Funded by the European Union

nexus

carec

CAWEP
CENTRAL ASIA WATER & ENERGY PROGRAM

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs, Education and Research EAER
State Secretariat for Economic Affairs SECO

UKaid
from the British people

FACTSHEET ON NEXUS DEMONSTRATION PROJECTS

INFORMATION SHEET ON THE NEXUS DEMONSTRATION PROJECTS

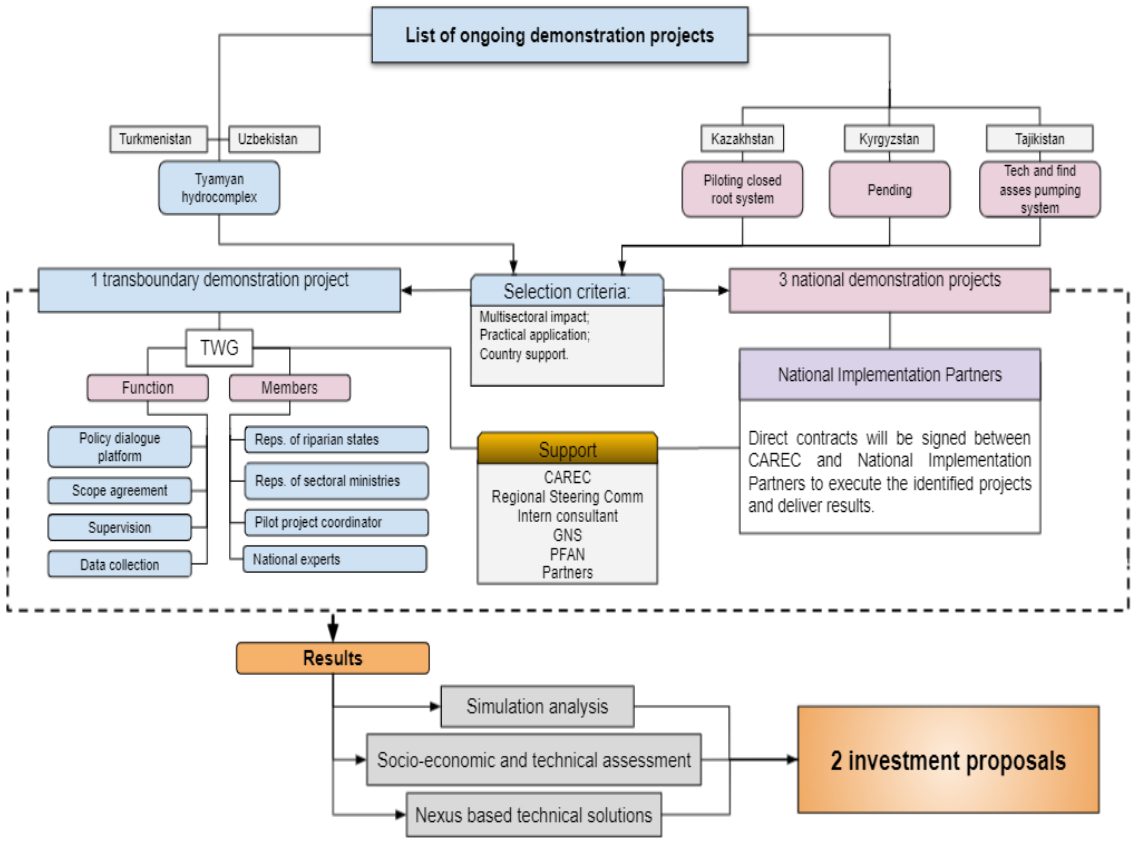
The Central Asia Nexus Dialogue Project: Fostering Water, Energy and Food Security Nexus Dialogue and Multi-Sector Investment[1] (Phase II) (the Project) aims to institutionalize the water, energy and food (WEF) Nexus approach in national and regional governance structures, as well as in investment decision making. The Project is funded by the European Union (EU) and operated by the Regional Environmental Centre for Central Asia (CAREC) in partnership with government authorities and interested development partners. The Project's aim shall be achieved via interventions under three main pillars: i) regional intersectoral dialogues; ii) capacity building; and iii) implementation of 4 (four) demonstration projects in Central Asian (CA) countries.

The demo projects manifest the most important element of the Project and serve the platform for showcasing the Nexus approach in practice through the application of analytical products and finding technical solutions ensuring the WEF security. Based on the undertaken efforts and formulated solutions applicable to the demo projects, the investment proposals will be elaborated as the main Project's output and offered for public, private and/or IFI financing (Fig. 1.).

Remarkably, the four selected demo projects address a variety of WEF security challenges such as afforestation of the Aral Sea's dried bottom, combatting intensive siltation (sedimentation) of reservoirs and ensuring energy efficiency of pumping stations, all equally important for the sustainable development of CA states (CAS). Although the demo projects are carried out at the national level, the entire Central Asian Region (CAR) will benefit from their final deliverables through knowledge and technical solutions' exchange and/or replication.

This document provides the brief and expanded descriptions of the tasks and implementation status of each of the four demo projects to keep the beneficiaries and stakeholders updated.

Figure 1. *Implementation modalities and outputs of demo projects.*



[1] For more information about the Project, please, see here.

Transboundary demo project between Uzbekistan and Turkmenistan "Tuyamuyun Hydroelectric Complex"

Key information:
Requested by: Ministry of Water Resources of the Republic of Uzbekistan and State Committee of Water Resources of Turkmenistan;
Implemented by: national and international experts;
Implementation period: Jan 2020 – Apr 2023;
Location: Lebap Veloyat, Turkmenistan;
Co-financed by: World Bank, CAWEP Trust Fund, Global Nexus Secretariat, "Central Asian Institute for Ecological Research" (Kazakhstan).

Background: The Tuyamuyun Hydroelectric Complex (THC) is a transboundary water-energy facility located along the Amudarya River at the border between Uzbekistan and Turkmenistan. The facility is located in Turkmenistan, but belongs to Uzbekistan. The land is leased by Turkmenistan based on the corresponding interstate legal agreements. As a strategic facility, THC regulates the Amudarya's lower stream and secures water resource allocation between the riparian countries. As such, it supplies i) water to 425,000 ha of irrigated land in Turkmenistan and 779,300 ha in Uzbekistan; ii) electricity to Uzbekistan; and iii) drinking water to Khorezm Region and Republic of Karakalpakstan (Uzbekistan).

The growing sedimentation of the THC's Ruslovoye reservoir – that has already reached 70% – disables water passage to the other three reservoirs of the THC for irrigation and drinking needs. By 2040, the Ruslovoye reservoir is forecasted to get fully silted as per the business-as-usual (BAU) scenario harnessing the WEF security for around 5 million people in total in Uzbekistan and Turkmenistan. The state authorities of both riparian countries have been joining efforts to pinpoint and implement cost-effective technical and investment solutions to tackle the sedimentation at the Ruslovoye reservoir.

Task 1: To conduct social and economic assessment of the WEF dependence on the Ruslovoye reservoir;
Task 2: To estimate the current sedimentation volume, forecast the sedimentation growth during the next 50 years and design technical solutions to clean the sediment;
Task 3. To conduct climate vulnerability and risk assessment of THC and supported territories;
Task 4: To develop technical recommendations on cost-effective sedimentation cleaning supported by profit and loss analysis by the international consultants "Deltares" and "Altus Impact" respectively;
Task 5: To determine the sediment's recycling potential by conducting chemical analysis and lab experiments on producing the pilot products out of the sediment;
Task 6: To develop the investment proposal on cleaning and recycling the sediment.

Achieved results:

- Final reports finalized (Tasks 1., 2. and 3.);
- The draft of the final report produced by the international consultant "Deltares" (Task 4.);
- The chemical composition of the sediment from the Ruslovoye reservoir concluded (Task 5);
- The lab experiments on producing the burnt brick, foam block and facing tile out of sediment of the Ruslovoye reservoir successfully conducted by a Kazakhstan laboratory. The conclusion of the State Sanitary and Epidemiological Surveillance of the Republic of Kazakhstan was issued with the assignment of "first class" to the pilot foam block, i.e. suitable for residential construction (Task 5.);
- A draft profit and loss analysis produced for the treatment and recycling of sediment from the Ruslovoye reservoir by the international consultant "Altus Impact" (Task 4.).

Next steps:

- Development of the draft investment proposal on cleaning and recycling the sediment from the Ruslovoye reservoir (Task 6);
- Presentation of the developed investment proposal to the potential investors (Task 6).

National demo project in Kazakhstan "Afforestation of the dried bottom of the Aral Sea: piloting a closed root system"

Key information:

Requested by: Executive Directorate of the International Fund for Saving the Aral Sea (EDIFAS) in Kazakhstan;
Implemented by: EDIFAS in Kazakhstan;
Implementation period: Nov 2020 – Apr 2023;
Implementation location: Kyzylorda Region, Kazakhstan, premises of the Eco-Aral National Touristic Centre (70 km from Aralsk Town);
Co-financed: EDIFAS in Kazakhstan.

Background: The area of the Aralkum Desert has reached approx. 6 mln ha, out of which 2.8 mln ha are located in Kazakhstan (Kyzylorda Region) and 3.2 mln ha in Uzbekistan (Republic of Karakalpakstan). Both countries have been actively afforesting the dried bottom of the Aral Sea as part of government programs and donor-supported interventions to curb massive dust transfer across Central Asia (CA) and beyond, negatively affecting the environment, public health, and economy in the region and beyond for the last decades.

Today, the Aralkum's afforested area has reaches 200,000 ha in Kazakhstan and 1.5 mln ha in Uzbekistan, including the self-reproducing plantations. The augmenting water mineralization and soil salinity within the dried seabed area, as well as the anomalous air temperature increase all prevent accelerated greening. According to UNDP statistics, the average survival rate of forest plantations in the target zone equals 0% for 25.4 thous. ha, 0-50% for 15.9 thous. ha, and 50%+ for 10.1 thous. ha.

In addition, climate change has been significantly affecting the Aral Sea Region. Based on the World Bank's data, a 10 to 30% drop in the discharge of the Syrdarya and Amudarya Rivers will facilitate the expansion of the Aralkum Desert area. Innovative methods shall be considered to speed up the afforestation and increase plant survival rate. One of these methods could be the cultivation of tree seedlings using the closed root system method, allowing to boost the survival rate of saxaul species up to 2-3 times compared to conventional planting techniques.

Aim: Pilot the closed root system method of growing saxaul seedlings to increase the survival rate up to 70% by executing the following tasks:

Task 1: To construct 2 greenhouses and 1 shade-house with the total area of 140 m^2 and plant 2,000 black saxaul seeds using the closed root system method;
Task 2: To replant seedling to the dried bottom of the Aral Sea in 1 year;
Task 3: To carry out estimations on the volume of the water and electricity resources needed for growing seeds of saxaul in a closed root system;
Task 4: To monitor the growth and survival rate of saxaul seedlings replanted on the dried bottom of the Aral Sea comparing to other methods (mechanized planting and with Aquasorb hydrogel solution).

Achieved results:

- 2 saxaul greenhouses and 1 shade-house built, and seeds of saxauls planted through closed root system;

- Only 20% of the planted seeds survived due to the hot summer and high-water mineralization in Kamystybas Lake in 2021;
- In the spring of 2022, 200 seedlings of saxaul were replanted from the greenhouses and shade-house to the fenced area of 5 ha in the dried bottom of the Aral Sea, where saxaul seedlings were planted in a several different ways as part of the USAID-funded project "Regional Activity of the Environmental Restoration of the Aral Sea" implemented by ED IFAS in Kazakhstan;
- As a result, the planted saxaul seedlings in the closed root system demonstrated the best survival rate comparing to other methods (over 50 %). It was observed that saxauls grown in the closed root system can wake up after some time and begin to grow from the root;
- Given the positive results, one of the national saxaul nursery committed to introduce the closed root system in a massive saxaul replanting.

Next steps:

- Watering the replanted saxaul seedlings in the dried bottom of Aral Sea and monitoring their survival rate (Task 4.).
- Carrying out estimations on the volume of the water and electricity resources needed for growing seeds of saxaul seedlings in a closed root system (Task 3.).

National demo project in the Kyrgyz Republic "Institutionalization of the WEF Nexus approach in the agricultural sector"

Key information:

Requested by: Ministry of Agriculture of the Kyrgyz Republic (MoA of the KR);
Implemented by: national experts;
Implementation period: Jan – Dec 2022;
Implementation location: national level.

Background: The agricultural sector is key for the overall economic development of the Kyrgyz Republic. Yet, the industry has been developing slower than the national economy at large, and remains uncompetitive. In 2019, agriculture contributed 0.3% to the GDP, whereas the overall economic growth reached 4.5%. Meanwhile, 66% of the country's population reside in rural areas. There are several challenges holding back the sector's further growth.

Kyrgyzstan's agriculture is dominated by small-scale peasant farms (96% market share in 2020). With the limited availability of irrigated acreage, the growing number of small farming households makes the industry inefficient and unappealing for foreign investments. With the slow deployment of technical innovations and high (local) commercial bank interest rates (approx. 16%), the sector is not able to explore its full potential and is hardly able to satisfy the domestic needs. In 2019, the country's agricultural imports prevailed 1.3 times over exports. Another hurdle is the decreasing land productivity that has reached 36% during the last 5 years; meanwhile, the population growth in same period has amounted to 11%. The exacerbating climate change and degrading irrigated farmland also threaten national food security. To advance the agricultural sector, the MoA of the KR initiated the enhancement of the 2021-2025 Agriculture Development Strategy of the KR (Agro Strategy) and requested the Project to provide targeted technical assistance.

Aim: Support the MoA in upgrading/drafting the Agro Strategy with the introduction of the Nexus approach through executing the following tasks:

Task 1: To evaluate the performance of the active Agro Strategy;
Task 2: To enhance the Agro Strategy considering the current macro- and microeconomic and social factors;
Task 3: To introduce digitalization in the agricultural sector.

Achieved results:

- The Project had supported the review of and enhancements to the Agro Strategy in early 2021. However, with the nation-wide unrest and subsequent government reshuffle, the newly appointed MoA's management transformed the revised Agro Strategy into the 2021-2031 Concept of Agrarian Development of the Kyrgyz Republic as per the recommendations of the national Cabinet of Ministers. The draft Concept was later approved by the Government of the KR. Given the vast replacement of the technical staff, the Nexus approach is not fully reflected in the Concept as opposed to the earlier Agro Strategy revised with the Project's assistance (Tasks 1., 2. and 3.);
- The assessment of the Agro Strategy during the review pointed to intersectoral discoordination as a principal cause of the agricultural sector's inefficiency. The approved Concept also highlights the need for a single state body to coordinate, monitor and analyze the efforts within the framework of all state programs and by all partners (Tasks 1., 2. and 3.).

Next steps: The Project team will monitor the Concept's implementation and may consider assisting with designing technical rules and/or other frameworks to support its full-fledged execution.

National demo project in Tajikistan "Improving the electricity consumption control and monitoring system at pumping stations and upgrading a large pumping station in Sughd Region in the Republic of Tajikistan based on energy-efficient technologies"

Key information:

Requested by: Agency for Land Reclamation and Irrigation (ALRI) under the Government of the Republic of Tajikistan (RT);
Implemented by: national experts;
Implementation period: July 2021 – April 2023;
Implementation location: Sughd Region of Tajikistan;
Co-financed by: CAWEP Trust Fund, Grundfos, Dutch pumping equipment manufacturer.

Background: Over 90% of Tajikistan's territory is occupied by mountains, which requires mechanically lifting water from rivers and canals to irrigate farmland. The pumping stations across the country pump and lift water to 50%+ of domestic irrigated land generating 80% of the country's agricultural production, and thus secure the functionality of its agricultural sector per se. The industry, in turn, provides jobs to 70% of the population and contributes 20% to the country's GDP.

Agriculture is likewise a major consumer of water and energy in Tajikistan, using 90% of available water resources and 10% of the total electricity supply (for powering pumping stations). On top of that, the pumping stations were mainly built 40-50 years ago, and thus are highly energy intensive. The corresponding investment costs are hardly collected due to low end user solvency. Hence, the Government of the RT has been subsidizing electricity costs during vegetation season.

The escalating use of old and energy-intensive pumping stations threatens the national food security. According to statistics, the annual population growth in Tajikistan is 2.2%. With such a demographic trend, it is expected to reach 11.2 mln by 2030. To respond to the challenge from the technical side, ALRI is considering introducing power metering and energy-efficient technologies at a pumping station in Sughd Region to ensure proper electricity consumption for subsequent nation-wide replication.

Aim: Improve energy-efficiency of pumping stations in Sughd Region of Tajikistan by executing the following tasks:

Task 1: To conduct the analytical review of pumping stations' operation modalities;
Task 2: To execute technical examination of metering at 173 pumping stations, and design the Concept of digitalizing electricity consumption metering at pumping stations;
Task 3: To carry out energy and water audits at 2 pumping stations;
Task 4: To draft the investment proposals for digitalizing electricity consumption metering at pumping stations and upgrading the Golodnostep Pumping Station based on energy-efficient technologies.

Achieved results:

- Analytical review on pumping stations' operation modalities completed;
- 173 pumping stations fully examined, and the Concept of digitalizing electricity consumption metering at pumping stations finalized;
- Energy and water audits conducted and the energy audit reports developed by Grundfos;
- 2 investment proposals for digitalizing electricity consumption and monitoring metering at pumping stations and upgrading the Golodnostep Pumping Station drafted.

Next steps:

- Presentation of the developed 2 investment proposals to the potential investors.