensive crops like rice and cotton. Water efficiency remains poor. Based on preliminary estimates, not less than 50-70% of water goes for crop watering. For instance, in Uzbekistan farmers on average use 14,000 m3 of water per ha while the irrigation norms in countries like Pakistan and Egypt – albeit all the inefficiencies of their irrigation approaches – average about 9,000-10,000 m3/ha.

Water deficit is aggravated by its extremely inefficient use on the farm level. The main losses occur in intra-farm irrigation networks and in the fields. At the same time, higher-than-normal losses on both levels average approximately 4,440 m3 per ha or 37% of the total amount of water supplied to farm limits.



Land salinization constitutes another critical challenge, as it affects more than 47.5% of irrigated land in Central Asia (specifically, 33% of irrigated land in Kazakhstan; 11.5% in Kyrgyzstan; 16% in Tajikistan; 95.9% in Turkmenistan; and 50.1% - in Uzbekistan). Thus, salinization is a threat leading to decreased productivity.

By different estimates, the available water resources will be able to satisfy the CAR's needs only until 2020-2025. During this period, the overall water consumption by priority sectors can reach such a level that it will be possible to cover their further water needs only at the expense of reducing water supply to agriculture. In its turn, this measure will necessitate the reduction of irrigated acreage in the region. These processes are taking place against the backdrop of accelerated demographic growth and global climate change. The latter is already more than obvious with the sharp shrinkage of glaciers and snow cap, and may lead to the reduction of the Amu Darya River discharge by 20-30% and the Syr Darya River discharge by 15-20%. Meanwhile, only in the next 10-15 years the region's water demand may grow by 40%. The annual cost of land degradation in the CAR amounts to approx. $6 bln mainly due to deforestation ($0.3 bln) and other factors.

In view of the major role of irrigation in the economies of CA countries, including in ensuring food security, and also in the real-life context of water deficiency comprehensive resolution of the irrigation issue poses a priority task.

Project location: *(the territory and sites for project implementation are subject for identification and coordination by stakeholder countries jointly with a potential project initiator/designer).*

Contribution to water, energy and food security: The factors of growing water shortage and competition for water and land between agricultural and non-agricultural sectors force the need of enhancing water efficiency in agricultural crops and ensuring sufficient nutrition for future generations.

CAR countries possess extensive agricultural resources, including light, heat, water and land. Yet, their spatial distribution is not even. For instance, Turkmenistan has excellent soils, relief, labor and other environmental and social conditions thanks to its location in mid- and lower reaches of the Amu Darya and Syr Darya Rivers. Upper-stream countries have more water. Kazakhstan has the richest land resources. Uzbekistan enjoys significant agricultural potential. In recent years, some countries started shifting to less water-intensive crops (fruit, cucurbits, etc.). However, it is impossible to replace the traditional crops like rice and cotton completely.

Required cooperation and contribution by neighbouring state(s): *(the actual cooperation is subject to discussion after identification and coordination of project territory by stakeholder states and potential project initiator/designer).*

Expected project outcomes and measurable indicators (including in relation to stable access to water, energy and food) (in quality terms; in quantity terms TBD upon selecting project location/site):

- Improved reclamation condition of irrigated land in the region;
- Increased efficiency of collector and drainage and irrigation systems;
- Enhanced crop productivity;
- Growth of water user incomes;
- Growth of water efficiency by 1.5-1.7 times, including as a result of re-use;
- Saving of irrigation water.

Sustainability indicators: *(subject to confirmation and identification by potential project proposal initiator/designer).*

PROJECT 1.3 «Safety of dams and other hydrotechnical facilities in Central Asia: development of the potential and regional cooperation»

Key project information:

Project initiator: WBO "Syr Darya".
Involved countries: Under consideration.
Implementation: WBO "Syr Darya" and WBO "Amu Darya".
Budget: $USD 6 800 000.
Timeline: Four years of implementation.

Background: Ensuring dam safety and operation is of critical importance for Central Asia. HTFs in the region supply water to all sectors of the economy and serve as a main source of drinking water of the population. Around three hundred dams and other HTFs are located along transboundary rivers, supplying over 90% of irrigated lands with freshwater and contribute to 50% of electricity generation in the region.

Following the collapse of the Soviet Union, ownership of the dams was transferred to respective states, the private sector and various national bodies with a budget for maintenance from public sources. With exception of Uzbekistan, national legislation on dam safety of the states in the region is spread across a multiple laws, normative acts and technical standard provisions, leading to distinct inconsistencies.

Ageing infrastructure, inefficient operations and budgetary constraints in the past decades significantly contribute to an estimated obsolescence rate of dams across the whole Central Asian region is between 40%-60%. Dams in Central Asia, are multipurpose infrastructures, including seasonal and long-term regulation of river flows for irrigation, hydropower, drinking water supply, flood protection, reduction of landslide risks and droughts for more than 15 million people, living in flood risk zones. Hence, they play a significant role for human safety and economic sector developments. For example, the largest fully operational dam, the Nurek Dam in Tajikistan, is 300 meters high and has an installed capacity of 3000 MW, almost 70% of the country's total hydropower capacity generated (5000 MW).

Since the 1990s none of the proposed regional agreements on dam regulation and safety issues have been signed. To date, some dam safety issues are regulated bilaterally, but in the past several years countries have initiated discussions on this matter at the regional level as well. This happened in part, through high-level meeting and donor projects. Hence the proposed project is aligned with the Decision of the States of Central Asia of April 28, 2009 and Decision of the IFAS on the «Aral Sea Basin Program for 2011-2015».

Project objective: Improve dam safety in Central Asia by developing institutional and legislative frameworks, as well as modernizing of selected HTFs through the implementation of the following activities:

- Development of safety regulations and assessment criteria for HTFs operation;
- Resumption of dialogue to draft an intergovernmental agreement on HTF safety cooperation;
- Development of national and regional programmes improving the safety of HTFs;
- Equipping a number of HTFs with automated monitoring and metering systems;
- Installation of early warning systems in ten HTFs;
- Building capacities of HTF employees on the use of modern methodology and equipment.

Project location: *subject to negotiation and identification by interested countries.*

Expected results:

- Efficiency and stability in the management of the water and hydro-energy resources increased;
- Reliable and uninterrupted operation of HTFs of interstate significance safeguarded;
- Regional dialogue and cooperation on HTF operation safety commenced.

DETAILED PROPOSAL DOCUMENT FOR PROJECT 1.3

Focus

1. Integrated water resource use

Stakeholder state(s)

Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan

Project code

Project title (and location)

Project 1.3 Safety of dams and other hydro-technical installations in CA: capacity building and regional cooperation

Submitted by

BWO Syr Darya and S.R. Ibatullin expert team based on the list of non-executed ASBP-3 projects; and the team of the EU Central Asia Nexus Dialogue Project. Project operator: Central Asian Regional Environmental Centre (CAREC). Liaison: Ms. Ludmila Kiktenko (lkiktenko@carececo.org)

Project operator(s)

Authorized national bodies engaged in controlling and supervising the technical condition and safety of operations of hydro-technical installations (hereinafter, authorized supervisory bodies), Ministry of Ecology, Geology and Natural Resources of Kazakhstan, Ministry of Energy and Water Resources of Tajikistan, Ministry of Rural and Water Management of Turkmenistan, Ministry of Water Management of Uzbekistan, Uzbekgidroenergo JSC, BWO Syr Darya and BWO Amu Darya.

Required funding	**Source(s) and type(s) of funding**
$6,080,000	Means of IFIs: grant (20%); loan (80%).
Project duration	**Designed by**
4 years after the start of funding	Authorized supervisory bodies of CA countries, BWO Syr Darya and BWO Amu Darya

Brief description and rationale (including location)

The project's goal is to increase the safety of dam operations in Central Asia (CA) by building up the institutional and legal frameworks, as well as upgrading target hydro-technical installations (HTIs) by way of executing the following actions:

- Develop 6 national-level regulations, including HTI safety rules, Methodology for determining and adjusting HTI safety criteria, Methodology for assessing dam seismic risks, Methodology for combatting reservoir silting, Provisions on emergency stocks of materials, machinery and equipment, Terminology on HTI safety in the national languages of CA countries. It is expected that each document will be drafted based on a uniform and modern methodology for each country and adapted to national legislations allowing their harmonization on the regional level;
- Renew the expert efforts among Central Asian countries on drafting an intergovernmental agreement on HTI safety cooperation developed with the engagement of stakeholder states' representatives under the Project "Dam safety in Central Asia: capacity building and regional cooperation";
- Develop national- and regional-level programs on HTI safety;

- Equip several facilities with modern control and measuring apparatus (CMA) and introduce an automated HTI reliability control system;
- Fit several facilities with early warning systems to notify population of emergencies at these facilities;
- Arm HTI safety personnel and mobile express labs with modern high-precision diagnostic devices and equipment;
- Train more than 400 technical and administrative staff of operating and supervisory bodies on applying modern standard methodologies and the supplied hardware.

Achieving these objectives will allow cardinally improving the coordination among countries and control of HTI safety, including these of interstate significance; will establish the responsibilities of authorized HTI safety bodies; will strengthen the legal framework regulating the structure of actions aimed at ensuring HTI safety. It is also planned to widely deploy a system for the objective assessment of the current condition of structures at all stages of their life cycle based on modern comprehensive strategic indicators. It is likewise planned to design a set of organizational and technical actions (including an action plan for cases of threatening operational impacts and HTI accidents), plans for renovating and upgrading the installations, qualification and other measures. In addition, it is also expected to build up the rapid response preparedness for HTI accident risks as well as ensuring reliable, continuous and overall safe long-term operation of HTIs.

Rationale: Safety of dams and their operations are of special importance for Central Asia. HTIs deliver water to all sectors of national economies and are the main source of potable water. Over 90% of irrigated land and 50% of generated electricity are supported by the HTIs operating in the CAR. About 300 dams and other HTIs are located on transboundary rivers and are of intercountry significance.

After the disintegration of the former Soviet Union, dams passed into the ownership of corresponding states, transferred into private ownership or re-distributed among various national authorities with the relevant operational costs covered from state sources. Only Uzbekistan and Tajikistan have special legislation on HTI safety. In other CA countries, HTI safety requirement are dispersed across regulations on water management, power, etc., which results in multiple discrepancies.

Dams in Central Asia play a diversity of functions and are characterized by high protective and economic value. Dams provide seasonal and long-term regulation of river discharge for irrigation, hydro-power generation and water supply. They also constitute the instruments of protection against floods, high flows and droughts for over 15 mln people living in flood-prone zones. The largest dams (retaining walls of over 300 meters height) are located in upper-stream countries. Due to limited budgetary means available in the course of the last several decades, the rate of dam depreciation in the region is 40-60% and more.

Starting 1990, no regional agreement on dams has been signed. The draft agreement on regional cooperation executed in 2004 did not come into force due to the lack of consensus. On the one hand, CA countries have insufficient designated legal frameworks; on the other hand, domestic legislations are also poorly harmonized. These factors make the safe operation of HTIs located on shared (transboundary) waterways significantly more complicated, thus, increasing the risk of accidents at such facilities. As of today, certain dam safety issues are regulated on a bilateral basis. However, during the last few years the stakeholder countries have begun to discuss and pay attention to the matter on the regional level, which is evidenced by high-level meetings.

The problem is further aggravated by the fact that Central Asia is among the most vulnerable regions to climatic change in the world. The impacts of sharp temperature fluctuations in the region are becoming obvious already – the hydrological regimes of rivers in the Aral Sea Basin are changing, drought duration and rainfall intensity within a short period of year are increasing. All these build up the risk of sudden floods and, respectively, lead to the growing threat of dam accidents, increased sediment formation, more intensive damage to river and water reservoir coasts and accelerating stream bed erosion. The aforementioned facts justify the need of developing regulations on safety rules and criteria, assessment of seismic risks, reservoir anti-silting actions, and emergency stocks of materials, machinery and equipment, as well as corresponding HTI safety terminology.

The draft Agreement on cooperation on HTI safety among the governments of CA countries was developed under the UNECE Project “Dam safety in Central Asia: capacity building and regional cooperation”. The procedure of reviewing and coordinating the draft agreement did not evolve mainly because country-designated experts could not agree on the controversial issue of responsibility of each

party before other parties for accident aftermath. Yet, the recent years have seen the emergence of an active dialogue among the stakeholder states on practically all complicated issues of water and power cooperation. This draft agreement may become the foundation of a regional- as well as basin-level agreements forging the overarching dimensions, forms and mechanisms of potential mutually beneficial cooperation in the field of safety. Signing the agreement will be important for preventing possible emergencies and accidents at target facilities and their long-term reliable and uninterrupted operation, as well as ensuring the overall water security in the CAR. The agreement's adoption would also allow attracting investments into the region for enhancing the technical condition of HTIs, their re-fitting with modern equipment, devices and hardware, especially these located on transboundary waterways and characterized by interstate significance.

Practically all CA countries lack a detailed and comprehensive national programme on HTI safety for further harmonization under a regional-scale program. The modern automated system controlling the reliability and technical condition of this allowing continuous and high-quality monitoring of extreme values of quantity indicators and quality characteristics via control and measuring apparatus is deployed poorly. A widespread introduction of such a system at pilot facilities based on the corresponding best practices requires the deployment of an automated system for making in-situ observations of HTI technical condition.

Continuous duty of HTIs and their sophisticated equipment in complicated conditions requires their regular servicing and performing periodic multi-factor assessment of their technical condition using diagnostic devices. Yet, the designated bodies authorized to execute this task lack both the corresponding equipment and the experience of utilizing it.

Considering the project objectives, including drafting corresponding up-to-date methodologies, the responsible personnel need to undergo a special training.

Project location (*subject to the identification by the countries of the river basin):* In the Aral Sea Basin, there operate HTIs of both national and interstate significance (water reservoirs, mudflow storage reservoirs, tailings dams, hydro-power stations, pumping stations, hydro-posts, main canals and collectors, shore-protection and training works).

Contribution to water, energy, food and environmental security: HTIs in CA supply water to all sectors and industries as well as ensure irrigation of over 90% of agricultural land and water supply for commercial, drinking, industrial and other needs. In addition, these installations generate about 50% of electric power in the CAR. They are also the core element of flood protection of sites of various profiles and more than 15 mln people residing in retaining works zones. HTIs likewise allow diversion of mineralized, salinized and polluted water as well as accumulation and extraction of liquid waste from industrial and agricultural operations.

At the same time, taking into account the arid climate of some CA countries – and especially these located in the lower reaches – the assessment of potential emergencies caused by HTI accidents should consider not only the dynamic accidents driven by the distribution of breakthrough waves or high flows in tail races, but also the potential violations of community livelihoods as a result of decreased water level in reservoirs, restrictions of water supply to irrigation systems as per the operating procedures, as well as corresponding termination and/or restriction of various types of water use and, likewise, other consequences of decreased water level. Damage to life, health, private, commercial and/or public property due to negative environmental aftermath of HTI-related accidents should also be taken into account while evaluating HTI resilience and safety.

A temporary halt of HTI operations – although for a time period sufficient for dehumidification of plants in arid conditions – does not pose a direct threat to life and health of people. It can however leave communities engaged in agriculture and receiving water from specific HTIs without work and food, i.e. livelihoods. This type of risk is directly associated with hydro-posts, pumping stations and irrigation canals.

The aforementioned factors distinguish the project's contribution to water, energy, food and environmental security of the CAR.

Required cooperation and contribution by neighbouring state(s): The strategy for ensuring reliability and safety of HTIs in Central Asia with the engagement of regional, international and donor agencies is stipulated in multiple important regional and national documents, including:

- Decision of the Heads of CA states of October 6, 2002 and Decision of the IFAS Board of August 28, 2003 in relation to the "2003-2010 Program of specific actions to improve ecological and social-economic situation in the Aral Sea Basin" (ASBP-2);
- Decision of the Heads of CA states of April 28, 2009 and Decision of the IFAS Board on the "2011-2015 Assistance program for the Aral Sea Basin countries" (ASBP-3);
- National legal acts of CA countries regulating HTI reliability and safety state that in case international treaties signed by CA countries establish rules on HTI safety other than these provided for in domestic legislation, the rules of international and other treaties shall prevail.

The collaboration of Central Asian states within the framework of the Project "Dam safety in Central Asia: capacity building and regional cooperation" implemented under ASBP-3 laid the necessary foundation for the further progress of collaborations on HTI safety in the CAR. Considering the already launched successful legal and institutional reforms in the sphere of HTI safety, the stakeholder countries acknowledge the need for even greater efforts on behalf of each of them and the need to coordinate them regionally.

Due to this, in recent years resilience and safety of HTIs – mostly located on transboundary rivers – has been gaining an increasing attention because of the serious concerns over overlapping problems which intensify the frequency of failures of HTI materials and structures. Simultaneously, natural and social factors create additional stresses which together or separately cause accidents at such facilities. In many cases social consequences and material damage from HTI breach or destruction as a result of accidents – mainly due to breakthrough wave action – can be compared to natural disasters, including catastrophic consequences.

In this regard, establishing dialogue and exchanging experience among CA countries, as well as building the regional capacity in the field and reviewing the lessons learnt to expand the scale of measures addressing the shared challenges in ensuring HTI reliability and safety are key for further advancement. Considering the already existing linkages among the water systems of the CAR and the similarity of climate change induced challenges which CA countries currently face, a coordinated and integrated approach to ensuring HTI resilience and safety may bring numerous benefits.

Expected project outcomes and measurable indicators (including in relation to stable access to water, energy and food): The Project's implementation will reduce disaster risks and losses associated with HTI-related accidents, including human losses, loss of livelihoods, deterioration of human health, as well as adverse impacts on economic, physical, social, cultural and environmental assets of people, enterprises, communities and countries.

The project will forge the capacities for reliable, uninterrupted and safe operation of HTI of both national and interstate significance.

Besides, it will increase the efficiency and sustainability of water and hydro-power resource governance with the aim of guaranteeing their secured supply, sustainable economic development and social-environmental security of the CAR countries, as well as fulfilment of their relevant international obligations in the sphere of water and hydro-power resource management.

The project's execution will allow taking adequate measures for changing the hydrological regimes of target rivers and water management ecosystems violated as the result of global climate change.

Yet another project's output will be the rational and effective use of financial resources allocated for the implementation of actions to enhance HTIs' reliability and safety in Central Asia thanks to clear identification of short-, mid- and long-term priority actions.

The project will likewise foster the conditions of transparency and mutually advantageous regional-level dialogue and collaborations, determining mutually acceptable ways of responding to issues associated with HTIs of interstate significance.

Sustainability indicators:

- 6 drafted regulations (HTI Safety Rules; Methodology for determining and adjusting HTI safety criteria; Methodology for assessing dam seismic risks; Methodology for combatting reservoir silting; Provisions on emergency stocks of materials, machinery and equipment; Terminology on HTI safety in the national languages of CA countries) allowing to establish the requirements, necessary HTI safety levels, including the levels of compliance of HTI technical condition and environment condition with the established reliability and safety criteria;
- CA countries signed an intergovernmental agreement on cooperation on HTI safety developed with the engagement of representatives of stakeholder states within the framework of the Project "Dam safety in Central Asia: capacity building and regional cooperation" under ASBP-3, thus, continuing the necessary dialogue on the matter;
- Developed national and regional programs on HTI safety;
- Modern early warning systems installed at 10 HTIs (high and medium-height retaining works) of interstate significance;
- Modern automated monitoring systems (based on control and measurement apparatus) deployed for high-quality and timely natural observation of the technical condition at 5 HTIs;
- I, II, III class HTIs and these posing the highest risks equipped with modern mobile diagnostic labs, including mobile and high-precision devices and equipment for express HTI diagnostics;
- The efficiency of utilizing the financial resources allocated for HTI capital repair and renovation increased by 15% due to rational and credible identification of short-, mid- and long-term priority tasks associated with HTI safety;
- Necessary capacities for ensuring reliable, uninterrupted and long-term (not less than 25 years) operation of HTIs, including these of interstate significance, built;
- Professional competencies of responsible personnel (not fewer than 400 people) enhanced.

PROJECT 1.4 «Improvement of the WRM in the Amu Darya River Basin through the rehabilitation and modernization of the water facilities and interstate legislative framework»

Key project information:

Project initiator: WBO "Amu Darya".
Involved countries: Under consideration.
Implementation: WBO "Amu Darya".
Budget: $USD 35 000 000.
Timeline: Four years of implementation.

Background: The Amu Darya River is the longest river in Central Asia and its basin encompasses four countries (Afghanistan, Tajikistan, Turkmenistan and Uzbekistan). Over 76% of the Amu Darya River flow is drained from Tajikistan, which heavily relies on the water for agricultural production and energy generation. The Amu Darya River Basin is managed by the Water Basin Organization (WBO) "Amu Darya", the operational arm of the Interstate Coordination Water Commission (ICWC) of Central Asia. The WBO is responsible for 36 water withdrawal facilities of interstate importance and three interstate main channels that reach across the territory of Tajikistan, Turkmenistan and Uzbekistan.

Ever since the 1990s the riparian countries have managed the transboundary water resources independently and no official high-level agreements were reached on the management of the Amu Darya River Basin. Unlike in HTFs in the Syr Darya River Basin, no automated water withdrawal control and monitoring system (such as the SCADA) were installed in the Amu Darya River Basin. Access to reliable information on water withdraw and a legal basis of allocation of use would be equally important for decision makers in the Amu Darya River Basin. This is particularly true given that the Amu Darya River serves as a main source of drinking and irrigation water for Turkmenistan and Uzbekistan, but during the past decades water quality in the Amu Darya has deteriorated considerably as a result of discharge of drainage and industrial water from neighbouring countries.

Project objective: Tackle issues of unsustainable water resource uses in the Amu Darya River Basin through the set of activities, including:

- Laying the ground for a regional legislative framework on water management in the Basin;
- Constructing or revival of SCADA control systems in key water withdrawal facilities along the main channels in the upper, middle and lower parts of the Basin;
- Installation of water treatment facilities and/or integration of biological cleaning methods in CDSs in the upper part of the Basin.

Project location *(subject to negotiation and identification by interested countries):* ***Upper part:*** Vaksh waterworks facility, Lower Beshkent waterworks facility and other key water withdrawal facilities. ***Middle part:*** Middledaryan Division, key facility Karabekaul. ***Lower part****:* channel Bairamsaka with hydrotechnical facilities, canal Palvan-Gazavat, key facility Tashsaka, Khan-yab hydroposts.

Expected results:

- Water loss in irrigated areas decreased by 20%;
- Uninterrupted operations of water facilities of transboundary significance safeguarded;
- Average water salinity decreased by 0.4-0.5 grams per litter;
- Draft interstate agreement on water use is developed for the Amu Darya River Basin, including the formation and operations of the unified database;
- Hydro infrastructure and technological communication along the river basin (hydro posts) improved,
- SCADA systems installed at the key facilities:
- Technical capacity of the staff of water basin organizations and its branches has increased;
- Flood risks decreased.
-

DETAILED PROPOSAL DOCUMENT FOR PROJECT 1.4

Focus

1. Integrated water resource use

Stakeholder state(s)

Tajikistan, Turkmenistan, Uzbekistan

Project code

Project title (and location)

Project 1.4 Improvement of water resource management in the Amu Darya River Basin by rehabilitating and upgrading water management facilities and enhancing interstate legal framework

Submitted by

BWO Amu Darya subsidiaries and S.R. Ibatullin expert team based on the list of non-executed ASBP-3 projects; with the support of EU Central Asia Nexus Dialogue Project. Project operator: Central Asian Regional Environmental Centre (CAREC). Liaison: Ms. Ludmila Kiktenko (lkiktenko@carececo.org)

Project operator(s)

BWO Amu Darya in cooperation and coordination with national authorities: Ministry of Rural and Water Management of Turkmenistan, Ministry of Water Management of Uzbekistan, Ministry of Energy and Water Resources of the Tajikistan, national hydrometeorological services and ICWC SIC.

Required funding	**Source(s) and type(s) of funding**
$35,000,000 (based on preliminary expert evaluation; subject to specification during the project's preparation phase)	Conditionally: national budgets (10%) Outside investment: ADB, Islamic Bank, WB (75%), grant (15%)
Project duration	**Designed by**
4 years after the start of funding	BWO Amu Darya, Ms. Gulnara Kadyriy (amudarwater@mail.ru, amu_BWO@mail.ru)

Brief description and rationale (including location)

The project aims to comprehensively address the tasks associated with sustainable water resource management (WRM) in the Amu Darya River Basin via the following: 1) enhancing the legal framework regulating WRM in the catchment; 2) renovation/construction, automation and upgrading water intake headworks and main canals in upper, mid and lower reaches of the Amu Darya River Basin; 3) installation of power supply sources; and 4) installation of treatment installations and/or application of biological methods of purification at tail collector and drainage systems in the Amu Darya mid-stream.

Rationale: The Amu Darya River is the largest river in Central Asia (CA), forming the watershed (approx. 1017,8 thousands km2) shared by 4 countries: Afghanistan, Tajikistan, Turkmenistan and Uzbekistan. Over 76% of the Amu Darya River discharge accumulates in Tajikistan characterized by the substantial dependency on hydro-power resources for agriculture and power generation. The catchment is managed by the executive body of the Interstate Commission for Water Coordination (ICWC) in Central Asia serving 3297770,5 ha of Amurdarya River Basin and responsible for 36 water intake facilities of interstate significance and 3 interstate canals passing through the territory of Tajikistan, Turkmenistan and

Uzbekistan. The annual volume of diverted water amounts to 52 bln m3 ensuring irrigation of 3.3 mln hectares of farmland.

BWO Amu Darya manages multiple HTIs and interstate transboundary canals – characterized by high degree of criticality by class, category and degree of potential risk of accidents – located in the watershed. At present, over 25 mln people live in the Amu Darya Basin. In the future, its population is estimated to annually grow by an average of 2.5%. The irrigated land of riparian countries provides for the most part of their agricultural production. The basin's water resources amount to approximately 69 km3. Specific indicators of water resources and irrigated land per capita have been significantly decreasing due to demographic growth and industrial development.

Since 1990 – when the riparian began their independent WRM – no high-level agreement was signed on the Amu Darya River Basin. While in the Syr Darya Basin, several SCADA systems were installed, no such systems, including for automated water intake control and monitoring, had been deployed in the Amu Darya Basin. Transparent and effective management of water resources supported by corresponding legal and technical frameworks would be equally important for decision makers from all stakeholder states, in particular, due to the fact that the Amu Darya is the main source of potable and irrigation water for Turkmenistan and Uzbekistan and covers the significant water needs of Uzbekistan for crop irrigation.

Introduction of such a system at target facilities is necessary (including repairing a part of technological equipment of lifting devices and uninterrupted power supply system). Along with that, the large volume of data and real-time information related to the operational control over the observance of water intake limits – with the account of the overall extensive length of the river and the distribution of water management facilities across the catchment – requires comprehensive alignment, creation of a modern information center at BWO Amu Darya Head Office based on relevant IT technologies and applications. In this regard, a large share of this task would be addressed by fitting target HTIs with modern communications and power supply equipment as well as water-measuring devices.

Upgrading HTIs and installing SCADA will guarantee timely supply of transboundary water to consumer-states sharing the Amu Darya Basin, reduced unproductive water losses, smooth long-term operation of HTIs of interstate significance, secure operation of public and industrial facilities, as well as safe accommodation of people residing in the zones adjacent to retaining works.

Project location *(subject to identification and coordination by the countries):* The project is planned to be implemented at the following facilities:

- Upper-stream: Vakhsh Waterworks, tail race of Beshkent Waterworks, "Gravity Main Canal" head water intake facility, Dekhkanabad and Halkayar head water intake and escape facilities, Dekhkanabad Hydro-Post on the Pyandj River, right branch of the Yavano-Obikiik Main Canal on the Vakhsh River, Head water intake and escape facility of the Vakhsh Main Canal (Uzbekistan), hydro-posts (Termez (Uzbekistan), Lower Pyandj, Tigrovaya Balka, Aivadzha (Turkmenistan);
- Mid-stream: Srednedarya Deparment, Karabekaul Headworks (Turkmenistan);
- Lower-stream: Bairamsaka Canal with HTI, Palvan-Gazavat Canal, Tash-Saka Headworks (Uzbekistan), Khan-Yab with hydro-posts (Turkmenistan).

Contribution to water, energy and food security: Water supply stability and uniformity across the whole CAR is the cornerstone of the water-energy-food-ecosystem nexus in the Amu Darya Basin. The monthly volume of water resources administered by BWO Amu Darya based on mean annual calculations amounts to 52 bln m3, including 35 bln m3 during vegetation period and 17 bln m3 during inter-vegetation period, with the area of irrigated land covered reaching 3,297.7 thousand ha in Tajikistan, Turkmenistan and Uzbekistan.

Besides, the large-scale and especially important HTIs on the books of BWO Amu Darya located on transboundary waterways ensure the execution of necessary actions to combat floods and high flows associated with water-logging and flooding risks and, thereby, prevent significant damage to environment, public and other facilities in the catchment.

Essentially, these are the factors characterizing the project's contribution to water, energy, food and environmental security.

Required cooperation and contribution by neighbouring state(s): The strategy for rational and effective WRM is stipulated in many important regional documents, including:

- Joint Communique of the Council of IFAS Founding States of August 24, 2018 (Turkmenbashi City): "The Parties note the importance of the arrangement among the heads of water management organizations of the IFAS founding states on carrying out joint actions on engaging donors with the aim of automating the hydro-posts across the Syr Darya River Basin";
- Agreement "On cooperation in the sphere of joint management of use and protection of interstate water resources" among the Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan and Turkmenistan of February 18, 1992 (Alma-Ata City);
- Bilateral inter-government agreements between the Amu Darya Basin riparian states;
- Bilateral agreements between the Turkmenistan and Kazakhstan regulate many issues associated with HTI operation, repair, material and technical supports, movement of material and human resources for ensuring uninterrupted water supply to water consumers;

The riparian states will consider the facilities suggested for upgrading under the project, identify their priority and significance. BWO Amu Darya jointly with the relevant agencies of Tajikistan, Turkmenistan and Uzbekistan will perform technical assessment of each target HTI and will make a relevant decision describing its priority level and cost of works. Based on the aforementioned assessments and decisions, BWO Amu Darya will perform a feasibility study for each HTI separately and for the whole basin.

Expected project outcomes and measurable indicators:

- An inter-government agreement covering issues, including the establishment and operations of a single service, databases, constructions of hydro-posts, etc. signed;
- New facilities replacing obsolete and deteriorated HTIs (Karabekaul Headworks, Dekhkanabad Hydro-Post, right branch of the Yavano-Obikiik Main Canal, hydro-posts (Termez, Lower Pyandj, Tigrovaya Balka, Aivadzha)) built;
- Transfer of the hydro-post from Darganata to Ilchik or Lebap settlement area completed with the aim to ensure joint water-consumption measurement on the Amu Darya and mini-HPP of the Tash-Saka System;
- Metal and reinforced concrete structures, lifting gears and electric equipment at head water intake facilities replaced;
- New communications technologies deployed, power networks replaced, automatic water management and accounting system introduced, including remote water-consumption sensors along canals;
- A single automated dispatching service put into operation, a single software package and daily database created;
- A capacity-building system for BWO Amu Darya staff designed and functioning on the premises of ICWC Urgench Branch Training Center;
- Stable power supply sources installed: solar panels or wind generators (at least 15-20 KW) in BWO Amu Darya subsidiaries (5) and head works (36);
- Treatment or biological purification facilities installed at tail collector drainage systems (Amu Darya mid-stream);
- Material support of BWO Amu Darya subsidiaries with special equipment and transport strengthened.

Sustainability indicators:

- Decreased unproductive water losses and increased crop yields (15-20%);
- Increased water availability for watershed residents;
- Increased sanitary releases in the Aral Sea area (20%);
- Decreased average annual water salinity (by 4-5 g/l).

PROGRAMME DIRECTION 2: ENVIRONMENTAL PROTECTION

PROJECT 2.1 «Rehabilitation of the Aral Sea ecosystem to combat desertification and land degradation»

Key project information:

Project initiator: Executive Board of the International Fund for Aral Saving in the Republic of Kazakhstan.
Involved countries: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan - subject to confirmation.
Budget: To be defined during the project preparation.
Timeline: 2020-2025.

Background: Rapid depletion of the Aral Sea since the 1960s was caused by the Soviet Union building massive irrigation projects in the region. The severely reduced inflow subsequently caused the water level in the Aral Sea to drop and the Aralkum Desert was formed on its seabed. The saline soils in the Aralkum Desert are a major source for dust and salt storms in the region. The 4.5 million ha of the desert are overloaded with toxic sand and pollutants from pesticides and eroding ships. 100 million tons of dust formed from these pollutants and toxic salts are carried away by a strong east-west airstream every year. The increasing degradation of lands in the region drive desertification rates and may further expand the area of the Aralkum Desert, which already occupies over three quarters of the territory of Central Asia.

The adverse effects of this manmade ecological disaster are not only felt by the 70 million people living in Central Asia. The toxic dusts from the Aralkum Desert were found on the coastlines of the Antarctica, on the glaciers of Greenland and in the forests of Norway. The dusts are carried also to glaciers of the Himalayas, the Pamirs, the Tien Shan and the Altai. An increase of toxic dust on the surfaces of glaciers and mineralization of precipitation accelerate melting of glaciers, changing the Syr Darya and the Amu Darya river discharges which feed water back into the Aral Sea Basin. This constitutes a vicious cycle for the already arid region of Central Asia that relies on glaciers for fresh water and condensation of atmospheric moisture.

To halt desertification and reduce exposed toxic soils and pollutants, increasing plant coverage is considered a viable measure. Reforestation and plantation efforts will need to go hand in hand with the improvement of the CDS in the Amu Darya and Syr Darya River Basins.

This proposed project is in line with the commitments of all Central Asian countries highlighted at the high-level summit of IFAS in August, 2018 in Turkmenistan. On the implementation side, the proposed project was supported by the Secretariat of the Interstate Commission on the Sustainable Development in Turkmenistan and Executive Board of IFAS in Uzbekistan.

Project objective: Rehabilitation of the bottom Aral Sea through forestation and improvement of the collector-drainage system. In particular, the following activities are planned: 1) Forestation of the bottom Aral Sea by creating the “Green Belt”; 2) Development of CDSs in the Amu Darya and Syr Darya River delta; 3) Organization of nurseries of economically viable species of woody vegetation; and 4) Capacity building of local land and forestation specialists.

Project location: *subject to negotiation and identification by interested countries*

Expected results:

- A “Green belt” on a territory of 180-200 thousand ha is created;
- A collector and drainage system with a length of 200 km in the deltas of Amu Darya and Syr Darya Rivers is modernized or constructed to support the “Green Belt”;
- Two nurseries on 4 ha are created;
- Test site for the cultivation of desert plants is created (50 ha);
- Nursery for planting material (10 ha) is created in Dashoguz Velayat, Turkmenistan and Republic of Karakalpakstan (on 150-200 ha).

DETAILED PROPOSAL DOCUMENT FOR PROJECT 2.1

Focus

2. Environmental protection

Stakeholder state(s)

Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan

Project code

Project title (and location)

Project 2.1 Rehabilitation of ecosystems in the Aral Sea Basin to combat desertification and land degradation (the project is planned for implementation on the dried-up bed of the Aral Sea).

Submitted by

IFAS Executive Directorate in Kazakhstan supported by IFAS GEF Agency in Uzbekistan, ICSD Secretariat in the Turkmenistan, and S.R. Ibatullin expert team based on the list of non-executed ASBP-3 projects; with the support of EU Central Asia Nexus Dialogue Project. Project operator: Central Asian Regional Environmental Centre (CAREC). Liaison: Ms. Ludmila Kiktenko (lkiktenko@carececo.org)

Project operator(s)

IFAS Executive Directorate in Kazakhstan supported by IFAS GEF Agency in Uzbekistan, ICSD SIC in the Turkmenistan jointly and in coordination with the following national authorities:

- Kazakhstan: Ministry of Ecology, Geology and Natural Resources, IFAS ED, local administrations;
- Uzbekistan: Ministry of Water Management, Committee for Environmental Protection, Institute of Forestry, ICWC SIC, IFAS Nukus Branch, local administrations;
- Turkmenistan: IFAS EC Dashoguz Branch, Institute of Deserts, Flora and Fauna, local administrations.

Required funding	**Source(s) and type(s) of funding**
$200 mln (preliminary; TBD at the project preparation phase)	Grant + budget means + loan
Project duration	**Designed by**
4 years after the start of funding	Bolat Bekniyaz, Director of the IFAS Executive Directorate in Kazakhstan (bbolat@mail.ru) Vadim Sokolov, Director of the IFAS GEF Agency in Uzbekistan (vadim_sokol@mail.ru) Batyr Mamedov, Head of ICSD Secretariat (batyrmamedov@gmail.com)

Brief description and rationale (including location)

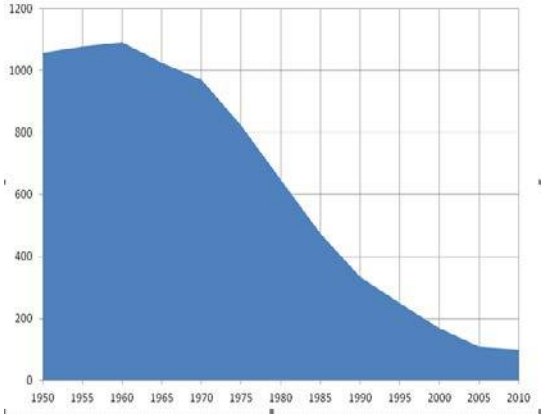
The project's goal is to reduce the direct influence of salt and dust dispersal from the bottom of the dried-up sea, and to protect people, settlements, agricultural land, flora and fauna of the Aral Sea zone by way of executing the following tasks:

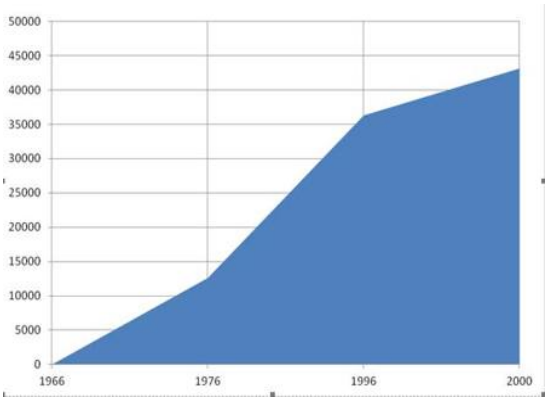
- Construction/creation of artificial channels for the Syr Darya below the Kokaral Dam with a system of creeks and wetlands on the territory of Kazakhstan and artificial channels for the Amu Darya to the north of its current delta on the territory of Uzbekistan with the aim of preserving water discharge and fish resources, watering of vegetation plantations, and watering sites for wild animals;
- Creation of the Aral Sea Green Belt along the artificial channels of the Syr Darya and Amu Darya Rivers on the territory of the dried-up bottom of the Large (South) Aral Sea and around settlements with the arrangement of plantations of commercial vegetation species on the territory of Kazakhstan, Uzbekistan and Turkmenistan;
- Attraction of additional water resources (120-150 mln m3 a year) to the Large (South) Aral Sea by building the main Kazalinsk Collector for withdrawal of surplus water from the Left-Bank Kazalinsk Irrigation Massif on the territory of Kazakhstan;
- Construction of 2 nurseries in Karateren and Kaukey settlements and establishment of a center for cultivating desert and fodder saplings in the Republic of Karakalpakstan (150-200 ha);
- Supplying water to the premises of Barsakelmes National Nature Reserve to ensure availability of watering sites for wild animals on the territory of Kazakhstan;
- Building the capacities of local specialists in the sphere of land and forest resources.

Rationale: Water-level decline in the Aral Sea – once the 4th largest lake in the world – led to the formation of a large saline desert known today as the Aralkum Desert. The Aralkum's salinized soil is the main sources of dust and salt storms in the CAR. Occupying 5.5 mln ha, the desert annually generates over 100 mln tons of dust and toxic salt dispersing in the atmosphere for thousands of kilometers around. Every hectare of barren sea bed contains anywhere from 100 to 300 tons of salt, saline hollows – up to 500 tons/ha. In addition, the Aralkum is known for frequent strong winds with the average speed of 3-5 m/s blowing tons of poisonous aerosols across the territory of Kyzylorda Region of Kazakhstan, Dashoguz Velayat of the Turkmenistan, Republic of Karakalpakstan, Khorezm, Bukhara and Navoi Velayats of Uzbekistan. The distribution scale of poisonous aerosols is not only regional but also global. The poisonous salts from the Aral Region were registered on the coast of the Antarctic, in Greenland glaciers, Norway forests and many other parts of the planet.

The accelerating desertification pushes the desert landscape – already occupying over ¾ of Central Asia – further and further out. Currently, not more than 10% of the river drain generating in the mountain section of the Aral Sea Basin actually enters the sea. Based on different estimates, due to demographic growth and, thus, the increasing economy and population needs the available water resources will be enough to satisfy the needs of the region only until 2020-2025. Further sharp shrinkage of glaciers and snow cover may lead to 20-30% reduction of the Amu Darya discharge and 15-20% reduction of the Syr Darya discharge leading to the reduction of the current 10% drain reaching the sea and even more severe salt storms.

Total water inflow (left) to the Aral Sea (mln m3) and Aralkum Desert growth dynamics (right):





Source: IFAS Executive Directorate in Kazakhstan

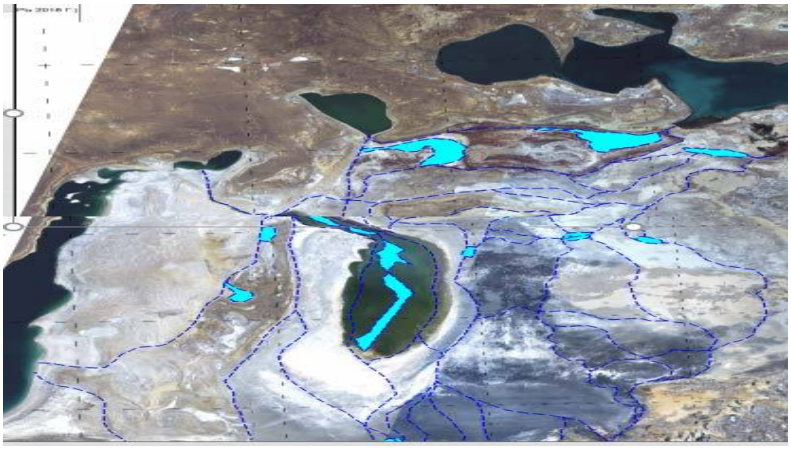
Another dangerous consequence of the Aral Sea catastrophe is the degradation of mountain glaciers in the Himalayas, Pamir, Tien Shan and Altai Mountains feeding the Syr Darya and Amu Darya Rivers. The increasing level of toxic salt and dust sourcing from the dried-up bottom of the Aral Sea accelerates glacier melting. This is a rather threatening process for the arid CAR as here mountain glaciers are the only centuries-old drinking water supply source and the main place of atmospheric moisture accumulation.

To improve the environmental situation, the Aral Sea dried-up bed needs to be reinforced by way of enhancing the vegetation cover as a mitigation measure. Stage-by-stage afforestation simultaneously with the upgrade of the collector and drainage systems to maintain the growth of plants will reduce land degradation as well as slow down salt dispersal across the region. The plantations created in the course of the last 20 years - from local hardy-shrub species – cover the area of 800,000 ha (including 500,000 ha in Uzbekistan, and 300,000 ha in Kazakhstan) which equals 14% of the total area of the dried-up bottom of the sea. Based on the experience, the wind speed has decreased 20.5% under annual plants, and by 34.6% under biennial plants. After 4-5 years, the natural grassy vegetation that emerged under the forest plantations led to the reduction of wind and deflation speed. At present, the termination of salt and sand blowing into the atmosphere within the limits of the aforementioned plantations is observed, as well as wild animal populations started increasing. Planted forests do not require care, and their territory is expanding thanks to natural seed distribution.

According to expert conclusions, a number of plants are adapted for growing in the Aralkum conditions and retaining sand at the same time. Survival of seedlings (Saxaul) after the first year reaches 34-40%, and after the additional second-year planting it reaches 55-65%. In addition to black saxaul, phyto-melioration plants also include prostrate summer cypress, Forage Kochia, and old-world winter fat. Moreover, such commercial phyto-ameliorants as almond, Rennet Smirenko apple, Russian olive, Elaeagnus multiflora and amaranth may also survive and take root in these conditions.

In this regard, the project considers the Aral Sea rehabilitation as a larger-scale and comprehensive plan which includes creation of artificial channels for the main rivers in the catchment, construction of a collector and upgrading CDNs in river deltas, and setting up green belt plantations. Creation of the network of artificial channels for the Syr Darya and Amu Darya within the Large Aral Sea limits will stabilize the ecological situation in the Aral Sea area as well as adjacent territories.

Preliminary layout of the Syr Darya and Amu Darya artificial channels within the Large Aral Sea



Source: IFAS Executive Directorate in Kazakhstan

The project assumes construction/creation of artificial channels for the Syr Darya and Amu Darya with creek canals, lakes and a wetland system consisting of a network of gravity earthen canals (mainly following the ancient courses and canals of the proto Syr Darya) of the extent, width and depth ensuring suitable and close-to-natural aquaculture conditions.

In the nearest future, the canal network and their impact zone will allow creating cane and reed communities on the territory of the dried-up sea, attracting waterfowl and wild hoofed animals, accelerating the formation of soil cover and supporting the stabilization of ground water table, as well as will foster soil de-salination in the aeration zone. In addition, flowing lakes may serve as the only fish spawning sites in the Large (South) Aral Sea. It is planned to supply water to the Green Belt plantations

at the expense of collector and drainage water of the Left-Bank Kazalinsk Irrigation Massif, water surplus of Aksai and Kuandary Lake Systems, as well as potential sanitary releases from the Amu Darya and Syr Darya Rivers via the artificial channel network.

The main gravity collector of the Left-Bank Kazalinsk Irrigation Massif is able of annually putting through 120-150 mln m3 of drainage water (previously purified in polder systems), water surplus of Aksai and Kuandary Lake Systems, and water of the possible sanitary releases from the Amu Darya and Syr Darya to the Large Aral Sea.

The water supplied via the network of artificial channels of the Syr Darya and Amu Darya will ensure watering of the Aral Sea Green Belt plantations, will bring fresh water to the former Barsakelmes Island for wild animals watering and, thus, will draw them back to the nature reserve and their natural habitats.

Thus, the rehabilitation of the drained bottom of the Large (South) Aral Sea will reduce the direct impacts of salt and dust dispersal, as well as protect people, settlements, agricultural land, flora and fauna of the Aral Sea Region. The Aral Sea Green Belt will serve as a kind of "environmental protection screen" and the habitat for wild animals.

The project design phase should include landscape zoning of the dried bottom of the Large Aral Sea as a potential source of salt and dust dispersal, as well as continual monitoring of the processes taking place across the drained territory of the Aral Sea and the Green Belt based on GIS and space imaging.

It is also necessary to establish a center for the adaptation of commercial vegetation species in the Aral Sea area, i.e. build a hothouse complex and 2 green planting nurseries (total area of 8 ha) in the settlements of Karateren and Kaukey.

Besides, it is planned to set up planted forests around the settlements of Koktem, Bugen, Karasholan, Karateren, Tastak, Zhanakurylys, Bozgol, Kaukey and the town of Aralsk in Kazakhstan (planned area of about 200 ha).

The project goals correspond to the following international conventions: UN Convention to Combat Desertification (Paris, 1994), UN Framework Convention on Climate Change (New York, 1992), UN Convention on Biological Diversity (Rio de Janeiro, 1992), Ramsar Convention on Wetlands (Ramsar, 1971), and UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, 1992). The project was included in the 2011-2015 Action Program to assist the Aral Sea Basin countries (ASBP-3) developed by IFAS EC as per the request of the Heads of IFAS founding states of April 28, 2009 in Almaty, but was not executed due to the lack of financial resources.

Project location *(subject to coordination with the interested countries):* The project will be implemented on the territory of the dried-up bottom of the Large Aral Sea and the following settlements:

- Kazakhstan (settlements of Koktem, Bugen, Karasholan, Karateren, Tastak, Zhanakurylys, Bozgol, Kaukey, and the town of Aralsk);
- Uzbekistan (the area of the Akpetkinsky Archipelago (border with Kazakhstan), southern part of the former bottom – Muinaksky and Rybatsky Bays, settlements of Uch-Sai and Kazakhdarya, and the town of Muinak);
- Turkmenistan (Turkmen part of the Aral Sea area -- Dashoguz Velayat).

Contribution to water, energy and food security: The project will mainly contribute to the achievement of two security aspects – water and food – of the CAR which are key for addressing the environmental Aral Sea disaster, including thanks to the following:

- Improved accommodation of the Aral Sea area communities by way of establishing the Aral Sea Green Belt, deployment of phyto-melioration methods for reducing salt and dust dispersal;
- Created new jobs;
- Enhanced operations of the collector and drainage network resulting in decreased land salinity allowing to use it for agricultural (crop cultivation) purposes;
- Improved overall water supply and functioning of the collector and drainage network.

Required cooperation and contribution by neighbouring state(s): In recent years, Central Asian countries have been increasingly pursuing active collaborations and joint response to environmental and social-ecological challenges, joint management and use of TWR, as well as executing joint interventions

to mitigate the aftermath of the Aral Sea crisis. Stakeholder states are making enormous efforts to forge practical targeted solutions.

In this context, the dominating role belongs to IFAS established as per the decision of the Heads of CA states on January 4, 1993 in Tashkent City.

At the Summit of the Heads of IFAS founding states on August 24, 2018 in Turkmenbashi City, the Joint Communique of the Council of the Heads of States was endorsed stipulating for the following:

- Heads of states confirmed the importance of developing the Action Program to assist the Aral Sea Basin countries (ASBP-4) for combining the efforts and capacities of the CAR countries and the international community to address the shared priority water management, environmental and social-economic issues of the Aral Basin;
- The Parties emphasized the need of executing coordinated measures aimed at reducing water and air pollution, land degradation, natural disaster risks, including floods, mudslides, droughts, as well as expanding the area of forest plantations, providing clean drinking water, etc.

In addition, the agreements already signed between and among CA countries on water management, power, environmental protection, ecology, etc. will serve a solid foundation for successful project implementation.

Expected project outcomes and measurable indicators:

- Aral Sea Green Belt (territory of 180-200 thousand ha) established; collector and drainage system (200 km long) in the Amu Darya and Syr Darya deltas upgraded and/or constructed to support the Aral Sea Green Belt; 2 nurseries (4 ha total territory) created; Center for cultivating desert and fodder plant saplings (150-200 ha) established in the Republic of Karakalpakstan; pilot site for cultivating desert plants (50 ha) established; planting material nursery (10 ha) established in Dashoguz Velayat, Turkmenistan;
- An ecological screen to protect settlements, irrigation massifs and pastures from salt and dust dispersal created; decreased desertification rate in the Aral Sea area; improved microclimate in settlements;
- Increased biodiversity and improved conditions for the return of native wild hoofed animal species and deltoid vegetation to the Aral Sea Basin;
- Improved water-salt regimes of irrigated fields, reduced (2-fold) leaching norms for salinized sites; increased yields of agricultural crops and irrigation water efficiency;
- Sand drifting of 8 settlements in Kazakhstan and 3 in Uzbekistan with unfixed sand prevented;
- New jobs (tree vegetation plantations, fruit plantations and newly established pastures) created.

Sustainability indicators:

- Increased biodiversity and improved conditions for the return of native wild hoofed animal species and deltoid vegetation to the Aral Sea Basin;
- A peculiar ecological screen to protect settlements, irrigation massifs and pastures from salt and dust dispersal created; decreased desertification rate in the Aral Sea area;
- Improved water-salt regimes of irrigated fields, reduced (2-fold) leaching norms for salinized sites;
- Increased (1.5-2-fold) yields of agricultural crops and irrigation water efficiency;
- Sand drifting of 8 settlements in Kazakhstan and 3 in Uzbekistan with unfixed sand prevented;
- New jobs (tree vegetation plantations, fruit plantations and newly established pastures) created;
- Improved microclimate in settlements and health among local residents.

PROJECT 2.2 «Integrated disaster risk management in the Aral Sea Basin»

Key project information:

Project initiator: Not yet confirmed.
Involved countries: Subject to confirmation.
Budget: Subject to identification after the project development.
Timeline: Not defined.

Background: Central Asian countries are highly exposed to various natural disasters, including earthquakes, floods, landslides, mudflows, droughts and avalanches. The region's geographic predisposition to natural disasters stems from its continental climate, aridity, and mountainous landscape. This situation is aggravated by impacts of climate change, increasing the frequency, duration and impacts of such events. Particularly water related disasters are common in the region and the transboundary river network is frequently affected by floods, flash floods and mudflows. Over the last two decades, natural disasters affected over 2.5 million people in Central Asia and caused losses exceeding $1.5 bln. Annually natural disasters in the Central Asian countries cause costs equal to 1% to 4% of their GDP.

In regards to disaster risk management, the countries of Central Asia share a number of issues that contribute to their high vulnerability towards natural disaster, including: (i) crumbling infrastructure due to insufficient maintenance; (ii) lack of national fiscal capacities for preventive measures; (iii) disaster risk reduction is not fully institutionalized; (iv) economic activities of the region are vulnerable to adverse natural events, including high dependence on agriculture; and (v) exposure of population to adverse natural hazards is increasing due to population growth, urbanization and settlement of high risk zones. Financial market instruments are not yet fully developed. Disaster prevention measures are funded from the state budget.

In 2016 the countries of Central Asia inaugurated the Regional Center for Emergency Situations and Disaster Risk Reduction that aims to provide a platform for high-level political and technical dialogue and exchange experiences and hold joint capacity building events.

Project objective: Offer an integrated approach to eliminate gaps in research/methodological, legal, institutional, technical and executive frameworks of disaster risk reduction, focusing on emergencies associated with climate change such as droughts, floods, mudflows, and landslides.

Project location: *Subject to negotiation and identification by interested countries.*

Expected results:

- Comprehensive risk assessment of natural disasters and assessment of damage and losses performed;
- A regional database set up for the assessment of glacier water reserves and forecast of the water regime for the rivers in the Aral Sea Basin under the impact of climate change;
- Legislation, laws, by-laws and amendments adopted;
- A regional DRR program designed;
- A single early warning system for all Central Asian countries is put in place;
- Existing climate change and disaster related agencies strengthened or new ones established;
- The technical infrastructure for studying and monitoring the condition of glaciers in the Aral Sea Basin set up;
- Devices for the observation of glacier flows and avalanches, as well as telemetric and space imaging devices and other control and monitoring hardware procured;
- Meetings/discussions with the participation of representatives or governments, the private sectors, financial institutions, socially vulnerable groups, and the general public held.

DETAILED PROPOSAL DOCUMENT FOR PROJECT 2.2

Focus

2. Environmental protection

Stakeholder state(s)

Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan

Project code

Project title (and location)

Project 2.2 Integrated disaster risk management in the Aral Sea Basin

Submitted by

S.R. Ibatullin expert team based on the list of non-executed ASBP-3 projects with the support of EU Central Asia Nexus Dialogue Project. Project operator: Central Asian Regional Environmental Centre (CAREC). Liaison: Ms. Ludmila Kiktenko (lkiktenko@carececo.org)

Project operator(s)

Project 2.2 Lead project operator is currently absent. The project idea is open for initiation. The information below was prepared by the expert team and is subject to review, revision and addition by an interested initiator of the project idea.

Required funding **Source(s) and type(s) of funding**

Project budget TBD at the project preparation phase

Project duration **Designed by**

5 years after the start of funding

Brief description and rationale (including location)

The project focuses on emergencies associated with climate change such as droughts, floods, mudflows, and landslides, and offers an integrated approach to eliminating lacunae in research/methodological, legal, institutional, technical and executive frameworks of disaster risk reduction (DRR).

The project includes the following proposed actions for implementation (however, the actions are subject to review and finalization by the interested initiator and/or designer of the project idea).

Component 1: Research

- Carrying out comprehensive assessment of natural disaster risks, and damage and loss assessment;
- Setting up a regional database for the assessment of glacier water reserves and forecast of the water regime for the rivers in the Aral Sea Basin under climate change.

Component 2: Legal framework and policy

- Develop the legal framework associated with climate change adaptation;
- Develop a regional DRR program;
- Include DRR aspects into sectoral programs (amendment of legislation);
- Draft recommendations on reducing greenhouse gas emissions by means of deploying new methods and technologies for industry and agriculture.

Component 3: Institutional framework

- Develop an early warning system shared by all CA states, including identify responsible executive agencies;
- Build up the institutional capacities on climate change adaptation, in particular, by strengthening existing organizations engaged in climate change agenda as well as by supporting cross-sectoral integration of adaptation measures on the national level;
- Develop a package of measures for mitigating disaster impacts, including recommendations on safe infrastructure placement.

Component 4: Technical framework

- Create the infrastructure (institutional subordination subject to discussion and confirmation) necessary for providing technical means for studying and monitoring the condition of glaciers in the Aral Sea Basin;
- Procure devices for the observation of glacier flows and avalanches, as well as telemetric and space imaging hardware and other control and monitoring equipment.

Component 5: Cross-sectoral interactions

- Involve the private sector in DRR efforts both for increasing the scale of interventions and for protecting private investments (holding meetings with the participation of investment banks' and private sector representatives);
- Mainstream the engagement with local authorities and communities for their actual and not only formal participation in disaster risk prevention and disaster preparedness activities (local awareness-raising meetings);
- Develop measures for public capacity building with the aim of providing people with relevant information and research results, as well as use communication means to disseminate information;
- Expand the range of financial mechanisms for attracting additional resources and spreading the financial burden between the public and commercial sectors.

Rationale: CA countries face various natural threats, including earthquakes, floods, landslides, mudflows, droughts and avalanches. Disaster impacts and the ability to cope with them differ across the stakeholder states. For instance, the risk of earthquakes is considerable in the majority of Central Asian countries, and the average annual losses due to earthquakes are the highest in Tajikistan (4.68% of GDP), followed by Kyrgyzstan (4.03% of GDP), then Uzbekistan (3.19% of GDP), Turkmenistan (3.04% of GDP) and Kazakhstan (1% of GDP). Seismic events can directly cause or accelerate other threats, including landslides, mudslides, ground liquefying, glacial lake formation and flash floods. Moreover, according to the Global Seismic Hazard Assessment Program large cities in CA (Almaty, Bishkek, Ashgabat, Dushanbe and Tashkent) are all located within high and very high seismic risk zones.

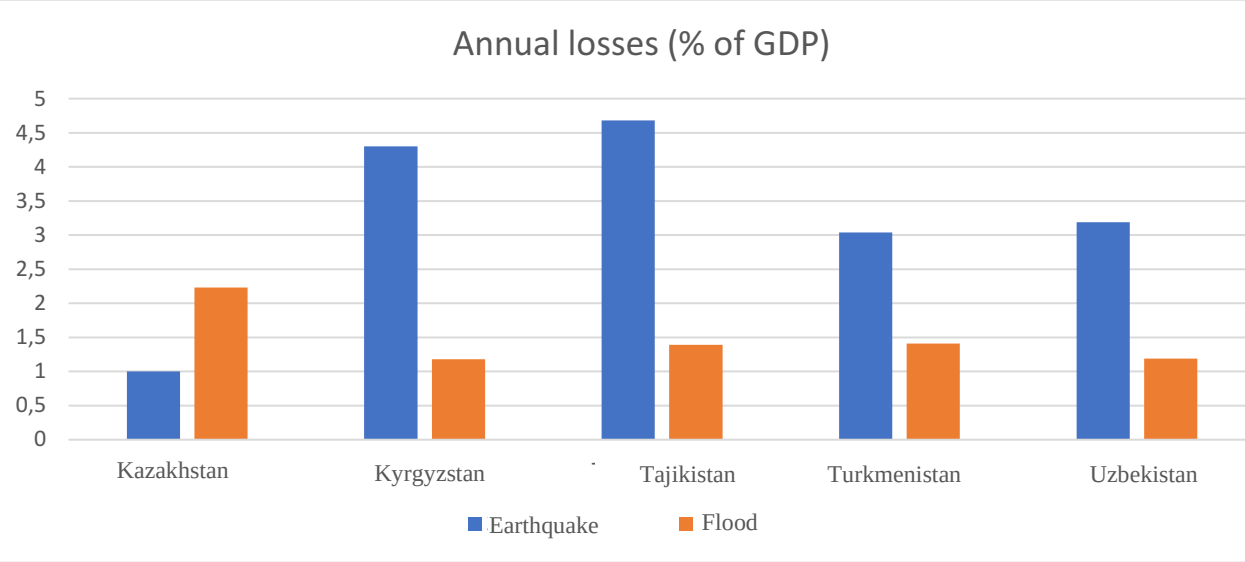
Flood-related events pose yet another significant threat to the CAR with the highest average annual losses suffered by Kazakhstan (2.23% of GDP), Turkmenistan (1.41% of GDP), Tajikistan (1.40% of GDP), Uzbekistan (1.19% of GDP) and Kyrgyzstan (1.18% of GDP). The situation is often aggravated by the transboundary nature of river floods, flash floods and mudflows, as well as the estimated negative influence of climate change on emergence, duration and impacts of such events.

River floods mainly occur in mountainous areas of the region. In the Kyrgyzstan, 182 cities and villages are subject to flood risk. In Tajikistan, 70 river floods take place every year. Sudden floods and mudflows are even more widespread across the CAR. For example, 13% of the territory of Kazakhstan with 26% of its population is under the threat of mudflows. About 1,153 settlements in Kyrgyzstan are likewise subject to flash flood and mudslide risks. In 1990-2008, approximately 850 flash flood and mudslide events were registered in the country. As for Uzbekistan, nearly 12% of its territory (accommodating 16% of the national population) is subject to the risks of sudden floods and mudflows.

Tajikistan and Kyrgyzstan are most threatened by landslides. The former has about 50,000 landslide-prone sites, and the latter – about 5,000 such sites. In Kazakhstan, landslides pose a rather small risk, yet in 2004 48 people died as the result of a landslide series.

In the course of the last two decades, natural disasters affected over 2.5 million people in the CAR and caused losses exceeding $1.5 bln. The EM-DAT Emergency Database demonstrates the historical impact of large disasters on Central Asia during the recent 17 years. Extreme temperatures had the highest impact

affecting over 2 mln people and causing $1 bln damage. In their turn, floods affected more than 600,000 people and led to losses exceeding $500 mln. According to the estimations of the Global Facility for Disaster Reduction and Recovery (GFDRR) and World Bank, considering the probability of natural disasters they may become an even heavier burden – under the corresponding scenarios floods and earthquakes annually affected on average 1.6 and 2% of the regional GDP respectively (see the table below).



Source: World Bank

Project location *(subject to coordination and identification by the interested countries).*

Contribution to water, energy and food security: *(subject to confirmed actions with the potential initiator/designer of project idea).*

Required cooperation and contribution by neighbouring state(s): *(TBD based on confirmed actions with the potential initiator/designer of project idea).*

Expected project outcomes and measurable indicators:

- Comprehensive risk assessment of natural disasters and assessment of damage and losses performed;
- A regional database set up for the assessment of glacier water reserves and forecast of the water regime for the rivers in the Aral Sea Basin under climate change;
- Legislation, laws, by-laws and amendments adopted;
- A regional DRR program designed;
- A single early warning system for all CA countries in place;
- Existing climate change and disaster related agencies strengthened or new ones established;
- The infrastructure necessary for providing technical means for studying and monitoring the condition of glaciers in the Aral Sea Basin created;
- Devices for the observation of glacier flows and avalanches, as well as telemetric and space imaging devices and other control and monitoring hardware procured;
- Meetings/discussions with the participation of representatives of public and private sectors, financial institutions, socially vulnerable groups of population, and the general public held.

Sustainability indicators: *(subject to the confirmed actions with the potential initiator/designer of project idea)*

PROGRAMME DIRECTION 3: SOCIAL AND ECONOMIC DEVELOPMENT

PROJECT 3.1 «Ensuring sustainable water and power supply to rural communities of Central Asian countries»

Key project information:

Project initiator: ICSD SIC in Turkmenistan.
Involved countries: Subject to confirmation.
Budget: Subject to identification during project preparation.
Duration: 5 years of implementation.

Background: Non-conventional renewable energy sources (RES) are becoming increasingly competitive in securing access to small-scale electricity generation, i.e. for household-level electricity and heat supply for off-grid communities. In sparsely populated areas with harsh continental climate and arid conditions, non-conventional and low-potential RES, such as biogas digesters that use livestock by-products, are of interest to complement more widely used technologies such as solar panels.

In addition to RES, collection of accumulated atmospheric moisture for irrigation purposes, using the daily difference of ambient temperature as well as by atmospheric air condensation, is another solution that would significantly contribute to the lives of remote, arid communities.

The proposed project will act as a good impulse for the wider population to implement innovative RES and other technologies. These technologies will bring people and the environment closer together while promoting public employment among remote rural residents. Furthermore, the project provides the necessary prerequisites for water, food and energy security without harming the ecosystem.

Project objective: Improve the socio-economic well-being for remote desert communities in Central Asia. During the first phase, pilot sites will be assessed and selected, and opportunities for introducing non-conventional RES (natural and artificial origin) investigated. Suitability and adaptability of traditional knowledge and practices will be taken under consideration.

During subsequent phases, it is envisaged to carry out repair and rehabilitation works and/or construction of new drinking water supply systems. At the same time, institutional, legal and economic norms will be strengthened to act as the foundation for improving living conditions in rural, remote areas (possible organization of public and/or private informal production associations).

Project location *(subject to negotiation and identification by interested countries)***:** Kazakhstan (South Kazakhstan Region), Uzbekistan (Republic of Karakalpakstan), Turkmenistan (Central and Western Kara Kum).

Expected results:

- Access to drinking water for local communities improved (increased water consumption by volume, coverage, number of people, percentage wise)
- Food security of local communities increased (increased livestock population, increased meat production)
- Electricity supply for local communities improved (increased consumed electric power and coverage of the number of people (families, households)
- Social and demographic trends in remote desert areas improved.

DETAILED PROPOSAL DOCUMENT FOR PROJECT 3.1

Focus

3. Social and economic development

Stakeholder state(s)

Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan

Project code

Project title (and location)

Project 3.1 Ensuring sustainable water and power supply to rural communities of Central Asian countries

Submitted by

S.R. Ibatullin expert team based on the list of non-executed ASBP-3 projects; with the support of EU Central Asia Nexus Dialogue Project. Project operator: Central Asian Regional Environmental Centre (CAREC). Liaison: Ms. Ludmila Kiktenko (lkiktenko@carececo.org)

Project operator(s)

ICSD SIC in Turkmenistan in cooperation and coordination with state agencies (TBD)

Required funding	**Source(s) and type(s) of funding**
Project budget TBD at the project preparation phase	

Project duration	**Designed by**
5 years after the start of funding	Batyr Mamedov, Head of ICSD Secretariat (batyrmamedov@gmail.com)

Brief description and rationale (including location)

The project's goal is to improve the social-economic human living environment in remote desert communities in Central Asian (CA) countries. During the first phase, it is planned to assess and select pilot sites, as well as investigate the opportunities for introducing non-conventional RES (renewable energy sources) of natural and artificial origin with the account of historically established and traditional practices.

Within the nexus context, improving social-economic human living environment in remote desert areas is understood as follows:

1. Improved drinking water supply to households by means of:
   - increasing the volume of available drinking water;
   - increasing water-supply coverage of households (number of people).
2. Improved food supply to households by means of:
   - developing homestead crop production (irrigation of household land plots) for providing households with crop products and cattle fodder;
   - setting up watering sites adjacent to pasturable areas to promote grassland livestock farming within ecosystem capacity limits.
3. Providing households in remote areas with sufficient power supply by means of:

- using in-situ RES installations;
- optimizing power supply infrastructure.

Non-conventional RES is becoming increasingly competitive in the following sectors of "small-scale" power: local electricity and heat supply; integrated power supply of independent (off-grid) small consumers. In sparsely populated areas with sharply continental arid climate, non-conventional and low-potential (as additional to the already available) RES of natural and artificial origin – biomass as a by-product of stall livestock production – are of interest. Accumulation of moisture for irrigation purposes can be done by using the daily difference of ambient temperature as well as by atmospheric air condensation.

The project can give a good impulse for the implementation of modern RE (renewable energy) technologies and innovations. They will ensure the linkage between the land and the people, promote public employment among remote rural residents, as well as forge the necessary prerequisites for water, food and energy security without damaging ecosystems.

To achieve the project goal, the following interventions and their elements are proposed:

Component I. Living conditions of local populations. Drinking water supply in hard-to-reach areas.

<u>During Phase 1:</u>

1.1. Selection of a typical territory (pilot site) with 2-3 remote small settlements and adjacent natural pastures (preferably, close to regular routes of main collectors);
1.2. Acquaintance with traditional and historically established methods of receiving water and farming (grassland livestock production, household plant cultivation);
1.3. Assessment (inventory) of the current situation. Identification of issues which may potentially be addressed by applying innovation methods of water and electric power supply to autonomous consumers;
1.4. Feasibility study of projects for the rehabilitation of available infrastructure and construction of water supply systems.

<u>During subsequent phases:</u>

1.5 Carrying out repair and rehabilitation works and/or construction of new drinking water supply systems;
1.6 Improvement of institutional, legal and economic norms as the foundation of human living environment in rural remote areas (possible organization of public and/or private informal production associations).

Component II. Water and energy for distant-pasture livestock breeding and household irrigation.

<u>During Phase 1:</u>

1.1 Selection of pilot sites;
1.2 Assessment (inventory) of the current situation;
1.3 Assessment of opportunities to deploy wind, solar, and hydro-power installations at households and cattle watering sites;
1.4 Comparative analysis of using historically established and innovative water- and power-efficient technologies;
1.5 Investigating the opportunities for collector water re-use for household needs, pasture-based watering sites and household plot irrigation;
1.6 Selection of suitable technologies for receiving water and RE. Development of projects on water and power supply, including based on wind, helio and biogas installations.

<u>During subsequent phases:</u>

1.7 Procurement of equipment to analyze the quality of collector water and building wind, helio and biogas power-generating installations;
1.8 Development of techniques for using RES in households and their testing;
1.9 Practical deployment of RE technologies at pilot sites and personnel training.

Component III. Engaging local population in the creation and development of agro-industrial complex.

The main objective is to forge institutional prerequisites for the formation of sustainable and acceptable living conditions in remote desert areas and guaranteed level of crop productivity (household land plots) which will ensure the social foundation for their further economic progress.

3.1 Production of cattle forage based on climate-resilient and salt-resistant crops and collector water irrigation technology;
3.2 Setting up the stall cattle maintenance scheme – creation of farms combined with forage production;
3.3 Introduction of modern pasture rotation schemes for seasonal grazing with the aim of preserving pasturable ecosystems;
3.4 Organizing cattle watering sites at pastures based on water-efficient technologies;
3.5 Drafting recommendations on using fodder resources of natural pastures (not exceeding pasture calculated capacity).

Component IV. Public information dissemination and awareness-raising.

During Phase 1:

4.1. Collection, study and analysis of technological (historically established) materials used for household purposes in remote desert areas;
4.2. Integration of modern and historical traditional knowledge (methods);

During subsequent phases:

4.3. Development of information materials for local communities and optional training programs for school students;
4.4. Carrying out information campaigns among local populations, and optional trainings at schools.

Component V. State mechanisms for stimulating land use among rural communities within admissible ecosystem economic capacity limits.

- The positive experience of EU countries shows that among the diverse factors influencing the level and prospects of RES development, various state economic incentive systems available in these countries play the crucial role. The level of development of state infrastructure in remote areas is another important factor;
- In our opinion, it would be useful to consider the standard and legal opportunities for creating conditions for public access and use of natural ecosystems within the limits of their economic capacities with the account of mentality and historically established economic traditions;
- In the course of executing the previous components of the proposed project, based on the analysis of issues and ways of resolving them, there may be a high possibility of enhancing existing national legislations (targeting regional legal environmental standards) based on the legal practices of other CA countries.

The planned mechanism (sequence) of project implementation:

1st stage (preparation):

- Identification of pilot sites (typical for the region), acquaintance (meetings with local residents);
- Analysis of the current situation, assessment of potential and opportunities, development of the project work plan.

2nd and subsequent stages:

- Specification of works, equipment and materials, formation of the project team, project implementation.

Project location *(TBD by stakeholder state(s)***):** Kazakhstan (South Kazakhstan Region), Uzbekistan (Karakalpakstan), Turkmenistan (Central and Western Kara Kum).

Required cooperation and contribution by neighbouring state(s): In many respects, the principles of economic management in remote rural desert areas in Turkmenistan, Kazakhstan and Uzbekistan are similar. The project assumes the exchange of knowledge and collaboration as to RES practices.

Contribution to water, energy, food and environmental security: The project can give a good impulse for the implementation of modern RE technologies and innovations. The increased share of RE within the power sector will allow making electricity supply to rural areas more stable and safer.

Strengthening the linkages between the land and the people, ensuring public employment among the residents of remote rural areas and environmental education create necessary prerequisites for water, food and energy security without prejudicing ecosystems.

The project can also render assistance as to development, improvement and updating of national programs, as well as development of target plans and strategies and devising state budgets.

Expected project outcomes:

- Increased share of communities with improved water and power supply in project areas;
- Increased interest among local populations on using off-grid RES installations in households;
- Adjustable economic capacity of utilized ecosystems – advancement of livestock production without damaging pasturable ecosystems;
- Created institutional conditions for the development of public (private) agricultural production (agro-industrial complex) in remote rural areas.

Sustainability indicators: In terms of economic and environmental wellbeing, sustainable development can be adequately evaluated not so much by cost but by quantitative natural indices of social, economic, environmental and institutional dimensions. For instance, while assessing the productivity of natural pastures the indicators of gross and grazed wild-growing fodder plants as well as pasture rated capacity (admissible number of livestock per unit area) are applied.

In the course of drafting resilience (sustainability) indicators it is possible to use the recommendations of the UN Commission on Sustainable Development, Scientific Committee on Problems of the Environment (SCOPE), as well as the OECD's set of indicators.

The following measured parameters can be used as key indicators:

- Improved access to drinking water for local communities (increased water consumption by volume, coverage, number of people, percentage wise);
- Improved food supply for local communities (increased livestock population, increased meat production, in kilograms);
- Improved electricity supply for local communities (increased consumed electric power and coverage of the number of people (families, households);
- Better social and demographic trends in remote desert areas.

PROJECT 3.2 «Integrated development of eco-and agro-tourism with elements of ethno-tourism in protected natural areas of the Aral Sea basin»

Key project information:

Project initiator: Executive Board of the International Fund for Aral Saving in the Republic of Kazakhstan.
Involved countries: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan - subject to confirmation.
Budget: To be defined during the project preparation.
Timeline: 2020-2023.

Background: The depletion of the Aral Sea has disastrous consequences on the environment, as well as on social and economic developments in the region. Nevertheless, it also presents a potential for eco-tourism, similar to the Dead Sea, active volcano sites, deserts and other natural phenomena that attract people for educational, scientific, medical and recreational reasons. Currently, a number of private travel agencies offer tours to showcase the Aral Sea catastrophe which points to the demand in such visits. In the area of the Aral Sea Basin there are a number of ecosites and geoparks with the potential to be included in popular touristic routes. However, the basic infrastructure is missing.

Development of the eco-tourism in the Aral Sea Basin would improve the well-being of local populations, create a market for locally produced goods and stimulate growth of SMEs. In addition, eco-tourism in the region would also contribute to other the mitigation measures, like forestation efforts. This proposed project will be key to involve the private sector, including through PPP, and various interested communities (local, volunteers, academic). With that, it has commercial potential. The financial scheme with a forecast on the revenue to be generated and repayment capacity is still under development.

Project objective: Mobilization of the economic potential and preservation of the ecosystems of the Aral Sea Basin through the development of eco-touristic corridors and the creation of a single regional services for tourists through the following planned activities:

- Development of eco-tourism routes in protected natural areas of the Aral Sea Basin;
- Development of tourist and supporting infrastructure.

Project location *(subject to negotiation and identification by interested countries)***:**

Kazakhstan – national parks «Barsakelmes», Usturt and Karatay, Sairam-Ugam national park, Ergis – Turgai state nature reserve. Kyrgystan – "Besh - Aral" nursery, state nature park "Bash - Tash" and "Chon-Kemin". Wildlife sanctuary "Surmatash", "Chychkan" and "Malaya AK-Su".

Tajikistan – conservancy area "Tigrovaya Balka" and "" Dashti Dzhum", Tadjik National Park, Natural Park "Sari - Khosor", Wildlife sanctuary – "Karatag", "Almosi", "Kusabli Sai" and "Iskanderkul".

Turkmenistan – "Kaplankyrs State National Park" (Dashogyz Velayat), Amydarya state national park.

Uzbekistan – Wildlife sanctuary "Sudache", "Dengizkul", "Arnasay". Natural Parks: "Chatkal - Biosphere", "Surkhan" National Park "Ugat - Chatkal".

Expected results:

- Relevant touristic routes across the Aral Sea Basin are developed;
- Touristic infrastructure is in place;
- Respective touristic networks are established,
- Socio-economic well-being of the population improved.

DETAILED PROPOSAL DOCUMENT FOR PROJECT 3.2

Focus
3. Social and economic development
Stakeholder state(s)
Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan
Project code
Project title (and location)
Project 3.2 Integrated development of eco- and agro-tourism with ethno-tourism elements in especially protected nature areas (EPNAs) in the Aral Sea Basin
Submitted by
IFAS Executive Directorate in Kazakhstan and S.R. Ibatullin expert team based on the list of non-executed ASBP-3 projects; with the support of EU Central Asia Nexus Dialogue Project. Project operator: Central Asian Regional Environmental Centre (CAREC). Liaison: Ms. Ludmila Kiktenko (lkiktenko@carececo.org)
Project operator(s)
IFAS Executive Directorate in Kazakhstan

Required funding	**Source(s) and type(s) of funding**
Project budget TBD at the project preparation phase	Budget means (under tourism development programs); loan (IFIs) + grants (World Bank, Asian Development Bank, IFCA)
Project duration	**Designed by**
3 years after the start of funding	Bolat Bekniyaz, Director of the IFAS Executive Directorate in Kazakhstan (bbolat@mail.ru)

Brief description and rationale (including location)

(The description is based on Kazakhstan's example; additional descriptions by stakeholder states are required)

The project targets at mobilization of economic capacity and preservation of ecosystems of the Aral Sea Basin countries by way of unlocking their tourist potential, creating tourist corridors and forming a uniform package of regional services (eco- and agro-tourism) with ethno-tourism elements in the catchment.

Proposed project actions are grouped under main directions: development of tourist routes going through the network of EPNAs of the Aral Sea Basin, creation of support infrastructure, involvement of business and local population. The project will also include the development of the corresponding financing and loan repayment schemes.

The following tasks are proposed for execution to achieve the project goals:

- Creation of a geo-park on the premises of Barsakelmes Nature Reserve (Kazakhstan) – the first geo-park in Kazakhstan (proposed title – Aral Sea Geo-Park). The proposed territory complies

with the majority of UNESCO criteria, including presence of historical monuments, geological heritage, paleontological features, cooperation with international organizations, presence of eco-tourism routes and NGOs for cooperation, etc.;
- Creation of the Aral center for wild animals' adaptation to climate change - restoration of rare wild hoofed animal populations (included in the Red List of Kazakhstan) by way of breeding in semi-free conditions with subsequent reintroduction into the wild nature;
- Creation of the Aral Sea Scientific and Tourist Center with the necessary material and technical resources to coordinate research efforts in the Kazakhstan's part of the Aral Sea Basin as well as infrastructure to promote scientific and educational tourism, museum and expedition framework;
- Construction of health complexes based on hydro-thermal wells in the settlements of Kulandy, Akesp, Akbasty, Zhanakurlys of Aral District of Kyzylorda Region.

Rationale: Although the Aral Sea crisis has become the reason for tremendous negative environmental, social and economic impacts, the area can still become an eco-tourism site. As seen from the international experience (the Dead Sea, areas of active volcanoes, deserts and other natural phenomena) attract enthusiasts pursuing educational, scientific, medical and recreational purposes. Already today, private travel agencies offer tours to demonstrate the Aral Sea in its current state, which evidences the presence of interest. In addition, and, perhaps, most importantly the Aral Sea territory is rich with original cultural and ethnographic heritage, historical monuments, archaeological and geological resources which must be preserved for future generations. The control over research and use of natural resources exercised in the area at the moment is not fully effective. Paleo-geological outcrops with prehistoric animal remains and unique hydro-thermal sources are subject to uncontrolled exploration and outflow beyond the national border. Artifacts from archeological sites (X-XII centuries) found on the drained bottom of the Aral Sea (settlement of Kerderi) are subject to plunder and destruction. The prospering unauthorized "black" tourism causes irreparable losses to recreational resources.

Within the Aral Sea Basin, there exist a number of ecosystems and geological sites which can potentially turn into tourist routes. However, the absence of tourist infrastructure and scientific and technical infrastructure, including expedition, still makes it impossible. Development of ecotourism in the Aral Sea Basin will improve the social welfare of local population, promote local production and stimulate increased incomes among local residents. Besides its information-dissemination and awareness-raising aspects, eco-tourism will contribute to supporting the mitigation measures, for example, afforestation. The proposed project likewise has a high potential for attracting the private sector, including via PPPs, and various interested communities (local, volunteer, academic). Although deemed a development project, it also has significant commercial potential. To promote regional tourism, it is necessary to train the corresponding specialists, i.e. launch tourism training programs at existing colleges in regional centers.

Project location *(subject to coordination and identification with the countries).* Within the framework of the project, it is proposed to set up tourist routes within the following EPNAs:

- Kazakhstan (Barsakelmes, Ustyurt and Karatau State National Nature Reserves (SNNR), Sairam-Ugam National Park, Yergis-Turgai State Nature Wildlife Reserve);
- Kyrgyzstan (Besh Aral Reserve, Besh-Tash and Chon-Kemin National Nature Parks, Surmatash and Chychkan Wildlife Reserves, Malaya Aksu National Park);
- Tajikistan (Tigrovaya Balka and Dashti Dzhum Nature Reserves, Tajik National Park, Sari-Khosor Nature Park; Karatag, Almosi, Kusavli Sai, Iskanderkul Wildlife Reserves);
- Turkmenistan (Kaplankyr State National Nature Reserve (Dashoguz Velayat), Amu Darya SNNR);
- Uzbekistan (Sudochye, Dengizkul, Arnasai Wildlife Reserves, Chatkal Biosphere and Surkhan Nature Reserve, Ugat-Chatkal National Park).

Contribution to water, energy and food security:

- Creation of new tourism-related jobs will facilitate distraction of local residents from poaching (unauthorized fishing, felling of saxaul, shooting of endangered wild animal species, etc.) and excessive use of water resources for cucurbit cultivation;
- An opportunity to create visit-centers and cordons in remote areas based on alternative energy and sound utilization of self-flowing geothermal springs will ensure their rational use;
- Launching a greenhouse facility on the premises of the Aral Sea Science and Tourist Center for adapting commercial vegetation species will promote distribution of fruit- and nut-bearing trees

in the Aral Sea Region. This will lead to water saving and producing valuable and competitive foods.

Required cooperation and contribution by neighbouring state(s): CA neighbouring countries can implement a uniform Central Asian Regional Tourism Program/System mutually supplementing each other and, thus, enriching corresponding domestic tourist routes. A Central Asian Tour can cover the whole set of climatic zones as well as an extensive landscape and historical diversity. It will also enhance the financial sustainability of SNNRs in stakeholder states.

Expected project outcomes and measurable indicators (including in relation to stable access to water, energy and food):

1. Creation/upgrading of tourism transport and logistics infrastructure, namely:
   - construction and/or renovation of auto- and railroads, local airports and development of small aircraft, suspension and pedestrian bridges in SNNRs;
   - introduction of regular transport routes;
2. Infrastructure development in guest locations:
   - setting up eco-tracks and routes, including signs, sign and information boards, extreme tourism infrastructure (rock-climbing, sport fishing and hunting);
   - construction/upgrading/renovation of hotels, cafes and other buildings;
   - creation/upgrading of water supply and disposal systems, power supply systems;
   - installation of wind, solar and mini-hydroelectric power station, thermal pumps;
   - setting up a satellite communications system, including provision of accessories;
   - construction of nurseries, artificial plantations, incubation shops and ponds for breeding and cultivating rare and threatened species of wild plants, birds, animals and fish;
3. Development of a micro-credit or preferential loan system for small and medium business, as well as utilizing PPP tools will be supported by the corresponding business training for local communities and entrepreneurs (all stages of the service chain).
4. Strengthening institutions and capacities: creation of a partner network, development of a comprehensive work plan, setting up eco-tracks and routes, launching a website with an online payment system, mobile applications, printed materials, charts, schemes, etc.

Sustainability indicators: The most important sustainability indicator will be the engagement of local populations and utilizing their capacities for promoting tourism. Under the condition of available infrastructure and local specialists, the tourism industry in the CAR will progress successfully and sustainably.

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