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MINISTRY OF AGRICULTURE, FOOD PROCESSING AND LAND IMPROVEMENT OF THE KYRGYZ REPUBLIC

DEPARTMENT OF WATER RESOURCES AND LAND IMPROVEMENT

AGRICULTURAL PRODUCTIVITY AND NUTRITION IMPROVEMENT PROJECT

ENVIRONMETAL MANAGEMENT PLAN
For WUA «Toktomush» Jumgal rayon, Naryn oblast

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Abbreviations and acronyms

AAS	Agricultural Advisory Services
AISP	Agricultural Investment and Services Project
AHE	Ameliorative Hydrogeological Expedition of DWRLI
APNIP	Agricultural Productivity and Nutrition Improvement Project
DSES	Department of Sanitary and Epidemiological Supervision
DWRLI	Department of Water Resources and Land Improvement
E	Environment
EA	Environmental Assessment
EMP	Environmental Management Plan
IDA	International Development Association
ISF	Irrigation Service Fee
GPAFS	Global Program for Agricultural and Food Security
GWT	Groundwater table
KR	Kyrgyz Republic
OIP-2	Second On-farm Irrigation Project
OIP-2 AF	Additional Financing for OIP-2
O&M	Operation and maintenance
PIU	Project Implementation Unit
POL	Petroleum, Oil and Lubricants
RSU	WUA Rayon Support Unit
RVK	Rayon Irrigation Department (Rayvodkhoz)
SAEPF	State Agency for Environmental Protection and Forestry
SanPin	Sanitary Regulations and Rules
SETI	State Environmental and Technical Inspectorate
WBSMQRS	World Bank safety measures quality rating system
WUA	Water Users Association

1. Introduction

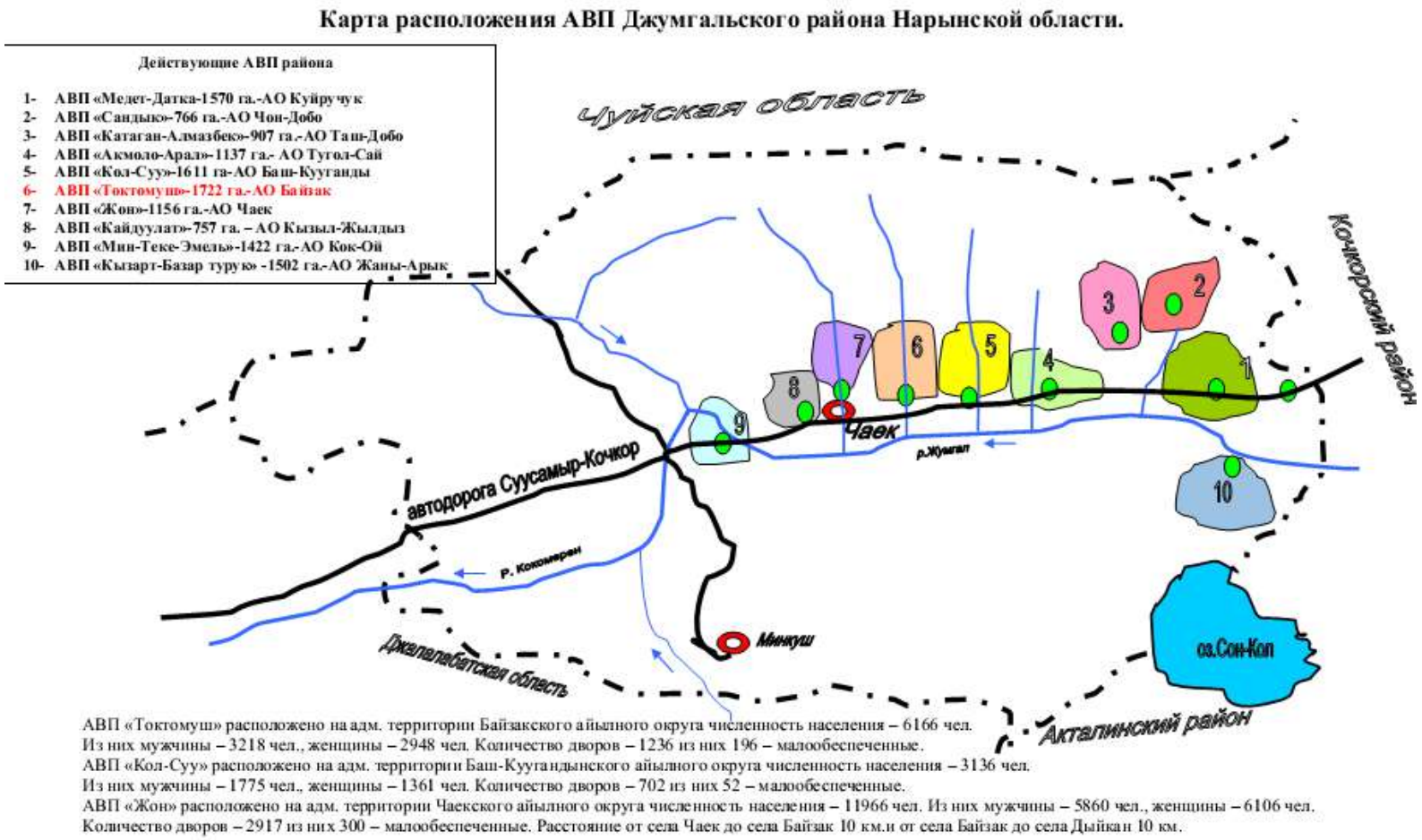
The Agricultural Productivity and Nutrition Improvement Project(APNIP) for the Kyrgyz Republic is being implemented by the International Development Association (IDA) and financed by the Trust Fund of the Global Program for Agricultural and Food Security (GPAFS).

Within APNIP framework the Environmental Management Plan (EMP) prepared that is aimed at ensuring that the Project complies with the principles and practices of environmental management and environmental protection policy and laws requirements of the Government of the Kyrgyz Republic, as well as IDA policy on environmental safety interventions.

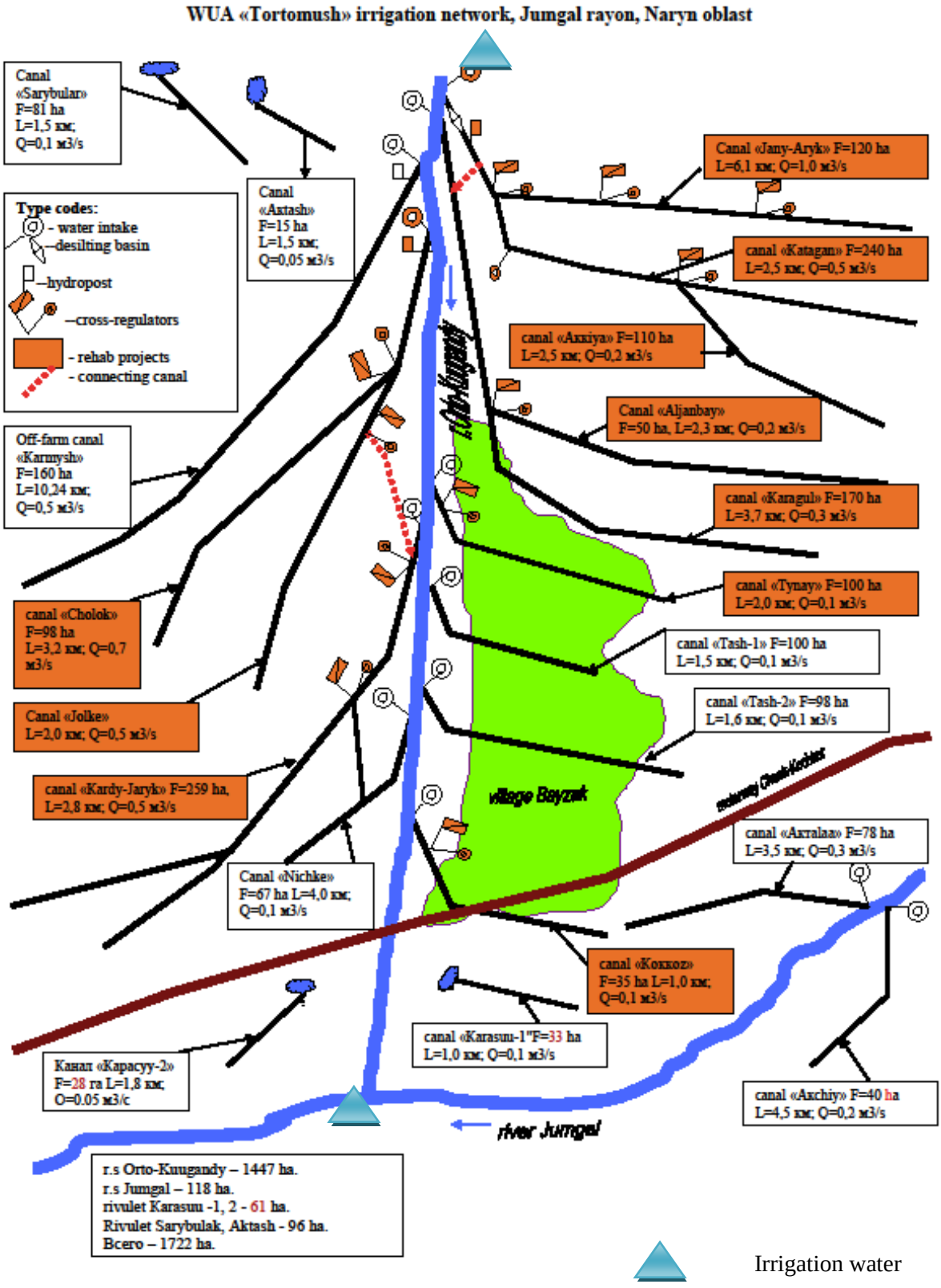
The environmental assessment (EA) goals are to identify the significant impact of the proposed project on surrounding environment (positive and negative), identify appropriate preventive and mitigation interventions aimed to minimize or eliminate any expected irreversible impacts. EMP serves as a management tool that ensures proper implementation of interventions to prevent and mitigate the environmental impact, as well as monitoring and institutional strengthening of recommended interventions while implementing the proposed project. EMP also establishes the necessary institutional obligations, proposes timing of the implementation of mentioned activities and cost estimates for their implementation within the project's budget.

APNIP, in the World Bank environmental risks system , is classified as "B" category. No irreversible or significant impact on the surrounding environment is expected.

Based on the general EMP, the Environmental Management and Monitoring Plan (EMMP) for the rehabilitation of WUA "Toktomush" has been developed, taking into account the specifics of this particular subproject



Picture 1. Overview map of WUA «Toktomush» location



Picture 2. WUA «Toktomush» on-farm irrigatin network

2. Description of subproject rehabilitation

Location of WUA “Toktomush” is within Bayzak AO, Bayzak residential area of Jumgal rayon, Naryn oblast, 15 km to south-east from residential area Chaek. The distance to railway station “Balykchy” 170 km and 350 km from Bishkek. Population 6045 people, 1298 households.

The total irrigated area 1722 ha, 1700-1900 meters from the sea level. The landscape slopes vary from 0,02 to 0,025%.

The rehabilitation of recommended sections of the canals were selected by the specially appointed commission in close cooperation with the engineers of Naryn OGR(Oblast Rehabilitation Group), Jumgal RSU WUA and WUA "Toktomush" representatives. While examining the WUA "Toktomush" on-farm network it was found that the canals are in unsatisfactory technical condition, require reconstruction and equipping with the necessary hydraulic facilities and was concluded that reconstruction of the on-farm network will increase the scheme’s efficiency, reduce water filtration losses, create easy maintenance of the canals, reduce the areas of alienation and soil erosion, improve the local landscape.

1.1. Technical condition of subproject

The irrigation network is fed from the rivers Orto-Kuugandy, Jumgal and rivulets Karasuu. The total area of the scheme is 1722 ha and includes water delivery from r. Orto-Kuugandy – 1477 ha, from r. Jumgal – 118 ha, rivulets Karasuu – 1 and 2 – 61 ha, rivulets Sarybulak and Aktash – 96 ha. The on-farm earth-bed canals deliver water from r. Orto-Kuugandy, JUmgal and rivulet Karasuu.

The WUA’s irrigation network analysis demonstrated 49.0 km of on-farm earth-bed canals. The irrigation network still running and built during Soviet era, however certain canals require rehabilitation.

The rehabilitation works will increase canals’ water flow and water metering control, lower down irrigation water losses, increase canals’ capacity and provide uninterrupted water delivery and distribution.

Average annual water flow of r. Orto-Kuugandy

average annual water flow м³/sec												Q_{av}, м³/sec	W_{year}, mln.m³
I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
0,35	0,5	1,2	1,7	4,4	7,6	6,4	3,7	2,6	2,0	1,5	0,4	2,7	85

Average annual water flow of r. Jumgal

average annual water flow м³/sec												Q_{av}, м³/сек	W_{year} mln. м³
I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
8,88	9,13	9,73	9,73	10,8	17,1	10,3	8,25	8,35	8,58	9,41	9,64	9,91	314

1.2. Description of WUA’s scheme

The WUA’s «Токtomush» irrigation network is receiving water from the rivers Orto-Kuugandy and Jumgal. The designed maximum water flow of r.Orto-Kuugandy 1%, 5% and 10% of water supply are 38,7; 32,0 and 29,0 m³/sec and formed by extensive seasonal snow melting.

The main problem is the unreliability of the Gibb’s groins (river headworks) located on r. Orto-Kuugandy that divert water into the canals of Jany-Aryk, Karagul, Cholok and Kardyzharyk. All of those headworks are absent of desilting structures that result on regular

water delivery into canals and provide emergency water discharge from supply canals into the river.

At present, the water delivery into canals executed via temporarily installed Gibb's groins (water intake spurs) from the soil. Existing spurs and dams that deliver water into canals are destroyed during the floods and have to be reconditioned several times a year. The cross regulators located on canals are also in an emergency condition. The gates are deformed and incomplete. With this type of water intake, it is impossible to carry out normal water delivery, regulate water volumes flow and execute desilting interventions.

From HM17+83 till HM22+00, the canal's Katagan bed goes along the motorway and impacted by severe erosion. The erosion processes, on that section of canal, are progressing and threat of canal's destruction is high that will result on water delivery on irrigated lands located downstream. To avoid the canal's destruction, on that section, and follow-up erosion processes, the subproject envisions canal's route relocation. It is necessary to line that section with parabolic precast reinforced concrete blocks LR-8. The total length of which 425 m.

The water intake for canal Kardy-Jaryk located 2.5 km downstream from the head of canals Cholok and Jolke. During the vegetation season, into canal Kardy-Jaryk, due to water filtration losses on the river Orto-Kuugandy, the required water volumes is not provided. That is why construction of water structures and facilities (to provide sufficient water delivery and desilting/stilling basins) is economically unviable, as operational costs for water intake are doubled. And that is the main reason why the decision to build a cross-regulator on canal Jolke was adopted. The required water volume for canal Kardy-Jaryk will be provided through adjoining canal that connects both canals into one river system. The multihead will be eliminated and the rehabilitation and operation costs will be reduced. A finance saving scheme has been adopted and, according to which, the water supply to canal Kardy-Zharyk will be carried out from the canal Zholke via connecting/adjoining canal with length 1.35 km.

The certain parts of existing cross-regulators' concrete and metal constructions are completely destroyed or absent. The concrete bed and walls of canals have gaping, fractures or porous, attrition of which is 80-100%. Gates are deformed and incomplete. Water regulation on certain sections are made manually. All canals, mainly, in earth-bed and certain sections of canals sedimented and water flow capacity is not provided, and there are no hydroposts, water metering of water volumes delivered is not maintained, as well as lack of water outlet structures on canals. The water intake is carried out via primitive structures of non-engineering type, there is also insufficiency of bridge crossings and access roads to execute technical maintenance

The surface water irrigation method applied, 980 individual household farms are water users.

To ensure water metering delivered into canals, reduction of water losses, improving efficiency and guaranteed water delivery and distribution there is a necessity to rehabilitate off-farm and on-farm canals as rehabilitation interventions will ensure sufficient water delivery, as well as yield of agricrops.

The Project envisions following types of on-farm canals rehabilitation works:

- Lining sections with monolithic concrete or stone concrete at length 1.1 km;
- 1.746 meters will be lined with prefabricated concrete flumes Lr-80 and Lr-60;
- Construction of 2 head cross regulators, 1 stilling basin with hydraulic flushing, connecting canal Г-120(G-120) at length 80 meters with structures, 3 hydroposts/gauging stations, 2 spillways into earth canals, 8 water outlets with cross regulators, 28 water outlets,
- Assembly of metalwork for 3 water outlets, 8 pipe crossings, 5 sluice regulators, 3 canals' bridge crossings and 2 spillway structures.

2. Description of interventions executed within the subproject

2.1. Water intake from the river Orto-Kuugandy

At present, water intake from the river Orto-Kuyugandy into the canals of Jany-Aryk, Karagul, Cholok, Tynay, Tash-1,2, Kok-Koz and off-farm canal Karmysh is carried out by segregated river repelling water intakes.

The uppermost water intake delivering water to the Jany-Aryk left-bank canal is located in the narrowest part of the river and confined by rocky sides and below, within 135 m reach, there is the Karagul canal's water intake, here the river valley extends to 100 m. 150 m below, the right-bank Karmysh off-farm water intake located, and below of which, within 200 m reach, the canals Cholok and Zholke water intake also located. Moreover, within 2500 meters from the canals' Cholok and Zholka water intake there is the Kardy-Zharyk canal's water intake located.

The design of all water intake structures/facilities is similar: they include Gibb's groin, entrance canals, head water regulator and discharge gateways, which built, if necessary, while a canal's water level is minimal and using locally found construction and improvised materials. Each water intake structure includes a headwork/gauging station, which is currently disintegrated and is in non-operating condition. On the canal Jany-Aryk there is also a stilling basin with a washing gateway.

While operating water intakes, there is a number of difficulties associated with the provision of water abstraction and sediment control. To recondition the Gibb's groin, it is necessary to have an emergency team and machinery/equipment be on stand-by, considering the fact that washing off of the stilling basins is not executed at very high-quality, and remaining canals also require annual cleaning. All this suggests that in order to improve the reliability of water supply and the quality of water treatment desilting, it is necessary to reconstruct hydro-engineering complex.

2.2. On-farm canals

Rehabilitation measures for on-farm canals will increase the capacity of canals, increase efficiency by reducing water losses, ensure guaranteed water supply and water distribution. After the rehabilitation, farmers will receive the required amount of water and, accordingly, the yield of agricultural crops will increase.

2.2.1. Canal «Jany-Aryk»: length – 6.1 км, capacity – 0,5 $м^3$/s, earth-bed, command area – 120 ha.

Construction of the headwork water regulator, stilling basin with hydraulic wash-off, cross-regulator and a connecting canal outstretching to 890 meters planned.

2.2.2. Canal «Katagan»: length – 2,5 км, capacity – 0,3 $м^3$/s, command area – 240 ha. The subproject framework includes: pre-cast concrete lining with flumes Лр-8 and Лр-6 outstretching to 426 linear meters, construction of 2 cross-regulators, 2 water outlets, 1 water discharge into earth-bed canal and 1 pipe crossing.

2.2.3. Canal «Аккіуа»: length - 2,5 км, capacity - 0,25 $м^3$/s, command area - 110 ha, earth-bed. The subproject envisions construction of 1 water outlet and pipe crossing.

2.2.4. Canal «Karagul»: length – 3,7 км from r.s Orto-Kuugandy with designed water flow - 0,5 $м^3$, earth-bed, command area – 170 ha. The subproject envisions construction of cross-regulator, hydropost and 4 water outlets.

2.2.5. Canal «Aljanbay»: length - 2,3 км, capacity – 0.2m³/s, command area - 110 ha, earth-bed. Construction of new water structures/facilities required. It is necessary to build 8 water outlets and pipe crossing.

2.2.6. Canal «Tynay»: length - 2,0 км, capacity – 0.1m³/s, command area - 100 ha, earth-bed. The head water discharge cross-structure absent, there is also water outlets of non-engineering type (canal's gaping, primitive cross-structures). The subproject envisions construction of water discharge cross-regulator and 4 water outlets.

2.2.7. Canal «Kokkoz»: length - 1,0 км, capacity – 0.1m³/s, command area - 35 ha. Metal parts of gates exhausted, rock aprons disintegrated. The bed of upper rock apron destroyed, the metal parts of head water discharge structure exhausted. Maintenance pathways absent. The subproject envisions construction of water discharge structure.

2.2.8. Canal «Cholok»: length – 3.2 км, capacity – 0.2m³/s, command area - 98 ha. The subproject envisions construction of the head cross-regulator, 3 cross-regulators, hydropost, 2 bridge crossings and 350m concrete lining.

2.2.9. Canal «Cholok»: length - 2,0 км, capacity – 0.1m³/s, command area - 50 ha, earth-bed. The subproject envisions concrete lining of 750 m, construction of cross-regulator into connecting canal "Kardy-Jaryk", 3 cross-regulators and 1 bridge crossing.

2.2.10. Canal «Kardy-Jaryk»: length - 2,8 км, capacity – 0.3m/³, command area - 259 ha,, earth-bed. The subproject envisions construction of connecting canal from concrete flumes LR-60 outstretching for 1320 linear meters, 1 water outlet, 3 pipe crossings, cross-regulator, water discharge structure into earth-bed canal.

2.2.11 Canal «Tash-1»: length - 1,5 км, capacity – 0.1m³/s, command area - 100 ha, earth-bed. To regulate water delivery, it is necessary to modernize cross-regulators.

2.2.12. Canal «Tash-2»: length - 1,6 км, capacity – 0.1m³/s, command area - 98 ha, earth-bed. пропускная способность 0,1 $м^3$/с. To regulate water delivery, it is necessary to modernize cross-regulators.

Water reservoirs, dams and dikes rehabilitation is not planned. Therefore, the irrigation dams and reservoirs policy (OP 4.37) is not applicable.

The application of the WB's policy OP4.12 (forced resettlement) is not required, since all works will be carried out within the existing irrigation system, without constructing additional facilities that capture lands of an individual landowner and land-user, which could require additional coordination and relocation.

Construction and rehabilitation works deadline: years 2018-2019.

3. Description of the environmental parameters at the site

3.1. Climate

The climatic characteristics: the average monthly and annual T°C is give in the table below.

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	annual
-9,9	-6,0	0,5	0,5	11,0	13,8	16,3	15,0	10,9	4,8	-3,8	-8,2	4,2

- Average air max.T°C: + 3,9.

- Absolute air T°C minimum: – 38.
- Estimated temperature of the coldest five-day period ^{0}C: – 30.
- The average temperature of the coldest air (ventilation) ^{0}C: – 18.
- Estimated coldest days T°C: – 37.
- The normative depth of seasonal soil freezing of an open, exposed to snow surface for coarse soils sm – 238; sandy clay, sand and dust – 196 sm; sandy gravel, coarse and average density sм – 210.
- Extension of no-frost period, days - 146.
- Average monthly and annual precipitation, mm.

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	annual
10	12	15	16	33	53	31	17	11	6	14	11	209

- Average max. of precipitations, mm - 20.
- Number of days with snow cover – 109.
- Average decade height of snow cover, sm - 20.
- Average air humidity at 13.00 o'clock; the coldest month of the year – 59%, the hottest month of the year -31%, village Kochkorka.

Average monthly and annual air humidity; %

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	annual
62	59	54	52	56	58	60	60	56	55	62	64	58

Average monthly and annual wind speed; m/sec

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	annual
1,7	1,7	1,3	2,1	1,9	2,3	2,3	2,0	2,8	2,0	1,7	1,5	1,9

3.2. Landscape

Geomorphologically, the area, where works are planned, is confined to accumulative surfaces of different genetic types. Alluvial surfaces are formed by the accumulative activity of large permanent factors and are represented by beds, flood plains and regional terraces. Proluvial surfaces are represented by narrow beds and bottoms of dry rivers and small sediment cones. The main forms of the landscape are light erosion rills, man-made structures. The Upper Quaternary proluvial surfaces are represented in the form of extensive plumes in the interfluves of the main tributaries. The surface is convex, wavy, sloping, limited and, as a rule, alluvial-proluvial plumes. The subproject works will not affect the surrounding soil and landscape.

In the Kyrgyz Republic practically all areas, used for agriculture, are potentially erosion-troubled. One of the negative factors contributing to water erosion is presence of landscape slopes. In WUA "Toktomush", Naryn Oblast, rehabilitation is ongoing, the landscape slopes vary from 0.02 to 0.025%. Therefore, to prevent erosion processes, caused by irrigation of agricultural lands, it is necessary to use agro-ameliorative interventions aimed at preventing the soils impacted by water erosion. In the EMP these interventions are proposed for the period of water object/facility operation. (Re)construction works will not impact the lands of projected objects with erosion processes.

To prevent soil erosion during irrigation, the tail-end water discharge structures built on the existing irrigation network.

3.3. Geo-engineering conditions

Background survey of the land plot, where rehabilitation works are planned, is insufficient. The research area is located within Bayzak AO lands of Djumgal rayon, 350 km off Bishkek, 13 km to the north-east from Chaek. The site's background is insufficient.

The cenozoic deposits take part in the geological structure i.e quaternary timing of different genesis. The site is composed of alluvial Holocene sediments of the river Orto-Kuyuganda bed, represented by boulder-pebbles, proluvial Holocene sediments, represented by crushed stone accumulations, the proluvial upper Quaternary sediments, represented by gravel-crushed stone accumulations. The lithologic structure has the depth of 3.3 m and is represented by a pebble soil with a loamy soil layer up to 1.5 m thick and a soil-vegetative layer. Rocky, non-arable soils absent. The area of proposed constructions has seismicity of 9 points.

The soil filtration coefficient is 15-20 m/day. Groundwater lies at a depth of 52.0 m. Zones of flooding and waterlogging are absent.

3.4. Hydrology

The water intake structure and a complex of water facilities for it is located in the river Orto-Kuugandy floodplain. The width of the floodplain is 30-125 m. The river bed and floodplain are composed of boulder-pebble soils. Boulder sizes reach 2.0 m in diameter. The floodplain is covered, in some places, with twiggy growth. The river Ortho-Kuyuganday, by type of water origin, is related to snow-glaciated.

The flooding start in April, less often in early March and ends in September, rarely in August. During the flooding, the annual water runoff summarizes up to 69%. The largest annual flow is recorded in June. During high water periods, the average water discharge varies from 2-3 m^3/s to 10-12 m^3/s and in high water years up to 16 m^3/s. The maximum water flow is observed in May-July, the estimated maximum water flow is 1% - 38.7 m^3/s, 5% - 32.0 m^3/s. The river forming flow rate is set on 10% and equal, roughly, to 29.0 m^3/s.

The low-water season lasts from September till March or April of upcoming year and, of course, water consumption decreases, varying from 3.0 till 0.8 – 1.0m^3/s. The average annual water turbidity is 87 g/m^3. The average annual weigh of sediments is 10.1×10^3 tonnes or 8.420 m^3 per year. The main volume of sediments, more than 95%, washed in during the high water period. The average weighed slope of river bed is 0.03. During the maximum water flow in river Orto-Kuyugandy, a large volume of weighed and flowing sediments is taking place. In general, the natural water intake conditions are quite typical and afford construction of engineering-type structures/facilities.

In the surrounding areas there are no entities that discharge hazardous chemicals, pesticides and sewage into the source of irrigation.

3.5. Vegetation cover

Vegetation cover: agricrops, trees, grass cover. The soil-vegetation layer will not be disturbed, as construction works will be executed on existing water structures/facilities. The rehabilitation works will not impact the agricultural areas, as all projected objects for rehabilitation located beyond their borders.

In the process of canals rehabilitation, it is necessary to execute tree felling that hamper course of works and are in the alienation zone of water facilities/structures. According to the requirements of the Water Code of the Kyrgyz Republic, Art. 80 p.3, while executing repair and rehabilitation works, the shrubbery cutting and forest felling within the alienation zones of water management structures and canals, as well as sanitary cutting and deadwood cutting, do not require permission from specially authorized state agencies/bodies. Prior to commencement of work, the contractor will inform the environmental protection agency of forthcoming tree and shrub

vegetation cutting to be conducted. If rehabilitation works to-be-conducted on the sections that are not within alienation water management zones, then tree and shrubbery cutting is the subject to approval with environmental protection agencies/bodies.

4. Description of procedures related to regular operation works

4.1. Technical surveillance on canals and structures condition

In the operational scheme activities, paramount importance is paid to the timely conduct of preventive and rehabilitation works that exclude probability of system failure, while complying to the rules of its operation.

The main indicators of normal technical condition and reliable operation of the on-farm irrigation network are provision of designed canal's capacity, minimum filtration and performance specification water losses, absence of sedimentation, greenery overgrowing, collapse and canal's erosion.

If the actual canal's capacity corresponds to the estimated throughput, then the technical condition of a canal is good and considered as reliable. If there are 20 -25% throughput deviations, then a canal's reliability is reduced, and the technical condition is an average. If the deviations are more than 25%, then a canal's performance considered as unreliable and its technical condition is below the average.

To ensure a canal's throughput, it is necessary to conduct a careful monitoring over water regulating structures. The water volumes regulating structures must be easily and reliably (re)adjusted and controlled. While operating water regulating structures, it is necessary to ensure that there is no water leakage through the water outlet gates and no canals' erosion and destruction on its structural parts. The lined sections, expansion and construction joint sections of a canal are the subject of constant surveillance. The damaged lining must be reworked immediately. A canal's lined sections must be of monolithic concrete and maintenance must be timely to prevent cracking. A particular attention must be paid to subsiding soils, as concrete lining on those soils is prone to cracks formation.

A daily maintenance of lined and unlined canals, facilities and equipment located on them, keeping them in good condition is reduced to the removal of vegetation and floating objects that block canals and lead to sedimentation in certain areas. During the maintenance, works are carried out to clean up structures and water distribution units from debris and ice, vegetation overgrowth and sedimentation.

A slight and gradual canal's base degradation, sometimes, leads to the formation of cracks on the lining that impossible to rehabilitate. In this case, the cracked and battered lining sections are cut down and filled with new concrete.

The joint sections of a canal, with prefabricated reinforced concrete slabs, are the subject of particular attention. Constant surveillance of which is necessary and, if there any urgency, must be treated with resilient water resistant materials that can withstand a vegetation impact.

Within the flumes it is prohibited to dissolve various types of fertilizers that may cause destruction of concrete. It is also not recommended the flumes network operation if water flow temperature is below -5 - 10°C. Therefore, in the process of preparing the network for winter, the whole canal's route must be completely freed of water.

The livestock crossing and pasturing on canal's dams and slopes is prohibited. The livestock drinking and dipping allowed on special canal's section only.

To monitor the quality of irrigation water and prevent a canal's sedimentation, the water samples must be regularly inspected for the following indicators: turbidity, temperature, hydrogen index and mineralization.

4.2. Preparing on-farm network for the winter period

In the winter period, the on-farm irrigation network can be used for water charging irrigation, washing off and other types winter watering, as well as for supplying water to the residential areas and livestock farms, filling up reservoirs. Control over canals and structures operation, in the winter, should be paid particular attention, as to prevent formation of ice jams near bridges, crossings, etc. The trash racks that were set for the summer in front of water structures, must be removed for the winter. When frosts are formed and structures are covered with the ice, in this case the ice must be chipped without violating integrity of the structures and canal's coating.

4.3. Looking after wood lines and access roads

Forest plantations along canals are designed to protect the canals from vegetation overgrowing, lowering the level of groundwater along a canal's route and reducing the adverse effect of wind force on crops. Alongside of permanently located canals of the farm network that require constant desilting interventions, it is recommended to create, on the one side two-row or three-row strips of fast-growing trees and shrubs. The distances between trees in the strip is 1-3 m, between bushes - 0.75 - 1 m with a distance between greenery strips of 1.5 - 3 m.

The field and on-farm roads on irrigated area, as a rule, are ground roads. If they pass through silty loams and solonchaks, then a road is made of gravel or other coating. Roads maintenance is limited to keeping the upper layer in good condition. The thickness of gravel coated roads is maintained within 8 - 10 cm. The roadbed condition is also the subject of maintenance and must be periodically planned and compacted. Roadside cuvettes and canals must be cleaned of dirt and vegetation. To improve the water flow into cuvettes, the roadways must be made with slopes and with a slight lateral inclination from the middle to the cuvettes.

4.4. Repair works

The irrigation schemes are subject to repair works according to the annually developed and approved plans. In the practice of irrigation and drainage systems operation the current, major and emergency repair works are executed.

The current repair works carried out annually including desilting of canals, removal of vegetation, strengthening and widening dams, cleaning berms, eliminating small landslides, collapses, rifts and sandspits, repairing damaged anchorages and canals' lining, repairing small damages of a structure parts. While carrying out current repair works, a complex technical repair works and modifying a structural construction is not included. The preventive (prophylactic) repair works include:

- Patching ratholes;
- Structural cracks maintenance after ice impact;
- Tightening fixing bolts;
- Drainage structures winterization etc.

Preventive repair and a significant part of the current repair, including desilting of canals, vegetation and landslides removal, a minor canal repairs, repair of structures, buildings and other devices are performed annually without stopping the system operation.

Major repair is carried out, as required, within a few years' period and includes: repair works on a canal's sections, dams and parts of structures attritions and destructions, structural modification or replacement of certain elements and structural units.

Emergency repair - rehabilitation of canals, dams and structures or parts of them, destroyed as a result of natural phenomena (mudslides, floods, etc.), or violations of the technical operation rules, execution of which carried out 24/7, and all available material and technical resources and labor resources are mobilized for their implementation.

Repair and construction works on the on-farm network canals performed by WUAs contracting a construction company. Repair works expenses and operation of the on-farm network are annually provided by WUA budget.

4.5. Desilting of canals and vegetation removal

The solid particles of soil form sedimentation that moved around by water flow. The content of solid particles, per water volume unit, characterizes the water flow saturation with sediments, or its turbidity. Sediments, often, are formed as a result of soil wash-away in the catchment basin via snow/glaciers melting and rain waters. Partly the sedimentation is a product of a canal/river bed and banks erosion. The largest bed's sedimentation with pebbles and coarse sand observed and remain within the head section of a bulk water supply canal. The average sized sediment particles washed into a canal's distribution network and even into on-farm irrigation network.

On average, about 80% of sediments remains in the off-farm canals network and about 20% inflows into on-farm irrigation network. A canal's inclination impacts on sedimentation process, if an inclination is too steep then about 60% of sediments washed in on-farm network and fields. Desilting executed on annual basis and, if necessary, more often.

5. Environmental impact

Implementation of APNIP is addressed to provide economic, social and environmental benefits to farmers, farmer entities and local communities through WUA's development, the rehabilitation and modernization of irrigation and drainage infrastructures in projected areas. The best practices of previous projects demonstrate positive impacts on the environment. Namely, this project is aimed at reducing water losses in irrigation schemes, improving water resources management, improving agricultural productivity and improving soil fertility.

During the canals' rehabilitation process, the trees felling and shrubbery vegetation removal required, which is subject to approval with environmental protection authorities. Design and engineering works require strict compliance to the necessary requirements, including noise control, planting new trees to protect against wind erosion and construction of access roads, air pollution and timely construction waste disposal.
The requirements for the prevention of environmental pollution and negative impact on the population are provided for in the Law of the Kyrgyz Republic "General Technical Regulations for Ensuring Environmental Safety in the Kyrgyz Republic", the Law "On Production and Consumption Wastes", the Law "On Protection of Atmospheric Air", SanPin "Noise in the workplaces, in premises of residential, public buildings and on the territory of residential buildings" the Governmental decree of the KR, dated 11/04/2016. №201,

5.1. Expected positive environmental impact

The positive impact consists of:
- Water losses reduction;
- Improved water resources management, consisting of construction and rehabilitation of water distribution and water-metering structures;
- Agricultural productivity increase;

• Improved soil fertility by increasing humus while applying an efficient irrigation schedules.

5.2. Potential negative environmental impact

At the same time, while carrying out irrigation network reconstruction works, there may be some potentially negative impacts on environmental protection conditions in the projected areas and require attention, preventive actions and appropriate mitigation measures during planning, development, construction, operation and maintenance.

While performing the planned irrigation networks rehabilitation works, no asbestos-containing materials will be used. It is necessary to mention that previously asbestos cement pipe crossings were used. But they were replaced with structures of more inert materials and, at the moment, problems with asbestos-containing materials are not expected. In the event of removal of asbestos cement pipes asbestos contained materials waste will be collected, transported and finally disposed by applying special protective measures in accordance with the hazardous waste handling standards. See Section 10 for detailed information on disposal of asbestos-containing materials.

The potential negative impacts are relatively minor, and positive economic, social and environmental benefits far outweigh them in environmental assessment. Consideration of these impacts is given below.

5.3. Impact on climate change

The irrigation and drainage schemes rehabilitation will enhance the agriculture and farming practices, materially-technical procurement, land owning, pastures and water management that will lead to productivity increase and adaptation to climate change and sustainable use of natural resources.

Table 1. Assessment and ranking of environmental risks

Activities	Impact	Type	Duration	Term	Degree	Risk	Reversibility	Probability
Construction phase								
Construction site location	Soil contamination at a construction site as a result of storage, construction and household waste, including liquid wastes.	direct	short-term	immediate	low	low	reversible	average
	surface water and ground water contamination at a construction site, as a result of storage of construction and household waste, including liquid waste	direct	short-term	immediate or delayed	low	low	reversible	low
Unloading of excavated soil and construction waste	landscape and animals' natural habitat degradation, local drainage scheme alteration	direct	mid-term	immediate	low	low	reversible	average
Transportation of building materials, use of heavy machinery	air contamination and noise impacting local residents/workers during traffic of vehicles and heavy machinery	direct	mid-term	immediate	low	average/ low	reversible	high
canals rehabilitation	Damage and trees felling and shrubbery currying	direct	long term	immediate	high	low	reversible	high
Operation and maintenance phase								
Earth-bed canals cleaning while in operation	landscape and animals' natural habitat degradation, local drainage scheme alteration	direct	mid-term	immediate	low	low	reversible	average
Increase in irrigation water supply, which increases the volumes of waste water	Surface water pollution with agrochemicals, as a result of excessive application of pesticides and mineral fertilizers	indirect	mid-term	delayed	moderate	moderate	reversible	average
Increase in irrigation	surface water pollution with	indirect	long-term	delayed	moderate	moderate	reversible	average

water supply, which increases the volumes of waste water	agrochemicals, as a result of excessive application of pesticides and mineral fertilizers							
increase in irrigation water supply that leads to water speed increase	soil erosion, related to existing agricultural production practices	indirect	long-term	delayed	moderate	moderate	reversible	low

6. Environmental management and monitoring plan

All the construction phase risks are easily monitored and eliminated. They can be minimized by properly designing mitigation measures and monitoring the Contractor, while executing works. During the (re)construction works, trees felling and shrubbery cutting in a canal's alienation zone will be carried out in accordance with the requirements of the Water Code (Article 80, para. 3.) and in agreement with the specially authorized environmental protection agency/body.

Among the O&M risks, the risk of landscape and animals' natural habitat degradation, while cleaning earth-bed canals and drains, is clear and easily controlled. In case of suspected contamination of surface and groundwater by agrochemicals due to excessive use of pesticides and mineral fertilizers, soil erosion associated with existing practices of agricultural production, increasing groundwater table in the zone of their deep occurrence due to excessive irrigation and, as a consequence, soil salinization, an accredited laboratory will be mobilized for special monitoring. The need for mitigation interventions at the O&M phase is determined exactly in the process of environmental monitoring.

Table 2: Mitigation plan

Phase	Issue	Preventive/ Mitigation interventions	Cost, US $		Institutional responsibility		Control
			installation	operation	installation	operation	
Construction	organizing a construction site	1) It is forbidden to locate a construction site in the water protection zones of rivers and canals; 2) Ensure removal of all waste and construction rubble from (re) construction sites to dispose on the authorized municipal landfills, with the permission of local authorities; 3) Execute planning and restoration measures to restore troubled lands during and after completing (re)construction	n/a	part of the (re)construction works contract 611 000	PIU/Contractor	Contractor	1) A Contractor bears responsibility to execute environmental mitigation interventions; 2) A construction site inspections made by PIU; 3) State Ecological Inspectorate
	soil after a canal's cleaning	conduct a planned rehab works	n/a		PIU/Contractor	Contractor	1) A Contractor bears responsibility to execute environmental mitigation interventions; 2) A construction site inspections made by PIU; 3) State Ecological Inspectorate
	trees and shrubbery vegetation	Coordination with the specially authorized environmental protection agency/body cutting greenery plantations	n/a	part of the (re)construction works contract	PIU/Contractor	Contractor	1) A Contractor bears responsibility to execute environmental mitigation interventions; 2) A construction site inspections made by PIU;

							3) State Ecological Inspectorate
	vehicular emissions into the atmosphere	1) vehicular exhaust systems and construction equipment should be in good condition, in order to minimize air pollution; 2) Limiting the speed of vehicles and selecting suitable transportation routes to minimize dust emissions; 3) Moisturizing the road surface while driving through the residential area territories	n/a	part of the (re)construction works contract	PIU/Contractor	Contractor	1) A Contractor bears responsibility to execute environmental mitigation interventions; 2) A construction site inspections made by PIU; 3) State Ecological Inspectorate
	noise impact within labor area	machinery and equipment operation	n/a	part of the (re)construction works contract	PIU/Contractor	Contractor	1) A Contractor bears responsibility to execute environmental mitigation interventions; 2) A construction site inspections made by PIU; 3) State Ecological Inspectorate
	Workers' and rural population health and safety	1) construction sites will be equipped with information and designator boards concerning working regulations and requirements; 2) easily accessible and complete first aid kit to treat an injury. 3) ensuring personal protection equipment (helmets, protected shoes, gloves); 4) limiting access to (re)construction sites, zones and equipment locations by local citizens.	n/a	part of the (re)construction works contract	PIU/Contractor	Contractor	1) A Contractor bears responsibility to execute environmental mitigation interventions; 2) A construction site inspections made by PIU; 3) State Ecological Inspectorate

Operation	Threats to water quality due to salinity of soils because of drainage	- training on water and soil use improvement; - visual monitoring (preventing waterlogging)	n/a	n/a	AAS/AISP	WUA members	RSU on-site inspection, approval and coordination with SETI
	Threats to water quality due to contamination by agrochemicals	- best practices on pesticides application, - application of agrochemicals in accordance with recommended norms, - preventing effluent water discharge into canals and surface water objects,	n/a	n/a	AAS/AISP	WUA members	RSU on-site inspection, approval and coordination with SETI
	Increase of soil erosion	- training on water use and soil science, - outreach campaign - rational use of irrigation water and applying water regimes in accordance with the irrigation requirements, - Arrangement of irrigation furrows on the lowest slope (cross-cut furrows); - shortened furrows length; - altering irrigation technology (sprinklers, drip irrigation)	n/a	n/a	AAS/AISP	WUA members	RSU on-site inspections
	Climate change impact	- education on environmental mitigation activities; - compliance of irrigation norms and regulations.	n/a	n/a	AAS/AISP	WUA members	DWRLI

Table 3. Environmental monitoring plan

Project Phase	Parameter	Location	Method/Equipment	Frequency	Objective	Costs		Responsibility	
						Organization	Performance	organization	performance
baseline	salinity, concentration of hydrogen ions (pH), water turbidity	Headworks and tail-end of irrigation scheme: river system Ortho-Kuyuganday	Field equipment for parameters measurement	At the beginning, in the middle and at the end of vegetation season	Rehabilitation works and agricultural activities impact assessment	0	Insignificant	Samples selection RSU	water sampling and analysis
Construction	Site-specific environmental management and monitoring plan	subprojects under rehabilitation	Visual inspection of subproject	Before, during and after completion of construction	Compliance with environmental protection measures	0	Insignificant	PIU/Contractor	PIU/Contractor
	Salinity, concentration of hydrogen ions, turbidity	Canals under rehabilitation, located upstream and downstream of the rehabilitation site	Field equipment for parameters measurement	At the beginning, in the middle and at the end of vegetation season	assessment of construction works impact	0	Insignificant	RSU	water sampling and analysis. Introduction of results to PIU
	Pollution of watercourses by petroleum, oil and lubricants	Selectively for subprojects when suspected of contamination. Downstream of rehabilitation subproject	Sample for laboratory analysis	During construction	Civil works impact assessment	0	100 USD	Contractor	Accredited laboratory Water sampling and analysis. Introduction of results to PIU
operation	Salinity in soil	Problematic sites	Sample of soil/analysis	Quarterly	Soil quality identification	0	300 USD	AHE	AHE

	Salinity, concentration of hydrogen ions, turbidity	Headworks and tail-end of irrigation scheme: river system Ortho-Kuyuganday	Field equipment for parameters measurement	Before, during and after completion of construction	Civil works impact assessment	0	Insignific ant	RSU	RSU

7. Legislative support

In the Kyrgyz Republic there are numerous laws on environmental protection, provisions and regulations, which address specific issues of environmental protection. Table 4 summarizes the legal regulations relevant to this project.

Table 4: Basic laws, provisions and resolutions

Legal authority	Legal mandate
Constitution (2010)	The state's ownership of natural resources, rights and duties of citizens.
Water Code of the Kyrgyz Republic (2005)	It identifies the state policy, legislative and institutional basics on water resources management and protection
Law on environmental protection (1999)	It identifies state policy on environmental protection, legislative and institutional basics on water resources management and environmental protection
Law "General technical regulation on ensuring environmental safety in the Kyrgyz Republic" (2009)	The Regulation determines the main provisions of technical regulation in the field of environmental safety and establishes general requirements for ensuring environmental safety while designing and implementing of interventions within economic and other types of production activities, storage, transportation and production disposal.
Law on environmental appraisal (1999)	It requires review of environmental protection issues (environmental appraisal) and prevents negative environmental impacts and human health as a result of economic and other activities
Law on specifically protected natural reservations (2011)	It establishes regulations for specially protected natural areas, various types and/or levels of economic activity.
Law on protection of atmosphere (1999)	It regulates emissions to atmosphere and specific obligations on protection of atmosphere
SanPin "Noise in the workplaces, in premises of residential, public buildings and on the territory of residential buildings" the Governmental decree of the KR, dated 11/04/2016. №201,	Establish sanitary-epidemiological requirements, standardized parameters and maximum permissible noise levels at (re)construction sites, noise classification, permissible noise levels in the projected rooms, (re)construction sites, (re)constructed and operated residential, public buildings and on the territory of residential buildings.
the GovKR. Provision No.224 of 03/05/2013. "On approval of fees for calculating the amount of penalties for damages caused to objects of animal and plant life, mumijo-containing mineral materials and mushrooms by legal entities and individuals"	Fees designed to ensure preservation of biodiversity, proper protection of flora and fauna

The Government of the Kyrgyz Republic ratified a series of international conventions on environmental protection and agreements, related to this project:

- Convention on environmental impact assessment of the transboundary territories Espoo(2001);
- Agreement on cooperation in environmental protection and efficient use of natural resources (Kyrgyz Republic, Kazakhstan, Uzbekistan) (1998),

- Convention on wetlands, representing international importance for the main habitat for waterfowls (Ramsar Convention) (2002);
- Convention on right to use international watercourses as transport routes (1997), Agreement on the use of water structures for interstate purposes on the Chu and Talas Rivers (Kyrgyz Republic and Kazakhstan) (2000);
- The United Nations Framework Convention on Climate Change (2000 г.);
- Kyoto Protocol (2003).

8. Public hearings

In accordance with Operational Procedures OP4.01.[1] The WB has special requirements for information and public consultations disclosure. The disclosure includes presentation of information about the Project to the general public and population covered by the Project and other stakeholders, starting from earlier implementation cycle and throughout the framework. The information disclosure is intended to facilitate constructive interaction with the population covered by the Project and stakeholders throughout the Project's lifecycle.

In addition, the Kyrgyz Republic is a member of the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, the United Nations Economic Commission for Europe, which also contains provisions for ensuring the disclosure of objectives and environmental considerations of the Project.

Public hearings in the WUA "Toktomush" were held on September 28, 2017, in v. Bayzak, in Jumgalsky rayon, Naryn oblast and 29 people took part in the public hearings: representatives of WUAs, local self-governing authorities, farmers, WUA's rayon support units, designers, PIU.

At public hearings, the information was provided concerning technical solutions of the Project and its environmental impact, as well as the interventions that would be taken to prevent and mitigate the impact.

Participants in the hearings were asked a number of questions, the activities for which are included in the EMP.

The minutes of the public hearings, list of participants and photos are attached.

[1] Operational Guidelines of the World Bank: OG 4.01, "Environmental Assessment", point 3.

8.1. Minutes of public hearings

The minutes of public consultations on environmental issues concerning the rehabilitation process of irrigation network of WUA "Toktomush" in Jumgalsky rayon, Naryn oblast, as part of the World Bank project "Agricultural productivity and nutrition improvement"

Village Bayzak **September 28, 2017**
Attendees:
Samsaliev K. – PIU engineer, APNIP
Neronova T. – Environmental protection specialist, PIU APNIP
Abdylgaziev M. – Design engineer WUA "Токtomush"
Nasyvaly ullu Kanybek – Head of Bayzak AO
Kuchmuratov T. – Meeting chairperson – Chairperson of WUA
Moldaliev T.- WUA «Токtomush» Director

29 people participated in the public hearings: water users, farming entities representatives, farmers, members of the WUA. The list of participants in the public hearings is attached.

Samsamiev K – informed all in presence about the project and talked about the on-farm network rehabilitation interventions to-be-done within the framework of the project "Agricultural Productivity and Nutrition Improvement".

Neronova T. - spoke about the environmental legislation of the Kyrgyz Republic requirements and the World Bank's policy on environmental protection under the project. The main environmental assessment objective is to identify the significant impact of the project on the environment (positive and negative), identify appropriate preventive measures and mitigation measures aimed at preventing, minimizing or eliminating any kinds of expected irreversible impacts. Implementation of APNIP is addressed to provide economic, social and environmental benefits to farmers, farmer entities and local communities through WUA's development, the rehabilitation and modernization of irrigation and drainage infrastructures in projected areas. The best practices of previous projects demonstrate positive impacts on the environment. In fact, many positive impacts of the projects have been identified during the environmental assessment. Namely, this project is aimed at reducing water losses in irrigation schemes, improving water resources management, improving agricultural productivity and improving soil fertility. At the same time, while executing (re)construction of irrigation networks works, there may be some potentially negative impacts on environmental conditions in projected areas that require attention, implementation of preventive actions and appropriate mitigation measures during planning, development, (re)construction, operation and maintenance.

- While performing the planned irrigation networks rehabilitation works, no asbestos-containing materials will be used. It is necessary to mention that previously asbestos cement pipe crossings were used. But they were replaced with structures of more inert materials and, at the moment, problems with asbestos-containing materials are not expected.
- The potential negative impacts are relatively minor, and positive economic, social and environmental benefits far outweigh them in environmental assessment. Consideration of these impacts is given below.

The main impact that may take place, as a result of construction works:

1) Soil contamination at the construction site;
2) Pollution of groundwater at the construction site;
3) Deterioration of the landscape, destruction of the animal world natural habitat, the local drainage network alteration;
4) Air pollution and impact on workers/local population during traffic and heavy machinery operation.

To prevent or mitigate the negative impact of construction works, EMMP is drafted for each of the rehabilitation subprojects. It includes a mitigation and monitoring plan, both for the construction phase and for the O&M phase.

All the construction phase risks are easily monitored and eliminated. They can be minimized by properly designing mitigation measures and monitoring the Contractor while carrying out works.
Among the O&M risks, the risk of landscape and animals' natural habitat degradation, while cleaning earth-bed canals and drains, is explicit and easily controlled. The risks of surface and groundwater pollution by agrochemicals, due to excessive use of pesticides and mineral fertilizers, soil erosion associated with the existing practices of agricultural production, increase of near-surface groundwater level, due to excessive irrigation and, as a consequence, soil salinization, require special monitoring. The need for mitigation interventions while on O&M phase is determined exactly in the process of environmental monitoring.

Questions:

Asanbekov B. – Whether there a canal's water purity monitoring will be done, to prevent water contamination?

Neronova T. – The monitoring will be executed by WUA RSU at the designated water controlling points described in the EMMP. It is also the fact that water purity control will be done during operation period(s), such as, mineralization, water ions concentration (pH), water turbidity.

Imanalieva A. – After construction works completed, what kinds of landscape cleaning interventione are planned?

Neronova T. – After construction works completed the subcontractor bear responsibility for planned recultivation of site location(s), such as land leveling, construction waste disposal.

Saadatov Zh. – Whether a permission to tree felling and shrubbery removal is necessary to obtain, if they are located within the alienation zone?

Neronova T. – During the inspection done alongside of canals, it was found that there is no greenery that needs to be removed or felled within the construction zones. If such issue arises, then it is WUAs responsibility to compose a formal letter to Osh oblast environmental protection department and to negotiate the issue.

Slaymov У. – Will noise and dust affect the local population during (re)construction works?

Neronova T. - The residential areas, where (re)construction works are planned located quite far from the construction site(s). Therefore, the impact of noise from operating machinery will not have an impact on the population. Dust can be stirred when vehicles pass through the residential areas. EMP has strict requirement on speed limits while driving through the residential areas, so the dust and noise controlling interventions are in place.

Niyazov K.– Construction waste, will it be duly disposed?

Neronova T. – The sobcontractor will bear full responsibility for waste disposal interventions into the places agreed and negotiated with the Local authorities. And construction wastes could be recycled.

At the end of the hearings all participant supported the implementation of the project.

The WUAs Chairperson, on behalf of the attendees thanked for support and introduced information.

The list of participants and signed introduced below.

Список участников общественных слушаний 29 сентября 2017г. АВП «Токтомуш»
Жумгальский р-н, Нарынская область

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3.	Сапинтазаков Э.	Дир. АВП	0701889273	[illegible]
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28.	[illegible]	завклуб	0702737185	[illegible]
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9. Pictures of canals in the existing condition

Picture 1. Canal «Jany-Aryk», 29 September, 2017

Picture 2. The headwork on canal «Karagul»,29 September, 2017

Picture 3. Earth-bed canal «Jolke»,29 September, 2017

Picture 4. Canal «Karagul», 29 September, 2017

Picture 5. Canal «Jany-Aryk», 29 September, 2017

Picture 6. Public hearings, 29 September, 2017

10. Collection, storage, transportation and disposal of asbestos-containing wastes.

Removal of materials that contain asbestos will be carried out in line with the local legislation, including construction standards, work safety issues, air borne emissions of hazardous pollutants and disposal of waste and hazardous waste (in the event that there is no local legislation, the Directive 2003/18/EC of the European Parliament will be used, that amends and supplements Directive of the Council 83/477/EEC on worker protection from workplace asbestos exposure risks: threshold values of airborne dust particles is 0.1 fiber/cm3; also use the Good Practice Note: Asbestos: Health Issues at Workplace and Community; World Bank). Asbestos materials shall be subject to immediate final disposal/burial under special conditions.

According to Order #885 of the Government of the Kyrgyz Republic *On Hazardous Waste Management in the Kyrgyz Republic* of December 28, 2015, asbestos-containing wastes should be disposed as follows.

The hazardous waste management process (waste lifecycle) consists of the following phases: generation, accumulation (collection, temporary storage, stockpiling), transportation, neutralization, recycling, reuse of recycled products, and disposal.

When asbestos is present at a project site, it should be clearly labeled as a hazardous material. Asbestos-containing materials should not be subject to cutting or breaking as this will result in dust generation. In reconstruction, all workers should avoid crushing/damaging asbestos-containing waste, stockpile such waste at designated locations within the construction site and dispose of it properly afterwards to a special location or landfill.

When asbestos-containing waste is subject to temporary on-site storage, they should be properly contained in leak-tight containers and labeled appropriately as a hazardous material. Safety precautions should be taken to prevent any unauthorized removal of such waste from the site.

10.1. Collection and temporary storage of waste

Asbestos waste generation should be minimized by using efficient technologies.

All asbestos-containing materials should be handled and disposed by qualified and experienced personnel only. The personnel should wear appropriate protective equipment (safety masks, gloves and overalls).

The amount of waste stored at the designated site must not be greater than permitted by the standards.

Industrial waste collection sites and access ways must not be blocked up.

When handling asbestos waste, the workers should necessarily wear special protective clothing, gloves and respirators. Prior to removing (if required) asbestos from the site, it should be treated with a wetting agent to minimize asbestos dust emission. Removed asbestos should never be reused.

Keeping foreign items, individual or working clothes, or personal protection equipment, or having meals at waste collection sites is not allowed.

During handling operations, workers must comply with applicable handling requirements and general safety rules. All operations should be carried out mechanically, using labor-saving lifting and transport equipment.

Hazardous wastes should be transported to the landfills by properly equipped vehicles, either own or of a specialized third party carrier. The transport vehicles should be constructed and used in a manner that prevents potential incidents, losses and environmental pollution both on the way to the landfill and when transferring waste from one vehicle to another. All activities that involve loading, transportation and unloading of waste at main and auxiliary sites should be mechanized and use leak-tight equipment. Opening hazardous waste containers during transportation is prohibited.

Solid and dusty wastes should be transported in special containers or containers fitted with gripping devices for unloading by truck cranes. Transporting unpacked asbestos in open trucks or on flat wagons is not allowed.

Using hooks and other sharp tools in handling operations is not allowed.

No one except the driver and staff members authorized to escort the waste off site is allowed to be in vehicles transporting hazardous waste. The drivers of vehicles that will transport asbestos waste must be trained in safe transport requirements.

All operations in connection with loading, transport, unloading and disposal of waste must be mechanized. The waste must be transported in a way to prevent transportation losses and environmental impacts.

10.2. Disposal of asbestos waste

Asbestos waste must be disposed to landfills for municipal solid waste or unrecycled industrial solid waste.