

KYRGYZ REPUBLIC

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

DEPARTMENT OF WATER RESOURCES AND LAND IMPROVEMENT

AGRICULTURE PRODUCTIVITY AND NUTRITION IMPROVEMENT PROJECT”

ENVIRONMENTAL MANAGEMENT PLAN

For subproject WUA «Ak-Jol-Suu», Nookan rayon, Jalal-Abad oblast

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ABBREVIATIONS AND ACRONYMS

WUA	Water Users' Association
NSR	Night storage reservoir
SAEPF	State Agency for Environmental Protection and Forestry
POL	Petroleum, Oil and Lubricants
HTS	Hydro technical structures
SETI	State Environmental and Technical Inspectorate
DWRLI	Department of Water Resources and Land Improvement
AF	Additional Financing
CDN	Collector and drainage network
EC	Efficiency coefficient
KR	Kyrgyz Republic
LNK	Levoberejnyi Naryn canal (Left bank Naryn canal)
IDA	International Development Association
AHE	Ameliorative Hydrogeological Expedition
Off-farm	Off-farm
LSGA	Local self-government authorities
ES	Environmental safety
E	Environment
PIU	Project Implementation Unit
OIP	Second On-farm Irrigation Project
ISF	Irrigation Service Fee
SVL	Soil Vegetation layer
AISP	Agriculture Investments and Services Project
APNIP	Agricultural Productivity and Nutrition Improvement Project
RSU	WUA Rayon support union
RVK	Rayon Irrigation Department (Rayvodkhoz)
SanPin	Sanitary Regulations and Rules
AAS	Agricultural Advisory Services
GWT	Groundwater table
O&M	Operation and Maintenance

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).

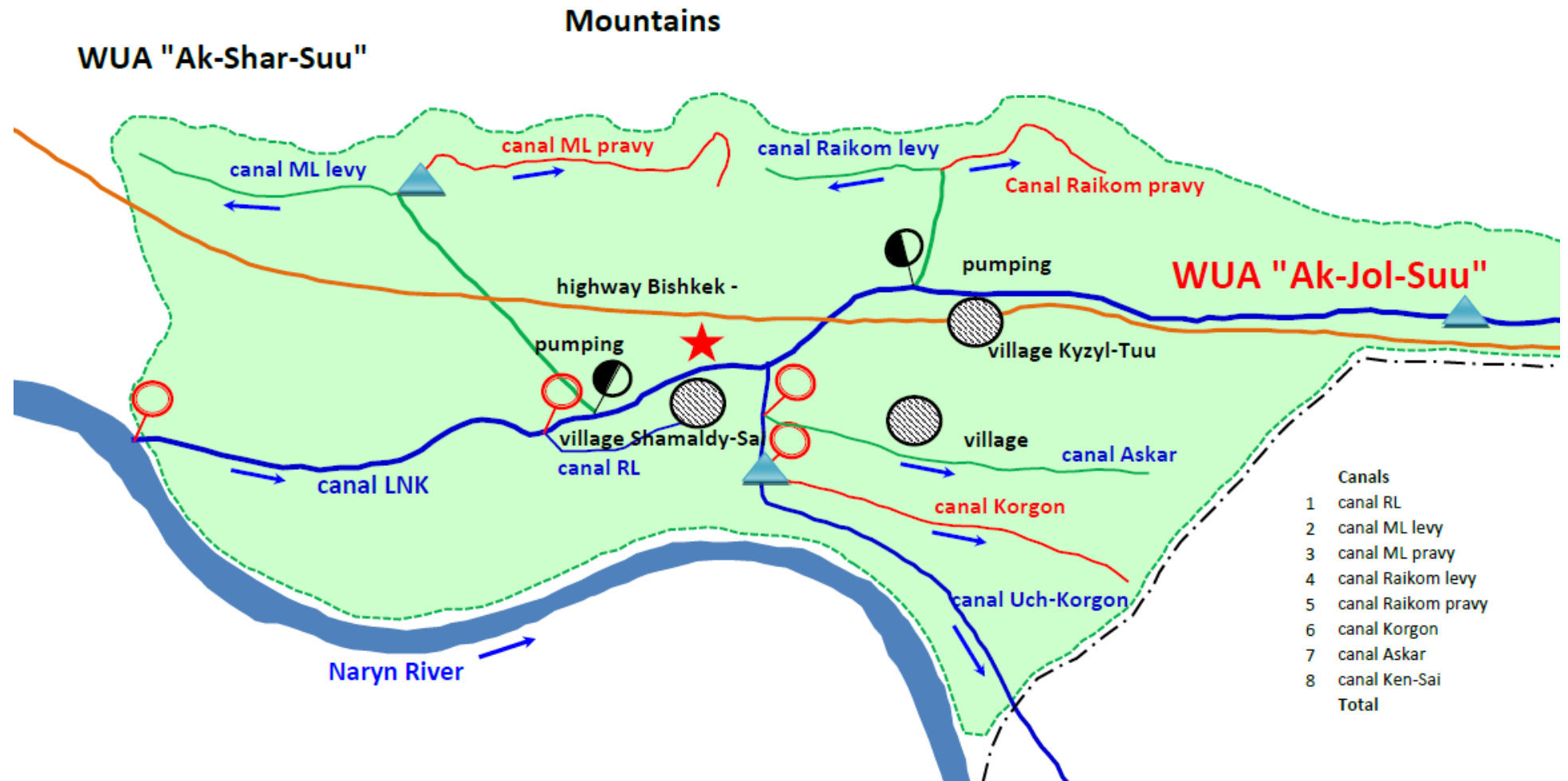
Within APNIP framework the Environmental Management Plan (EMP) prepared. EMP aimed at ensuring that the Project complies with the principles and practices of environmental management and environmental protection policy, and legal requirements of the Government of the Kyrgyz Republic, as well as IDA policy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

The environmental assessment (EA) goals are to identify the subproject's significant impact 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 subproject. EMP also establishes the necessary institutional obligations, proposes timing of the implementation of mentioned activities and cost estimates for the subproject's budget.

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

Based on the general EMP, the Environmental Management Plan (EMP) for the rehab of WUA "Ak-Jol Suu", Nookan rayon, Jalal-Abad oblast has been developed, taking into consideration the specifics of the particular subproject.

Image 1. Layout map of WUA “Ak-Jol Suu” irrigation canals



2. Description of subproject under rehabilitation

WUA "Ak-Jol_Suu" was established in 2002, legal registration dated 02.08.2002 - (certificate №3884-3303-ОЮЛ), in accordance with the Law "On Associations (Unions) of Water Users».

WUA «Ak-Jol-Suu» located within the territories of Dostuk AO, Nookan rayon, Jalal-Abad oblast, and 100 km off the administrative center of Jalal-Abad city.

The WUA service area - 2239 ha. The landscape height is 900-1150 masl. The population of AO- 12,000 people. The WUA includes 39 farming entities, 316 individual farmers, 1 AO (Aiyl Okrug) redistribution fund, and 1408 owners of household gardens. A dirt road network that provides traffic and machinery interconnects WUA objects.

2.1. Technical condition of subproject under rehab

2.1.1. On-farm canals

Half of the WUA "Ak-Jol Suu" service area is irrigated by three pumping stations, which are on the balance sheet of the Nookan RVK. The total length of 8 on-farm canals is 27,8 km, of which 7,1 km are in reinforced concrete flumes, the remaining 20,7 km are in earthen bed.

Due to the deterioration of the prefab, there is the problem of water loss from the prefabs and earthen canals. Difficult water distribution and water accounting due to faulty water outlets and gauging stations, difficult passage of transport through the canals due to the lack of pipe crossings.

The WUA "Ak-Jol-Suu" system does not include NSR or dams. Collector-drainage network within the WUA territories is nonexistent.

2.1.2. Off-farm canals

The WUA "Ak-Jol-Suu" abstracts water from off-farm canals LNK, LNK "Drujba" and "Uch-Korgon" (Naryn river system). The off-farm network in a good condition.

Off-farm LNK canal (Left bank Naryn canal) is on the balance of Nookan RVK and abstracts water from Naryn River by head works. LNK canal was built in 1964, with total length 63,9 km in earthen bed. The command area - 3092 ha, the maximum throughput capacity- 25,0 m³/s. WUAs "Zhany-Aryk-SA", "Ak-Zhol-Suu" and "Kyla" abstract water from the LNK canal.

Off-farm LNK canal "Drujba" is on the balance of Nookan RVK. Moreover, abstracts water from off-farm LNK canal by pipe station "Drujba". Canal LNK "Drujba" was built in 1972. WUAs "Zhany-Aryk-SA", "Ak-Jol-Suu" and "Kyla" abstract water from the LNK "Drujba" canal.

The off-farm canal Uch-Korgon abstracts water from the off-farm canal LNK, with total length -19.3 km in the earthen bed. The command area - 1109 ha, the maximum throughput capacity -8,0 m³/s.

The WUA "Ak-Jol-Suu" system does not include NSR or dams. Collector-drainage network within the WUA territories is nonexistent. As to prevent soil erosion during irrigation on the existing irrigation network, the tail-regulator is intact.

The subproject includes the rehabilitation of on-farm canals. During the examination of the rehabilitated canals and the territory adjacent to them, it has been established:

The canals in earthen beds are overgrown and their throughout capacity is practically reduced to zero, there was no water in the canals;

1. HTS and pipe crossings are destroyed.
2. Canals are passing outside of residential areas; therefore, construction works will not affect the population, including air and noise pollution.

3. There is a large amount of trees and shrubs are growing along the both sides of the canal and needs to be uprooted and cut.
4. The mudflow course passes not far from canal MP pravyi. The project provides for the construction of overchutes.
5. There are no entities that dump toxic chemicals and wastewater into the source of irrigation.

2.2. Description of activities under Subproject

2.2.1. 1. On-farm canal ML pravyi

Canal MLpravyi abstracts water from off-farm LNK canal by LNK pump station. The canal length is 4, 0 km in the earthen bed, 3,176 km of it is to be rehabilitated. The command area - 430 ha, designed throughput - 0, 75 m³/s.

The earth bed passes in gravel-bearing soils, as a result, seepage losses of water are observed. Difficult water distribution due to faulty water outlets. Water is not counted due to a malfunctioning water meter. There are no mudflow structures for mud flood passing.

The subproject provides following workload:

- The construction of monolithic concrete lining at length 3,167 m as to prevent water losses.
- The construction of 10 water outlets and tails as to improve water distribution.
- The construction of HP “fixed bed” as to improve the water accounting.
- The construction of three overchutes to protect the canal from mudflow.
- In addition, the construction of 2 drop structures, a transition section with a pipe crossing.

2.2.2. On-farm canal “Raikom” pravyi”

Canal “Raikom pravyi” abstracts water from off-farm LNK canal by “Raikom” pump station. The length - 3, 6 km in the concrete flumes; 0,378 km are to be rehabilitated. The command area - 250 ha, designed throughput - 0, 2 m³/s.

Due to long-term operation, partial concrete flumes destroyed, resulting the technical water losses. Difficult water distribution due to faulty of turning wells. There are no mudflow structures for mud flood passing.

The subproject provides following workload:

- The dismantling of concrete flumes with following concrete lining of a 250-meter canal, as well as the replacement of 50 reinforced concrete flumes in various sections of the canal with a total length of 300 m, to prevent the water losses.
- The construction of 8 turning wells to be planned to improve the water distribution.
- The construction of 2 overchutes for mudflow prevention.
- The construction of 2 aqueducts made from steel pipes for the water transportation through mudflow courses.
- In addition, the construct a concrete section with overchute, tail escape, and repair of the prefabricated flume section.

2.2.3. On-farm canal “Ken-Sai”

C-I “Ken-Sai” abstracts water from off-farm canal LNK “Drujba. The length - 2700 km in the prefabs flumes; 1088 km are to be rehabilitated. The command area-100 ha, designed throughput - 0,1 m³/c.

Due to long-term operation, prefabs destroyed, resulting in technical water losses. Water distribution is complicated due to faulty of water outlets.

The subproject provides following workload:

- The replacement of prefabricated flumes with following concrete lining at 1088 m length, to prevent water losses.
- The construction of 4 outlet structures for water distribution improvement purposes.

- The construction of pipe crossing.

2.2.4. On-farm c-l “Korgon”

Canal “Korgon” abstracts water from off-farm canal Uch-Korgon”. The length - 5,7 km in the earthen bed, 3167 km of it to be rehabilitated. The command area - 630 ha, designed throughput - 1,0 m³/s.

The earth bed passes in gravel-bearing soils; as a result, seepage losses of water observed. Water distribution is complicated due to faulty of water outlets.

The subproject provides following workload:

- The construction of monolithic concrete lining at length 3167 m, to prevent water losses.
- The construction of 8 water outlets, for water distribution improvement purposes.
- The construction of distribution structure and 4 turning wells.
- The construction of 2 bridge crossings for transport passage.

Within the rehab workload plan, it is expected to reduce water losses and improve the overall water use efficiency. There are no major problems with the drainage in irrigation network. After canals and structures rehabilitation in the WUA “Ak-Jol_Suu”, the subproject provides the rational irrigation of the irrigated areas, in accordance with the irrigation practice.

All canals will be reinforced with necessary structures that facilitate the canals function (gauging stations, water outlets, bridge crossings, etc.), which will give an aesthetic appearance to canals and easy operation, reduce the alienation areas under canals.

The rehabilitation of the reservoirs and dams not planned. Thus, the policy on irrigation dams and reservoirs (Dam safety - OP 4.37) is not applicable.

The construction workload deadlines: 2019-2021.

3. Description of environmental parameters at the site

3.1. Climate

The rayon climate is characterized by observations of meteo-station (m/s) “Masy”. The rayon climate is characterized with long hot summer and short moderate cold winter periods:

- | | |
|--|---------------------------|
| • Average annual air T° | +11,9° |
| • Average annual air T° in vegetation period | +22,6° |
| • Absolute maximum of air T° | +42° |
| • Absolute minimum of air T° | -23° |
| • Average maximum air T° of hottest month | +33,5° |
| • Average annual precipitation volume | 470 mm |
| • Annual amount of liquid precipitation | 389 mm |
| • Ground load snow per 1 m ² of horizontal ground surface | 51.0 kgf / m ² |

3.2. Landscape

The nature of the modern landscape in the WUA "Ak-Jol-Suu" is attributed to the southwestern spurs of the Fergana ridge of the Tien-Shan.

According surface on the territory of the WUA “Ak-Jol-Suu”, there is a geomorphological zone of the foothill plains, which is genetically associated with the erosion-accumulative activity of rivers, streams and temporary canal ways. The absolute masl ranges from 900-1150 m.

The object is located on the territory, the general slope of which is directed from north to south. The canals are mainly designed with a slope from northeast to southwest.

3.3. Hydrology

The Naryn River is a main irrigation source of Dostuk AO lands in Nookan rayon. The Naryn River flows through the territory of Kyrgyz Republic and Uzbekistan, is the main component of the Syr- Darya River.

It starts from the glaciers of the Ak-Shyrak massif, then merging with the Kara-Darya River, gives rise to the Syr- Darya River. The length - 578 km, which 213 km within the territory of Jalal-Abad oblast. The main nourishment of river due to streams issuing from glaciers. According to the water regime it refers to the rivers of the Tien Shan type with flood in the warm season. The standard annual water consumption - 420, 0 m³/s.¹

3.4. Engineering and geological conditions

Alluvial-proluvial sediments represent the geology-lithological structure along the WUA on-farm canal route. Under the soil-vegetation layer, there are mainly loamy soils deposited. Loesslike loamy soils are deposited on the surface with a thick layer. Loams are of light-gray color, dry macroporous, hard, with the inclusion of carbonate sediments. The thickness of the soil vary from 0,6 to 2,0 m. Gravel soils are located below the loams.

The physical properties of loams characterized by the following data:

• gravity water content	7,87%
• actual weight	2,71 g/cm ³
• the volume weight	1,61 g/cm ³
• dry density	1,49 g/cm ³
• plastic index	9,2
• the maximum molecular moisture content	15,79%
• porosity ratio	0,815
• water permeability	20,0 m/day

The loams development difficulty belongs to group II. Standard weight value is up to 2,0 kg/sm² (SNiP IV-5-82). Gravel soil with sandy aggregate up to 40% and gravel-stone content up to 10%. The dry density of soil is 1.85 t/m³. By the difficulty of manual development, gravel soil belongs to the III-construction category. The thickness of the gravel soil is more than 10.0 m. The depth of groundwater is more than 90.0 m. Stony, non-cultivated soils are absent. The seismicity of the area of work is IX points.²

3.5. Vegetation cover

The vegetation cover is represented by trees, shrubs and herbs.

The soil and vegetation layer (SVL) will be disturbed during construction, since straightening of some new canal beds is planned. Thus, in the workloads plan it is necessary to provide locations for SVL storage, or let the local authorities and residents handle it for use in agricultural and landscape activities.

There are tree and shrubbery cover alongside of the canals. During the rehab of canals, it is necessary to uproot trees that complicate conducting workload, and which are within the alienation zone of water management 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,

¹ Ramazan M. S. some features of the hydrological regime and hydrotechnical classification of rivers of Kyrgyz Republic

² The geotechnical data are provided from the working documentation of the object "Rehabilitation of the Sakaldy-Suu WUA irrigation system" in the Nookan rayon of the Jalal-Abad oblast (PIU-OIP-2).

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 authorized environmental protection agencies/bodies. Prior to commencement of work, WUA has to agree with authorized environmental protection agencies/bodies on tree and shrubbery cutting and necessity of compensatory measures.

4. Description of procedures related to regular operation works

4.1. Technical supervision on canals and structures conditions

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 throughput, minimum filtration and performance specification of water losses, and 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 joint sections construction of a canal are the subject of constant surveillance. The damaged lining must be reworked immediately.

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 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 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 reworked.

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 prefabs it is prohibited to dissolve various types of fertilizers that may cause destruction of concrete. It is also not recommended the prefabs 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, dipping and etc. allowed on a special canal's section only.

To monitor the quality of irrigation water and prevent a canal's sedimentation, RSU WUA must regularly inspect the water samples 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. To the controlling 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 lining.

4.3. Looking after wood lines and access roads

The forest plantations alongside of canals are designed to protect 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 farming network that require constant desilting interventions, it is recommended to plant, 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 the distance between greenery strips of 1.5.... 3 m.

The field and on-farm access 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. The roadside cuvettes and canals must be cleaned of dirt and vegetation. To improve 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 and 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 in dams; (liquidation)
- structural cracks maintenance after ice impact;
- tightening fixing bolts;
- drainage structures winterization etc.

The preventive repair and a significant part of the current repair, including desilting of canals, vegetation and landslides removal, a minor canal repair(s), repair of structures, buildings and other devices are performed annually without stopping a system's operation.

Major repair is carried out, as required, after 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 to solve a contingency case(s).

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. When precipitated, they form stream-bed deposits. The content of solid particles, per water volume unit, characterizes the water flow saturation with sediments, or its turbidity.

Sediments, often, are formed because 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 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. Dust particles are carried into on-farm irrigation network.

On average, about 80% of sediments remain in the off-farm canals network and about 20% inflow 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

The 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 (sub)projects demonstrate positive impacts on the environment. Namely, this subproject is aimed at reducing water losses in irrigation schemes, improving water resources management, improving agricultural productivity and improving soil fertility.

The design works require compliance with a number of mandatory requirements, including requirements to comply with noise reduction, air quality, timely removal of solid, liquid household waste and construction debris. The requirements to prevent environmental pollution and negative impact(s) on the population are ensured in the Law of the Kyrgyz Republic "General Technical Regulations for Ensuring Environmental Safety in the Kyrgyz Republic", in the Law "On Production and Consumption Wastes", in the Law "On Air Protection", in SanPiN "Noise at workplaces, in premises of residential, public buildings and in the territory of residential buildings" the Gov.KR dated 11.04.2016. №201,

5.1. Expected positive environmental impact

The positive impact consists of:

- Lining the canals with monolithic concrete will reduce filtration in the canals, as a result, water losses will be reduced;
- 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 executing irrigation network (re)construction 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. Climate change impact

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 2. 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 because 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, because of storage of construction and household waste, including liquid wastes.	Direct	Short-term	Immediate or postponed	Low	Low	Reversible	Low
Unloading of excavated soil during construction of a new canal's bed during the (re)construction work	the landscape deterioration, destruction of natural habitat of the animal world	Direct	Mid-term	Immediate	Low	Low	Reversible	Average
Construction materials transportation and use of heavy machinery	Air and noise pollution impacting on laborers/population during heavy machinery and vehicles use	Direct	Short-term	Immediate	Low	Moderate	Reversible	High
Canals rehabilitation	1) Damage and trees felling and shrubbery cutting 2) SVL removal	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	Direct	mid-term	Immediate	Low	Low	Reversible	Average
Increase in irrigation water delivery, which	Surface water pollution with agrochemicals, as a result of	Indirect	Mid-term	Delayed	Moderate	Moderate	Reversible	Average

increases the volumes of waste water	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 and with existing landscape inclination in WUA	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. Excavated soil-vegetation layer will be transferred to the local authorities or WUA members to apply for agricultural purposes or/and landscape improvement.

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 necessity to apply mitigation measures, during O&M, is identified exactly in the process of environmental monitoring.

7. Health and safety at work

In accordance with the KR's legislation requirements, concerning occupational health and safety, as well as the World Bank protective policies, the EMP has developed measures to protect health and safety during the (re)construction work under the subproject, which are presented in Table 2.

Developed and approved by order №8/п of the PIU Director, dated March 16, 2018. The regulation "Requirements for environmental protection, occupational health and safety to people involved in work and the provision of services at facilities implemented as part of the World Bank's project "Improving Agricultural Productivity and Nutrition" had been developed and approved by the PIU Director's Order No. 8/p, dated March 16, 2018. The regulations are sent to all subcontractors involved in rehabilitation and (re)construction works under this subproject.

Control over compliance with safety at a construction site will be carried out by the PIU, state control executed by the State Inspectorate of Environmental and Technical Safety under the Government of the Kyrgyz Republic.

Table 3: Mitigation plan

Phase	Subject	Preventive/mitigation activities	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 797 965	PIU/Contract or	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 laying a canal's route	1) soil transportation to the designated areas, approved by the local authorities; 2) executing rehabilitation and planning activities	n/a		PIU/Contract or	Contractor	1) A Contractor bears responsibility to execute environmental mitigation interventions; 2) A construction site inspections made by PIU; 3) State Ecological Inspectorate
	1) Trees and shrubbery cover;	Coordination with the specially authorized environmental protection agency/body cutting greenery plantations that grow outside of a canal's alienation zone;	n/a	Part of the (re)construction works contract	PIU/Contract or	Contractor	1) A Contractor bears responsibility to execute environmental mitigation interventions;

	2) SVL excavations	2) SVL handled by WUAs or local authorities					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 safety of staff; 2) SETI on- site inspections;
	Health and safety at work	1) Work sites will be equipped with appropriate information boards and signs informing workers about work rules and regulations; 2) Easily accessible and complete first aid kit to treat an injury. 3) ensuring personal protection equipment (helmets, protected shoes, gloves);	n/a	Part of the (re)construction works contract	PIU/ Contractor	Contractor	1) A Contractor bears responsibility to execute employee safety measures 2) SETI on- site inspections;

	Population safety	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 employee safety measures 2) SETI on-site inspections;
Operation	Threats to water quality due to contamination by agrochemicals	<ul style="list-style-type: none"> - 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 RSU on-site inspection, approval and coordination with SETI
	Increased of soil erosion	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - education on environmental mitigation activities; Compliance of irrigation norms and regulations.	n/a	n/a	AAS/AISP		RSU on-site inspections

Table 4. Environmental monitoring plan

Project Phase	Parameter	Location	Method/Equipment	Frequency	Objective	Inputs		Responsibility	
						Organization	Performance	Organization	Performance
Baseline	Salinity, concentration of hydrogen ions (pH), water turbidity	Head and tail part of rehab canal,	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	RSU	Water sampling and analysis.
Construction	Environmental Management Plan	subprojects under rehab	visual inspection of a subproject	before, during and after (re)construction completion	Ensuring implementation of planned activities under EMP	0	Insignificant	Contractor or PIU	Contractor PIU
	Salinity, concentration of hydrogen ions, turbidity	Canals under rehabilitation, located upstream and downstream of the rehabilitation site	Field equipment for parameters measurement	Before, during and after (re)construction completion	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	When suspected of contamination. Downstream of rehabilitation subproject	Sample for laboratory analysis	During construction	Assessment of construction works impact	0	100 USD	Contractor	Accredited laboratory Water sampling and analysis. Introduction of results to PIU

Operation	Salinity, concentration of hydrogen ions, turbidity	upper and tail reach of irrigation system of Naryn river	Field equipment for parameters measurement	At the beginning, in the middle and at the end of vegetation season	irrigation and waster waters quality control	0	Insignificant	RSU	RSU
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7. Stockpiling, transportation and disposal of asbestos containing materials/wastes

Asbestos-containing materials disposal will be executed in accordance with the local legislation, including construction standards, occupational health and safety regulations, emissions of harmful substances into the atmosphere, disposal/removal of construction and hazardous wastes (in cases of a specific domestic legislation absence, the European Parliament Directive 2003/18/EU, which amends and updates the EU Directive 83/477/EEC on protection of workers against workplace exposure to hazards from asbestos and asbestos containing materials: the air pollution thresholds are 0.1 fiber/cm³, and also use the recommended standards Notes: Asbestos: “Health problems at the workplace and in the community”, the World Bank). The asbestos materials are subject to immediate unconditional disposal/entombment in special conditions.

In accordance with the Government of the Kyrgyz Republic’s Order No. 885 "On Management of Hazardous Wastes in the Kyrgyz Republic, December 28, 2015," asbestos-containing wastes should be disposed the following order:

- The process of handling hazardous wastes (waste lifecycle) consists of the following stages: generation, accumulation (collection, temporary storage, stockpiling), transportation, neutralization, recycling, reuse of processed products and disposal/entombment.
- If there is asbestos on a construction site, it should be clearly marked as a hazardous material. Asbestos-containing materials should not be cut or destroyed, as this leads to dust formation. During the (re)construction, all workers should avoid crushing/destroying the asbestos-containing waste, store such waste(s) in designated areas on a construction site and properly dispose thereafter in a special place or landfill.
- When asbestos-containing wastes are to be temporarily stored at a designated area(s)/construction site, they should be properly placed in sealed containers and marked appropriately as a hazardous material. Precautions must be taken to prevent unauthorized disposal of such wastes from a designated area/site.

7.1. Storage and stockpiling

- The asbestos containing materials extraction should be minimized by using efficient technologies.
- All asbestos containing materials should be recycled and disposed by the experienced specialists. The specialists are obliged to wear protective outfit (face masks, gloves, uniform)
- The stockpiled wastes, on a designated area(s), should not exceed established volumes/requirements.
- The access roads for removal of industrial and construction wastes from a designated area(s) should not be obstructed.
- While handling asbestos containing wastes, all operating staff members should wear protective outfit (facemask, gloves etc.). Prior to removal of asbestos waste (if necessary) the stockpiled area should be treated with a moisturizing agent to minimize emission of asbestos containing dust. Disposed asbestos should not be reused.
- Storage of inappropriate items, individual protective or working outfit is strictly prohibited at the designated asbestos waste(s) locations.
- During handling operations, all workers should strictly follow the asbestos treatment requirements, and health and safety requirements. All operations should be executed with the use of mechanized machinery, elevating and transportation equipment.
- Hazardous waste(s) should be transported by the superficially equipped Vehicles to the landfill locations, either contracted, or owned. The Vehicles should be designed and used in such a way, as to prevent possible incidents, losses and pollution of the environment, both on the way to the disposal site location, and during the (re)loading of waste from one vehicle onto another. All types of handling and transportation of waste operations from/to the main

and supporting facilities should be mechanized, and an airtight equipment used. It is strictly prohibited, during the transportation, to open the hazardous waste containers.

- Solid and dusty wastes are the subject of transportation in a specially designed containers, equipped with gripping devices for (un)loading by cranes. The transportation of asbestos wastes on the open-bed vehicles and railway cars is strictly prohibited.
- The use of hooks and other sharp tools, while processing the waste, is strictly prohibited.
- The driver of the Vehicle, transporting hazardous waste and authorized accompanying staff only, are allowed on the Vehicle(s). The Driver(s) must be aware of the safe transportation requirements.
- All handling, transportation, (un)loading and disposal of waste must be mechanized. The waste must be transported in such a way, as to prevent transport losses and impact on environment.

7.2. Disposal of asbestos containing wastes

- Asbestos-containing waste must be disposed in municipal solid waste dumps or non-recyclable industrial solid waste damp-yards.

8. Legislative support

In the Kyrgyz Republic, there are a number of environmental protection laws, regulations and requirements, which address the specific issues of environmental protection. Table 5 summarizes the legal norms relevant to the subproject.

Table 5: The main subordinate legislations, regulations and requirements

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, and transportation and production disposal.
Law on environmental expertize (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 on the workplaces, in premises of residential, public buildings and on the territory of residential buildings" the Governmental decree of the	Establishes a 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

KR, dated 11/04/2016. №201,	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 multiple 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 the international importance for the waterfowl's main habitat (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).

9. Awareness rising campaign, consultations and public attendance

9.1. Public consultations

In accordance with Operational Procedures OP4.01.³ The WB has special requirements for disclosure of information and public consultations. The disclosure includes introduction of information about the Project affected population (PAP) and other stakeholders, from the Project's early implementation cycle, and throughout lifecycle of the Project. The information disclosure is intended to facilitate comprehensive interaction with the Project affected population, and stakeholders throughout the lifecycle of the Project.

Moreover, 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 the objectives and environmental considerations of the Subproject.

Public hearings in the WUA "Ak-Jol Suu" took place on June 21 in the Dostuk AO of the Kemin rayon of the Jalal-Abad oblast where 29 people took a part: WUA representatives, local authorities, farmers, RSU WUA, PIU project designer.

At the public hearings, information was provided on the technical decisions of the project and the environmental impact of the project, as well as measures to be taken to prevent and mitigate the impact. The minutes of Public hearings, the list of participants and pictures, are attached.

The EMP is uploaded on the APNIP website in "environmental reports" section: <http://apnip.water.gov.kg/en/reports/environmental-reports/>.

9.2. Grievance redress mechanism (GRM)

³ World Bank Project Operational Manual OP 4.01, «Ecological assessment», clause.3.

Objective. The primary target of GRM and population's statements is identification, registry and assistance in solving complaints that were stressed during the Project activities.

The GRM main principles are:

- (i) Protection of Citizens' rights;
- (ii) Transparency;
- (iii) Accessibility to a free GRM mechanism and without follow-up prosecution;
- (iv) Appropriateness, from the point of local cultural sensitivities view;
- (v) Personal responsibility for the performance duties;
- (vi) Accountability of during the GRM consideration and applications by the PIU.

Complaints and applications filed in accordance with the established procedure are subject to a mandatory review, refusal to admit is not allowed. Complaints and applications of citizens, without indication of the name and postal address, to which the reply should be sent, are considered anonymous and are not subjected to revision.

The GRM does not hinder the right of citizens to applying into the Judiciary authorities. Citizens have the right to apply to the court, or other state bodies for the resolution of emerging issues related to the violation of their rights, emerged under the Project.

For the GRM implementation, the PIU and WUA created a register of complaints and statements from the population. Moreover, anyone can apply to the PIU in an online format at: <https://mail.rambler.ru/m/redirect?url=http%3A//apnip.water.kg/%25D0%25BE%25D0%25B1%25D1%2580%25D0%25B0%25D1%2589%25D0%25B5%25D0%25BD%25D0%25B8%25D1%258F-%25D0%25B8-%25D0%25B6%25D0%25B0%25D0%25BB%25D0%25BE%25D0%25B1%25D1%258B/&hash=8ef50d487d10168e5d891f2d9dd443cd>

9.2.1. General process of complaints investigation

- In the process of the assets assessment, PAP will be introduced to the information concerning filing and reviewing procedure.
- The first step in the process of handling complaints will be a personal verbal appeal to the Subproject representative, local authority, or by phone, (the mobile phone number will be provided on the information board of AO's office, and posted in ads in places frequented by the population). If the problem cannot be resolved within 5 days, consideration of the complaint will be done at the next level.
- An aggrieved person can file a complaint on the issue related to the process of resettlement or compensation, in written form, to the PIU APNIP Director. A complaint must be signed and dated by an aggrieved party. The APNIP social affairs consultant will maintain a direct link with the PAP. The PIU will determine the validity of a complaint and notify an aggrieved person that he/she will be assisted. The answer will be provided within 14 working days, during which meetings and discussions will be held with an aggrieved person.
- If a complaint concerns an asset assessment at the expense of the Subproject, a secondary or even a third, assessment of an asset will be carried forward, until both parties accept it. The follow-up assessments can also be carried forward by an independent appraiser(s) at the expense of an aggrieved party. The PIU will assist to an aggrieved party at all stages to resolve a complaint and ensure that a complaint is treated the best of breed.
- If, after receiving a response from the PIU, an aggrieved party remains unsatisfied, then a complaint is considered in the working group of the Project under AO, which will be established by the head of AO's resolution, from the members of the Local AO deputies, WUAs representatives, local dignitaries and the PIU specialists.
- In case of an objection, regarding to the working group decision, which is provided within 30 working days, the PAP may appeal to the court.

9.2.2. Management of registered complaints

A local representative of the Subproject should ensure a weekly transfer of received complaints from the PAP to the PIU, as well as the first instance consideration result(s). The local authorities should work with complaints in accordance with the established order and should file the complaints and proposals in the processing registry.

The PIU upon receipt of an information, the social consultant should ensure that each complaint has an individual identification number and a progress report in reviewing each complaint reflected in the FRP, which identifies a person(s) responsible for each individual complaint and recording the dates of the following events:

- the date of filing a complaint;
- the date of entering a Complaint(s) Registry in the Project database;
- the date when the information on the proposed solution measure(s) was sent to an aggrieved party (if applicable);
- The response date to an aggrieved party.

The general information on complaints received (number, type of complaint); progress in resolving it and problems encountered, and should be included in the Subproject's periodic reporting submitted to the World Bank.

10. The minutes of Public hearings

The minutes of public hearings on environmental protection and social issues in WUA «Ak-Jol-Suu», Nookan rayon, Djalal-Abad oblast, the World Bank, "APNIP"

Dostuk AO

June 21. 2019.

Attendees:

Batyrbekov. A. – WUA Chairperson;

Turdaliev. I.- WUA «Ak-Jol-Suu» Director;

Saftenko V. – Ch.engineer APNIP;

Ajimatov A.- Engineering coordinator, PIU APNIP (south);

Neronova. T. – National environmental consultant, PIU APNIP;

The public hearing was attended by 29 people; waterusers, representatives from farming entities, WUA members, of which 6 women. The list of attendees is applied.

Chairperson – Batyrbekov. A.

Ajimatov. A.– introduced an information concerning the APNIP and informed about the projected rehab workload for on-farm network».

Neronova T.- has explained about the Kyrgyz Republic's environmental legislation requirements and the World Bank's policy on environmental protection under the Project. The task of environmental assessment is to identify the Project's significant impact on the environment (positive and negative), identify appropriate preventive measures and mitigation measures aimed at preventing, minimizing or eliminating any expected irreversible impact(s). The experience of previous projects demonstrates the positive impact of the Project on the environment. In fact, many positive impacts of projects have been identified during the environmental assessment. Namely, this Project is aimed at reducing water losses in irrigation schemes, improving water management, scaling up agricultural productivity and improving soil fertility.

At the same time, while carrying out civil works on (re)construction of irrigation networks, there may be some potentially negative impacts on environmental protection conditions in projected areas that may need attention, to undertake preventive actions and appropriate mitigation measures during planning, development, construction, operation and maintenance.

- No asbestos-containing materials will be used for the planned rehabilitation of irrigation networks, noting that previously asbestos-cement pipe crossings were used. But even in the past years they were dismantled and replaced with structures of more inert materials. Thus, no problems with asbestos-containing materials are expected.
- Potentially negative impacts are relatively small and positive economic, social and environmental benefits far outweigh them in environmental assessment. Consideration of these impacts is given below.

The main impact(s) that can be seen as a result of the (re)construction works:

- 1) Soil pollution on construction site.
- 2) Groundwater pollution on construction site.
- 3) Deterioration of the landscape, destruction of the natural habitat of the animal world, changing the local drainage network.
- 4) Air pollution and impact on workers/population during traffic and heavy equipment operation.

The site specific EMP is composed for each of the rehabilitation subproject to prevent or mitigate the negative impact of the construction works. It includes a mitigation and monitoring plan, both for the construction phase, and for the O&M phase. All the risks of the (re)construction phase are easily controlled and eliminated. They can be minimized by properly designing mitigation measures and controlling the Contractor, while carrying out the works.

Moreover, all WUAs have a complaint form and GRM. The ecological and social issues were also discussed, the main goals of which are constant surveillance on public opinion, awareness raising campaign to deliver a message to the stakeholders, while under rehab and modernization of irrigation network. In addition, the PIU site (www.apnip.water.gov.kg) has a separate section on appeals and complaints, where anyone can send their appeal or complaint about the Project's activities. For effective monitoring and management of complaints of the population and GRM, the PIU maintains a database of appeals and complaints.

Questions:

Turdaliev I. – Will the state bodies be controlling the (re)construction works?

Neronova T.– Prior to the commencement of works, the subproject is submitted for assessment to the state environmental bodies. Only upon receipt of a positive conclusion from the state environmental body the subproject can be started. During construction, the SIETS will maintain controlling functions. The Subcontractor is responsible for the implementation of activities specified in the EMP.

Batyrbekov A. – Who gives permission for waste disposal, SIETS or aiyl okmotu? Where the construction and household waste will be removed after (re)construction?

Neronova T.– **All types** of wastes will be buried at designated by the local authority landfills and the subcontractor will be in charge for it

Botobekov T. – How the (re)construction works, such as noise, air pollution, exhaust fumes, speed limits will impact the local residents? Does the EMP include articles and activities to mitigate consequences of (re)construction and executing workload during the day time only?

Neronova T.– The EMP includes measures aimed at preventing pollution of water bodies. The water quality monitoring in the canals will be conducted by the rayon's waterusers' support unit. They will conduct express analyzes of water for mineralization, acid-base analysis and water turbidity.

Ismailova C. - Tree and shrubbery felling within alienation zone(s) is permission needed for it? What is GRM?

Neronova T.– During surveying of canals it was found that there is some greenery within those zones. Thus, WUA has to compose the formal letter with the request to cut greenery to the Djalal-Abad territorial environment protection department, and they will consider this issue. And in accordance with the Water Code of the KR, art.80, a permission for greenery cutting/felling is not required as they grow within a canal's easement zone.

Neronova T.– local residents who have questions and concerns during the (re)construction works can make an entry into the complaints register. If WUA/wateruser will not receive a response, the complaint will be submitted to the PIU APNIP for follow-up revision.

Saparaliev S. - Who is eligible to compose a complaint?

Neronova T.- Any member of WUA or local resident is eligible to compose a complaint, which could be done in any moment, either in written, or verbal form during preparation or execution stage.

At the end of the meeting, all attendees have supported implementation of the subproject and expressed their acknowledgement.

Chairperson

Batyrbekov A.

Environmental specialist

Neronova T.



Image # 1. Public hearings in WUA “Ak-Jol-Suu”, June 2019.

11. Images



Image # 2. Canal ML pravyi in earthen bed, June 2019



Image # 3. Construction site of distribution well with outlet on c-l Korgon, June 2019.



Image # 4. Canal Kenesai in flumes, June 2019.



Image # 5. Public hearings in WUA “Ak-Jol-Suu”, June 2019.