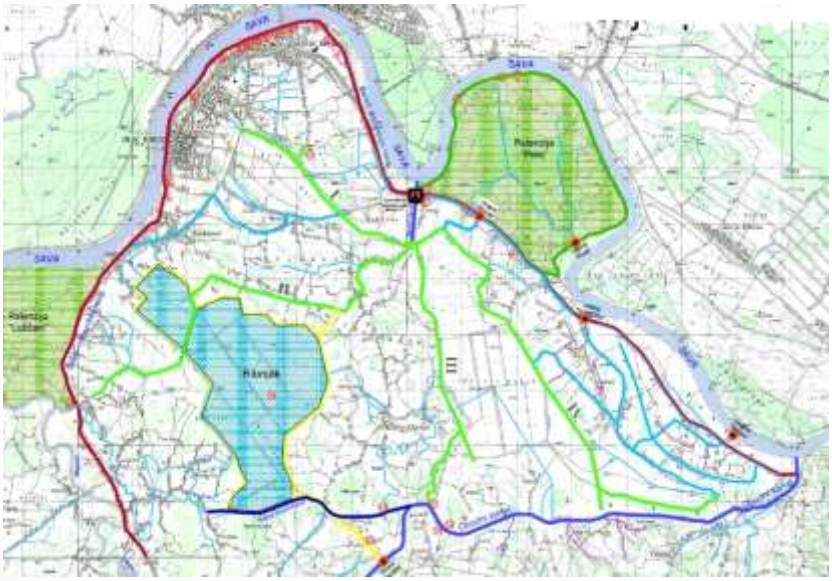
AGRICULTURE RESILIENCE AND COMPETITIVENESS PROJECT
ARCP (P171266)

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)



REHABILITATION AND RECONSTRUCTION OF THE CANAL NETWORK IN THE IVANJSKO POLJE MUNICIPALITY OF BROD (CONSTRUCTION OF SLIDE GATES WITHIN PRIMARY INTERNAL CANAL III AND IV)

(DRAFT)

March, 2025

CONTENT

LIST OF TABLES

LIST OF PICTURES

ABBREVIATIONS AND ACRONYMS

APCU	Agriculture Project Coordination Unit
APIF RS	Agency for Intermediary, IT and financial services of the Republic of Srpska
ARCP	Agriculture Resilience and Competitiveness Project
ARDP	Agriculture and Rural Areas Development project
BH	Bosnia and Herzegovina
CFD	Central Feedback Desk
CLC	Corine Land Cover
DTM	Digital Terrain Model
DWTP	Drinking water treatment plant
ESMF	Environment and Social Management Framework
ESMP	Environmental and Social Management Plan
ESF	Environment and Social Framework
ESSs	Environment and Social standards
ETc	Crop Evapotranspiration
FBH	Federation of Bosnia and Herzegovina
GBV	Gender-based violence
GRM	Grievance redress mechanism
GRS	The World Bank Grievance redress system
GIS	Global information system
HEC-RAS	Hydrologic Engineering Center River Analysis System
IDA	International Association for Development
IDP	Irrigation development project
IPA	Pre-accession instrument
LCOs	Local Complaints Offices
LCOr	Local Complaints Officer
LMP	Labor Management Procedures
M&E	Monitoring and evaluation
MoAFWM RS	Ministry of Agriculture, Forestry and Water Management of the Republic of Srpska
MoSPCEE RS	RS Ministry of Spatial Planning, Civil Engineering and Ecology
NGO	Non-governmental organization
PAP	Project affected people
PDO	Project development objectives
PUCs	Public Utility Companies
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
RHMI RS	Republic Hydrometeorological Institute of the Republic of Srpska
RS	Republic of Srpska
SEA/SH	Sexual exploitation and abuse and sexual harassment
SEP	Stakeholder Inclusion Plan
SRHMI RC	State Republic Hydrometeorological Institute of the Republic of Croatia
UC	Utility Company
WB	The World Bank
WUA	Water Users Association

SUMMARY

The Agriculture Resilience and Competitiveness Project (ARCP - P171266) is an investment project financing through a Loan and implemented under the auspices of the World Bank (WB) in Bosnia and Herzegovina's two entities: the Republic of Srpska (RS) and the Federation of Bosnia and Herzegovina (FBH). The general goal of the ARCP project is to improve the resilience of the agricultural sector through increased productivity, better market connectivity and increased food quality and safety, while the Project Development Objective (PDO) is to improve the resilience of the agricultural sector and increase competitiveness towards EU market access.

Environmental and Social Management Plan (ESMP) covers the activities carried out under the prepared sub-project "Rehabilitation and reconstruction of the canal network in the Ivanjsko Polje drainage area/construction of slide gates between primary internal canal III and IV, (total length approx. 15 km). This site-specific sub-project refers to the improvement of the existing infrastructure, i.e., modernization and improvement of primary internal canals III and IV, as well as the construction of slide gates in eight separate locations.

This document is based on two completed designs: "The main design of rehabilitation and reconstruction of the canal network in Ivanjsko Polje" financed by the EU and "The main design of the construction of slide gates on the system of primary internal canals III and IV of the drainage system and peripheral canal of the Ukrina-Sava rivers".

The ESMP documents the specific measures, responsibilities, protocols, and monitoring required to manage a subproject's environmental and social risks and impacts throughout its life cycle. It was developed per the adopted Environmental and Social Management Framework (ESMF) for the ARCP project and represents a practical plan for implementing environmental and social standards at the ARCP project level. The ESMP aims to provide a clear and concrete guide for implementing measures that minimise the project's negative environmental and community impacts. ESMP offers detailed instructions on protection procedures, roles and responsibilities of project participants, and how to monitor and assess environmental and social impacts during implementation.

The Ministry of Agriculture, Forestry, and Water Management of the Republic of Srpska (MoAFWM RS) and the Agriculture Project Coordination Unit (APCU) are responsible for implementing the ARCP and this Sub-project. To comply with the requirements defined by ESMF for ARCP, APCU has prepared this ESMP for sub-project “Rehabilitation and reconstruction project of drainage canal no. III and IV with the construction of 8 slide gates, in Ivanjsko Polje, Municipality of Brod”, which was preceded by a Screening and is a result of the risk classification.

APCU has experience in implementing World Bank-funded projects such as ARDP, IDP and other externally funded agricultural sector projects. In the past period, APCU served as the main unit for preparing and implementing agriculture and irrigation projects in the RS. APCU has expert staff for agriculture and water management, as well as staff for procurement, financial and project management, monitoring, and reporting. As part of APCU, experts in the field of environmental and social issues are also engaged, and they will be engaged in the implementation of this ESMP. Still, the main burden of the ESMP in implementation will be on the Contractor. The ESMP will be incorporated in the Bidding Documents for selection of the Contractor for which APCU will use the applicable Standard Bidding Documents of the World Bank
APCU, in previous arrangements with WB, successfully implemented together with the project municipalities several projects in RS where investments were made in irrigation infrastructure: in Ljubinsko Polje in municipality of Ljubinje; in 20 local communities of Bratunac municipality; in Novi Selo, Donji Crnjelov and Batkovic in the municipality of Bijeljina, Gojkova and Stakica Polje in the municipality of Pelagicevo, Trebinjsko Polje and Petrovo Polje in the municipality of Trebinje, etc.

1. INTRODUCTION

1.1. Brief description of the project

APCU is implementing the ARPC project to help the agricultural sector's resilience through growth, productivity, better market linkages, and strengthening food quality and safety.
The ARCP project is implemented through four components:

Component 1: ENHANCING PUBLIC SUPPORT RESILIENCE AND TRACEABILITY
with sub-components:

- Sub-component 1.1 – Enhancing Agriculture Information Systems.
- Sub-component 1.2 – Supporting Climate-resilient agriculture.

Component 2: IMPROVING AGRICULTURE PRODUCTIVITY, ADAPTATION TO CLIMATE CHANGE, AND ENHANCING LINKAGES WITH MARKETS
with sub-components:

- Sub-component 2.1 – Strengthening Value Chain and Developing Productive Partnerships.
- Sub-component 2.2 – Improving irrigation and drainage systems for climate change adaptation. This subcomponent will help improve the development and management of irrigation and drainage systems in the RS and strengthen climate-smart agricultural practices as two key elements of the resilience and adaptation program in agriculture. Experiences with the recently completed Irrigation Development Project[1] have shown significant potential for improving agricultural production and productivity, thereby increasing farmers' income, especially when irrigation water is used to produce high-value agricultural products. In RS, access to irrigation enables earlier planting and creates opportunities for double vegetation and crop diversification - all aspects that are crucial for obtaining higher prices due to the possibility of early entry to the market and increased productivity per hectare due to more intensive use of available land.

  The sub-component supports (a) selective development of new and rehabilitation of existing irrigation and drainage systems where it is proven that they economically and sustainably increase agricultural productivity, support diversification towards higher value crops, improve agricultural export competitiveness, revitalize the rural economy and increase the resilience of production to climate impacts change; and (b) strengthening institutional and financial arrangements for the sustainable operation and maintenance of irrigation and drainage systems and improved water resources management planning.

Component 3: FOOD QUALITY AND SAFETY ENHANCEMENT, with sub-components:

- Sub-component 3.1 – Food quality and safety standards.
- Sub-component 3.2 – Information Technology (IT) Systems for Food Safety Enhancement.

Component 4: PROJECT MANAGEMENT

Planned activities under sub-component 2.2 include improving irrigation and drainage systems to adapt to climate change, which were prepared within the Irrigation Development Project (IDP project) framework. Several other potential irrigation and drainage canal networks need to be considered for support under the ARCP according to the agreed criteria, for which project documentation has yet to be prepared.

[1] IDP RS Complete report

Activities within the Project are planned with the aim of:

a) enhance Agriculture Information Systems;
b) enhance capacity to produce certified seeds and seedlings, and improvement of extension services;
c) provide matching grants to aggregators and farmers (in selected sub-sectors: fruits and vegetables, and dairy) to comply with market requirements;
d) improve agricultural infrastructures- intake structures, main and secondary irrigation networks;
e) improve capacities of project benefitting municipalities, municipal level public utility companies or joint PUC to participate in the operation and maintenance of the systems rehabilitated or constructed under the project;
f) develop a database of all irrigation systems, including GIS mapping;
g) strengthen the food systems, addressing quality and safety standards related to animal health protection, food safety and security and plant health protection with corresponding laboratories;
h) development and upgrading of IT software and hardware systems to improve national Food and Feed Safety Standards.

The beneficiaries of the ARPC project are farmers, agricultural organizations, private companies, collectors, and agro-processing and collection centres working in the sub-sectors of horticulture and animal husbandry in the project areas. The corresponding grant program will provide technical and financial support to 30 collectors and 1,000 small farmers in the RS. The project will focus on improving water management in selected project areas, and the main beneficiaries will be private farmers using public irrigation and drainage canal networks with a minimum cultivable management area of 30 ha.

1.2. World Bank requirements

Operations and activities for which the World Bank`s Investment Project Financing (IPF) is sought after October 1, 2018, fall under the application of the Environmental and Social Framework (ESF)[2]. The ESF comprises, inter alia, the 10 Environmental and Social Standards, which set out mandatory requirements for the Borrower and the Project. The relevance of each standard is determined during preparation of the Project to be assessed for each Sub-Project in line with the framework management instrument.

Below is an overview of WB's environmental and social standards and a brief explanation of their relevance for the subproject.

Table 1 ESSs considered relevant for the sub-project

ESS		Relevance to ARCP	Relevance to the sub-project
ESS1	Assessment and Management of Environmental and Social Risks	This standard serves as a guideline for developing E&S instruments, including those designed for the Project: ESMF, SEP, RPF and LMP and the corresponding risk assessment for	The contractor will prepare appropriate documentation based on the ESMP's recommendations (Site

[2] https://thedocs.worldbank.org/en/doc/837721522762050108-0290022018/original/ESFFramework.pdf

	and Impacts	certain activities carried out within the project.	Organization Plan, Occupational Safety and Health Plan, Waste Management Plan) which will be given to the supervising engineer for review and approval.
ESS2	Labor and working conditions	This standard is a guideline for creating healthy relations between workers and management. The main risk related to the labor is the risk of informal work. Risks associated with informal work include unpaid and underpaid work, work overload, poor employment conditions, lack of occupational health and safety measures, and denied access to social, pension, or health insurance. To ensure compliance by third parties, i.e., different contractors, with the requirements from ESS2, a checklist was created to check the workforce and compliance and monitoring and evaluation procedures that should be included in the tender documentation.	Considering the size of the project, a small number of workers is expected, which will be controlled during the execution of the works. The contractor will prepare appropriate documentation based on the ESMP's recommendations (Occupational Safety and Health Plan, Workers GRM) which will be given to the supervising engineer for review and approval.
ESS3	Resource efficiency and pollution management and prevention	This standard establishes requirements for solving resource efficiency issues, pollution prevention, and pollution management during the project life cycle. As most activities involve minor construction works, the main risk is that contractors will not be familiar with best practices for avoiding or minimizing pollution from project activities or adverse impacts on human health and the environment. This site-specific ESMP will guide contractors in implementing appropriate pollution prevention and management measures.	The contractor will develop a training plan for workers to prevent /remediate the specific type of pollution expected on the project.
ESS4	Community health and safety	This ESS establishes requirements for avoiding or minimizing community exposure to traffic and road safety risks, diseases and hazardous materials related to the project, as well as effective measures for emergency events. The works envisaged in this project will be carried out within and on the	The contractor will prepare a Construction Site Traffic Management Plan emphasising the populated area and taking concrete measures to overcome risks to the community.

		route of the existing canal, and the project does not use or produce hazardous substances and waste. The main risk related to the project relates to the health and safety of the workers involved in ESS2.	
ESS5	Land acquisition, restrictions on land use and involuntary resettlement	This ESS provides guidelines for Procedures to avoid forced and economic displacement or to carry out forced and economic displacement with the least possible impacts. The sub-project of rehabilitation and reconstruction of the canal network in Ivanjsko Polje does not include the possibility of land acquisition.	There will be no land purchase for the project. The existing canal network has been used for drainage for several decades, and the property-legal relations have already been resolved, including the necessary consents and building permits.
ESS 6	Biodiversity Conservation and Sustainable Management of Living Natural Resources	This standard sets a requirement to avoid adverse impacts on biodiversity and habitats. Protection and conservation of biological diversity and sustainable management of living natural resources are of key importance for sustainable development. This ESMP guides avoiding or minimizing impacts on biodiversity and implementing mitigation measures as appropriate.	This sub-project will not be implemented in nationally and internationally recognised natural and critical habitats, protected areas, wetlands, Ramsar sites, or locally designated natural sites for protection.
ESS10	Stakeholder engagement and information disclosure	This ESS serves as a guideline for the involvement of relevant stakeholders in the project life cycle. Following the requirements of this ESS, a Stakeholder Engagement Plan (SEP), including a complaint grievance mechanism, was developed for this project. The main risk is related to the proper implementation of the SEP.	The contractor will be obliged to inform the stakeholders about the progress of the works and actively participate in the elimination of possible disagreements with the local community.

The World Bank's Environment, Health and Safety Guidelines (EHS WB) are a comprehensive set of recommendations that define good practices for managing environmental, health and safety aspects during project planning, construction, operation and closure. These guidelines are used in various sectors and industries to ensure that projects meet the highest standards of environmental and human health protection and ensure the safety of workers and local communities.
EHS WBs provide a framework for responsible business and help projects minimize risks, achieve sustainability and contribute to a positive impact on the environment and society.

The guidelines cover four main thematic areas:

1. **Environmental protection**—Regulations covering waste management, air emissions, water and soil protection, and pollution risk management. The goal is to reduce projects' environmental impact through comprehensive measures that conserve resources and minimise harmful effects on ecosystems.
2. **Health and safety of workers**—This segment covers measures to preserve workers' physical and mental health, including standards for occupational safety, hygienic conditions, safety protocols, and accident prevention. Special attention is paid to ensuring adequate working conditions, regular training, and protection measures.
3. **Community Safety** - The Guidelines also define measures to protect communities that may be affected by the project. This includes prevention and response to potential incidents that may affect public health, such as air and water pollution, noise, traffic hazards, and safety measures against accidents and natural disasters.
4. **Hazardous Materials Management** - Regulations for the safe handling, storage and disposal of hazardous materials. The goal is to prevent potential accidents and environmental incidents that could endanger human health and the environment.

Applying the EHS Guidelines has several key benefits:

- **Improving environmental standards**: Projects that follow these guidelines achieve a higher level of environmental protection, reduce harmful emissions, and ensure better waste management. The guidelines contribute to the conservation of natural resources, the reduction of pollution, and the protection of biodiversity.
- **Improving worker safety and health**: EHS Guidelines provide workplace safety standards, reducing the risk of accidents and occupational diseases. The guidelines help protect workers' physical and mental health by ensuring adequate equipment, training and protective measures.
- **Safety and well-being of local communities:** The EHS Guidelines reduce adverse impacts on communities located near the project through measures to prevent and respond to risks. These include measures such as noise control, air and water quality, and protection from industrial hazards, thereby ensuring the health and safety of the local population.
- **Compliance with international standards**: Adherence to these guidelines helps projects to comply with international norms, increasing transparency and accountability to donors, investors and local authorities. In this way, projects gain greater community trust and increase the chances of long-term success.

1.3. Objective of the Environmental and Social Management Plan

The goal of creating the ESMP for the rehabilitation and reconstruction project of drainage canals III and IV (total length approx. 15 km) in Ivanjsko Polje (Municipality of Brod), including the additional planned use of water for irrigation purposes on an area of about 800 ha, is to:

- manage risks and mitigate impacts,
- analyse the policies, legal and administrative framework relevant to the improvement of drainage and irrigation systems,
- identify possible negative and positive impacts of the project on the environment and the social segment and propose mitigation measures,
- specify the critical criteria for monitoring the quality of the environment in the area of project implementation;
- develop guidelines for environmental and social acceptable construction practices;
- assist in inter-institutional coordination and the process of public hearings and
- to integrate the requirements of the SEP, LMP and ESMF documents for ARCP.

2. OVERVIEW OF PERMIT REQUIREMENTS

After the initial review of the condition of irrigation development subprojects by the World Bank (screening), it was concluded that the subject subproject was assessed as a moderate-risk subproject, which requires the development of an ESMP. The screening identified areas which require more in-depth attention, and hence the ESMP is enhanced and focuses on areas of waste management, occupational health and safety, labor and working conditions, and community health and safety.

Below is a brief overview of the need for permits for the Ivanjsko Polje sub-project area in Brod, in the RS. The adopted ESMF for the ARCP project gives a detailed overview of the RS's legal framework for environmental and social impact assessment. The ESMF is a document that thoroughly analyses the compliance of the ARPC project activities with the provisions of the law regulating ecological protection in the RS and with the requirements of the ESF WB.

Following the requirements of the Law on Environmental Protection of the RS[3] and the Rulebook on projects for which an environmental impact assessment is carried out and the criteria for deciding on the need to carry out and the scope of an environmental impact assessment [4], irrigation system construction/reconstruction projects are not subject to an environmental impact assessment the environment, nor are they subject to the procedure for issuing an environmental permit.

The ESMF, as the framework document developed to guide assessment of Sub-Project specific risks and their implementation identified gaps area were the national regulations have gaps or are not materially compliant with the WB ESF. The gaps in the Social Impact Assessment (SIA) as part of the ESMP document, developed based on the ESMF for the ARPC project, have been closed through alignment with relevant legislation of the Republic of Srpska and implementation of World Bank standards. The Labor Management Procedures (LMP) ensures compliance with the Labor Law and the Law on Occupational Safety and Health, including training of workers on occupational safety and health and mechanisms for filing and resolving complaints. Public consultations conducted by the SEP and ESMF for ARPC, as well as this ESMP, have enabled the active involvement of the local community and consideration of their needs, with a special focus on vulnerable groups.

Identified social impacts have been minimized through specific measures described in the ESMP, including ensuring safe working conditions and health and safety of the local community during project implementation. Continuous monitoring and evaluation ensure that the proposed measures are implemented by applicable regulations and best practices. Although resettlement is not relevant to this ESMP, an RPF has been developed to address potential needs at the broader level of the ARPC project.

The existing canal network has been used for drainage for several decades, and property-legal relations have already been resolved, including the necessary consents and a building permit from 1980. The Law on Spatial Planning and Construction of the Republika Srpska does not specify a time limit for the validity of a building permit after the facility has been constructed in accordance with the issued permit. Given that there have been no subsequent changes to the facility in the meantime, the permit remains valid. The additional construction/installation of sliding foundations will be an element of the function of the existing channels, and the Location Conditions and Building Permit of the competent authority have been obtained. The Municipality of Brod, as a user of the canal network, is obliged to inform the JU "Voda Srpske", the competent authority for water management for Ivanjsko Polje, about the planned activity.

3 "Official Gazette of the RS", no.71/12, 79/15 and 70/20

4 " Official Gazette of the RS", no. 124/12

According to the Law on Water[5] in irrigation development projects, water documents are subject to issuing, which, in this case, is the responsibility of the PU "Vode Srpske". The ESMF describes the procedure for issuing water documents and their connection with the environmental permit in Annex 3.

Also, this type of project is subject to the procedure of granting a concession for using watercourses and waters, which the Law regulates on Concessions of the RS[6].

The following table summarises the necessary procedures and activities for proposed sub-project in the Ivanjsko Polje. It is important to emphasise that the applicant for water acts, concessions for water use, and permits under construction regulations are the future users of the system.

According to the ESF WB procedures, the subject subproject is classified as moderately risky concerning the associated environmental and social risks, therefore, the subject ESMP was prepared.

Table 2 Current status of procedures and activities required by WB and national RS laws

Procedures following World Bank requirements	ESMP	In process
ESF WB procedures	Public disclosure, stakeholder engagement and information sharing including establishment of a GRM for stakeholder and GRM for workers	In process
Procedures following national water legislation	Water consent for the entire drainage canal	Obtained
	Concession for the entire drainage canal	Obtained
	Water consent for the sub-project	In process
Procedures following national construction legislation	Construction permit for the entire drainage canal	Obtained
	Location conditions for the sub-project	Obtained
	Construction permit for the sub-project	Obtained
Procedures following national environmental legislation	Environmental permit for the entire drainage canal	Obtained
	Environmental permit for the sub-project	In process

5 "Official Gazette of the RS " , no. 50/06, 92/09, 121/12 and 74/17

6 "Official Gazette of the RS", no. 59/2013, 16/2018, 70/2020 and 111/2021

3. PROJECT DESCRIPTION

3.1. Description of the project location

The project in question is located in Ivanjsko Polje, which belongs to the municipality of Brod, which extends across the northern part of the Republika Srpska.

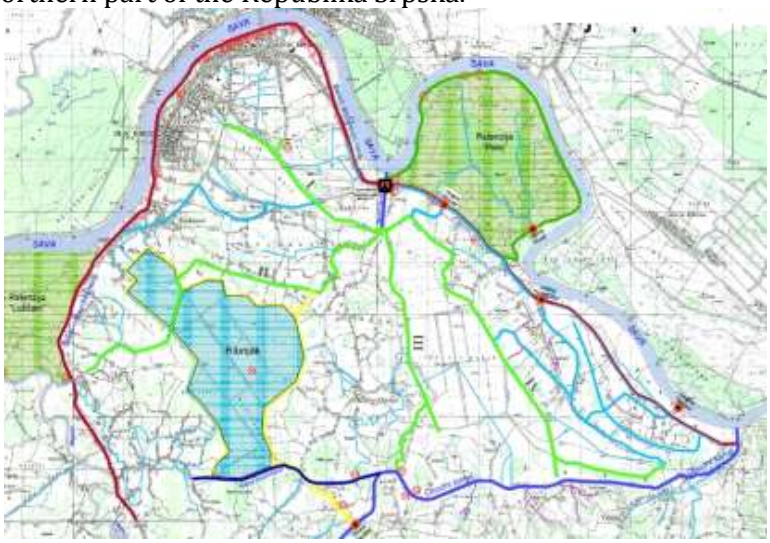


Figure 1 Location of Ivanjsko Polje in the municipality of Brod

The Ivanjsko Polje reclamation area extends in the Posavina plain from the slopes of the Vucjak mountain area to the Sava River in a south-north direction. In a narrower sense, that area is bordered from the west by the IV order road, i.e. the Sava defensive embankment, from Brod to Novi Selo with a length of 10,450 km, from the north by the approaches to Brod, i.e. the road that leads through Brod, from the east by the defensive barrier, i.e. the IV order road along the Sava river from Brod to the intersection of Kamena with a length of 13,300 km, and south of the river Ukrina, i.e. the narrow-gauge railway line Brod - Derventa near Parastusa, and above the village of Zboriste to the Nova Cadjavica stream, then the upper part to the village of Unka, below the village of Vinska below the lake Ljubigoste and finally to the old dam, that is, on the third-grade road to Kamen and the Sava river. This area is about 23 km long and about 6 km wide.
In a broader sense, this area extends to the belts along the Sava River outside the defence dam, including the area of Poloj, which stretches on the plain and is closed by a large bend of the Sava River. The total land reclamation area is 8,741.5467 ha.

3.2. History of agricultural production in the subject area

The majority of the Brod municipality is situated on the plain. Therefore, the municipality's primary natural resources are agricultural land and smaller areas of forests, followed by the rivers Sava and Ukrina. Considering such a terrain, the area is abundant with extremely high-quality land favourable for agricultural development.
Due to its excellent quality, this area has always been important for agricultural production. The municipality of Brod has about 11,563 ha of arable land, which is about 0.77 ha per inhabitant, almost 4.5 times more than the minimum required to ensure existence (according to estimates, 0.17 ha of arable land per inhabitant is enough to ensure minimum existence).[7] Only within Ivanjsko polje there are 8,000 ha of arable land.

7 Development Strategy of the Municipality of Brod 2022-2028

According to agrometeorological, hydrographic, and relief characteristics, the municipality of Brod is suitable for agricultural production, such as arable farming, animal husbandry, vegetable and fruit growing, beekeeping, and fishing. The most represented and developed branch of agriculture in the municipality of Brod is arable farming, where corn, wheat, soybeans, triticale, barley, and oats are most commonly planted in grain production.

According to available data from the Agency for Intermediary, IT and Financial Services of the Republic of Srpska (APIF RS), around 380 agricultural holdings will be registered in Brod by 2023, which can use 13,962 ha of arable farmland. Farmers in the municipality area have mainly changed their previously outdated production habits and have started applying modern standards. The application mentioned above of the standards is reflected in the formation of economically self-sustainable farms in the territory of the municipality, namely two pig farms with over 1,000 fattening pigs per year, about ten milk production farms with over 15 dairy cows, about 20 fattening beef farms with over ten fattening cows, 1 laying hen farm. In the municipality's territory, the Association of Beekeepers "Vucjak Brod" is registered, and it has 80 beekeepers with over 4,500 colonies (bees). These farms operate in accordance with positive environmental principles and environmental permits that they had to obtain in accordance with applicable laws in the field of environmental and water protection.

The Ivanjsko polje is suitable for the production of corn and wheat, which are chosen by over 60% of agricultural producers, followed by soybeans, oats and triticale. [8]

3.3. Description of existing drainage system

A network of primary and secondary canals within Ivanjsko Polje drainage system was built in the area of the municipality of Brod, as well as structures for retaining and letting water into the Sava River, which has been in operation for several decades. A drainage/irrigation system is built through a system of drainage pipes or a linear irrigation system covering an area of 800 ha. The land is organised into regular block plots in 5 cadastral municipalities: Lijesce, Vinska, Kolibe Gornje, Kolibe Donje and Unka, with approximately 200 cadastral plots.

The existing channel network consists of:

- A 15 km long perimeter canal that protects against mountain water and relieves the Ukrina River in the event of a flood wave by diverting part of the water that is then discharged into the Sava River in the downstream section from the city area.
- The main collection channel, 1 km long, collects all the water from the primary and secondary channels and pumps it into the Sava River.
- Primary melioration canals with a length of 32 km, the purpose of which is to provide water for irrigation of crops.

For drainage from the canal network, two pumping stations were built near the right embankment of the Sava River - the Brod - Klakar section in the Ivanjsko Polje catchment area. Both pumping stations, the old (Ivanjsko Polje PS1) and the new (Ivanjsko Polje PS2) have been in operation since 1958 and 1988, respectively. The catchment area of these pumping stations is approximately 8,500 ha, the total designed capacity is 10.7 m^3/s and the installed power is 1020 kW.
They are managed automatically and the PU “Vode Srpske” is responsible for regular control.

8 Report on the state of cultivated and sown areas of agricultural land owned by the RS in the municipality of Brod for the year 2023 - Department of Economy and Social Activities of the Municipality of Brod

Pump station Ivanjsko Polje PS1—The designed capacity is 5.7 m^3/s, and the installed power is 520 kW. In general, the condition of the building structure of Ivanjsko Polje PS1 is similar to that of other pumping stations. Between 1997 and 1999, a general overhaul and repair of the building and the roof were carried out without fine works, but the roof still leaks.
The threshold in front of the pumping station is 83.70 m above sea level. The maximum elevation of the setback is 85.06 m above sea level, and at that height, the pumping units are put into operation. The shutdown of the pumping units is at an altitude of 84.50 m above sea level, so the level difference is 56 cm.
Pump station Ivanjsko Polje PS2—The designed capacity is 5.0 m^3/s, and the installed power is 500 kW. In general, the condition of the building structure of Ivanjsko Polje PS2 is similar to that of other pumping stations. Between 1997 and 1998, emergency repairs were carried out to the engine /control building roof and window glazing, but the roof still leaks.

The described pumping stations and their management are not part of the project activities. Their description is given to show the overall appearance and functioning of the Ivanjsko polje drainage system.

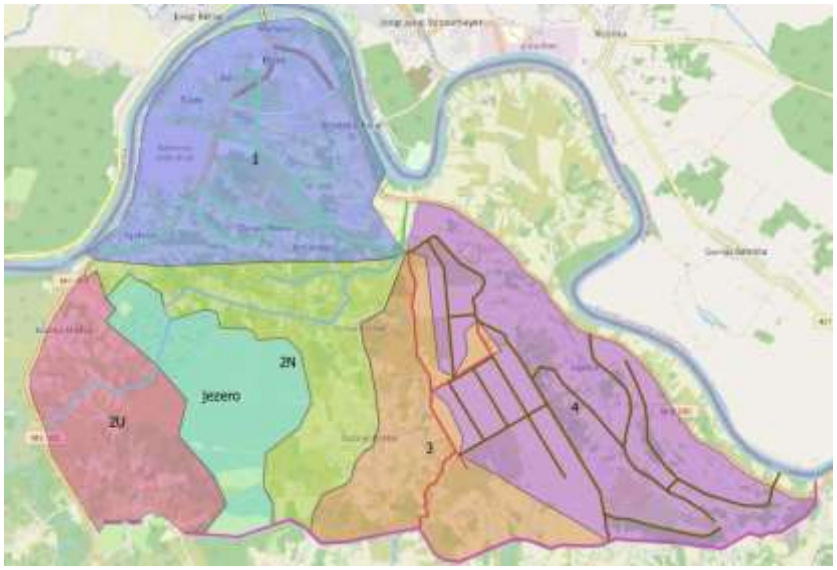


Figure 2 Map of the Ivanjsko Polje area with the existing irrigation/drainage canal network

3.4. Description of investigative hydraulic and geodetic works

As part of the analysis of the current state of the canal network in the area of Ivanjsko Polje[9] a hydraulic mathematical model of the current state was created to determine the hydraulic capacity of the existing canals and the state of the water level at the relevant flows P(Q)=1/20.

Based on the results of the hydraulic calculation of the capacity of the existing canal network for flows of the return period P(Q)=1/20, it was concluded that the existing canals could not accept large waters of the return period P(Q)=1/20 and that there is an overflow of water from the canal, flooding the surrounding area.

The existing canals should be rehabilitated and rebuilt to increase their hydraulic capacity and protect the subject area from flooding. [10]

9 The main design of rehabilitation and reconstruction of the canal network in Ivanjsko polje

10 The main design of the production of slide gates on the system of internal canals no. III and IV of the drainage system and peripheral canal

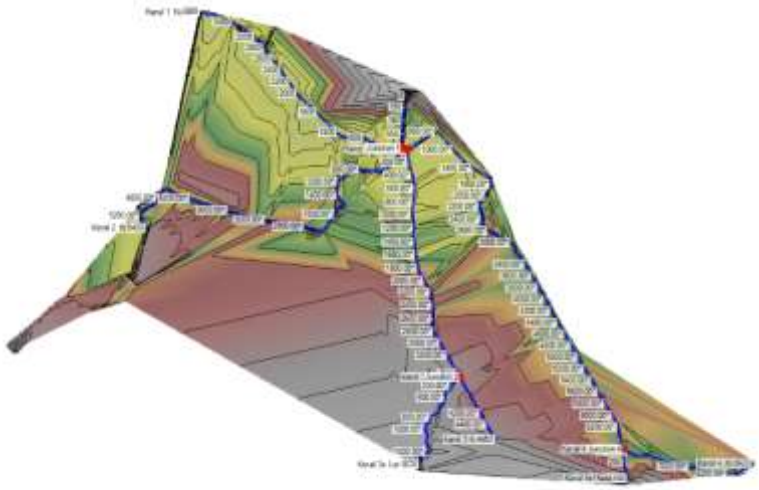


Figure 3 The authoritative digital terrain model (DTM) used for the HEC-RAS models

To create a geodetic base as part of the Main design of rehabilitation and reconstruction of the canal network in Ivanjsko Polje, a geodetic survey of the primary canals was carried out, and characteristic detailed points in position and height were recorded every 250 m. At the same time, the terrain configuration required a densification profile in some places.

A total of 1660 points were recorded for a previously mentioned geodetic survey. The total length of the recorded coverage is 27981 m. The number of transverse profiles for the construction of the geodetic base was 121. Geodetic surveying determined a certain number of bridges and culverts.

Geodetic surveying registered 4 culverts with a circular cross-section on canal IIIa, which drains water from the Koliba area. The dimensions of the trenches do not correspond to the calculated large waters of the return period P(Q)=1/20.

Based on geodetic images, a terrain model was created in the scope of the geodetic survey performed on the ground, and it was combined with the Lidar image.

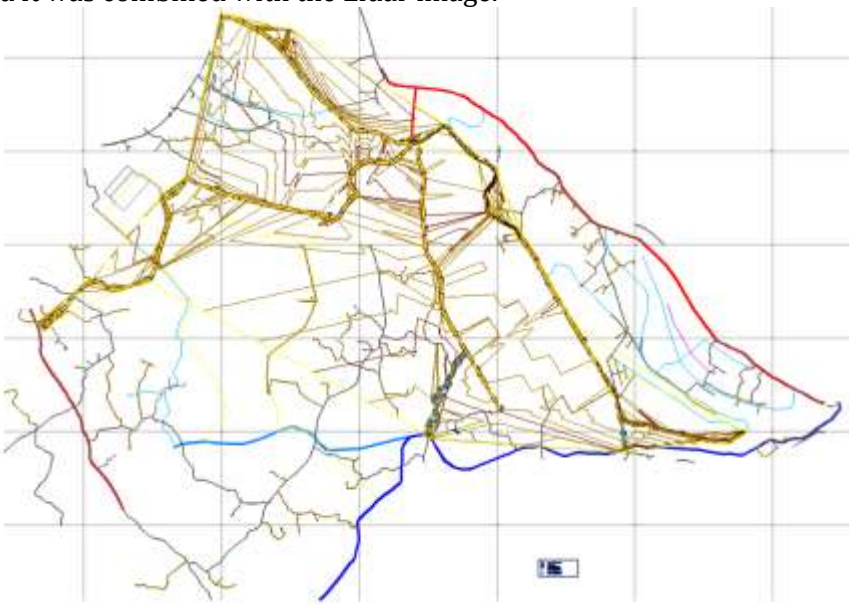


Figure 4 Geodetic situation of the project area with the irrigation/drainage canal network

of the Ukrina-Sava rivers

3.5. Description of sub-project actvities

The sub-project activity includes rehabilitating primary drainage canals III and IV to improve drainage performance and constructing slide gates on the primary internal canals III and IV within peripheral canal of the Ukrina-Sava rivers, which use water to rinse agricultural areas in Ivanjsko Polje.

The primary function of the slide gates is to retain water in channels III and IV so that it can be used for irrigation in agricultural areas in Ivanjsko Polje during the dry part of the year. This will provide the necessary moisture for the growth of crops in the critical stages of growth, ensuring safer and more profitable agricultural production.

Works on constructing slide gates on the primary internal canals III and IV will be divided into:
a) Construction works - which include:
- Previous works (staking out the construction site, cleaning the ground, preparing the substrate, placing notice signs and traffic signs)
- Earthworks (removal of the surface layer of soil, excavations, insurance of excavations, production of filters and buffers, strengthening of structures, loan of materials, material dumps, etc.)

b) Concrete-reinforced works - which include:
- Selection of materials for concrete, examination of concrete samples, transport and installation of concrete, waterproofing, repairs and surface treatment
- Selection of reinforcement, preparation for installation, formwork and scaffolding

c) Assembly works - which include:
- Procurement, delivery and installation of slide gates

d) Final works - which include:
- Arrangement and cleaning of construction sites
- Returning the access roads to working condition
- Marking and coloring of installed equipment
- Removal of notification signs and traffic signs.

Within Ivanjsko Polje, the number of users of land tenants is 30 large agricultural farms and about 50 users of smaller private plots. The number of households that would be covered by the irrigation system is 80 households. The municipality of Brod will primarily benefit from the implementation of the subproject, from the point of view that residents have an interest in increasing production productivity and providing safer production conditions that will provide higher standards of food safety and quality. Implementing the sub-project will significantly increase the potential for improving agricultural production and productivity, thus increasing farmers' incomes. This is mainly because water within the drainage canal network will be collected and used to irrigate agricultural areas, increasing agricultural production productivity.

Access to the irrigation system will be defined by the Brod municipal administration, which will publish a public call on the municipal website, which will define the necessary conditions for application. It is not expected that there will be a need to purchase new infrastructure for irrigation purposes, as the irrigation system will be designed with the participation of each registered user's own pumps and irrigation hoses.
In RS, access to irrigation enables earlier planting and creates opportunities for double vegetation and crop diversification—all aspects that are crucial for obtaining higher prices due to the possibility of early entry into the market and increased productivity per hectare due to more intensive use of available land.
The total number of inhabitants who would benefit from the realization of the subject sub-project is 80 households.

The hydrological study's results indicated that when designing the leading canal network, the main canals must be widened and deepened to meet the twenty-year flow and provide sufficient water for the irrigation of agricultural plots in Ivanjsko Polje.

The construction design solution foresees the installation of 8 (eight) slide gates on the canals.

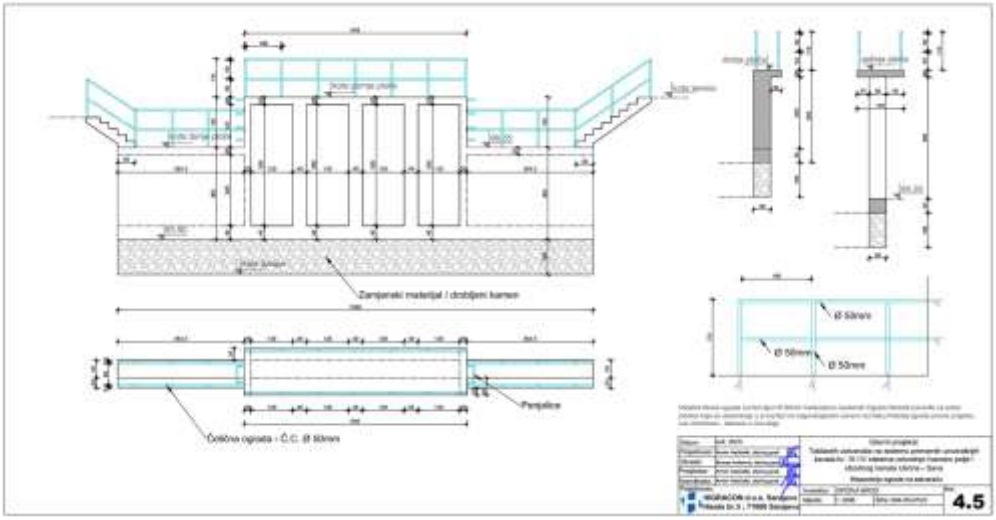


Figure 5 Sliding gate layout

In Terms of Construction - All slide gates represent a welded steel structure made of structural steel. The gates move within guides using a spindle with a single-thread trapezoidal thread, which is supported at its upper end by a top-bearing lantern. Due to its width, the suspension of the slide gate structure, in this case, is executed using a single-threaded spindle.
At the lower end of the spindle, a corresponding nut with housing is inserted, to which a load-bearing tube is welded in a detachable manner to the slide gate structure.
The connection between the load-bearing tube and the slide gate structure allows kinematic freedom in one plane, thereby compensating for minor inaccuracies that may occur during the manufacturing and installation of the gate.
Through a rigid coupling and wedge, the threaded spindles are manually operated using non-motorized worm gear reducers with a transmission ratio of i = 8 and a drive handle.
The hydrostatic pressure force of water is transferred through the slide gate structure to the stainless steel guide via high-quality support materials (Zellamid 1100 or Novilon), which have a very low coefficient of sliding friction.

Sealing Mechanism - Sealing on the upper and both vertical sides of the gate is achieved using a profiled rubber strip supported by the stainless steel guide. The water column exerts hydrostatic pressure on the profiled rubber (shaped like a musical note), ensuring effective sealing.
Sealing on the lower side of the gate is achieved through frontal closure by placing a flat rubber strip on the slide gate structure.
The weight of the slide gate structure, combined with the additional lowering force through the drive and threaded spindle, ensures sufficient sealing.
The slide gates are sealed with sealing rubber profiles, and the drives will be manual, using worm gearless motors.

Locations where the slide gates will be built are shown in the Figure 6.

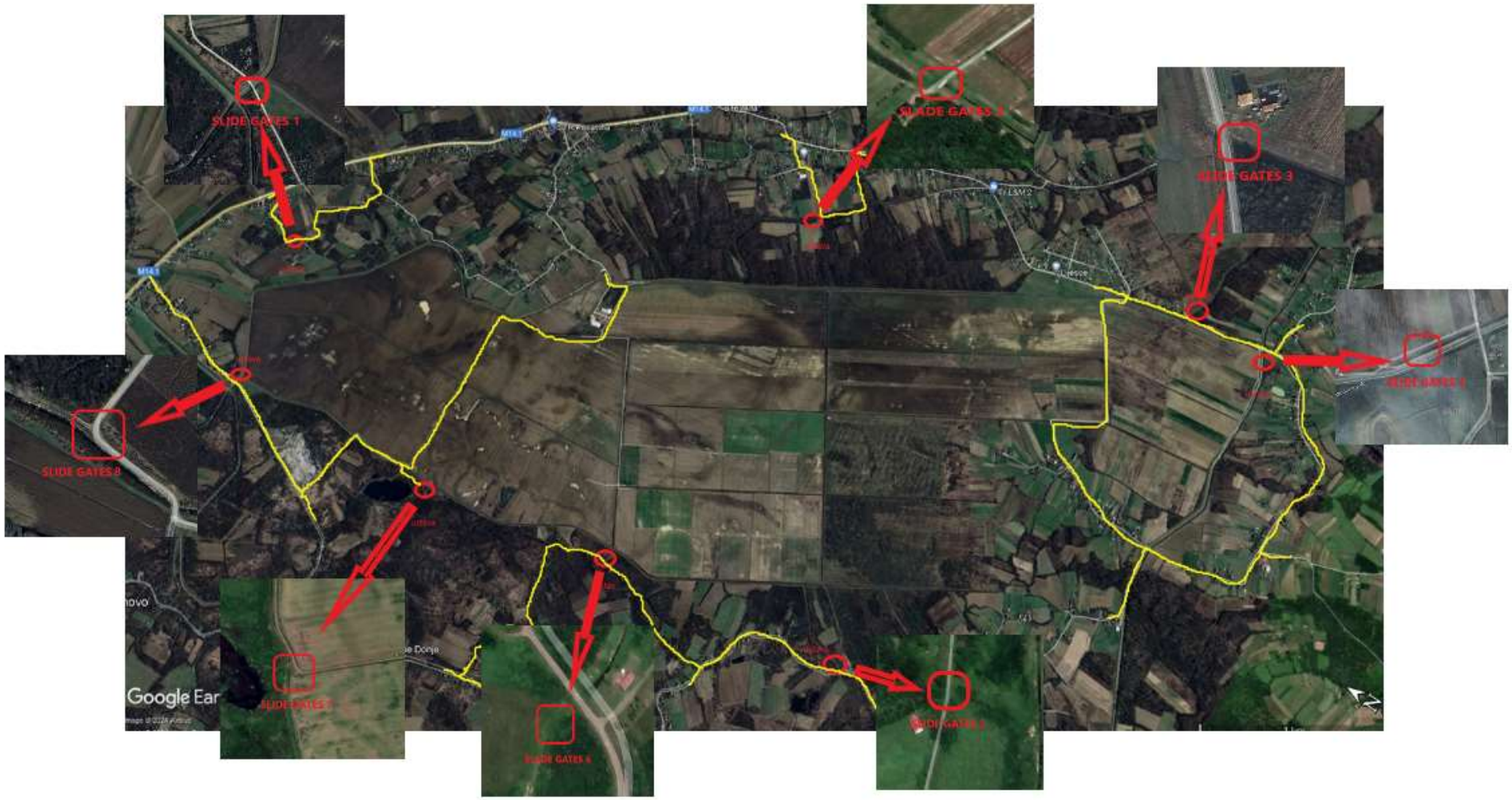


Figure 6 Overview of the location of construction of slide gates

3.6. Assessment of the water needs of crops

Crop water needs depend on several factors, including the type of plant, its growth stage, climatic conditions, and soil type. Each plant has specific water requirements that change during different stages of growth. By analyzing water needs and applying irrigation in the critical stages of plant development, optimal yield and improved quality of agricultural products can be achieved.

Water is essential for the plant's basic biological processes, including photosynthesis, nutrient transport, and cell turgor maintenance, enabling stable plant growth. Plants draw water from the soil through their roots, and through transpiration, they lose water through their leaves, which contributes to cooling the plant and maintaining its metabolism. Water requirements vary depending on the stage of plant development.

Analysis of irrigation needs by crop type:

- **Wheat and cereals**: Additional irrigation is needed during germination and grain formation, while later, in the ripening phase, irrigation should be reduced.
- **Maize**: Maize requires a lot of water during germination, vegetative growth, and flowering. Irrigation is essential for good yields, especially during the flowering stage when water stress and high temperatures are most critical.
- **Vegetables (tomato, pepper)**: Vegetables require constant irrigation throughout the entire vegetative cycle, especially during the flowering and fruit development phases. Lack of water can lead to fruit drying, falling flowers, and reduced yield.
- **Fruits (apple, pear)**: Fruits require irrigation during flowering and fruit development, while during ripening irrigation is reduced to allow proper sugar development and reduce the risk of rot.

Watering norms or the amount of water for one watering, which plants need, depends on several factors, primarily on the type of soil (sandy soils hold water less healthy than clay soils), land coverage (land under mulch better preserves moisture), the method of plant production (plants produced from seedlings have higher needs than plants from direct sowing), stages of plant growth and development (with plant growth, they also need water), type of plant (above mentioned divisions), air temperature (evaporation intensity), amount of precipitation (only precipitation is counted with over 10 mm of water).

Irrigation is critical to the successful cultivation of crops, but its application must be adapted to the specific needs of each plant and its growth stage. Regular monitoring of soil conditions, humidity and weather conditions can help farmers optimize the amount of water they apply, ensuring healthy plant growth and high yields.

To assess the need for water for irrigation of crops, it is necessary to determine the total amount of water needed during the growing season, i.e. the value of evapotranspiration. Evapotranspiration is the total amount of water that is lost by the processes of evaporation and transpiration from a particular surface at a specific time. Evaporation corresponds to the value of water lost from the soil surface through evaporation, while transpiration corresponds to the value of water consumed by the plant through the root system. The processes of evapotranspiration are influenced by climatic conditions (air temperature, wind, relative humidity and solar radiation), terrain slope, soil colour, land coverage, etc.

The tables below show the evapotranspiration of the crops that are planned to be grown in The project area, by individual stages of growth and development, i.e. by month.

Table 3. Crop evapotranspiration (ETc)

Culture	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Reference	11.16	19.04	43.4	**69**	**102.3**	**120**	**132**	**118.11**	**70.2**	**39.06**	**19.5**	**11.78**
Wheat - winter	3.35	5.71	43.4	72.45	107.42	30	0	0	0	11.72	5.85	3.53
Barley - in winter	3.35	5.71	13.02	62.1	107.42	30	0	0	0	11.72	5.85	3.53
Corn - mercantile	0	0	0	0	40.92	90	146.29	129.92	38.61	0	0	0
Triticale	3.35	5.71	13.02	62.1	107.42	30	0	0	0	11.72	5.85	3.53
Sunflower	0	0	0	24.15	76.73	90	146.29	129.92	52.65	0	0	0
Tomato	0	0	0	0	61.38	126	119.69	106.3	10.53	0	0	0
Onion	3.35	5.71	13.02	27.6	97.19	90	99.74	0	0	11.72	5.85	3.53
Beans	0	0	0	0	35.81	90	146.29	82.68	0	0	0	0
Cabbage	0	0	0	0	0	48	119.69	112.2	59.67	0	0	0
Potatoes	0	0	15.19	24.15	61.38	72	139.64	82.68	0	0	0	0
Carrot	0	0	19.53	31.05	86.96	120	132.99	0	0	0	0	0
Parsley	0	0	19.53	31.05	86.96	120	132.99	0	0	0	0	0
Maize silage post	0	0	0	0	0	0	53.2	88.58	57.92	0	0	0
Buckwheat sideways	0	0	0	0	0	48	106.39	118.11	42.12	0	0	0
Pasture	0	0	0	0	86.96	102	113.04	100.39	0	33.2	0	0
Lawns - DTS	0	0	0	0	86.96	102	113.04	100.39	59.67	33.2	0	0
Alfalfa	0	0	0	0	86.96	102	113.04	100.39	59.67	0	0	0
Soy	0	0	0	24.15	76.73	90	146.29	129.92	52.65	0	0	0
Apple	0	0	0	34.5	76.73	132	146.29	129.92	59.67	0	0	0
Hazelnut	0	0	0	34.5	76.73	132	146.29	129.92	59.67	0	0	0
Pear	0	0	0	34.5	76.73	132	146.29	129.92	59.67	0	0	0
Walnut	0	0	0	34.5	76.73	132	146.29	129.92	59.67	0	0	0
Pomegranate	0	0	0	34.5	76.73	132	146.29	129.92	59.67	0	0	0
Plum	0	0	0	34.5	76.73	132	146.29	129.92	59.67	0	0	0
Cherry	0	0	21.7	34.5	76.73	132	113.04	0	0	0	0	0

Water requirements can be calculated in different ways. The "CropWat" computer program is acceptable and the most used, where the water needs to be calculated based on the difference between crop evapotranspiration and effective precipitation. If the effective precipitation is subtracted from the evapotranspiration of the culture, a water deficit is obtained, which is compensated by irrigation. The need to irrigate crops can be represented by the formula:

Water Requirement = Evapotranspiration - Effective Precipitation

This formula helps determine the amount of irrigation needed to ensure optimal crop growth by addressing water deficits.

PNk = ETc – Pef

where is:

PNk – the need to irrigate crops,
ETc – evapotranspiration of crops,
Pef – effective precipitation

Below are the irrigation needs of certain crops in a dry year and an average year [11].

Table 4 Total monthly and annual net needs in a dry year in mm

Culture	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annually
Effective rainfall 75%	26	22	37	33	41	50	44	27	44	41	43	**29**	**436**
Reference	0	0	0	36	62	70	89	91	26	0	0	0	**381**
Wheat - winter	0	0	0	39	67	0	0	0	0	0	0	0	**113**
Barley - in winter	0	0	0	29	67	0	0	0	0	0	0	0	**96**
Mercantile corn	0	0	0	0	0	40	103	103	0	0	0	0	**246**
Triticale	0	0	0	29	67	0	0	0	0	0	0	0	**96**
Sunflower	0	0	0	0	36	40	103	103	9	0	0	0	**290**
Tomato	0	0	0	0	21	76	76	79	0	0	0	0	**252**
Onion	0	0	0	0	56	40	56	0	0	0	0	0	**153**
Beans	0	0	0	0	0	40	103	55	0	0	0	0	**198**
Cabbage	0	0	0	0	0	0	76	85	16	0	0	0	**177**
Potatoes	0	0	0	0	21	22	96	55	0	0	0	0	**194**
Carrot	0	0	0	0	46	70	89	0	0	0	0	0	**206**
Parsley	0	0	0	0	46	70	89	0	0	0	0	0	**206**
Maize - silage fast	0	0	0	0	0	0	10	61	14	0	0	0	**85**
Buckwheat-loaf	0	0	0	0	0	0	63	91	0	0	0	0	**154**
Pasture	0	0	0	0	46	52	70	73	0	0	0	0	**241**
Lawns - DTS	0	0	0	0	465	52	70	73	16	0	0	0	**257**
Alfalfa	0	0	0	0	46	52	70	73	16	0	0	0	**257**
Soy	0	0	0	0	36	40	103	103	9	0	0	0	**290**
Apple	0	0	0	1	36	82	103	103	16	0	0	0	**341**
Hazelnut	0	0	0	1	36	82	103	103	16	0	0	0	**341**
Pear	0	0	0	1	36	82	103	103	16	0	0	0	**341**
Walnut	0	0	0	1	36	82	103	103	16	0	0	0	**341**
Pomegranate	0	0	0	1	36	82	103	103	16	0	0	0	**341**
Plum	0	0	0	1	36	82	103	103	16	0	0	0	**341**
Cherry	0	0	0	1	36	82	70	0	0	0	0	0	**189**

Table 5 Total monthly and annual net needs in the average year in mm

Culture	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annually
Average effect. precipitation	45	41	45	55	68	74	68	57	70	64	59	**52**	**696**
Reference	0	0	0	14	35	46	65	61	1	0	0	0	**221**
Wheat - winter	0	0	0	17	40	0	0	0	0	0	0	0	**57**
Barley - in winter	0	0	0	7	40	0	0	0	0	0	0	0	**47**
Corn - mercantile	0	0	0	0	0	16	78	73	0	0	0	0	**167**
Triticale	0	0	0	7	40	0	0	0	0	0	0	0	**47**

11 ESMP for the irrigation development project in the locality of Miloševac (locality "Krušici"), who Garevac (locality "Jabuka") and who Dobrinja (locality "Pašinac"), municipality of Modriča

Sunflower	0	0	0	0	9	16	78	73	0	0	0	0	**176**
Tomato	0	0	0	0	0	52	52	49	0	0	0	0	**152**
Onion	0	0	0	0	30	16	32	0	0	0	0	0	**77**
Beans	0	0	0	0	0	16	78	25	0	0	0	0	**119**
Cabbage	0	0	0	0	0	0	52	55	0	0	0	0	**107**
Potatoes	0	0	0	0	0	0	72	25	0	0	0	0	**97**
Carrot	0	0	0	0	19	46	65	0	0	0	0	0	**130**
Parsley	0	0	0	0	19	46	65	0	0	0	0	0	**130**
Maize - silage post.	0	0	0	0	0	0	0	31	0	0	0	0	**31**
Buckwheat-loaf	0	0	0	0	0	0	38	61	0	0	0	0	**99**
Pasture	0	0	0	0	19	28	45	43	0	0	0	0	**135**
Lawns - DTS	0	0	0	0	19	28	45	43	0	0	0	0	**135**
Alfalfa	0	0	0	0	19	28	45	43	0	0	0	0	**135**
Soy	0	0	0	0	9	16	78	73	0	0	0	0	**176**
Apple	0	0	0	0	9	58	78	73	0	0	0	0	**218**
Hazelnut	0	0	0	0	9	58	78	73	0	0	0	0	**218**
Pear	0	0	0	0	9	58	78	73	0	0	0	0	**218**
Walnut	0	0	0	0	9	58	78	73	0	0	0	0	**218**
Pomegranate	0	0	0	0	9	58	78	73	0	0	0	0	**218**
Plum	0	0	0	0	9	58	78	73	0	0	0	0	**218**
Cherry	0	0	0	0	9	58	45	0	0	0	0	0	**112**

3.7. Use and maintenance

The Water Users Association (WUA) will have a crucial role in managing the irrigation system. The members of the WUA will bear all the costs of using and maintaining the system, demonstrating their commitment to the project. The management and maintenance of the irrigation system will be defined in cooperation with the Brod municipal administration and WUA, which will have a separate budget for the management and maintenance of the system.
As part of sub-component 2.2 of the ARCP project, the MoAFWM will ensure the capacity building of the WUA related to the operation and maintenance of the irrigation system.

The administration of the municipality of Brod will be responsible for the cleaning and maintenance of the Ivansko Polje drainage canal with all further responsibility for the adequate management of excavated sediment from the canal.

4. DESCRIPTION OF THE ENVIRONMENT ON WHICH THE PROJECT MAY HAVE IMPACT

4. 1. Physical factors

4.1.1. Climatic characteristics

The climate of the municipality of Brod is moderately continental, which is a characteristic climate for most of Bosnia and Herzegovina. This climate is characterized by clear seasons with moderately cold winters, warm summers, and pronounced spring and autumn. This climate is characterized by accentuated seasonal contrasts, which means that the changes in the seasons are clearly expressed. In municipalities with a moderate continental climate, such as Brod, each season brings specific climatic conditions that directly affect nature, the economy and the way of life of the population.

The moderately continental climate is characterized by four distinct seasons: cold winters, warm summers, fresh spring and autumn. This climate allows for a variety of crops, as each season contributes to the cultivation of specific types of fruits, vegetables, grains and other crops. On the other hand, winter cold and summer droughts can pose a challenge to agriculture, requiring effective planning and adaptation of irrigation, storage and crop protection techniques.

4.1.2. Meteorological characteristics

There is no weather station near Ivanjsko Polje. Therefore, to develop the Preliminary and Main design for the rehabilitation and reconstruction of the canal network in Ivanjsko Polje, meteorological data on daily precipitation, temperatures, relative humidity, pressure, intensity and wind direction were available at stations in the vicinity of the field: Banja Luka, Srbac, Gradiska [12] and from Slavonski Brod station in Croatia[13], which is separated from Ivanjsko Polje by the Sava River.[14]

This long-term meteorological data provides all the necessary information about the region's climatic conditions, enabling precise estimates regarding the plants' water needs in different seasons. Its reliability and accuracy are crucial for making informed decisions in agriculture.

Table 6 Source of meteorological data

Weather stations	Period	Data source
Slavonski Brod	1958 - 2010	SRHMI RC
Gradiska	1961 - 1987 2006 - 2020	RHMI RS
Srbac	1961 - 1977 2000 - 2020	
Banja Luka	1960 – 1976 1994 – 1999 2016 - 2020	

Temperature

The municipality of Brod's area has an average annual air temperature of 11.5°C, with pronounced seasonal variations. The coldest year was 1996, when the average annual temperature was 10.2°C, while 2013 was the warmest, with an average of 12.5°C. That difference of 2.3 °C indicates amplitudes that can affect agricultural production and water resources.

12 RHMI RS - The Republic Hydrometeorological Institute of the Republic of Srpska

13 SRHMI RC _State Republic Hydrometeorological Institute of the Republic of Croatia

14 ECONERG doo Environmental protection study for the modification of KKE Slavonski Brod

December, January and February are the coldest months, with average temperatures of 1.3°C, 0.6°C and 2.6°C, while the warmest months are July and August when average temperatures reach 22.4°C and 21,7°C. June 2003 was particularly hot, with an average maximum temperature of 28.7°C, which further increased evaporation and plant water needs.

High temperatures, especially in the summer months, significantly increase plants' demand for water due to increased evaporation. During dry periods, plants are exposed to stress due to moisture loss, necessitating additional irrigation to maintain optimal soil moisture. These climatic conditions, including high temperatures and wind, increase the rate of evapotranspiration, further depleting soil moisture and creating the need for regular and adequate irrigation to ensure optimal conditions for crop growth.

In the municipality of Brod, the vegetation period lasts approximately 220 days, from the second decade of March to the second decade of October. This extended growing period allows the cultivation of several thermophilic crops, such as corn, soybeans, and sunflowers, and the possibility of a second harvest in one season for faster-maturing crops.

During the growing season, plants go through several critical stages of development in which water is of key importance. They are especially sensitive to drought during the sprouting period, the phase of intense growth and flowering, when the scarcity of water can harm the yield and quality of the crop. In the summer months, when temperatures are high, water consumption increases further, and evaporation increases, which increases the plants' irrigation needs even more. Without supplemental irrigation at those crucial times, plants are exposed to stress that can reduce yields, especially for drought-sensitive crops.

Sunshine

In the municipality of Brod, the average annual number of sunny hours is around 1971, meaning the sun shines for an average of 5.5 hours a day. The year 2000 was exceptionally sunny, with 2,341 hours of sunshine recorded, while the year 2014 had the fewest hours of sunlight in the observed period, with only 1,735 hours. December, the foggiest month, has an average of only 1.6 hours of sunlight per day. During the dry period, high insolation increases the plants' need for water, because intense solar radiation accelerates the process of water evaporation from the soil, which further depletes the moisture reserves in the soil. Without adequate irrigation, plants can be exposed to stress, which can affect crop yield and quality. High insolation, especially in the summer months, combined with high temperatures, significantly increases the water consumption of plants and their need for additional irrigation to provide optimal conditions for growth and development.

Precipitation

The municipality of Brod's area recorded an annual average of 775 mm of precipitation from 1960 to 2020. The wettest year in that period was 2005, when as much as 1010 mm of rain fell, while 2010 was the driest, with only 430 mm of precipitation. This shows the great variability of precipitation in this area. On average, June records the most precipitation, with an average of 85 mm, while September 2001 had an exceptional monthly maximum of 224 mm.

The least precipitation falls on average in the winter months – January brings 48.8 mm, while February has a slightly lower average amount of 43.8 mm. During this period, not a single month without precipitation was recorded, and the minimum monthly amounts were recorded in December 2013 with only 1.2 mm, and in March of the same year with 1.3 mm. Unlike temperatures, precipitation shows a slight negative trend throughout the observed years, which indicates a long-term decrease in precipitation in this region.

Air humidity
In the area of the municipality of Brod, the average annual air humidity is about 76%, which shows that the air is moderately humid during the year. The highest recorded humidity was 83% in 2012, while the lowest was in 2000, when it reached only 68%. The autumn and winter months show the highest relative humidity values, resulting from shorter days and more frequent cloudiness, which retains moisture in the air. In contrast, April has the lowest average humidity of 69.9%, so the air is arid compared to the rest of the year.

Wind
In the area of Brod, the average wind speed from 1960 to 2020 was 1.2 m/s, which is a critical factor for determining evapotranspiration, i.e. total water loss through evaporation and transpiration of plants. The highest average wind speed was recorded in March, while October had the least wind. In 1997, the winds reached their maximum, while 1992 was the calmest year, with a speed difference (amplitude) of 0.9 m/s between these years.
Wind is essential in increasing evaporation, especially during dry periods when plants need more water. Even moderate wind speeds in arid areas can accelerate soil moisture loss, increasing the need for additional crop irrigation. These climatic conditions, including wind speed and moisture availability, significantly affect agricultural production, especially during critical stages of plant growth, as wind contributes to the desiccation of topsoil and plant water demand.

Assessment of the climate from the perspective of the favorableness of agricultural production
With its moderately continental climate, the municipality of Brod provides favourable conditions for living, working and developing various economic sectors. A clear seasonal difference allows residents to adapt to the seasons sustainably using natural resources. The climate enables sustainable agriculture, economic development and everyday life, making the area of the municipality of Brod a dynamic place that offers many opportunities for its residents.

The municipality of Brod is characterised by a moderately warm and humid climate with an average annual temperature of 11.5°C and an average yearly precipitation of 775 mm. During the year, the period from April, May and September is characterised by warm temperatures, while the summer months - June, July and August - are scorching. Slightly warmer temperatures characterise October, while the winter months of January, February and December are cold. March and November are moderately cold months.

The precipitation analysis shows a lower number of precipitations than the average. During the rainy year, from June to August, 66% of the total 726 mm of rainfall fell, while in the dry year, only 42% of the total 640 mm fell in the same period. Therefore, in a wetter year, the dry period occurs only in September, which is favourable for crop ripening. In a dry year, the drought begins in the last decade of June and lasts until the middle of September.

The moderately continental climate greatly influences life in the municipality of Brod. Thanks to the fertile land and suitable climatic conditions, agriculture is the most represented branch of the economy. The climate also contributes to the development of animal farming and fruit growing, which are important sectors of the municipality's economy. The local population adapted their activities to seasonal changes—in winter, most attention is paid to preparations for spring and summer work. In contrast, summer months are reserved for intensive agricultural activities.

4.1.3. Climate Change and Flood Risks in the Municipality of Brod: Challenges and Projections

According to the Climate Change Adaptation and Low-Emission Development Strategy of Bosnia and Herzegovina for the period 2020-2030, climate change in the country will manifest through rising air temperatures, the occurrence of droughts during the summer months, and extreme variations in the amount, distribution, and intensity of precipitation. The most vulnerable sectors affected by climate change are agriculture and water resource management.

Projected changes in precipitation levels and air temperatures will have adverse effects on the existing water resource management system in the Republic of Srpska. Changes are expected in the timing, frequency, and intensity of extreme events such as floods and droughts. The most significant increase in air temperatures is forecasted for the vegetation period (June, July, and August), with a slightly milder increase during March, April, and May. This will lead to heightened evapotranspiration and more pronounced extreme minimum water levels in watercourses. Consequently, water resource availability will decline during the vegetation period, when water demand is at its peak, both in terms of quantity and quality, as low-water periods increase the potential and actual risk of significant water quality degradation.

A substantial increase in air temperatures during the winter season (December, January, and February) will result in reduced snowfall and, consequently, lower water flow in most watercourses during the spring months. On the other hand, more frequent and intense rainfall is expected to cause heavier runoff, often accompanied by flooding.

Due to the pronounced spatial and temporal irregularity of precipitation during summer drought periods, when water demand is highest, there will be an increased need for irrigation of agricultural crops. Spring crops will be at risk due to high temperatures and water shortages during the summer months. Additionally, there will be a reduction in yield and quality of pasture and forage (especially spring crops), leading to the impoverishment of pastures due to heavy rains and stronger winds. Accelerated soil erosion processes can also be expected, mainly due to increased soil erodibility after prolonged drought periods, more intense precipitation, and changes in land use patterns. The negative consequences will also be evident in frequent floods, which inevitably destroy crops. One of the challenges is surface water stagnation, which further threatens and damages crops.

4.1.4. Flood Protection Infrastructure and Vulnerability in the Municipality of Brod

According to the Spatial Plan of the Municipality of Brod for the period 2017–2037, floods and high temperatures are natural disasters that pose significant threats to the area. Floods are particularly prominent in the northern part of the municipality along the Sava River and in the western part along the Ukrina River, resulting from high water levels in these rivers. The retention basins of Poloj and Luscani serve as reservoirs whose primary function is to retain high water levels and provide flood protection.
A crucial role in safeguarding not only agricultural land and crops but also the entire infrastructure of the Municipality of Brod is played by the flood protection canal network. The most vulnerable areas prone to flooding are those near the Sava and Ukrina rivers. Based on past experiences, approximately 40 households are exposed to the risk of flooding in the municipality, of wich 15 households are in project area.
The water protection structures designed to manage internal waters within the territory of the Municipality of Brod are part of the Ivanjsko Polje hydro-melioration system, located in the central Posavina region. This system is bordered by the Sava River to the north, the Ukrina River to the west, and the slopes of Mount Vučijak to the south and east. The flood protection system in the Municipality of Brod consists of several components, including the Sava defensive embankment, the perimeter canal

Sava-Ukrina, the central perimeter canal, a collection canal, pumping stations, six sluice gates, the Poloj summer embankment, retention basins within the flood defense system (Luscani and Poloj), fishponds with supply canals, as well as primary and secondary canal networks.

4.1.5. Air quality

In the municipality of Brod, where no district heating system has been established, air pollution mainly originates from local stationary sources. These include industrial facilities and residential and commercial buildings that use different fuel types for heating and production. Traffic, landfills, and agricultural emissions also significantly contribute to pollution.

The municipality's industrial sector is led by the "Oil Refinery," which plays a vital role in the economy and is a recognisable symbol of the area. In addition, the industry's structure includes branches such as footwear, textile, chemical, wood industry, and food and beverage production. Continuous air quality monitoring has not been established in the municipality of Brod.

4.1.6. Geological characteristics

Quaternary

Quaternary formations were deposited over large areas of the Slavonski Brod sheet. They are divided into Pleistocene and Holocene sediments.

Transitional Pleistocene and Holocene deposits are genetically designated as lake-marsh deposits, while the following genetic types were identified in the Holocene: alluvial deposits of the Sava, Bosna, and streams, sediment of flood plains, mortuary sediment, marsh sediment and diluvial deposits.

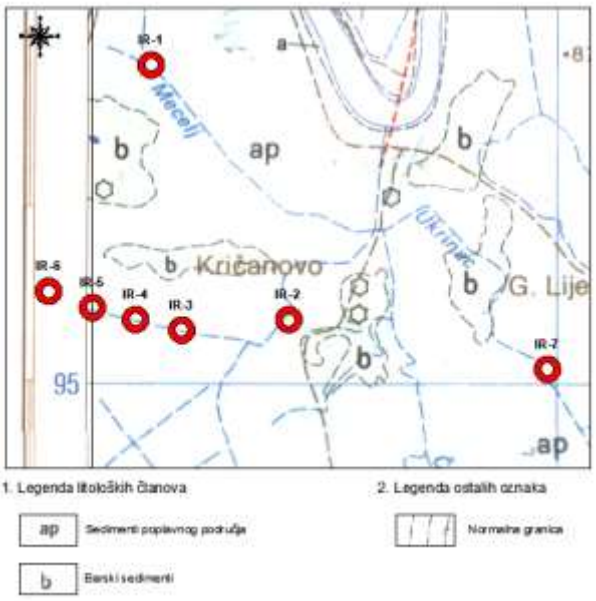


Figure 7 Modified OGK SFRJ[15], sheet Slavonski Brod 1:100000

Floodplain sediments (ap)

Under this name, sediments spread along the left and right banks of the Sava are singled out, with the fact that their width in the northern area is no more than 2 kilometres, and in some places, they are missing. It borders lake-bar deposits with a terrace section, which can be followed more or less continuously from Slavonski Brod to Samac. These sediments are more widespread south of the Sava, covering the first terrace of the Sava and Bosna rivers. Flood deposits are fine clastic deposits dominated by sands, silts and clayey sands. The thickness of these sediments does not exceed 5m.

[15] OGK SFRJ - Basic geological map of the SFRJ

4.1.7. Hydrological characteristics

Hydrological bases were made to develop the Main design of slide gates on primary internal canals III and IV of the Ivansko Polje drainage canal and the Ukrina-Sava peripheral canal-irrigation canal network. Water level and flow data were obtained from the relevant institutions in the RS water sector (PU 'Vode Srpske") and the SRHMI RC.

Table 7 Overview of hydrological stations with periods of available data

Station name		Data type	Period of work	Source
Hydrological stations	Gradiska	Q Wed, Sun	1965 - 1989	RHMI RS
		H Wed, Sun	1949 - 2020	
	Srbac	Q Wed, Sun	1953 - 1979	
		H Wed, Sun	1953 - 2020	
	Davor	Q Wed, Sun	1958 - 1992 2004 - 2018	SRHMI RC
		H Wed, Sun	1958 - 2018	
	Stara Gradiska	Q Wed, Sun	1937 - 1992 2004 - 2018	
		H Wed, Sun	1900 - 2018	

The assessment of the relevant flows in the canal network is determined by empirical methods, part of which refers to hydrological methods (SCS method) and part to methods commonly used for calculating the hydromodule of drainage of agricultural areas.
The used methods are:

- Hydrological:
  - SCS unit hydrograph
- Methods based on extreme precipitation in the growing season:
  - formulas by authors Nemet and Turazz (the so-called kinematic method) and
  - daily rain lasting 2-3 days.

The input data for the mentioned methods refer to the morphological parameters of the canal's catchment surface and the assessment of adequate precipitation of characteristic durations and return periods.

Table 8 Drainage hydro modules for assumed durations of relevant rains

Tk (hour)	IVANjSKO POLJE			
	Pb (mm)	Pe (mm)	q (l, s, ha)	Q (m^3/s)
48	97.9	39.5	2.29	13.20
72	108.6	47.7	1.84	10.61
60	103.6	43.9	2.03	**11.72**

According to SCS method the maximum flow to the pumping stations in Ivanjsko polje is 11.2 m^3/s.

4.1.8. Seismological characteristics

According to the Rulebook on technical standards for high-rise construction in seismic areas for a return period of 500 years, the subject area is located in the zone of maximum expected earthquake intensity of 8° MSK-64 scale with a probability of 63%.
The magnitude of the seismicity coefficient (Ks) for the 8° MCS intensity level is 0.050, while the lower limit values of the maximum horizontal acceleration for the 8° MCS intensity level range from 0.155 - 0.195.

4.1.9. Water supply and sewerage

The municipality of Brod's water supply system meets the water needs of all urban and rural settlements. The water distribution system has a total length of 250 km.

The water is captured at the spring in Brod within the PI "Vodovod i kanalizacija"[16] Purified water is pumped from the potable water purification plant (PPPV) to the water tower next to it. It then gravitates to consumers in the urban area.

Water supply in the Brod system is provided from one location, including two wells, with depths ranging from 70m. The average total water production is 82 l/s. The DWTP[17] was initially built in 1960 and expanded in 2000 (current capacity 100 l/s). It includes iron and manganese treatment, filtration, and chlorination. The distribution system's main water tank, which has a volume of 500 m3, is also located at this location.

The total number of connections with a water meter is 5238, of which the most represented are individual households, given that there are few residential buildings in the territory of the municipality of Brod.

Wastewater is collected in the Brod settlement and several suburban settlements. In other settlements, no sewage network has been built, and those households discharge wastewater into septic tanks and several minimal networks, which were built by groups of citizens.

One thousand seven hundred thirty-nine households are connected to the sewage system.

The sewage network was built between 1963 and 1987. year. A mixed type of sewage network was constructed using a combined method of sewage disposal. Rainwater collected by storm sewers is discharged into the faecal sewer. There are two sewage pumping stations in the Brod area. The leading collector drains wastewater to the recipient, a channel that flows into the Sava River.

Collected wastewater is discharged without any treatment.

The total length of the sewage network is about 19.5 km.

4.1.10. Waste management

Since 2013, UC "Komunalac Brod" has organised the removal of waste from the entire municipality, performed waste sorting, and generated income from recycling material. About 70% of the population is involved in organised waste collection, collected from about 6,000 households and 270 entrepreneurs and legal entities.

A large percentage of municipal waste is also produced in households. Food, garden waste, paper, cans, bottles, and plastic bags are integral to municipal waste.

The temporary disposal site for waste collected on the territory of the Municipality of Brod is located at the location of Koliba Donje, and the area of this disposal site is approx. 20,000 m^2.

In the Municipality of Brod, agricultural waste management faces certain challenges, including the lack of a comprehensive waste management system[18]. To improve waste management, the Municipality of Brod has initiated the implementation of the "CROSS WASTE" project[19]. The project is expected to contribute to the establishment of a more efficient agricultural waste management system through farmer education, infrastructure improvement, and the adoption of sustainable practices.

Current practices for managing agriculture waste, including plant residues, manure, and food remains, primarily involve compost production. Open burning of agricultural waste is forbidden under any circumstances.

Hazardous agriculture waste such as pesticide, herbicide, and fertilizer packaging, is managed following national waste management regulations and handed over to authorized operators.

[16] PI - Public Institution

[17] Drinking Water Treatment Plant

[18] Strategy of the development of the municipality of Brod for the period 2016-2020

[19] Project INTERREG IPA VI-A Cross-border Cooperation Programme Croatia-BiH-Montenegro 2022-2027

The strategic development plan for the Municipality of Brod envisions the development of infrastructure for waste collection and recycling, educating the population on the importance of proper waste disposal, and implementing projects that encourage intensified educational activities among farmers.

4.2. Biological characteristics of the area

4.2.1. Land - classification and uses

Based on the field identification of the excavated material from the excavation, supplemented by the results of laboratory tests at the site in question,[20] the soil was classified, and the following environments were distinguished - layers, natural and heterogeneous:

- layer 1. - Humus, embankment;
- layer 2. - Sandy-dusty clay.

LAYER 1. HUMUS, EMBEDDING—A layer of humus and clay was registered as a surface layer at the location in question. As construction soil, the humus layer can be up to 0.3 - 0.6 m thick; it should be removed entirely during earthworks.
LAYER 2. - SANDY-DUSTY CLAY - As layer 2 (two), a layer of sandy-dusty clay, grey to dark grey, with increased humidity and soft consistency and an increased percentage of the sandy fraction, was registered. These materials are registered on all investigative works and investigative excavations.

Data on land use were analysed based on pedological maps derived from CORINE Land Cover (CLC) 2012. The presented results suggest that the purpose of the considered areas is almost exclusively agricultural.

Table 9 Data on the land use of the considered fields and the percentage of representation of individual uses

CODE_12*	LEVEL 1	LEVEL 2	LEVEL 3	Representation %
IVANJSKO POLJE				
242	Agricultural areas	Heterogeneous agricultural areas	Complex cultivation patterns	47.20
231	Agricultural areas	Pastures	Pastures	2.11
243	Agricultural areas	Heterogeneous agricultural areas	Land mainly occupied by agriculture, with significant areas of natural vegetation	12.63
311	Forest and semi-natural areas	Forests	Broad-leaved forest	1.32
324	Forest and semi-natural areas	Scrub and herbaceous vegetation associations	Transitional woodland-shrub	0.71
512	Water bodies	Inland waters	Water bodies	10.49
121	Artificial surfaces	Industrial, commercial and transport units	Industrial or commercial units	2.31
511	Water bodies	Inland waters	Watercourses	0.07
211	Agricultural areas	Arable land	Non-irrigated arable land	15.20
112	Artificial surfaces	Urban factory	Discontinuous urban fabric	7.96

* original code from CORINA Land Cover

[20] Technical report within the Main design of slide gates on primary internal canals III and IV of the Ivansko Polje drainage canal network and the Ukrina-Sava peripheral canal -irrigation canal network

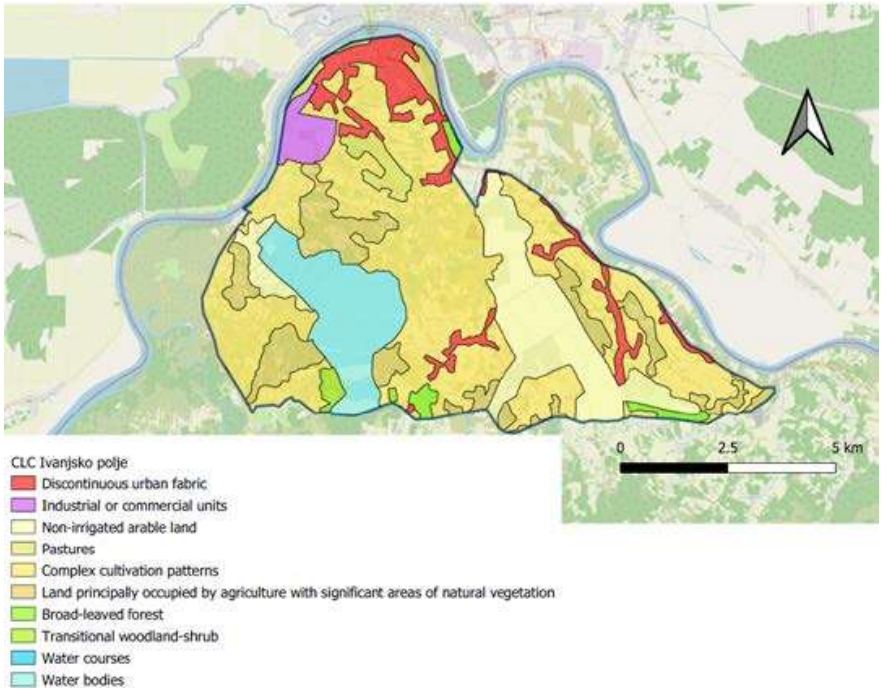


Figure 8 Land cover of Ivansko Polje with CLC nomenclature

Agricultural land

Agricultural land is one of the most important categories and forms the basis for intensive agricultural production. In the municipality's total area balance, agricultural areas occupy 11189.99 ha or 48.64%, representing a significant area share.

In terms of arable land, arable land is the most represented, followed by meadows and orchards the least. In the total agricultural land, meadows are more common than pastures. According to data from the cadastre, the area under arable land is 11563 ha (50.26% of the total area of the Municipality), under meadows 1747 ha (7.59%), pastures 943 ha (4.09%), orchards 652 ha (2.83%) and pond 706 ha (3.07 %). Fields, orchards and meadows represent arable land that includes 13,962 ha or 60.7% of the total territory of the Municipality of Brod. The uncultivable land covers 1679 ha (7.1% of the territory) and comprises pastures and a pond.

The total agricultural land is 64.8% arable and 7.1% non-arable, with an area of 15611 ha (67.8% of the total territory). The primary purposes of agricultural land are arable farming and cattle breeding, but it is mainly oriented towards semi-intensive production. Many activities related to cattle breeding and milk and meat production are also represented.

4.2.2. Forests

Forests with a total area of 9750.18 ha cover 42.38% of the municipality of Brod, below the average forest cover of the RS, which is 51.7%.

In the municipality's territory, the largest share of the category of coppice forests is 58.55%, which is significantly above the national average of 22.14%. The share of tall forests with natural renewal, which is the carrier of the economic use of this natural resource, is 29.22%, which is lower than the national average of 48.29%.

The existing forest coverage of the municipality of Brod is 28.22%. In tall forests with natural regeneration, according to the type of wood, deciduous trees prevail in the municipality (beech in the most significant percentage, oak, other deciduous trees and noble deciduous trees). Beech and oak belong to the category of quality industrial wood.

According to data from valid forestry bases for state and private forests, the total area of forests and forest land in private ownership is 3176.48 ha or 56.5%. In comparison, the area of state forests is 2445.34 ha or 43.5% of the total area of the municipality's territory.

According to the natural forest vegetation, the most widespread forests in the Brod municipality are the forests of sedge and common hornbeam (Querco-Carpinetum), which alternate with beech forests (Fagetum montanum) and acidophilic beech forests (Luzulo-Fagetum). This area has mixed cypress and beech forests as transitions between the basic types of cypress forests and hornbeam and beech forests.[21]
Due to extensive management and unplanned felling due to more significant " pressure" on the oak, common oak, and field ash, common hornbeam and pioneer tree species participated more fully in all plant communities, and the ground flora changed partially in favour of weedy plants.

4.3. Natural and cultural assets

The municipality's territory contains a significant number and diversity of immovable cultural and natural assets, representing considerable potential in the tourist offer. Still, these assets have not been sufficiently utilised, especially not adequately treated and defined within the comprehensive tourist offer.

No area has been officially registered in the municipality of Brod, but the Spatial Plan 2017-2037 provides for the following natural areas to be protected:

- ❖Lijesce, in the habitat management area category,
- ❖Patkovaca, in the habitat management area category,
- ❖Vucijak, in the nature park category,
- ❖Zboriste, in the forest park category;

The spatial plan envisages that the following natural areas and localities be placed under protection:

- ❖Sijekovac – Donja Ukrina and
- ❖River Sava.

None of the listed natural areas are located near the locations of the project activities.

4.4. Demographic characteristics

The municipality of Brod had 34,138 inhabitants before the war (1990-1995), and according to the last census from 2013, 15,720 inhabitants. According to the population census, households, and apartments in the RS in 2013, 15,720 inhabitants lived in 5,599 households in the municipality of Brod.

Of the total number of inhabitants, 13,506 were over 15 years old, of which 586 inhabitants had no education (4.34%), 1,241 inhabitants had incomplete primary education (9.19%), 2,986 inhabitants had completed primary school (22, 11%), 7,518 residents with a high school diploma (55.66%), 374 residents with a college degree (2.77%) and 801 residents with a university degree (5.93%). In all the following years, according to the estimate of the Republic Institute for Statistics of the RS, the population has decreased. Thus, in 2021, the number of inhabitants is estimated at 14,884, 5.32% less than in 2013.

According to the age structure, the largest share of the total population, 68.85%, is the population aged 15 to 64, which represents the population of working age; children aged 0-14 participate with 14.08%, and those aged 65 and over make 17.07% of the population. The share of these categories is approximately equal in 2013 and 2022.

[21]Ecological-vegetational rezoning of BiH (Stefanovic V., et al, 1983)

According to the gender structure, the participation of women in the total number of inhabitants in both observed years is approximately the same. About 52% of them, while about 48% are men. In the age category of 15-64 years, the number of women is about (48%) and men (52%) in both observed years, while the participation of women in the age category of 65 and over is slightly higher and amounts to 71% in 2013, while in 2022, that number is somewhat lower and amounts to 65% of the total population.

The project area is part of the Ivanjsko Polje hydro-melioration system. The project activities will be carried out within and on the surface of the canals (specific routes), which are part of water assets and water land owned by the Republic of Srpska. Therefore, the project activities do not involve land acquisition.
Field research confirmed that there are no informal settlements or nomadic groups near the project area. Local roads in the project area serve both as access routes for farmers to their fields and for connecting residential areas.

According to data from the agricultural department of the Municipality of Brod, the project area currently has 50 land leaseholders. Over the past five years, the most commonly cultivated crops have been wheat, corn, oats, and soybeans. In addition to the primary users, agricultural producers whose primary activity is farming will benefit significantly from the project.

Irrigation and drainage projects create conditions that support community health and safety by ensuring food security and fostering economic progress, enabling rural households to produce more safely and modernize their equipment using advanced technical and technological measures, agro-ecological indicators, and standards.

5. POTENTIAL IMPACTS ON THE ENVIRONMENTAL AND SOCIAL ENVIRONMENT

Within the next chapter, the identification of risks and impacts by phases and prescribed mitigation measures was carried out, taking into account the ecological and social basis (receptors, vulnerability, etc.), the probability of risk and the frequency and magnitude of risk.

IMPACTS DURING THE CONSTRUCTION PHASE

Impact of construction works

The project activity relates to the improvement of the existing infrastructure, namely the modernization and improvement of the primary internal canals III and IV with the construction of the slide gates on 8 locations. The works will be carried out on a project area precisely defined by Location conditions obtained in accordance with national legislation.

Since the existing infrastructure will be improved and reconstructed during the project's implementation, the primary impacts on the environment will be the presence of construction workers and construction machines on the project area performing construction works on the site.

The risks arising from the execution of works on the rehabilitation and reconstruction of the canal network will be limited to a narrow area of construction work and will be mitigated through measures defined in this ESMP in order to justify the moderate risk classification, with which the project has been assessed.

Due to the nature of these crops, it is essential to align the project timeline to avoid potential damage. Before commencing the works, coordination between leaseholders and the contractor is necessary, with a recommendation to conduct the works during the non-vegetative period, i.e., late autumn and early spring. Additionally, leaseholders and concessionaires are advised to avoid sowing winter crops during the project's duration. In the event of crop destruction, compensation measures have been planned.

Consequently, the range of impacts is limited (impacts directly related to rehabilitation activities), and their magnitude remains small (localised impacts with no significant implications for future work). Considering the nature of the proposed sub-project, it is predicted that negative impacts on the environment can be expected mainly in the construction phase i.e. installation of slide gates.

Key risks associated with construction work may include the following, but not limited to:

- Soil stabilisation;
- Cutting down trees and low vegetation;
- Traffic accidents;
- Ergonomic hazards during construction;
- Welding hazards (fume gas emissions from aluminium thermite welding, burns and radiation);
- Excavations and earthworks endanger vibrations;
- Vibrations of heavy construction equipment;
- Dust,
- Noise;
- Use of rotating and moving equipment.

The contractor is obliged to implement preventive and protective measures according to the following order of priority:

- Eliminating hazards by removing activities from the work process.
- Controlling the hazard at its source using engineering controls.

- Minimizing hazards through the design of safe work systems and administrative or institutional control measures, including job rotation, training in safe work procedures, lock-out and tag-out, workplace monitoring, and limiting exposure or duration of work.
- Provision of appropriate personal protective equipment for training, use and maintenance of PPE.

Access to the construction sites is possible from several directions, both local asphalt roads and rural macadam roads. The road network in the project area is highly branched due to the developed agricultural production and access to agricultural areas. The impact on the road network during the construction phase will be minimal and temporary in scope, and given the extensive road network, local traffic is not expected to be affected.

Impact on Water Quality
Construction activities may affect groundwater, primarily through pollution from oil spills and waste materials, as well as discharges from temporary on-site toilets. These impacts can become permanent if appropriate mitigation measures, such as proper material storage, suitable sanitation facilities, and water quality monitoring, are not implemented.

Impact on Air Quality
Construction activities will generate dust and vehicle emissions, particularly during excavation, equipment transport, and machinery operations. The impact on air quality will be localized and temporary, with the potential for air quality to return to its original state upon project completion. Mitigation measures include dust control and regular machinery maintenance.

Noise Impact
Construction activities will cause a temporary increase in noise levels, depending on the type of activities and machinery used. The works will primarily be conducted during daytime hours to minimize impacts on the local community. Implementing measures such as defined working hours in noise-affected zones will help reduce this issue.

Impact on Flora and Fauna
Construction work within the canal network and a temporary increase in water turbidity may pose a minimal and localised threat to the area's flora and fauna. The presence of construction machinery may temporarily disturb local fauna and cause the spread of invasive plant species. These impacts will be limited to the construction area and can be mitigated through good practices, such as regular equipment maintenance, invasive species control, and restoring the land to its initial state after construction.

Impact on Protected Areas
The project will not affect protected areas, as the works are conducted outside such zones. Furthermore, no rare or protected species have been identified in the project area, eliminating the possibility of negative impacts on natural resources.

Waste Generation Impact
Vegetation material and excavated soil that cannot be reused for the works will make up the bulk of the generated waste, as well as inert construction waste. Servicing and maintenance of machinery and equipment and installation work can generate waste such as metal waste, empty lubricant containers, plastics, rubber, etc. Also, this includes packaging materials, wrappers, utilization of polythene bags, food waste, used bottles, etc., used by construction workers.

Excavated sedimentary material is expected to occur during cleaning and maintenance of the drainage channel network. Depending on the physical and chemical composition of this waste, disposal will be carried out in accordance with national legislation. If this waste is classified as hazardous based on the analysis, then it will have to be handed over to operators authorized to manage hazardous waste. If the analyzes show that the extracted sediment is not dangerous, then it will be able to be disposed of at the local city landfill.

Impact on Community Health and Safety

Given that the project involves the movement of machinery on local roads and the execution of construction works at defined locations, there is a possibility that the aforementioned activities will disrupt the usual directions of movement of the population and motor vehicles. Figure 9 shows a map with the possible movement of the contractor's machinery. It is evident from the attached that there may be delays when machinery and machinery arrive and depart from the construction site. Since a small number of machineries are foreseen, no significant impact on the local population of the local communities of Lijesce and Koliba Gornje is foreseen. However, these impacts can be mitigated by applying good construction practice measures, including planning the placement of machinery and equipment in cooperation with the local population and authorities.

The construction sites are located next to local lower-level roads, which connect rural settlements. These roads are not burdened with traffic. Access to the construction sites is possible from multiple directions, as shown in Figure 9. No traffic disruption is expected during the works. However, the contractor must develop a Construction Site Traffic Management Plan that will define the use of primary and alternative access routes during the works in cooperation with the local community, in order to minimize potential impacts. Potential health risks due to the proximity of the construction site can be reduced by the use of appropriate signs and fencing.

Figure 9 Access roads to construction sites

Field research confirmed that there are no informal settlements or nomadic groups near the project area, indicating that the project will not adversely affect vulnerable or marginalized groups.

The impact of land acquisition has not been identified because the work will be carried out on the existing canal network which is a part of water assets and water land owned by the Republic of Srpska.

Impact on Health and Safety at Work

Workers will be exposed to various risks, including dust, noise, vibrations, and hazards associated with machinery and materials. The contractor will prepare a special grievance mechanism for workers and authorize the person responsible for its implementation and monitoring. The contractor will conduct regular training and provide appropriate equipment to minimize risks and comply with occupational health and safety regulations. Occupational health and safety officers at each employer and coordinators for the execution of works on construction sites are responsible for ensuring that adequate prevention and protection measures are applied and that regulations are followed. By using protective equipment, appropriate training and organisation of the construction site, the risk of injuries and health at work can be significantly reduced. ISO standards set additional requirements for quality management, environment, and safety at work, and they impose clear and strict technical conditions for various activities.

If the construction activities include potentially dangerous works, even after the implementation of preventive and protective measures (residual risk), persons under 18 will not be employed on the Project to avoid unnecessary risks. Consequently, the risk of child labour tends to be zero.

Gender-Based Violence and Sexual Harassment (GBV/SEA-SH)

Given the local context and the nature of the project, the risk of gender-based violence and sexual harassment on the construction site is considered low. Awareness-raising activities and preventive measures will be conducted to further reduce these risks and to allow the GRM to uptake such complaints.

Impact on Cultural and Historical Assets

The project area is not associated with cultural or archaeological assets, and the possibility of discovering significant findings is minimal. If archaeological remains are discovered during construction, works will be halted immediately, and the responsible heritage institution will be notified to assess and protect the findings.

Overall, all impacts from construction activities are temporary and can be reversed to their original state. Appropriate good construction practices prescribed in this document will help mitigate these impacts.

IMPACTS DURING OPERATIONAL PHASE

No significant adverse environmental impacts are expected during the operational phase. On the contrary, the effects in the operational phase are considered very positive, as the sub-project aims to improve the resilience of the agricultural sector through increased productivity, food quality, and safety. Planned activities within sub-component 2.2 include the construction/rehabilitation of the irrigation and drainage canal network will support agricultural development by preventing environmental and social risks. The work on rehabilitating the canal network is based on cleaning and regular maintenance. In contrast, the reconstruction works refer to installing sealants on the existing canal openings, enabling water collection in the canal network. Mobile pumping stations will be used to irrigate agricultural areas in Ivanjsko Polje.

The positive impacts of the canal network rehabilitation and reconstruction sub-project will bring economic, social, health and environmental benefits to this area's population and local community. The experiences of similar projects show that the sub-project will have many positive effects on society by creating conditions for the growth of population standards in almost all segments (increasing and modernising agricultural production, improving rural infrastructure, increasing yields, increasing the resistance of agriculture to climatic conditions, keeping the population in the project area).

5.1. Magnitude of negative impacts and proposed mitigation measures

Below is a summary of the key impacts during the design, construction and operation phases and recommended mitigation measures.

Table 10 Overview of impacts and proposal of mitigation measures

Influence	Magnitude	Comment/Mitigation Measures
Land Acquisition Restrictions on Land Use and Involuntary Resettlement	Low	The subproject will not trigger land acquisition and economic displacement, but restrictions on land use during construction are possible. Still, these potential impacts are expected to be resolved by implementing the RPF measures prepared under ESS5.
Underground and surface waters	Low	Due to the small amount of drainage water that can potentially be drained from the Contractor's site and during the execution of the works into the canal network, the resulting impact is expected to be low to negligible. Adequate monitoring will be established, and no long-term water disturbance or similar activities will be allowed. Given the methodology of the reconstruction works, localised impacts on water flow in the canal network (increased turbidity) are expected. Improper disposal of excavated material and construction waste can negatively affect groundwater and surface water. Properly organised waste disposal is mandatory.
Air quality	Moderate	Local air quality may experience moderate and short-term deterioration due to truck traffic dust, elevated nitrogen oxide (NOx) levels, and sulfur oxide (SO) from construction equipment exhaust gases. The impact can be mitigated by applying the WB EHS guidelines.[22]
Flora and fauna (protected areas and species)	Low	Loss or damage of flora and fauna disruption may occur locally at the site during the works. Still, compensatory measures will be able to compensate for the loss of vegetation. The work of the sub-project will lead to an increase in the consumption of energy and raw materials, the generation of waste, and the emission of pollutants. Impacts can be offset or mitigated by following EHS procedures and having valid environmental permits from material suppliers. There will be no negative impacts on protected areas because the locations of the works are not identified as protected areas, nor are they located near protected areas.
Noise and vibration	Moderate	Only a limited temporary impact during the construction phase of the reconstruction and rehabilitation of the canal network is expected. Implement all the measures to mitigate the impact of exhaust gases, noise, dust and vibrations. Provide sanitary and hygienic facilities for workers. Prepare and implement the Site Organization Plan and Worker Health and Safety Management Plan. All workers are required to comply with the Worker Health and Safety Management Plan. Provide workers with personal protective equipment (PPE) that meets the needs of performing work activities. Ensure that workers follow the procedures on the mandatory use of PPE and have received training on occupational safety. Adhere to the measures defined by the LMP.

[22] https://www. ifc. org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-atifc/policies-standards/ehs-guidelines

Influence	Magnitude	Comment/Mitigation Measures
		National noise protection standards will be applied for works on rehabilitation and reconstruction of the canal network following the Rulebook on limit values of noise intensity.[23]
Land quality	Low	Soil pollution can occur from the drainage of excavated materials and spillage of hazardous chemicals. The impact can be mitigated by following WB standards (ESS3 Resource Efficiency and Pollution Prevention and Management Risk).
Loss of topsoil	Low/ negligible	Loss of topsoil due to temporary access roads and working areas and landscape degradation is not expected.
Waste management	Moderate	Health hazards and environmental impact can be caused by inadequate waste management practices. The impact can be mitigated by following the WB standards (ESS3- Resource Efficiency and Pollution Prevention and Management Risk. In accordance with national legislation, the contractor shall prepare and implement a Waste Management Plan that will define all necessary actions and measures related to managing collection, disposal, reuse, etc.) of this excavated material and construction waste.
Community Health and Safety	Moderate	The main risks related to the health and safety of the community refer to potential risks to traffic and road safety for workers, vulnerable communities and road users throughout the sub-project area. These risks mainly arise from the increased traffic on the transport routes that the Contractors will use during the construction works, and the impact can be mitigated by following the WB guidelines (ESS4- Community Health and Safety Risk). The health and safety risks associated with workers are deemed to be minimal, as the workforce involved in executing project activities will be sourced from local companies. Consequently, there will be no requirement to secure accommodation in the project area or at the work site. It is anticipated that the organization will structure the workload to align with standard 8-hour work shifts, and, considering the nature of the construction work, there will be no necessity for an additional influx of workers. The risk of hazardous materials, including unexploded Ordnance and mine risks are low. However, even a small management of these risks is included in the contract for performing work. The procedures provided for in the contract will regulate unexploded ordnance and accidental mine finds. Regular monitoring and tour of the construction site and raising awareness in the communities regarding the risks of the construction site. Restrict public access by using signs and barriers nearby. Impacts on traffic due to increased traffic flows, abnormal loads and construction works near public roads
Worker Health and Safety	Moderate	The contractor will prepare and implement Workers GRM, in cooperation with municipal administrations and APCU, in order to establish a grievance mechanism to solve workers' complaints, in line with the ESS5 standard. The contractor will appoint one or more coordinators for safety and

[23] Official Gazette of RS no. 02/23

Influence	Magnitude	Comment/Mitigation Measures
		health issues at work. Before establishing the construction site, the contractor is obliged to adopt a safety and health plan. Workers may be exposed to adverse environmental influences, such as noise, dust, and the irregular movement of construction machinery.
Sexually exploitation and abuse and sexual harassment (GBV/SEA-SH)	Low	Sexual exploitation, abuse and sexual harassment (GBV/SEA-SH) is rated as low. The contractor shall prepare and implement a Code of Conduct (including the SEA/SH Code of Conduct) The contractor shall present the Code of Conduct to workers and the local community. Before starting work, the contractor shall train contract workers on SEA/SH issues and raise awareness on GBV/SEA-SH issues. The contractor shall enable complaints to be submitted through the appeals mechanism. Adhere to the measures defined by LMP.
Stakeholder Engagement	Moderate	As part of the APCR, a Stakeholder Engagement Plan (SEP) has been developed to enable stakeholders to address their concerns, comments, and suggestions. To adequately meet the needs of different groups, communication and information channels have been established for all identified stakeholders following their needs, following the ESS10 standard, from the initial stages to the completion of the project. The APCU, in cooperation with municipal administrations, has established a grievance mechanism to address issues related to losses and damages caused by construction activities, in line with the ESS5 standard. APCU, in cooperation with the municipal administration, has established a grievance mechanism to resolve issues related to losses and damages caused by construction activities, following the ESS5 standard. The GRM is accessible, efficient, easy, understandable and free of charge to the complainant/stakeholders at MoAFWM site and site municipality of Brod. During the implementation phase, individuals and households may observe changes resulting from te environmental and social impacts of project activities arising from construction works. However, they may also benefit from employment opportunities associated with the project, as well as the project's contributions to the development of a more competitive and climate-resilient agricultural production system.

6. PLAN OF MEASURES FOR PREVENTION/MITIGATION OF POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

The ESMP was prepared based on the results of the screening of potential environmental and social risks and impacts. Impacts were identified based on the environmental baseline, probability and magnitude of the impact and based on these, mitigation measures were proposed to either avoid or, where not possible, mitigate the risk to an acceptable level.

The impact mitigation measures are developed for all phases of the Project in consideration of the national legislation and the international standards are given in Table 12.
Mitigation measures are categorised as:

- Mitigation measures in the design/planning phase,
- Mitigation measures in the construction phase, and
- Mitigation measures in the operational phase.

The responsibility for the application of the mitigation management plans will rest upon the APCU during the preparation phase. It should be noted that the following activities and actions for the preparation and mobilization of the Project have already been taken by APCU:

- Necessary permits for the execution of works have been obtained following national legislation.
- All national legislation provisions have been complied with.
- Stakeholders were informed about th ARPC and this subproject.
- A grievance mechanism was created. Stakeholders were informed about contact information.

Other mitigation measures and monitoring activities will be carried out during the construction phase and operation phase of the Project.

Mitigation measures during the construction phase mainly refer to reducing negative impacts that may arise due to during construction works, which are classified as moderate, occasional, short-term and discontinuous.
During project implementation, the contractor will use the shortest route from the main road through the settlement to the site, with minimal traffic impact expected given the project's scope. Nonetheless, safety and traffic management measures must be implemented to reduce potential issues along planned routes, in coordination with the local community and in compliance with national traffic and safety regulations.

The main burner of implementing mitigation management plans during the construction phase will rest upon the Contractor. The APCU and the designated supervising engineer will supervise the implementation of mitigation measures and the Monitoring Plan. The list of good construction practices (Annex 1) and the Waste Management Plan (Annex 2) should be incorporated into the Contract with the contractor.

Mitigation measures in the operational phase refer to reducing negative impacts that may arise due to inadequate maintenance of the canal network, installed slide gates and water use for irrigation of agricultural plots in Ivanjsko Polje. During the operation phase, the responsibility will rest upon the competent administration of the municipality of Brod and WUA.

Table 12 shows the plan of measures for the prevention and mitigation of environmental and social impacts, which is designed as a checklist to ensure the implementation of relevant mitigation measures in the appropriate phases of the project.

Table 11 Plan of measures for prevention and management of potential environmental and social impacts

ISSUEISSUE	POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS	MITIGATION MEASURES	MONITORING PARAMETERS	RESPONSIBLITY
PREPARATION PHASE				
	Notify users and relevant institutions - stakeholders	Regularly inform users and relevant institutions - stakeholders about planned project activities	• Keep written proof of notices • Grievance mechanism records	• APCU
	Preparation of tender documentation	Ensure a professional approach, compliance with national legislation and WB guidelines	• Prepared tender documentation	• APCU
CONSTRUCTION PHASE				
General conditions of construction site arrangement	• Public information and general safety at the construction site • Reduced accessibility through the area where work is being carried out • Implementation of Construction Site Organisation Plan • Implementation of Good Construction Practice	• Inform the public about construction works through local media bulletin boards in local communities or municipal website minimum of1 month before works begin on the ground • Plan to move the equipment at a time when there are no sizeable daily traffic jams.Prepare and implement the Construction Site Organization Plan, which includes measures of Good Construction Practice from the Annex 1. • The contractor formally accepts that all works will be carried out in a safe and disciplined manner to minimise the impact on the surrounding population and the environment • Control of access of unauthorised persons to the construction site • Provide personal protective equipment (PPE) by international good practice (always helmets, as necessary masks and goggles, belts and safety boots) • Place appropriate signs on the construction site to inform workers of critical rules and regulations to follow and emergency contact numbers • Provide medical services and materials on-site for all emergencies • Provide portable wet and sanitary facilities for construction workers • Prepare and implement the Construction Site Organization Plan • Prepare and implement the Good Construction Practice • Prepare and implement the Construction Site Traffic Management Plan • Adhere to the measures defined by the LMP.	Keep written proof of notices • Interviews with employees • Grievance records • Training records • Contract examples • On-site inspections of coverage of construction works • Accident records • OHS practices in the field (Use of PPE, etc.)	• Supervisory authority at the construction site • APCU • Contractor
Procurement of materials	• Indirect impact on the environment by	• Materials should be procured from authorised companies that have a work permit	• On-site inspections • Contracts with suppliers	• Supervisory authority at the

	purchasing materials from companies that do not have a license to operate			construction site • APCU • Contractor
	Soil erosion as a result of clearing, and excavation	• Ensure the protection of slopes (compaction, stabilisation by greening, covering slopes) by the Main design • Prepare and implement the Construction Site Organization Plan • Prepare and implement the Good Construction Practice • Erosion control measures should be implemented after the completion of the earthworks. • Follow measures prescribed in the waste management plan.	• On-site inspections • Visual observation • Grievance records	• Supervisory authority at the construction site • APCU • Contractor
Air quality	• GHS emissions and solid particles from vehicles, equipment and aggregates	• Maintain equipment regularly • Equipment and machinery should be turned off when not in use • It is necessary to use high-quality fossil fuels (low sulfur and lead) as motor fuel for machinery and equipment • The contractor must submit proof of compliance with emission standards as part of the annual vehicle registration procedure	• On-site inspection • The presence of black smoke from construction vehicles • Attestation documentation • Daily control of the construction site	• Contractor • Supervisory authority at the construction site
	• Increase in dust concentration	• Compact the deposited soil material to reduce dust emissions to a minimum • Wet the surfaces of dust sources to minimise inconvenience to the surrounding population • Control vehicle speed to reduce dust suspension on roads • The impact of the dust formed during the construction phase will be mitigated by watering the construction site and the access roads. • The truck carrying dust-generating materials will be covered and the upper part of the material will be kept at 10% humidity. • Loading/unloading will be carried out carefully without scattering • Idling of vehicles will be avoided to prevent unnecessary emissions. • Speed limit will be set and adhered. • Driving of construction vehicles through the settlements should be avoided where possible. • Materials will be loaded and unloaded without scattering and throwing. • As minimum number of machinery and equipment as possible will be operated simultaneously • Compliance with the air quality limit values stipulated in national legislation and WBG/IFC General EHS Guidelines will be ensured. • In case of any grievance, dust measurements will be conducted, and urgent corrective and preventive action(s) will be taken • Adhere to the measures defined by LMP	• Grievance mechanism records • In the case of complaints, the inspection authorities will require a control measurement following national legislationDaily control of the construction site • On-site inspection	• Contractor • Supervisory authority at the construction site

Noise	• Increase in noise levels	• Use modern, well-maintained equipment with built-in noise-reduction devices • Arrange the movement of equipment outside the peak period of daily vehicle traffic • Avoid construction activities at night and comply with local laws regarding when construction work is permitted • Equipment and machinery should be turned off when not in use • Compliance with noise emission limit values under national legal regulations • Adhere to legally defined working hours on the construction site within limits (from 07:00 a.m. to 07:00 p.m.), where the limit value of the noise level must not exceed the noise levels for the intended zone of use of the space • Adhere to the measures defined by LMP. • Prepare and implement the Site Organization Plan, which includes measures of good construction practice • A minimum number of machinery and equipment as possible will be operated simultaneously. • Maintenance of the vehicles will be performed regularly to ensure their good working conditions. • Idling of vehicles will be avoided. • Driving of construction vehicles through the settlements will be avoided where possible. • Notification of communities/settlements about the noise levels that may be created during the construction phase due to heavy machinery use will be provided. • The Grievance Mechanism of the project will be in place. In case of any grievance, urgent corrective and preventive action(s) will be taken and necessary noise level measurements will be performed. • Employees will be provided with protective equipment as specified in the Occupational Health and Safety Law	• Grievance mechanism records • In the case of complaints, the inspection authorities will require a control measurement following national legislationIn the case of complaints, the inspection authorities will require a control measurement in accordance with national legislationDaily control of the construction site • On-site inspection	• Contractor • Supervisory authority at the construction site • APCU
Soil contamination	• Soil pollution caused by oil/fuel and chemical leakages • Soil pollution caused by inadequate waste disposal	• The Waste Management Plan should prescribe the removal and disposal of waste, and the final disposal should be entrusted to an authorised institution for waste management. • The storage and handling of lubricants in specific areas should be carried out with measures for soil protection and the prohibition of dumping lubricants on the construction site • Regularly maintain vehicles and machines to prevent oil leaks • Create a plan of measures to prevent accidental spills	• Daily control of the construction site • Monitor the level of land quality • In the case of accidents or complaints, the inspection authorities will require a control measurement by national legislation	• Contractor • Supervisory authority at the construction site • APCU
	• Soil erosion and landslides due to	• It is mandatory to control the stability of the soil during the execution of earthworks to prevent the degradation of the stability of	• The presence of eroded areas near the	• Contractor • Supervisory

	clearing and excavation	the terrain • Avoid steep slopes • Provide slope protection by compacting the dam, rock piles on critical sections or vegetative stabilisation • Determining the area for storing waste material, with the allocation of humus for later use to restore degraded areas to their former state	construction site • Signs of a potential/imminent landslide (unstable ground, signs of sliding, etc.) • Daily control of the construction site	authority at the construction site
Water resources	• Increased turbidity and siltation of surface and groundwater, causing inconvenience to the use of affected surface or groundwater by communities along the path of irrigation canals	• Install sediment screens along the canal network to filter eroded sediments • Proper drainage of spilt mud water remaining after remediation and removal of sludge • Same measures as above for erosion control and slope stabilisation • Prepare and implement the Site Organization Plan	• Grievance mechanism records • In the case of complaints, the inspection authorities will require a control measurement following national legislationDaily control of the construction site • On-site inspection	• Contractor • Supervisory authority at the construction site • APCU
	• Contamination of water bodies with oils and grease due to poor maintenance and repair of equipment and fueling	• Avoid servicing and refuelling in the field • When refuelling and vehicle maintenance at the construction site, use protective films. • Provide absorbent material in case of fuel spillage. • Manage the used oily materials and means following the Waste Management Plan. • Prepare and implement the Site Organization Plan, which includes measures of good construction practice from the Annex, measures from water acts and measures from the Waste Management Plan given in the Annex	• Grievance mechanism records • The presence of an oily film on the surface of the water • On-site inspection	• Contractor • Supervisory authority at the construction site • APCU
Waste and Resource Management	• Environmental pollution caused by improper waste disposal	• Implement the Waste Management Plan given in the Annex • Avoid using hazardous material • Determine routes and locations for waste collection and disposal for all major types of waste expected from construction activities. • Separate mineral construction waste from general, organic, liquid and chemical waste by sorting it on the construction site and storing it in appropriate containers. • Collect and dispose of construction waste appropriately with the support of authorised persons who have a permit for waste management • Waste management activities will be conducted in compliance with the applicable waste management regulations. • Regular on-site inspections of solid waste management will be	• Grievance mechanism records • Visual control of separately stored waste • General observation • Daily control of the construction site	• Contractor • APCU

		performed. • The wastes will be segregated (i.e., hazardous/non-hazardous, recyclable/non-recyclable) and stored temporarily in designated storage areas. • The temporary waste storage areas will be constructed based on the requirements listed in the Waste Management Regulation. • Hazardous and non-hazardous wastes will be stored separately, having different entrance doors. • Wastes will be stored separately according to the classification, labels indicating the type of waste will be placed for each type of waste. • Absorbents, firefighting equipment, etc. will be kept ready on site for immediate response, in case of an emergency such as spills and fires. • Physical access restrictions will be applied at waste storage areas through use of gates, fences, and locks; only authorized persons will be allowed in storage areas. • There will not be any waste burning, disposing, or burying activities under any circumstances. • The transportation of wastes will be ensured in appropriate frequencies so that the storage capacities are not exceeded • Grievance Mechanism of the project will be in place. In case of any grievance, urgent corrective and preventive action(s) will be taken		
Community Health and Safety	• Health and Safety risk • Grievances • Incidents •	• Inform the public about construction works through local media bulletin boards in local communities or municipal website minimum of 1 month before works begin on the groun. • The construction activities will be performed in a way that does not cause any damage to the utilities located in the working area. • Entry to the construction site will be carried out in a controlled manner by the security personnel. • Emergencies will be handled appropriately and promptly • It is significant to create an environment for the people to raise their concerns by informing them about the project, to hold regular stakeholder engagement activities in the settlements, and to create the opportunity to address the concerns of those who oppose the project. • A grievance mechanism will be in place	• Grievance mechanism records • Number of incidents/accidents	• Supervisory authority at the construction site • APCU • Contractor
Traffic risks	• Increased traffic due to movement of heavy equipment/vehicles/ works near local roads • Reduced public access through the construction area	• Prepare and implement the Construction Site Traffic Management Plan • Construction Site Traffic arrangements will be made considering the routine use of the roads by the local residents. • Traffic signs will be posted considering the provisions of the Regulation on Traffic Signs • Provide traffic assistants/signalers and traffic signs to help ensure	• Presence of traffic signs • Occurrence of traffic jams • Grievance mechanism records • Number of	• Contractor • APCU

	• Increased risks for the population of traffic accidents during construction works	the free and safe flow of traffic • Maintain and repair temporary alternative routes for vehicles and pedestrians • Provide supervision over the management of the number of construction machines and their working hours • The speed limits stipulated in Regulation on Traffic will be strictly followed • Ensure adequate lighting on the construction site • Provide adequate lighting in places where there are likely to be passers-by or where the population enters • Determine an alternative route for pedestrians and vehicles in coordination with municipal administration bodies or provide a safe passage through the construction site • Provide timely information to locals through the media about upcoming works and alternative directions • Adhere to the measures defined in the SEP. • A grievance mechanism will be in place.	incidents/accidents • Training of workers/drivers	
Occupational health and safety	• Labour and Working Conditions • Informal work • Accommodation conditions • Dieses • Grievences • Incidents • Use of PPE	• Safe working environments will be created at the work sites. • The APCU and its contractor(s) will ensure that Code of Conduct and public awareness training are given to all employees at the very beginning of the recruitment process, which will be also refreshed during the work period. • Trainings will cover workers' rights, contract requirements, Code of Conduct, grievance mechanism and contact channels. Compliance with the rules of code of conduct, including gender-based violence, sexual harassment, sexual exploitation and abuse, which are included in the trainings to be provided, will be in the contract articles of the personnel. The sanctions for non-compliance with the code of conduct will be clearly stated in the contract. • All employees will be provided with personal protective equipment (PPE) and necessary training will be provided for their use. • Work areas will be equipped with warning signs in accordance with the nature and potential risks of the work to be done in that area. • All necessary precautions will be taken in the project area to prevent fires. • An infirmary will be in place at the project area. In emergencies that require intervention, the personnel will be referred to the nearest health center by appropriate vehicles. • Drivers and operators will be trained to comply with traffic rules • Required traffic signs will be placed at the project site and its surroundings. • The areas to be excavated will not be accessible except by authorized personnel.	• Workforce Verification and Compliance Checklist • On-site inspections • Interviews with employees • Complaint records • Training records • Contract examples • Internal and external audits • Availability of an adequate OHS • Organizational structure • Incident/accident reports • Grievance records • Trainings and training materials • OHS practices in the field (Use of • PPE, etc.) • HSE Inspection • Legal requirements	• Contractor • Supervisory authority at the construction site • APCU

		• Loading and unloading activities are carried out together with an accompanying person. • The project site will be fenced and a security personnel will be employed. • Public access to these areas will be restricted • Prepare and implement the Site Organization Plan and the OHS Safety Measures Plan. • Provide regular training in OHS • Require all workers to comply with Occupational Safety Measures • Place warning signs along the rehabilitation and reconstruction route of the canal network • Provide workers with sanitary and hygienic facilities • Provide workers with personal protective equipment (PPE) that matches the tasks. • Ensure that workers follow the procedures on the mandatory use of personal protective equipment and that they have received training on occupational safety. • Ensure that machines are operated only by qualified machine operators with the skills and experience. • Adhere to the measures defined by LMP		
Protecting the Workforce	• Labour and Working Conditions • Informal work • Accommodation conditions • Dieses • Grievences	• The contractor(s) shall prepare and implement GRM for workers • The workers will be informed about the worker grievance mechanism. • Employment of child labor and forced labor will be prevented. • Workers will be provided with documented information that is clear and understandable, regarding their rights under national labour law; including collective agreements, their rights related to hours of work, wages, overtime, compensation, and benefits as of start-up of working relationship and when any material changes occur, • Particular concern will be paid on principles of non-discrimination and equal opportunity. Wages, work hours and other benefits will be per the national Labor Law, • The contractor(s) will not discourage workers from electing worker representatives, forming or joining workers' organizations of their choosing, or bargaining collectively, and will not discriminate or retaliate against workers who participate, or seek to participate, in such organizations and collective bargaining.LMP will be implemented for the Project and the personnel will be trained on this Plan.	• Grievance records	• Contractor • Supervisory authority at the construction site
Risks of GBV/SEA-SH	• GBV/SEA-SH requirements and expectations not being	• Prepare and apply the Code of Conduct (including the GBV/SEA-SH Code of Conduct) • Present the Code of Conduct to workers and the local community;	• Availability of an effective GRM with multiple channels to	• Contractor • Supervisory authority at the

	adequately addressed • Low awareness raising and sensitization on GBV/SEA-SH • GBV/SEA-SH grievances	• Provide training of contract workers on GBV/SEA-SH issues before starting work • Conduct awareness raising on GBV/SEA-SH issues. • Enable the submission of appeals through the appeals mechanism. • Adhere to the measures defined by the LMP	initiate a complaint parallel GBV/SEA-SH • GBV/SEA-SH grievance record • Codes of Conduct signed and understood •	construction site
Biodiversity - flora and fauna	• Biodiversity may be damaged during the period of work • Increased risk of invasive species of flora and fauna	• Do not allow undergrowth and low vegetation to be covered with soil • Clean machinery and vehicles before use. • In case of encountering a foreign invasive species, it is necessary to try to prevent its spread and remove it • On-site vehicle speed limits will be implemented to avoid potential road-kills. • Clearing must be done sequentially and in a way that directs escaping wildlife away from the clearing and into adjacent native vegetation or natural areas of their own accord	• Visual control • Analysis of flora and fauna in the project area	• Contractor in cooperation with the relevant services • Supervisory authority at the construction site
Chance finds	• Discovery of archaeological or other tangible or intangible cultural-historical heritage	• If, during the construction works, archaeological sites or archaeological objects are encountered, the contractor is obliged to immediately stop the work and notify the Supervising Engineer and the Institute for the Protection of Cultural, Historical and Natural Heritage of the RS to take measures to protect the finds and to preserve them in place and the position in which was discovered	• Visual control of the site location • A record of found objects or finds	
OPERATIONAL PHASE				
Irrigation system management	• Adequate publication of conditions for connection and use of the irrigation system • Control of the conditions under which the irrigation system is put to use by individual users • To ensure compliance with national legislation in the field of protection of soil, water and waste management	• Public release of information on the conditions for connection to the irrigation system and the necessary qualifications • public announcement of obligations to keep the irrigation system functional and protected • the obligation to adequately manage waste resulting from the use of the irrigation system by the national legislation in the field of waste management the obligation to protect the soil and water during the use of the irrigation system following the national legislation in the field of soil and water protection	• Grievance mechanism records • Visual control of soil and water condition • In case of accident, analysis of contaminated soil or water • Records of waste management	

Soil contamination	• Access restrictions during the operation phase • The gradual accumulation of harmful substances in the soil • Soil salinisation, flooding, soil washing (erosion) • Reduced yields due to excessive irrigation	• Introduce appropriate traffic signals and appropriate warning signs • Implementation of SEP, especially provisions on the timely provision of information to citizens through the media about upcoming maintenance, expected duration of works, alternative routes, etc. • Discharge of hazardous materials and wastes into soil will be forbidden	• Visual control of warning signs • Insight into published information • Visual control of soil condition • In case of accident, analysis of contaminated soil • Records of the type and quantity of cultivated plants that are irrigated • Visual inspection of the condition of the land	• System user (WUA) • The administration of the municipality of Brod •
Water resources	• The gradual accumulation of harmful plants due to undetected pollutants in the water used for irrigation, which can result in low yields and pose a possible threat to the health of consumers • Lack of water for irrigation caused by excessive pumping	• Determine the required level of irrigation water quality so that any future potential threat to plant and human health can be easily determined • In case of quality deterioration, choose another water source or carry out sanitary-hygienic rehabilitation measures.Give zero priority to the exploitation of water for irrigation of crops • Define the water needs of cultivated crops. • Prepare and implement the Irrigation System Management Plan and train water users to use it. The plan foresees regular calibration and maintenance of water management devices. • Determine and appoint the person(s) for regular monitoring and assessment of the condition of the irrigation system.	• Visual control of water level • Periodic analysis of water quality • Records of the type and quantity of cultivated plants that are irrigated	• System user (WUA) • The administration of the municipality of Brod
Noise	• Noise emission during the performance of works on cleaning and maintenance of drainage canals • Noise emissions during operation of irrigation pumps	• Use equipment and machinery that emits a lower level of noise and has less impact on the surrounding population and fauna • Regularly maintain equipment and machinery • In case of noise complaints from residents, it is necessary to apply all technical measures to reduce emissionsMachines should be turned off or reduced to a minimum when not in use • Limit noisy activities (e.g. excavation of water sediment, truck unloading, etc.) to times of the day that are least sensitive to noise and schedule activities so that they co-occur.	• Grievance records • In the case of complaints, the inspection authorities will require a control measurement in accordance with national legislation	• System user (WUA) • The administration of the municipality of Brod
Waste managementI	• Improper waste disposal from maintenance activities on cleaning drainage canals	• A project-specific Waste Management Plan will be implemented. • Training covering waste generation according to the waste management hierarchy (the prevention, reduction, reuse, recycling and finally disposal) will be provided for personnel to raise awareness. • The transportation of wastes will be ensured in appropriate frequencies so that the storage capacities are not exceeded.	• Grievance Mechanism of the project will be in place. • In case of any grievance, urgent corrective and preventive action(s) will be taken.	• System user (WUA) • The administration of the municipality of Brod

6.1. Monitoring plan

A monitoring plan during project implementation provides information about the project's key environmental and social aspects particularly the project's environmental and social impacts/risks and the efficiency of implemented mitigation measures. Such information enables the Client to evaluate the success of mitigation as part of project supervision and allows corrective action to be taken when needed.
The monitoring plan for the preparation, construction and operation phase are provided in Table 13.

Table 12 Monitoring plan of environmental and social impacts/risks

Issue	Which parameter shall be monitored?	Where the parameters shall be monitored ?	How the parameters shall be monitored, and what type of monitoring equipment will be used?	When/ How often the parameters shall be monitored?	Why is monitoring necessary?	Cost		Responsibility	
						Planning	Implement ation	Planning	Implementatio n
PREPARATION PHASE									
Grievances	Number of grievances Number of open and closed grievances Average grievance response and closure time Identification of grievance channels Nature of grievances recorded, addressed and analyzed	Administratio n office	Grievance mechanism records	Monthly	Impact to project success Prevention of reccuring cases	No additional cost	No additional cost	APCU, LCOs	APCU, LCOs
CONSTRUCTION PHASE									
Grievances	Number of grievances Number of open and closed grievances Average grievance response and closure time Identification of grievance channels Nature of grievances recorded, addressed and analyzed	Project area	Grievance mechanism records	Continuously during the construction phase	Impact to project success Prevention of reccuring cases	No additional cost	No additional cost	Contractor GRM officer LCOs APCU,	Contractor GRM officer LCOs APCU
Construction works	Coverage of the location of construction works Implementation of the Construction Site Organization Plan	Project area	On-site inspections Visual observation Grievance records Comparison with the Site Organization Plan	Monthly during the construction phase	To ensure no private land is occupied	-	Built into the costs of performing supervision	APCU Contractor	Supervision contractor
Soil	Number of oil/fuel and	Project area	Visual observation	Daily	To ensure adequate land	-	Built into	Contractor	Supervision

Issue	Which parameter shall be monitored?	Where the parameters shall be monitored ?	How the parameters shall be monitored, and what type of monitoring equipment will be used?	When/ How often the parameters shall be monitored?	Why is monitoring necessary?	Cost		Responsibility	
Contamination	chemical leakages/spills Amount of contaminated soil		Environmental incident registry	After each incident	protection To ensure the responsible performance of construction works		the costs of construction works		contractor
Water Resources	Surface water quality analysis and measurements that include spill-related pollutants	At the water resources	Sampling /analysis in situ measurements via an authorised environmental laboratory	In case of a major spill/leakage If spill/leakage reaches water resources Upon grievance	To ensure adequate water protection To ensure the responsible performance of construction works	-	Built into the costs of construction works	Contractor	Supervision contractor
Waste	Waste management during construction. Separation of hazardous and non-hazardous waste	At construction site Deposit areas Borrow areas	Visual monitoring and comparison with waste management reports	Continuously during the construction phase and removal from the construction site	To ensure proper waste management in accordance with local legislation and WMP	Built into the costs of constructi on works	Built into the costs of constructi on works	Contractor Supervision contractor	Contractor Supervision contractor
Noise and air pollution	Number of grievances on occurrence of noise and air pollution	Project area and its close vicinity	At least 24-hr measurements Standard equipment measuring air quality and noise level	Upon grievance By order of the inspection authorities	To determine the level of air pollution and noise level during construction works, compare it with the legal limit values	Built into the costs of construction works	Built into the costs of construction works	Contractor Supervision contractor	Contractor Supervision contractor
Biodiversity - flora and fauna	Emergence of foreign invasive species Disturbance on flora and fauna	Project area	Visual identification	Daily	To determine the presence of foreign invasive species To preserve local fauna	Built into the costs of constructi on works	Built into the costs of construction works	Contractor	Supervision contractor
Community Health & Safety	Safety conditions Precautions taken for safety (warning signs, fencing, etc.) Grievances	Project area Residential areas in the vicinity	Grievance records Site Audits Training records	Daily Upon grievance	Impact on project success Impact to community health & safety	-	Built into the costs of performing supervision	Contractor	Supervision contractor
Traffic Risks	Number of grievances Number of incidents/accidents Training of workers/drivers	Administration office	Grievance records	Quarterly	Impact on project success	-	Built into the costs of performing supervision	Contractor	Supervision contractor
Working Conditions	Human Resource Policy Internal and external audits Record keeping practices	Project Area Administratio n office	Document check On site inspections Employment records Workers interviews Workers Grievance records	Continuously during construction works / daily	To ensure national work protection low Adhere to the measures defined by the LMP	-	Built into the costs of performing supervision	Contractor	Supervision contractor

Issue	Which parameter shall be monitored?	Where the parameters shall be monitored ?	How the parameters shall be monitored, and what type of monitoring equipment will be used?	When/ How often the parameters shall be monitored?	Why is monitoring necessary?	Cost		Responsibility	
Protecting the workforce	Age of workers Sample contracts Legal work permit	Administration office	Document check Onsite inspections	Before each recruitment Monthly	To ensure national work protection low Adhere to the measures defined by the LMP	-	Built into the costs of performing supervision	Contractor	Supervision contractor
Occupational Health and Safety	Working conditions Accommodation conditions Disease Workers GRM Incidents. Use of PPE	Project area	On-site inspections Interviews with employees Workers GRM records Training records Contract examples Internal and external audits Availability of inadequate OHS organizational structure Incident/accident reports Trainings and training materials OHS practices in the field (Use of PPE, etc.) HSE Inspection Legal requirement	Continuously during construction works / daily	To ensure national occupational health and safety laws Adhere to the measures defined by the LMP	-	Built into the costs of performing supervision	Contractor GRM officer	Supervision contractor
Gender Based Violence (GBV), Sexual Exploitation Abuse /Sexual Harassment (SEA/SH)	GBV and SEA/SH related incidents and complaints	Administration office	GBV and SEA/SH Grievance records	Quarterly	Impact on project success Impact to community health & safety	-	Built into the costs of performing supervision	Contractor	Supervision contractor
Chance finds	Number of chance find	Project area	Record of chance find	Continuously during construction works	To protect the finds and to preserve them in place and the position in which was discovered Legal obligation to stop works and report to the competent institution for the protection of chance find	-	-	Contractor	Contractor Supervision contractor
OPERATION PHASE									
Grievances	Number of open and closed grievances Nature of grievances recorded, addressed and	Administration office	Grievance mechanism records	Continuously	Impact to project success Prevention of reccuring cases	No additional cost	No additional cost	APCU, LCOs	APCU, LCOs

Issue	Which parameter shall be monitored?	Where the parameters shall be monitored ?	How the parameters shall be monitored, and what type of monitoring equipment will be used?	When/ How often the parameters shall be monitored?	Why is monitoring necessary?	Cost		Responsibility	
	analyzed Average grievance response and closure time Identification of grievance channels								
Irrigation system management	Number of reported errors due to improper management at work	Project area	Visual observation Control of the conditions under which the irrigation system is put to use by individual users Control of implementation the Irrigation System Management Plan	Continuously	To ensure proper management of the irrigation system To ensure compliance with national legislation in the field of protection of vegetation, water and waste management	Maintenance costs	Fee for the person in charge of maintaining the system	System users (WUA)	System users (WUA)
Waste management	Waste management during performance maintenance of the drainage canal	Project area	Control of implementation of WMP Records of waste handover to the utility company or authorized operator	Continuously	To determine whether waste is managed in accordance with national legislation	Maintenance costs	-	The administration of the municipality of Brod	The administration of the municipality of Brod
Soil Contamination	Number of oil/fuel and chemical leakage/spills Amount of contaminated soil	Project area	Visual observation Sampling /analysis if accident occurred	Daily If an accident occurred	To ensure adequate soil protection To ensure the responsible performance of maintenance works	-	-	The administration of the municipality of Brod	The administration of the municipality of Brod
Water Resources	Surface/ground water quality analysis and measurements that include spill-related pollutants	At the water resources	Sampling /analysis and in-situ measurements via an authorised environmental laboratory, if accident occurred	According to provisions in the water permit If an accident occurred	To determine the impact of agricultural production	-	-	System users (WUA)	System users (WUA)
Biodiversity - flora	Emergence of weedy plants	Project area	Visual identification and counting of individuals	Daily	To determine the need for the use of phytopharmaceuticals	-	-	System users (WUA)	System users (WUA)
Community Health & Safety	Safety conditions Grievances The occurrence of diseases associated with improper handling of phytopharmaceuticals	Project area Residential areas in the vicinity	Grievance records Site Audits Training records	Continuously Upon grievance	To determine the impact of improper use of irrigation system to community health & safety	-	-	System users (WUA)	System users (WUA)

7. STAKEHOLDER ENGAGEMENT AND GRIEVANCE MECHANISM

As part of the ARPC project, a Stakeholder Engagement Plan (SEP) was developed to establish an efficient platform for productive communication with affected and other stakeholders during the implementation of the project. The purpose of the SEP is to represent the target groups, identify methods for their involvement and define responsibilities during the implementation of activities. According to the requirements of the World Bank, stakeholder engagement is an inclusive process that lasts throughout the entire project life cycle and is most effective when it is started at an early stage of project development.

MoAFWM RS started engaging interested parties during the project's preparation by preparing the necessary documentation from the World Bank's ESF and holding a public hearing. Timely identification and consultation enabled the opinions and views of all interested parties to be considered during the project's planning and implementation.

The specific purposes of the SEP included:

- identification and analysis of interested parties;
- planning of engagement methods and selection of practical communication tools for consultation and information;
- defining the roles and responsibilities of various actors in the implementation of the Plan;
- establishment of the Grievance Redress Mechanism (GMR);
- provide feedback to stakeholders

Communication and information channels adapted to the specific needs of different groups were created. The participatory process allows for collecting comments and suggestions for the project design, which can improve the project and bring additional benefits at the local level.

To adhere to best practice approaches, the ARPC project, as well as this sub-project, will apply the following principles of stakeholder engagement:

- Informed participation and feedback: information will be provided and widely distributed among all stakeholders in an appropriate format; opportunities will be provided for the submission of input from interested parties for analysis and resolution of comments and concerns;
- Access to openness and duration: public consultations on the project will be organised throughout the duration, conducted openly, without external manipulation, interference, coercion or intimidation;
- Inclusiveness and sensitivity: Stakeholders are identified to support better communication and build effective relationships. Project participation is inclusive. All interested parties are encouraged to be involved in the consultation process at all times and provided with equal access to information. Sensitivity to stakeholder needs is a fundamental principle underlying the choice of engagement methods. Special attention is paid to vulnerable groups.

The importance of stakeholder engagement throughout the project cycle is an essential aspect of good project management and provides opportunities to:

- Clarifying project goals, scope and managing expectations,
- Ensuring engagement is meaningful for citizens,
- Seeking feedback to inform project design, implementation, monitoring and evaluation,

- Assessment and mitigation of project risk,
- Better project results and uses,
- Dissemination of information and materials about the project,
- Resolving complaints on project

7.1. Public consultation

The draft ESMP was published on the websites of APCU and the municipality of Brod in Serbian and
English, together with invitations to public consultations. The invitation indicates how To access the document on which the public is consulted, details of the project, the date, time, and place of the consultation, as well as contact information for feedback and questions.

The public call was announced in reputable print media with national coverage to enable a wide range of the public to be involved in the consultation process. The Public Consultation Notice was published in the daily newspaper "(*the name of the newspaper will be entered later*)" in the edition of *(the date will be entered later*) and included details about the document's availability for the public and interested parties. This allowed the public to express their views on the project's risks, impacts, and mitigation measures, enabling the project proponent (Municipality of Brod) to consider and respond to them.

After 14 days from the date of publication by the project proponent, the draft ESMP was subject to public consultation by the WB Guidelines. Public consultations and the presentation of the ESMP for the rehabilitation and reconstruction project of the canal scheme in Ivanjsko Polje, Brod municipality, as part of the ARCP Project for the RS, were held in the organisation of the APCU within the MoAFWM RS, on (*date will be entered later*) starting at (*exact term will be entered later*).

The final version of the ESMP for the rehabilitation and reconstruction project of the canal network in Ivanjsko Polje, municipality of Brod, will be published on the APCU's website and visible throughout the project.

7.2. Grievance Redress Mechanism (GRM)

The GRM form is attached in Annex 5, and printed copies will be available at the construction site, the municipality of Brod's premises, and local communities.

APCU has established GRM by ESS10 at an early stage of ARPC project development to solve specific problems adequately and timely. GRM is available at no cost, and it is easily accessible.
A key objective of the GRM is to ensure the efficient handling of complaints.

APCU and the municipalities respectively are responsible for establishing a functioning GRM and informing stakeholders about the GRM role and function, the contact persons and the procedures to submit a complaint in the affected areas. Information on the GRM will be available: on the websites of the APCU and municipality Brod, on the notice boards of municipalities, and through social media campaigns. A leaflet containing the grievance mechanism procedure shall be made and disseminated to the PAPs in public meetings during each phase of the project, as well as placed in local communities' offices.

Within ARPC, APCU formed the Central Feedback Desk (CFD, which it will manage. Local Grievance Offices (LGOs) will be formed as part of the sub-project activities to create and manage local self-

government municipality units. APCU will ensure that the local office of the municipalities involved have at least one officer who will deal with complaints (Local Grievance Officer-LGOr). This officer will ensure that receipt of the appeal is acknowledged within 3 calendar days, that appeals are assigned to the correct person for review and proposed resolution, and that the resolution/closure letter is sent to the person who filed the appeal promptly and that receipt is acknowledged. The local municipal complaints officer will be required to update the APCU regularly on complaints received and on any extraordinary or urgent developments.

Any remarks or concerns can be brought to the attention of APCU or LGOr orally or in writing (by mail or e-mail) or by filling out a grievance form, free of charge for grievances. Grievances can also be submitted anonymously.

A CFD was formed to manage and appropriately respond to complaints at different stages, while LGOs will be in force within the Brod municipality. In addition to GRM, legal remedies are available under national legislation (courts, inspections, administrative authorities, etc.).

All grievances will be recorded in the Register and assigned a number, and their receipt will be confirmed within seven calendar days. Each grievance will be recorded in the register with the following information: description of the complaint, date of confirmation of receipt returned to the complainant, description of actions taken (investigation, corrective measures), and date of resolution and delivery of feedback to the complainant.

APCU or Local Grievance Officer shall make all reasonable efforts to resolve a grievance after the acknowledgement of its receipt. If APCU or municipal officer are not able to address the issues with a direct corrective measure, long-term corrective measures shall be identified. The complainant shall be notified of the proposed corrective action and following up the corrective action for 25 calendar days as of the grievance acknowledgement.

If a certain issue raised through the grievance mechanism cannot be resolved or if no action is necessary, the complainant shall be given a detailed explanation/justification why the problem was not resolved. A response shall also incorporate an explanation on how the person/organisation that lodged the grievance can pursue the grievance if the result is not satisfactory.

If the complainant is not satisfied with the implemented corrective measure and/or statement of reasons for which a corrective measure is not necessary, the grievance shall be forwarded to the CFD.

The CFD shall comprise at least:

- one member of APCU,
- one member of the of administration of Brod municipality,
- two representatives of project-affected persons.

The CFD will re-evaluate the previously implemented corrective measure and explain why the corrective measure is not necessary. It will also consider alternatives for satisfactorily resolving the complaint. The complainant will be informed about the proposed alternative corrective measure and control over the implementation of the alternative corrective measure within 3 months after confirmation of receipt of the complaint.

Applicants may seek other legal remedies at any time using the legal framework of the RS.

The APCU and Contractor will ensure that Code of Conduct and public awareness training are given to all employees at the very beginning of the recruitment process, which will be also refreshed

during the work period. Trainings will cover workers' rights, contract requirements, Code of Conduct, grievance mechanism and contact channels. Compliance with the rules of code of conduct, including gender-based violence, sexual harassment, sexual exploitation and abuse, which are included in the trainings to be provided, will be in the contract articles of the personnel. The sanctions for non-compliance with the code of conduct will be clearly stated in the contract.
A grievance mechanism shall be established to ensure any complaints/comments regarding the Project will be received and responded on time, providing solutions, and taking corrective measures as appropriate.
A grievance box for the employees has been placed and checked periodically.
Grievance mechanism was created. Stakeholders were informed about contact Information.

Contact details for concerns, queries and grievances:

Attention: Zoran Kovacevic, APCU Project Leader
Ministry of Agriculture, Forestry and Water Management of the RS
Address: Trg Republike Srpske 1
78000 Banja Luka
Phone: + 387 51 338-340
Email: z.kovacevic@mps.vladars.rs
Or
Local grivience office - Sinisa Jacimovic
Departments for economy and social activities - department of agriculture, municipality of Brod
Svetog Sava Street, 17
74 450 Brod
Phone: +387 53 611 970
E-mail: jacimovics@opstina-brod.net

The contractor will prepare and implement a special Workers GRM only for the needs of construction workers. The contractor will appoint a responsible person for the implementation and monitoring of grievances (Contactor GRM officer) and will regularly report on this to the administrative office of the municipality of Brod and APCU.
Contactor GRM officer will be responsible for establishing a functioning GRM and informing workers about the GRM role and function, the contact persons and the procedures to submit a complaint. Information on the Workers GRM will be available: on the websites of the Contractor and on the construction site. A leaflet containing the grievance mechanism procedure shall be made and disseminated to the workers on the construction site.
Any remarks or concerns can be brought to the attention of the Contactor GRM officer orally or in writing (by mail or e-mail) or by filling out a grievance form, free of charge for grievances. Grievances can also be submitted anonymously.
Contactor GRM officer will ensure that receipt of the grievance is acknowledged within 3 calendar days, that grievances are assigned to the correct person for review and proposed resolution, and that the resolution/closure letter is sent to the person who filed the grievance promptly and that receipt is acknowledged.
The Contactor GRM officer will be required to update the Local Grievance Officer of the municipality of Brod and APCU regularly on complaints received and on any extraordinary or urgent developments.

Details of Contractor's address, phone and email will be announced later.

7.3. Complaints Service at the World Bank

Communities and individuals who believe a WB-supported project has harmed them can file complaints with existing project-level GRM or the WB's Grievance Redress Service (GRS WB). GRS WB ensures that complaints received are promptly reviewed to resolve project-related issues. Complaints can be submitted in the local language or English.

For information on how to submit complaints to the WB Inspection Panel, visit.
http://wwwworldbankorg/en/projects-operations/products-and-services/grievance-redress-service .

8. ANALYSIS OF CAPACITY BUILDING AND TRAINING NEEDS

The following are responsible for the implementation of the ESMP:

- in the planning and preparation phase: APCU, project proponent and designer,
- in the construction phase: contractor and supervision contractor,
- in the use phase: managers and system users -Water Users Association (WUA) and the administration of the municipality of Brod.

It is possible to assume that the appropriate level of knowledge and necessary skills for designing, carrying out work and performing supervision are present among the project users. In this sense, it is not necessary to carry out special measures of personnel education to implement ESMP in the planning and construction phase.

A registered Association of Farmers will manage and maintain the system in the Brod municipality. In addition to the Association of Farmers, the Municipality of Brod can also be involved in the management and maintenance of the system through the work of the Department for Economy and Social Activities—Department for Agriculture and Civil Protection, which already manages the canal network and constitutions that are under the Municipality's jurisdiction.
Also, users of the system, long-term agricultural producers, have satisfactory levels of education related to adequate and responsible access to the use of irrigation systems for agricultural production, so it is not necessary to implement new training programs related to:

a) water dosing elements,
b) sustainable use of drainage/irrigation systems to provide sufficient amounts of water in the canal network,
c) Good agricultural practices, among others, refer to the use of methods of integral pest control and soil fertilisation with natural and mineral fertilisers.

Therefore, the training program should focus on future managers and users of water needs for irrigation of agricultural areas.
Future managers need to be trained in the sustainable management of the system.
The core of knowledge on sustainable system management is found among hydraulic and mechanical engineering specialists who specialise in the maintenance of pumping systems and pipelines employed in higher education institutions or relevant institutions and consultancies.

Regarding the first two points of the training program, the Project will prepare a Manual/Guidelines for the operation and maintenance of the system, which will help the client, users and the municipal department in their future work on the management and maintenance of the system.

It is recommended to hold a seminar at the project site for agricultural producers, Municipal authorities and other interested residents, where the Manual/Guidelines for operating and maintaining the system would be presented.

For the remaining point 3, "the use of good agricultural practices," the core of knowledge on land management and phytopharmaceuticals is found in agricultural faculties and their institutes. Based on the laws relevant to agriculture and the use of phytopharmaceuticals, agricultural producers must undergo appropriate training programs, the continuity of which should be provided by the faculties and their institutes. The training program must cover the system's users and other interested populations.

The training program should cover issues such as:

a) the most significant problems that farmers face in the field;
b) ways to overcome problems;
c) benefits and impacts related to the use of fertilisers and pesticides,
d) the use of good agricultural practices, among others, which refer to the use of methods of integral pest control and soil fertilisation with natural and mineral fertilisers

9. ANALYSIS OF OPTIONS FOR PREPAREDNESS IN CASE OF ACCIDENT SITUATIONS

Accidental situations can be considered unfavourable events during the system's exploitation, either due to breakdowns or force majeure. From the point of view of the planned system, the accidental spill of oil derivatives, which can occur during the construction phase due to faulty construction machinery or during the manipulation of these substances, is significant. Therefore, it is necessary to foresee and implement measures and procedures in case of incident situations during construction.

The release of dangerous substances (propellant, oil, and lubricants) on the ground can also occur if machinery used to cultivate agricultural land is leaked. There is a low probability of environmental pollution on a larger scale, but measures to prevent such occurrences must be applied, which is foreseen by the ESMP. More significant pollution of the environment can be caused by the irrational and uncontrolled application of various chemicals and other means in agricultural production, so accidents of a larger scale can occur. Excessive use of inadequate means and accidents during transport and storage can hurt the soil and indirectly affect watercourses and groundwater by destroying animal life and poisoning people. Their formation is probable, but it is within the limits of the probability of such processes, and there is no particularly pronounced situation for the locality in question.

Large-scale disasters can be caused by natural factors, such as earthquakes and hydrological conditions, or human factors, such as fires, construction failures, poor maintenance and management, and violent demolitions (war and terrorism).

A fire that would arise from ignition under the influence of external factors would be oriented to the place of origin, with the probability of spreading beyond the boundaries of the plots if the fire is transferred to vegetation and the surrounding area. Due to carelessness, such fires often get out of control and can turn into fires with significant consequences. The possibility of carrying fire gases to greater distances under the influence of air currents exists. Still, their emission would be of such a scale that it would not endanger the environment.

Considering the size of the fire and the material damage that can be caused, the application of appropriate technical and organisational measures will be necessary to prevent the possibility of their occurrence.
In addition to the unfortunate situations caused by man, it is necessary to consider the threat from natural disasters to mitigate the harmful effects that may arise under their influence. Natural disasters lead to minor or significant environmental changes, cause considerable material damage and can endanger people's lives and health. The following natural disasters can cause considerable accidents and dangers:

- Earthquake - The location is in the 8° MC scale seismic intensity area. In the Main design, the subject irrigation system is designed so that an earthquake of the specified intensity cannot cause harmful consequences.
- Large amounts of water—flooding—The area in question is not located near watercourses that could cause flooding. This phenomenon is unlikely to occur in the coming period, and the possibility of endangering people, technological equipment, and the environment of the surrounding area is ruled out.
- Landslides - The project area is on flat terrain, so the presence of landslides was not noticed
- Atmospheric discharge—According to the technical regulations on lightning rods, lightning is a direct electric discharge or a series of such discharges caused by the difference between the electric potential of atmospheric electricity and the earth, i.e., objects on the earth. These discharges are sufficient to damage objects and endanger people. Dimensions and technological features are threatened by this natural phenomenon, like natural disasters, but with a low risk.

Prevention of major accidents
Prevention of major accidents is a set of measures and procedures at the level of facilities, complexes, and the broader community to prevent major accidents, reduce the probability of significant accidents, and minimise the consequences.
Preventive measures for major accidents include everything that is undertaken with the aim of:

- to prevent the occurrence of a significant accident,
- to ensure quick perception of a situation that differs from the expected one,
- to react adequately in the event of a major accident,
- as well as to provide quick alarming of competent and responsible services and persons who organise the action of effective localisation and remediation of the consequences

Procedure in the event of a major accident:

- ❖ Defining the method of alerting and engaging the persons participating in the response to the accident (sound, telephone or other) as well as the persons who are competent and responsible for alerting and engaging other persons
- ❖ Creation of a management and coordination scheme among the persons responding to the accident. The scheme shows all planned participants in the response to the accident. Information is provided on organisations trained to respond to the accident and authorised to assist (name of institution, address and telephone numbers) for:
    - Firefighting assistance (local firefighting units and units of surrounding operators);
    - Medical assistance (health centres and specialised institutions for trauma, burns, poisoning control, etc.);
    - Detection (specialised laboratories for air, water and soil control);
    - Sanitation (specialised teams from other operators and specialised teams for dealing with hazardous waste);
    - Specialized authorised laboratories for air, water and soil control (monitoring).

- ❖ The composition of the accident response teams and the method of engagement of the accident response teams for:
    - Stopping the work process;
    - Extinguishing initial fires and stopping initial accidents;
    - Notification and alerting;
    - Transport and treatment of the injured;
    - Pollution detection and control;
    - Decontamination of people, equipment and space;
    - Information and contact with the public.

Relief measures include:

- Instructions on the behaviour of persons outside the complex (neighbouring operators or citizens);
- Technical protection measures taken in the event of an accident;
- Medical protection measures;
- Evacuation measures.

Measures to eliminate the consequences of the accident are aimed at defining the remediation of accidents as well as monitoring the post-accident situation:

- Defining accident recovery includes:
    - Objectives and scope of remediation depending on the type and scope of the accident;
    - Program of engagement of forces and resources by the operator and external expert services for rehabilitation;
    - Evidence of the method and success of the rehabilitation;
    - Rehabilitation costs
- The definition of post-mortem monitoring includes:
    - Monitoring the state of people's health;
    - Air, water and soil monitoring.

According to Article 63 of the Law on protection and rescue in emergencies,[24] to protect and save people and material goods from dangers caused by natural disasters and other accidents, jobs and tasks are carried out, among other things, related to the protection of plants and plant products.
According to Article 65 of the mentioned Law, the protection and saving of plants and plant products includes selection of the most optimal varieties of plants and proper cultivation; use of protective means under standards and norms in the field of agriculture, industrial production of food and medicine and animal husbandry; proper drying, silage and storage of seeds and finished products; fire protection and other measures that ensure the safety of plants and plant products from all types of plant diseases and pests; drying, canning and processing of fruits and vegetables; harvesting of edible and medicinal plants, fodder, livestock and other types of plants and plantations in case of danger from natural disasters and other accidents.
Municipal or city services responsible for protecting plants and plant products organise and carry out this protection: economic companies in agriculture and forestry, agricultural holdings, individual agricultural producers, other professional agricultural institutions, plant breeders, food producers, and competent protection and rescue authorities.

The Plant and Plant Products Protection Service carries out operational protection and rescue measures related to the protection of plants and other crops from plant diseases and pests in the affected area, namely:

- in the rescue phase:
    - suppresses and eradicates plant diseases and pests,

[24] "Official Gazette of the Republic of Srpska" No. 121/12

  - prohibits the cultivation of certain types and varieties of plants for a certain period and in a particular area to prevent plant diseases and pests; destroys infected plants and packaging and carries out disinfection, disinsection and pest control of plant product warehouses; carries out decontamination of plants and plant products.
- In the phase of eliminating the consequences, engage experts and specialist teams for plant protection to eliminate the consequences that have occurred on the plants; determine the scope of implications on plants caused by plant diseases and pests; participate in reseeding the land with crops to mitigate the impacts of plant diseases and pests in the affected area.

According to Article 60 of the Law on Protection and Rescue in Emergency Situations, civil protection measures and activities in the protection and rescue system are established by protection and rescue plans adopted by companies and other legal entities, the municipality, that is, the city and the Government. Businesses and other legal entities are obliged to coordinate the protection and rescue plan with the protection and rescue plan of the municipality, that is, the city.

11. ANNEX

ANNEX 1: GOOD CONSTRUCTION PRACTICES

The requirements regarding good construction practices that will be included in the Contract for the performance of works are as follows:

General requirements:

- Contractors will be obliged to follow the practice of good ecological construction in all construction activities and reduce to the minimum possible damage to vegetation, soil, groundwater, surface water, and landscape, as well as disturbance of settlements and local communications,
- Environmental protection, mitigation measures, and monitoring will be applied in parallel with construction activities. They will begin at the moment when workers, equipment and materials are placed on the construction site and will end with the cessation of construction work, when all workers, equipment and materials leave the construction site and when the environment is restored to its original state,
- The contractor is obliged to appoint a coordinator for occupational safety and environmental protection who will be responsible for ensuring compliance with the laws and objectives of environmental protection, occupational safety and fire protection,
- The contractor should ensure order, discipline and professional responsibility of all employees on construction sites. Work and stay must be limited exclusively to the construction work zone, and damage to private property, land and crops should be avoided. It is necessary to ensure regular contact with residents (local communities) representatives to exchange information or find solutions for possible disputes (arising from violating property rights, damage during construction works, etc.).
- Contractor shall prepare and implement the GRM for workers.

Supply and transportation of materials

- When purchasing materials for the rehabilitation and reconstruction of the canal network, the Contractor will choose a manufacturer/supplier that works with a valid environmental permit if he needs one by the Law on Environmental Protection of the RS ("Official Gazette of the RS" No. 71/12, 79/15 and 70/20), or other environmental standards that are recognised in BiH and the EU.
- To prevent dust emissions, the Contractor must transport asphalt, gravel, stone, earth and other materials in trucks covered with a tarp. Stone and gravel are transported in a wet state. The speed of the vehicle must not exceed 30 km/h. The contractor will avoid unnecessary driving.

Construction site organisation

- Contractor shall prepare and implement the Construction Site Traffic Management Plan.
- Contractor shall prepare and implement the Construction Site Organization Plan.
- Construction should begin (if possible) at a time of year when the advantages of dry soil can be used, i.e. when compaction and degradation through use are minimal.
- Appropriate machinery and protective plates will be used to prevent compaction during soil removal, e.g., by using rails or low-pressure tyres in places that indicate the possibility of

compaction. Appropriate procedures shall be used to remove, handle, store, and replace hummus.

- The contractor will establish a temporary storage area for construction materials, an area for washing concrete pumps and mixers, and an area for washing car tyres with an appropriate cleaning agent. Temporary dumps for excavated material (soil) will be reduced to a maximum height of 2 m to prevent compaction caused by the weight of the soil, and storage time will be reduced to a minimum
- The contractor will ensure that all construction equipment is licensed and approved by local regulations and, if possible, certified by EU standards.
- The contractor must use modern machines and vehicles that meet environmental standards regarding the emission of harmful gases (complete combustion). He will also use filters to reduce the emission of soot particles and fuel with a favourable chemical structure (low sulfur content) and efficient/safe transfer.
- The contractor must use modern machines and vehicles to represent noise sources (engine, exhaust system). This mainly implies the acquisition of new machines or implementing measures for installing additional sound insulation and its constant maintenance. In addition, it is recommended that the machines only work from 07:00 to 17:00 on all sections of the route whose distance from the nearest residential house is less than 60 m.
- The contractor is obliged to use biodegradable lubricants and gearbox oils. Maintenance, filling and cleaning of machines must be done outside the construction site and the area with surface water
- The contractor shall determine and follow control measures for dust generated during equipment handling and renovation work. cannot avoid transportation through settlements.
- Create a construction site organisation project with appropriate solutions for the drainage and treatment of sanitary wastewater and rainwater from the construction site zone. Drain the used water from the construction site with appropriate sewage systems; if necessary, collect it in watertight containers and treat it in the prescribed manner (either on-site or at a remote location) before discharging it into the recipient or the city sewage system.
- The contractor will ensure that the parking spaces for machines and vehicles and accommodation containers for workers are not located within forest areas and do not affect watercourses and endangered flora and fauna.
- The contractor will protect areas susceptible to erosion with stabilisation agents (temporary fences, pits) and replanting after the completion of construction works.

Execution of construction works

- In order not to jeopardise the stability of the soil on unstable or conditionally stable terrains, construction works will be performed in shorter intervals.
- During earthworks, the humus layer will be deposited in heaps no larger than 2 m and protected from pollution to maintain fertility.
- To minimise negative impacts on the canal network, construction activities on the existing barriers should be carried out during the low water season, which is most often from July to September. This should be considered when preparing the activities schedule.
- Oil and its derivatives are handled with the most significant protection measures to avoid spillage in the construction and procurement of machines. All oil and other derivatives packaging must be collected and taken to the Contractor's controlled landfill, where an authorised utility company will take it away. In case of accidents, fuel spillage, or lubricants in the environment, immediate interventions are required, as are the procedures for releasing fuel and lubricants.
- Machines and vehicles will not be washed in the work zone.

- Waste water from workers' toilets will not be discharged into the ground or watercourses.
- Waste will be managed by the Waste Management Plan (Annex 2)
- Dumping excavated material and other solid waste into waterways will be prohibited.
- The contractor will implement appropriate traffic control measures, by the law, for the duration of the contract, and the Supervising Engineer must first approve such measures
- Traffic safety management measures will include temporary lighting and appropriate signage during excavation rehabilitation and reconstruction.
- The contractor should appoint permanent personnel who will be engaged in traffic safety issues and will be responsible for the implementation of traffic safety measures and the implementation of traffic measures prescribed by state laws, which will include: (I) a review of the condition and position of traffic control equipment in use, (II) review of blueprints - section relating to traffic control equipment required to ensure safe and efficient traffic flow, (III) correction of all traffic deficiencies where applicable, (IV) control of work zones, handling of equipment and warehousing, material handling and storage related to traffic safety.
- The contractor must not leave excavated trenches unattended and must fence and mark all open trenches to prevent potential accidents.

The arrangement of construction sites after completion of works

- The contractor must also remove all unique structures and sites used in support of construction, including temporary buildings and their foundations, temporary installations (electrical, water and sewage installations) and equipment (sedimentation basin), restoration of temporary access roads and working areas, removal of fencing, signs and notices.
- The contractor will remove all construction debris.
- All construction areas and other areas affected during construction will return to their original state, depending on the future use of the land.
- Restoration activities will begin immediately after the installation of the slide gates.
- The construction area must be planted with species preserved in the peat and supplemented with suitable material, if necessary.

ANNEX NO 2: WASTE MANAGEMENT PLAN

Waste management in the RS is defined by the Law on Waste Management.[25] and includes implementing prescribed measures for handling waste within the scope of collection, transport, storage, treatment, and disposal, including supervising these activities and caring for waste management facilities after closure.

To fully understand this WMP, below individual articles of the Law are highlighted, as well as explanations of the basic terms used:

Article 4 points out that waste management is carried out in a way that ensures the least risk of endangering the life and health of people and the environment through control and reduction measures:

- water, air and land pollution,
- dangers to flora and fauna,
- danger of accidents, explosions or fires,
- negative impacts on areas and natural assets of exceptional value, i
- noise level and unpleasant odors

Article 7 defines the principles of waste management:

- The principle of choosing the most suitable option for the environment,
- The principle of proximity and common approach to waste management,
- The principle of waste management hierarchy,
- principle of responsibility i
- the "polluter pays" principle.

According to Article 22, the person in charge of the plant for which an environmental permit is required, according to the Environmental Protection Act, must designate a person who will carry out the tasks of coordinating waste management - the waste coordinator.
The person responsible for waste management is obliged to:

- organises the implementation and updating of the waste management plan,
- Propose measures of prevention, reduction, reuse and recycling of waste and
- Monitors the implementation of laws and other regulations on waste management and reports to management authorities.

The WMP need to be updated every five years.

Basic terms

- "Waste" means all materials or objects that the owner disposes of, intends to dispose of or must dispose of by one of the categories specified in the by-law issued by the minister responsible for environmental protection and are found in the Catalog of waste [26]adopted in a separate legal regulation;
- "Municipal waste" - means household and other waste, which by its nature or composition is similar to household waste
- "Hazardous waste" - means waste that is determined by a particular regulation and that has one

[25]" Official Gazette of the RS" no. 111/13, 106/15, 16/18, 70/20, 63/21 and 65/21

[26] Sl. Gazette of RS" 111 /13

or more characteristics given in the by-law issued by the minister responsible for environmental protection that causes danger to human health and the environment due to its origin, composition or concentration, as and waste listed in the waste catalogue as hazardous waste and regulated by special regulations;

- "Non-hazardous waste" - means waste that is not defined as "hazardous waste";
- "Inert waste" is not subject to significant physical, chemical or biological changes. Inert waste will not be dissolved, burned or otherwise physically and chemically processed, biologically degraded or adversely affect other substances with which it comes into contact in such a way as to cause environmental pollution or endanger human health;
- "Owner" means any natural or legal person who owns waste;
- "Producer" is a legal or natural person whose activity produces waste or a legal or natural person that performs pretreatment, sorting or other operations that lead to changes in the physical characteristics or composition of waste;
- "Legal or natural person" is a natural or legal person responsible for any waste management activity;
- "Waste management" – is a system of activities and actions that include prevention of waste generation, reduction of the amount of waste and its hazardous characteristics, waste treatment, planning and control of waste management activities and processes, waste transport, establishment, operation, closure and maintenance of waste treatment facilities after closure, monitoring, counselling and education related to waste management activities and actions

WASTE MANAGEMENT IN THE CONSTRUCTION AND REMOVAL PHASE

Classification of waste that occurs during the construction phase and the removal phase

Below is a classification list of all types of waste that may be generated during the preparation, arrangement and closure of the construction site during the construction and removal phases. For each category, guidelines are given for handling: collecting, transporting, processing and removing waste. The rulebook carried out waste classification, including categories, testing, and waste classification.[27]

Table No. 1 Classification of waste that occurs during the construction phase and the removal phase

WASTE CODE	WASTE NAME	QUANTITY (kg/year)
03	WASTE FROM WOOD PROCESSING AND PRODUCTION OF PAPER, CARDBOARD, PULP, PANELS AND FURNITURE	
03 02	waste from wood protection	cca 50kg
03 02 04*	inorganic wood preservatives	
08	WASTE FROM THE PRODUCTION, FORMULATION, SUPPLY AND USE OF COATINGS (PAINTS, VARNISHES AND GLASS GLAZES), ADHESIVES, SEALANTS AND PRINTING INKS	
08 01	waste from the production, formulation, supply use and removal of paints and varnishes	
08 01 11*	waste paint and varnish containing organic solvents or other hazardous substances	cca 20kg
12	WASTE FROM SHAPING AND PHYSICAL AND MECHANICAL SURFACE TREATMENT OF METAL AND PLASTIC	
12 01	waste from shaping and physical and mechanical surface treatment of metals and plastics	

[27] "Official Gazette of the Republic of Srpska", number 19/15, 79/18)

12 01 01	turning and processing of ferrometals	cca 60kg
12 01 03	scraping and processing of non-ferrous metals	cca 70kg
13	OIL WASTE AND LIQUID FUEL RESIDUES (EXCEPT EDIBLE OILS AND THOSE IN CHAPTERS 05, 12 AND 19)	
13 01	waste hydraulic oils	
13 01 12*	immediately, biodegradable hydraulic oils	cca 50kg
13 02	waste motor oils, gearbox oils and lubrication	
13 02 06*	synthetic motor oils, gear oils and lubrication	cca 50kg
13 02 07	light biodegradable motor oils, gear oils and lubrication	cca 200kg
15	PACKAGING WASTE, ABSORBENTS, WIPES, FILTER MATERIALS AND PROTECTIVE FABRICS, UNLESS OTHERWISE SPECIFIED	
15 01	packaging (including specially collected packaging in municipal waste)	
15 01 10*	packaging that contains residues of hazardous substances or is contaminated with dangerous substances	cca 50kg
15 02	absorbents, filter materials, wiping cloths and protective clothing	
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing which are contaminated with dangerous substances	cca 50kg
16	WASTE NOT OTHERWISE SPECIFIED IN THE CATALOG	
16 01	waste vehicles from various types of transport (including machinery) and waste resulting from the dismantling of waste vehicles and from vehicle maintenance (except 13, 14, 16 06 and 16 08)	
16 01 03	scrap tyres	cca 400kg
16 06	batteries and accumulators	
16 06 01*	lead batteries	cca 150kg
17	CONSTRUCTION WASTE AND DEMOLITION WASTE (INCLUDING EXCAVATED EARTH FROM CONTAMINATED SITES)	
17 01	concrete, bricks, tiles and ceramics	
17 01 01	concrete	cca 500kg
17 01 07	mixtures or individual fractions of concrete, bricks, tiles and ceramics other than those specified in 17 01 06	cca 500kg
17 02	wood, glass and plastic	
17 02 01	a tree	cca 70kg
17 02 03	plastic	cca 50kg
17 04	metals, including their alloys	
17 04 05	iron and steel	cca 100kg
17 05	soil (including soil excavated from contaminated sites), rock and excavation	
17 05 04	earth and stone other than those specified in 17 05 03	cca 100kg
17 05 06	excavation different from the one mentioned in 17 05 05	cca 100kg
17 06	insulation materials and building materials containing asbestos	
17 06 04	insulating materials other than those mentioned in 17 06 01 and 17 06 03	cca 100kg
17 09	other construction and demolition waste	
17 09 04	mixed construction and demolition waste other than those mentioned in 17 09 01 17 09 02 and 17 09 03	cca 100kg
20	MUNICIPAL WASTE (HOME AND SIMILAR COMMERCIAL WASTE AND INDUSTRIAL WASTE), INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 01	separately collected fractions (except 15 01)	
20 01 01	paper and cardboard	cca 100kg
20 01 38	wood other than that specified in 20 01 37	cca 100kg
20 01 39	plastic	cca 100kg
20 03	other municipal waste	
20 03 01	mixed municipal waste	cca 200kg

The objective of selective waste collection, storage, and handling is to prevent risks to human health and the environment, particularly the release of harmful substances into water and soil. Waste collection and storage will be organized at the construction site and will be based on the following fundamental waste management principles:

- The principle of separate collection,
- Prevention,
- Recycling.

The contractor is required to collect waste generated at the construction site selectively, i.e., in separate containers in accordance with waste classification regulations. The primary principle is to separate hazardous from non-hazardous waste, construction waste from other categories, and recyclable waste as a distinct category.

Hazardous waste and its packaging must be labeled in accordance with regulations governing the marking of hazardous substances. Hazardous waste should be collected and sorted according to the categories defined in the table above. Waste oils must be collected and stored separately.

Excavated and removed material from the canals will be collected immediately after extraction, loaded onto designated truck trailers, and transported to an authorized local landfill in compliance with national legislation.

The location for depositing excavated canal material will be agreed upon with the local municipal administration, which will issue a permit for disposal in accordance with national regulations.

Storage of Separated Waste

Separated waste must be stored in specially designated areas within appropriate containers:

- **Containers for hazardous waste:** (03 02 04*, 08 01 11*, 15 02 02*, 15 01 10*, 16 06 01*, 17 06 05*)
- **Container for non-hazardous waste:** mixed municipal waste (20 03 01)
- **Container for non-hazardous waste:** mixed recyclable packaging waste (20 01 01, 20 01 38, and 20 01 39)
- **Container for non-hazardous waste:** mixed recyclable metal waste (12 01 01, 12 01 03, and 17 04 05).

Containers must be designed for the intended purpose and must prevent material leakage. Each container must be properly labeled.

Collected waste oils (13 02 06* and 07*) will be stored in barrels or other suitable containers to prevent leakage. Vehicle servicing must take place exclusively on a maintenance platform located away from watercourses and sensitive areas, where barrels for storing waste oils will also be positioned. The disposal of waste oils into surface or groundwater, sewage systems, or soil is strictly prohibited. This restriction also applies to substances containing mineral or synthetic oils.

Obligations of the Contractor

The contractor is required to conclude a contract with an authorized organization for the collection, transportation, and final disposal of hazardous waste and to hand over collected hazardous waste accordingly. The contractor must maintain accurate records of generated and transferred hazardous waste in compliance with national legal requirements.

For the disposal of construction waste categories, the contractor must designate temporary storage locations or ensure direct disposal into designated trucks with trailers at each worksite. After the end of a work shift or when the trailer is full, the waste must be transported to the nearest regional landfill for permanent disposal.

The contractor is obligated to identify locations for temporary waste storage and obtain all necessary permits and agreements with the local municipal utility company for the transportation and disposal of all types of non-hazardous waste. On-site or open-air waste incineration is strictly prohibited.

Record keeping- The contractor is obligated to record the type and amount of waste produced. The record includes the following data:

- data on produced waste and the causes of its origin,
- waste storage,
- waste removal.

The contractor will prepare a record sheet in two copies for each waste shipment, one of which he will hand over to the Operator and one of which he will keep in his archives. Record lists of delivered waste should be kept in the Contractor's permanent office, and a copy should be kept at temporary locations for inspection.

Responsibility - The contractor must appoint a person responsible for supervising waste management at the construction site (Waste Coordinator).

WASTE MANAGEMENT IN THE OPERATIONAL PHASE

The responsibility for managing the canal network and the irrigation/drainage system lies with the municipal administration of Brod. Regular maintenance activities for this system will generate waste from canal cleaning and maintenance.

Given that it is anticipated that system users (WUA) will employ their own pumps, the maintenance of these pumps will remain their responsibility, including the management and disposal of agricultural production waste. The Water Users Association (WUA) will be responsible for overseeing the implementation of proper waste management measures by individual system users.

The following sections provide identification of waste that may be generated during the operational phase, in accordance with the Regulation on Waste Categories, Testing, and Classification ("Official Gazette of the Republic of Srpska," No. 19/15 and 79/18).

Table no. 2: Classification of waste that occurs during the operational phase

WASTE CODE	WASTE NAME	QUANTITY (kg/year)
02	WASTE FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING	
02 01	waste from agriculture, horticulture, aquaculture, forestry, hunting and fishing	
02 01 04	waste plastic (excluding packaging)	cca 100 kg
02 01 08*	agrochemical waste containing dangerous substances	cca 20 kg
02 01 09	agrochemical waste other than that specified in 02 01 08	cca 100 kg
02 01 10	scrap metal	cca 20 kg
02 01 99	wastes not otherwise specified	cca 100 kg
13	OIL WASTE AND LIQUID FUEL RESIDUES (EXCEPT EDIBLE OILS AND THOSE IN CHAPTERS 05, 12 AND 19)	
13 02	waste motor oils, gearbox oils and lubrication	
13 02 06*	synthetic motor oils, gear oils and lubrication	cca 50 kg
13 02 07 *	light biodegradable motor oils, gear oils and lubrication	cca 50 kg
15	WASTE FROM PACKAGING, ABSORBENTS, WIPES, FILTER MATERIALS AND PROTECTIVE FABRICS, LACONIA OTHERWISE SPECIFIED	
15 01	packaging (including specially collected packaging in municipal waste)	
15 01 10*	packaging that contains residues of hazardous substances or is contaminated with dangerous substances	cca 70 kg
15 02	absorbents, filter materials, wiping cloths and protective clothing	
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, and protective clothing, which are contaminated with hazardous substances	cca 70 kg
20	MUNICIPAL WASTE (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL WASTE AND SIMILAR COMMERCIAL AND INDUSTRIAL WASTE) INCLUDING SEPARATE COLLECTION OF THE FRACTION	
20 03	other municipal waste	
20 03 01	mixed municipal waste	cca 150 kg

* Hazardous waste

Waste management

The Water Users Association (WUA) will ensure that waste management is carried out according to the principles of good work practice and legal regulations. The restriction may be set by the current way of waste management in the municipality in question, favouring the separate collection of municipal waste.

During the system operation phase, during the regular maintenance of the water pumps, waste is generated as greasy and oily rags, waste oils, etc., marked as 15 02 02*. This waste should be collected, sorted and temporarily disposed of at the location of the planned facilities for the duration of the maintenance. To store the collected waste oils (13 02 06* and 07*), classified as hazardous waste, adequately marked barrels or other appropriate containers will be procured so that environmental pollution cannot occur. Distribute the waste collected in this way to companies dealing with the disposal of this type of waste, with which the system users should enter into a contract before starting work. Localised oil and grease leakage should be removed with a cloth, and the oily cloths should be temporarily stored in metal barrels. Grease that is partially removed from the equipment due to the appearance of mechanical particles or due to replacement should be removed in the same way.

In plant protection chemicals are used, and whose packaging is considered hazardous waste (02 01 08*). Such packaging should be selected and collected separately in specially marked bags. The waste

collected in this way should be handed over to a company that deals with hazardous waste disposal, with which a contract will be concluded before the system is put into operation.

Municipal waste marked 20 03 01, 17 02 03, 02 01 04, 02 01 10 and 02 01 99 generated by individual users can be generated at the irrigated location. Such waste will be collected and temporarily stored in plastic bins or containers that the municipal utility company has installed in the municipality. This category also includes non-hazardous waste from chemicals used in agriculture (02 01 09). If there is no waste collection service, each producer must organise collection and transportation to the nearest bin/container for disposal set up by the municipal utility company. Upon establishment of organised separate waste collection by municipal structures, recyclable waste (plastic, paper, glass and iron) will be separated and disposed of in special containers provided for that purpose.

Waste Collection and Disposal

The Water Users' Association will oversee the implementation of selective waste collection and disposal resulting from the use of the irrigation system. Individual system users are required to hand over all (selectively) collected waste to an authorized local municipal waste management operator. The operator will assume responsibility for transporting the waste to recycling facilities or permanent disposal sites. The final disposal of non-hazardous municipal waste will be carried out at the municipal landfill using trucks operated by the municipal public utility company, under a contract established with the Water Users' Association.

Hazardous waste will be handed over to authorized hazardous waste operators with whom the Water Users' Association will conclude cooperation agreements. During transportation, hazardous waste must be labeled and packaged in accordance with specific regulations and general requirements for the transport of hazardous goods. The transport will be accompanied by the necessary documentation.

During the maintenance and cleaning of drainage canals, extracted water sediment is formed. This waste must be placed on site in truck trailers and taken away from the site. The creation of temporary landfills and open burning of this waste is prohibited. The administrative services of the municipality of Brod are responsible for the adequate management of this waste. If this waste is classified as hazardous based on the analysis, then it will have to be handed over to operators authorized to manage hazardous waste. If the analyzes show that the extracted sediment is not dangerous, then it will be able to be disposed of at the local city landfill.

Record Keeping

The Water Users' Association will maintain records of all types of waste generated on-site. It is essential to keep records of the types and quantities of waste. For each waste shipment, a record sheet will be prepared in duplicate: one copy will be handed over to the authorized company, while the other will be retained in the Association's archive.

Based on the stored documents, the exact quantity of hazardous and non-hazardous waste handed over can be easily determined.

The administrative services of the municipality of Brod will maintain records of waste extracted from drainage canals, as well records of physical and chemical analyzes of extracted water sediment.

ANNEX 3 LEGAL FRAMEWORK

REGULATIONS IN THE FIELD OF ENVIRONMENTAL PROTECTION

Environmental impact assessment procedure

Environmental impact assessment (from now on referred to as EIA) is a procedure for assessing the acceptability of interventions about the environment, as well as determining the necessary environmental protection measures to minimise negative impacts and achieve a high level of environmental protection.
Environmental protection competes with the Ministry of Spatial Planning, Construction and Ecology of the RS (RS MoSPCEE).

The Law on Environmental Protection ("Official Gazette of the RS" No. 71/12, 79/15 and 70/20) Article 60-79 prescribes the procedure for environmental impact assessment. The Rulebook on projects for which an environmental impact assessment is carried out provides additional clarifications, as well as the criteria for deciding on the need for implementation and the scope of an environmental impact assessment (Official Gazette of the RS No. 124/12).

Articles 2, 3, 4 and 5 of the Rulebook on projects for which an environmental impact assessment is carried out and criteria for deciding on the need for implementation and the scope of an environmental impact assessment determine the projects subject to the EIA procedure.

A preliminary environmental impact assessment is initiated by submitting a request for a preliminary environmental impact assessment, which the project holder submits to the ministry responsible for environmental protection.

The request for a previous environmental protection plan can be prepared by the applicant himself or by an institution authorised to perform activities in the field of environmental protection. Article 64 of the Law on Environmental Protection prescribes what must be attached to the request for a previous environmental protection plan, namely:

1 description of the project, including data on its location, purpose and size,
2 description of possible impacts of the project on the environment during its construction or execution and during its operation or exploitation,
3 a description of the planned measures to prevent, reduce or eliminate the harmful effects of the project on the environment,
4 a brief overview of the alternatives considered by the project manager and the reasons for the chosen solution, considering the impact on the environment,
5 extract from the Planning Act,
6 information on possible difficulties encountered by the project holder during data collection
7 non-technical summaries of information from paragraph 2 of this article

The competent administrative body responsible for issuing Location Conditions will inform the applicant in writing about the requirement to submit a request to the RS MoSPCEE. This request should seek a decision on the obligation to conduct an environmental impact assessment (EIA) and the specific scope of that assessment. This procedure applies to projects outlined in the Rulebook concerning environmental impact assessments and the criteria for determining the need and scope of such assessments.

The preliminary environmental impact assessment request is submitted to the RS MoSPCEE protocol or by mail.
When it is determined that the request was prepared by Article 64 of the Law on Environmental Protection, it is considered, and the procedure of the previous Environmental Protection Act is initiated. By Article 65 of the Law on Environmental Protection, RS MoSPCEE must submit a copy of the request and provide access to the attached documentation to the entities specified in the same article to obtain an opinion. The deadline for submitting opinions in written form is 30 days from the day of receipt of documentation. On the request for a preliminary impact assessment, the RS MoSPCEE decides with a Decision that establishes the applicant's obligation to conduct an environmental impact assessment of the project, obtain an environmental impact assessment study and determine the approximate scope and content of the study or determines that the implementation of the impact assessment and obtaining studies are not required. This Decision is made within 60 days from the receipt of the request.

After the Decision on the obligation to carry out an impact assessment and the scope of the environmental impact assessment is issued, within six months of receiving this Decision, the project holder is obliged to submit a request to the authorised organisation for the preparation of an impact study for the activities specified in the Location Conditions and the decision on determining the obligation conducting an impact assessment and obtaining an impact study.

The environmental impact study is submitted to RS MoSPCEE in two hard copies and four electronic copies, along with a request for a decision on its approval within 30 days of receipt from the authorised institution.

RS MoSPCEE, in cooperation with the project holder, involves the public in the procedure. Within 15 days from the date the study's approval request is submitted, the project holder must inform the public and interested public about the submitted request in one of the daily newspapers in the RS.

The project holder is obliged to provide the interested public with an unrestricted view of the request for approval of the impact study and the impact study in the municipality where the location of the given project is located from the date of publication of the notice until the expiration of the prescribed period of 30 days for providing an opinion.

The project holder is obliged to organise a public hearing no later than 60 days from submitting the request for approval of the RS MoSPCEE impact study. The invitation to the public hearing must be published at least 15 days before the holding of the public hearing.

The project holder organises a public discussion on the impact study in the municipality where the given project is located. In the public debate, the representative of RS MoSPCEE must participate in who is leading the public debate. The project holder prepares and submits the public hearing minutes to RS MoSPCEE within 8 days after its holding.

The interested public can write comments to the project holder within 30 days of the public hearing regarding the request and the impact study. The project holder is obliged to submit to the RS MoSPCEE within the next 15 days the objections received in connection with the request, the impact study, and his preliminary expert opinion on the objections received.

RS MoSPCEE will evaluate the objections received from the public regarding the project holder's preliminary expert position and the relevant authorities' feedback. Within 15 days, RS MoSPCEE will

provide the project holder with its assessment and feedback. They will also instruct the project holder to make necessary changes and additions to the impact studies. The project holder will be given a deadline to submit an amended study, which cannot exceed 30 days. This amended study must include a specific section addressing the project's potential impact on the environment of other entities, including Brčko District.

The RS MoSPCEE entrusts the audit of the amended impact study to an authorised legal entity that meets the requirements for performing activities in the field of environmental protection (auditor). The impact study review verifies the impact study's professional quality. The auditor submits an audit report to the RS MoSPCEE, which contains an expert assessment of the impact study, possible remarks on the quality and completeness of the study, and instructions for eliminating those deficiencies. The Ministry submits the audit report to the project holder. The project holder is obliged to submit to the Ministry the impact study in its final form by the remarks and instructions from the audit report, within a period determined by the Ministry, but not longer than 15 days. in the final form.
The decision on the approval of the study determines in particular:

1 that the impact study was prepared by this law,
2 that the project holder is obliged to take measures for environmental protection that were determined in the impact study,
3 that the impact study is considered an integral part of the decision on the approval of the study

In the explanation of the decision approving the study, it is stated that the comments of interested parties and the interested public were considered, as well as the comments of another entity, Brcko District or another state. The decision to reject the study will be issued if:

- determines that the project could cause a significant negative impact on the environment, i.e. that the project could significantly endanger the environment,
- determines that the project is not by the environmental protection plan at the inter-entity and entity level or
- establishes that the project is not by the international obligations of Bosnia and Herzegovina regarding environmental protection.

The decision on the approval of the study ceases to be valid if the project holder does not obtain a building permit or other decision within two years from the date of receipt of the decision. After receiving the Decision on the approval of the Environmental Impact Study, the Investor submits the Application for an environmental permit by Article 85 of the Law on Environmental Protection.

REGULATIONS IN THE FIELD OF CONSTRUCTION

The Law on Spatial Planning and Construction of the Republic of Srpska (Official Gazette of the RS No. 40/13, 106/15, 13/16, and 84/19) regulates the spatial planning system and the preparation, drafting, and adoption of spatial planning documents. It addresses location conditions, the arrangement of construction land, the issuance of construction permits, and the types and content of technical documentation. Furthermore, it governs the construction of buildings and the relationships among parties involved in construction, as well as the use and removal of buildings, the legalisation of buildings, and the supervision of the law's application. The law also outlines the jurisdiction and responsibilities of the Chamber of Engineers and other relevant land use, construction, and building issues.

Procedure for obtaining a building permit
The process of obtaining permits in RS occurs through interaction with municipal services. In other words, when a permit application is submitted, the municipality determines whether or not it is within

its jurisdiction to approve the project. If not, the municipality will officially submit the request to the RS MoSPCEE.

The Law defines the procedure for issuing a building permit for Spatial Planning and Construction of the RS (Official Gazette of the RS No. 40/13, 106/15, 13/16 and 84/19).

This law regulates the system of spatial planning and spatial planning preparation, drafting and passing of documents of essential planning, location conditions, arrangement of construction land, issuance of building permits, types and content of technical documentation, construction of buildings and mutual relations between participants in construction, use and removal of buildings, legalisation of buildings, supervision over the application of this law, competence and work of the Chamber of Engineers, and other issues of importance for spatial planning, building land and construction of buildings.
Required documentation for obtaining a building permit:

- Location conditions, with urban-technical conditions,
- Proof of resolved property-legal relations,
- The main design in three copies,
- Report on the revision of technical documentation.

Following Article 127 of the Law, the administrative body responsible for construction work in the local self-government unit whose area sub-project activities are carried out is responsible for issuing a construction permit.

REGULATIONS ON WASTE MANAGEMENT

In the RS, by the Law on Waste Management ("Official Gazette of the RS" no. 111/13, 106/15, 16/18, 70/20, 63/21 and 65/21), for all facilities for which an environmental permit is issued, a waste management plan is prepared and adopted, which contains:

- documentation on the waste produced by the company (origin, types of waste according to the waste list, composition, quantity),
- measures to be taken to prevent waste production, especially when it comes to hazardous waste,
- separation of waste, especially hazardous waste, from other types of waste and from waste that will be reused,
- disposal of waste at the landfill,
- methods of treatment and disposal.

The Rulebook on categories of waste with a catalogue ("Official Gazette of the RS" no. 19/15 and 79/18) determines the list of waste according to the activities in which it is generated. Waste from agricultural production, horticulture, aquaculture production, food preparation and processing, hunting, and fishing is specified as one of the subcategories in this List. This category includes animal tissue, other animal waste, waste from agricultural plants, waste plastic, forest waste, and non-hazardous chemicals.

Waste chemicals used in agriculture, including their packaging and unused or expired chemicals, are classified as hazardous waste that requires special treatment by the provisions of the Law on Waste Management.

WATER MANAGEMENT REGULATIONS

In the RS, the Law on Water ("Official Gazette of the RS" No. 50/06, 92/09, 121/12) stipulates that the following water management acts must be obtained in the case of a project that includes, for example, the construction of flood protection facilities, as well as any other activities that could affect the quantity and quality of water:

- Water guidelines, which prescribe the manner and conditions under which the competent Ministry will allow the use of water (they are issued at the stage of urban planning permission, i.e. location conditions in the RS),
- Water consent, which confirms that the documentation attached to the application for water consent is by the previous water consent and water guidelines in RS, water regulations and planning documents (they are issued before construction permits in RS) water permit, which confirms that all the requirements specified in the water permit (issued before the use permit in the RS) have been met,
- The water permit determines the purpose, method and conditions of water utilisation, the operation mode of facilities and plants, the method and conditions of discharge of wastewater, the method and conditions of disposal of solid and liquid waste and other conditions. It also determines the applicant's obligations related to wastewater measurement, measurement frequency, quality control, keeping records of used water, and obligations associated with calculating and paying water fees.

The Entity Law on Water stipulates that the environmental permit is issued based on previously obtained water consent/water guidelines.

The law stipulates that the environmental permit is issued based on previously obtained water consent, that is, water guidelines that decide on the applicant's right to water and how to exercise those rights. This way, the RS MoSPCEE ensures that the previous water consent recommendations and water protection measures are integrated into the environmental permit. According to the legal legislation, the request for issuing the previous water consent is submitted by the authority responsible for issuing permits and the environment.

It should be noted here that the practice differs from the prescribed one. Namely, the investor is required to initiate the procedure of obtaining the previous water consent himself.

Article 125 of the Law on Waters of the RS stipulates that an Environmental Impact Study must be attached to a request to issue a water act for projects subject to the Environmental Protection Act. In this way, the study's recommended water protection measures are integrated into water acts. This ensures that the RS MoSPCEE can include all recommendations and measures related to water protection in the environmental permit. In the RS, water documentation is issued by the PU "Vode Srpske" and local self-government units.

REGULATIONS FROM THE FIELD OF AGRICULTURE

The legal framework for the implementation of agricultural policy in the RS is legal and by-laws, as well as strategic documents related to the development of the entire sector or rural areas of this entity in BiH by the Law on Republic Administration ("Official Gazette of the RS" no. 115/18, 111/21, 15/22, 56/22, 132/22, 90/23), the role of the MoAFWM RS as an institution responsible for administrative and professional work in the field of creation and implementation of agricultural policy is defined.

The Law on Agriculture of the RS ("Official Gazette of the RS" no. 70/06, 20/07, 86/07 and 71/09) establishes the objectives and measures of the agricultural policy, as well as the methods of its implementation and monitoring. The Law on Agriculture of the RS stipulates that the agricultural policy is implemented based on the Agriculture Development Strategy of the RS, a set of fundamental principles that determine the agricultural policy's goals, measures, and instruments.

The Strategic Plan for the Development of Agriculture and Rural Areas of the RS 2016-2020 simultaneously covers both areas – agriculture and rural development. expected: increasing the volume and productivity of agricultural production and ensuring the stability of the income of agricultural producers, strengthening the competitiveness of the farm sector through increasing the level of investments, increasing the degree of marketability and finalisation of agricultural production, sustainable management of natural resources and mitigating the consequences of climate change, balanced integral rural development and systematic support development of the agricultural sector and rural areas. This Plan envisages a partial reform of the current incentive policy, which aligns with approaching the monetary incentives policy in force in the EU, especially for countries that have recently joined the EU (transition to direct payments per unit of area and per head of livestock).

The basis for the continuous provision of funds is the Law on the provision and direction of funds for encouraging the development of agriculture and villages ("Official Gazette of the RS", no. 43/02 and 106/09). This Law initially provided that the secured funds are primarily used for interventions in agriculture through the payment of premiums, rebates and co-financing of various programs and projects, as well as investments in agriculture through interest rebates on loans granted to agricultural farms by banks.

REGULATIONS ON WORKING CONDITIONS

The following regulations regulate labour legislation and occupational safety in the RS:

- Labor Law ("Official Gazette of the RS" no. 1/16 and 66/18)

  Regulates labour relations, rights, obligations, and responsibilities arising from employment contracts, the conclusion of employment contracts, working hours, breaks and rest, general protection of workers, wages, benefits and other benefits, termination of employment contracts, protection of workers' rights, and organisation of workers and employers.
- Law on Occupational Safety of the RS ("Official Gazette of the RS" No. 1/08, 13/10)
- Regulates health and safety at work as an activity of general interest, responsibility for implementing and improving safety and health, rights, obligations, duties and preventive measures.
- Law on Protection from Harassment at Work ("Official Gazette of the RS" No. 90/21)

  This law defines that acts of harassment at work are considered to be physical attacks or threats of physical attack, as well as verbal attacks, that is, shouting, threatening or insulting, as well as inappropriate public commenting on personal characteristics and characteristics of workers.

ANNEX 4 SCREENING QUESTIONNAIRE FOR ENVIRONMENTAL AND SOCIAL ISSUES

Table No. 1. Screening questionnaire for ecological and social questions

Name sub-projects:	Rehabilitation and reconstruction of the canal network in the Ivanjsko drainage network/construction of slide gates between the primary internal canal III and IV - drainage canal network and peripheral canal of the Ukrina-Sava river - irrigation canal network
ID project:	
Location sub-projects:	Municipality of Brod
Agency for implementation:	Agricultural Projects Coordination Unit - APCU within the Ministry of Agriculture, Forestry and Water Management of the RS
Users sub-projects:	Agricultural producers of the municipality of Brod / Ivanjsko Polje
Estimated duration period construction:	1 year
Estimated duration of the work period i maintenance (lifetime century sub-project):	50 years
Basic information Fr proposed sub-project and activities:	Rehabilitation works on the part of the Ivanjsko Polje irrigation and drainage canal network (channels III and IV)
Project activity belongs in frameSub-components:	Sub-component 2.2 - Improving Irrigation and Drainage (I&D) systems for adaptation to climate change

No.	Environmental and social risk issues	YES	NO	Unknown	Notes
1.	Does the project support activities on the World Bank's elimination list?		√		-
2.	Does the proposed activity belong to the list of projects for which a full EIA is mandatory according to the Law on Environmental Protection of the RS?		√		-
3.	Does the proposed activity require another type of EA according to RS legislation?		√		For the reconstruction of existing buildings in use, it is not mandatory to prepare an EIA and documentation, according to Article 3, paragraph 13, Point D of the Rulebook, *on projects that require an EIA and criteria for deciding on the need to carry out works. conduct an EIA*
4.	Does the proposed activity require special public consultations according to RS legislation?		√		-
5.	Does the proposed activity involve new construction and additions?	√			The installation of slide gates /gates will be an element of the function of existing channels.
6.	Does the proposed activity include rehabilitation?	√			Earthworks to reconstruct the profile of two primary drainage channels (III and IV)

7.	Will the project use natural resources such as land, water, materials, or energy, especially nonrenewable or scarce resources?		√		
8.	Will the project activities be performed on, or will they potentially affect, the site of archaeological or cultural heritage?		√		The existing facility has been in use for several decades, so there is little chance of this impact occurring. However, during the reconstruction, the Contractor will take the necessary actions in case of findings and inform the critical interested parties—the Institute for the Protection of Cultural, Historical, and Natural Heritage of the RS.
9.	Will the project activities be sources of dust, pollutants or any hazardous, toxic or harmful substances in the air?		√		
10.	Will the project activities be sources of greenhouse gases or substances that damage the ozone layer - ODS [28](halogens)?		√		
11.	Will the project be a source of noise and vibration?		√		Temporary and short-term noise emissions during work execution are possible, and the ESMP will regulate this, defining appropriate measures to mitigate unavoidable risks and impacts.
12.	Will the project generate significant amounts of waste (hazardous, non-hazardous, inert waste)?		√		
13.	Will the project involve using, storing, transporting, handling, or producing substances or materials that could harm human health or the environment, such as pesticides, or raise concerns about actual or perceived risks to human health?		√		
14.	Will the project lead to additional wastewater discharges?		√		
15.	Are there risks of surface water contamination?		√		
16.	Are there risks of groundwater contamination?		√		
17.	Are there activities that will lead to physical changes in the body of water?		√		
18.	Will the project contribute to the pollution of international waters?		√		
19.	Are there risks of physical terrain changes, soil pollution, sediment loading, erosion, etc.?		√		
20.	Will the project involve the use of pesticides or fertilisers?		√		
21.	Are there areas on or around the site used by protected, essential, or sensitive species of flora or fauna, e.g.,		√		

[28] chlorofluorocarbons (CFCs), chlorofluorocarbons (HCFCs), halons and methyl bromide

	reproduction, nesting, feeding, rest, wintering, and migration, which could be affected by the project?				
22.	Will the project be located in or near a sensitive or protected area?		√		
23.	Are there areas or features of high landscape or scenic value on or around the site that could be affected by the project?		√		
24.	Will this project affect any critical habitats (forests, marshes, wetlands, aquatic ecosystems)?		√		
25.	Will this project affect any endangered plant or animal species??		√		
26.	Are there available waste management facilities near the subproject sites? Will this project affect any endangered animal species?		√		
27.	Are there roads or facilities on or around the site used by the public to access recreational or other facilities that could be affected by the project?		√		
28.	Are there transportation routes on or around the site subject to congestion or that cause environmental problems that could be affected by the project?		√		
29.	Does the project site cover a previously undeveloped area where green land will be lost?		√		
30.	Are there existing land uses within or around the site, e.g. houses, gardens, other private property, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, mining or quarrying, which could be affected by the project?		√		
31.	Are there areas within or around the site that are densely populated or built-up that could be affected by the project?		√		
32.	Will implementing the project cause physical displacement of individuals, families or businesses?		√		
33.	Will the project require a temporary or permanent purchase of land?		√		The existing facility is within the hydromelioration area. The work will be performed inside and on the canal's surface (precise routes), which is part of the water property and water land owned by the RS and maintained by the LC, so no impact on private land is expected.
34.	Is there a right-of-way issue?		√		
35.	Does the project affect community property?		√		

36.	Does the project affect the health and safety of the community?		√		Road safety measures are included in the General ESMF. Public roads will be used to access the existing canals during the reconstruction. There is no indication of any impact other than reduced passability and occasional interruptions to road traffic, only in the case of canal access machinery.
37.	Does the project affect the health and safety of the community?		√		
38.	Is there a probability of impact on the health and safety of workers?	√			Generic ESMF covers labour and occupational safety measures, including mandatory PPE. Additionally, the tender documentation for the works should include the prepared formats under the LMP covering the appeal mechanism, Code of Conduct, and Compliance Reporting by the Contractor to be implemented during the activity.
39.	Are there indications that informal labour will be used for the sub-project?		√		

CATEGORISATION OF RISK:

Any positive answer marked with red cells indicates that the proposed project activity represents a high risk and that such activity will not be funded.

Any positive answer marked with an orange cell indicates that the proposed project activity represents a significant risk. The ESS WB standards and the relevant national legislation will finance the proposed activity. The applicant should prepare an ESIA.

Any positive answer marked with a yellow cell - indicates that the proposed project activity represents a moderate risk - ESS WB standards and relevant national legislation will finance the proposed activity. The applicant should prepare the ESMP.

All responses marked with a green cell - indicate that the proposed project activity represents a low risk - ESS WB standards and relevant national legislation will finance the proposed activity. The applicant should prepare a generic ESMP.

The review will consider the cumulative risks and determine the overall category; however, the highest risk will prevail if indicated.

Project categorization prepared by E&S specialist: _ **Moderate risk** _____
Signature of the responsible person: _____
Date: _ _____
WB E&S specialist project categorisation issued: _____
Signature of responsible person: _____
Date: _____

ANNEX 5: SAMPLE COMPLAINT FORM

Table 1. Complaint form

Protocol number:	
Name and surname _____ (optional) [] I want to submit a complaint anonymously […] Please do not reveal my identity without my consent	
Contact information Mark the preferred method of contact (mail, phone, email)	[…] By mail: _____ _____ *Please provide a mailing address.* […] By phone: _____ By email: _____
Preferred language of communication	☐ Serbian/Bosnian/Croatian ☐ English (preferably)
Description of the event to which the complaint relates	What happened? Where did it happen? Which person did this happen to? What resulted from the problem?
Date of incident/complaint	[…] The event that happened once/complaint (date _____) […] It happened more than once (How many times? _____) […] It keeps happening (a problem that exists right now)_ _____
What do you want to be done?	

Signature: _____
Date: _____

Please send this form to the following address:

Attention: Zoran Kovacevic, APCU Project Leader
Ministry of Agriculture, Forestry and Water Management of the RS
Address: Trg Republike Srpske 1
78000 Banja Luka
Phone: + 387 51 338-340
Email: z.kovacevic@mps.vladars.rs

Or

Local complaints office- Sinisa Jacimovic
Departments for economy and social activities - department of agriculture, municipality of Brod
Svetog Sava Street, number 17
74450 Ship
Phone: +387 53 611 970
E-mail: jacimovics@opstina-brod.net

Or

Contactor GRM officer
Details of the address, phone number and email address of Contactor GRM officer will be published later.

ANNEX 6: MINUTES FROM THE PUBLIC HEARING

This chapter will be supplemented after the public hearing.