GOVERNMENT OF NEPAL
MINISTRY OF ENERGY, WATER RESOURCES AND IRRIGATION
DEPARTMENT OF WATER RESOURCES AND IRRIGATION (DWRI)
RANI JAMARA KULARIYA IRRIGATION PROJECT (RJKIP) PHASE II

Site Specific Environment Management Plan

Of
Modernization of Sub-Secondary Canals in Rani Kulo
Type of work: Command Area Development

Rani Jamara Kulariya Irrigation Project (RJKIP)
Tikapur, Kailali

Abbreviations

CAD	Command Area Development
CoI	Corridor of Impact
DWRI	Department of Water Resources and Irrigation
EMP	Environment Management Plan
EPA	Environment Protection Act
EPR	Environment Protection Regulation
ESF	Environmental and Social Framework
GPS	Global Positioning System
GoN	Government of Nepal
IUCN	International Union for Conservation of Nature
IEE	Initial Environmental Examination
KM	Kilo Meter
LCM	Lamki Chuwa Municipality
M	Meter
OSH	Occupational Safety and Health
PPE	Personal Protective Equipment
RJKIP	Rani Jamara Kulariya Irrigation Project
RM	Rural Municipality
STD	Sexually Transmitted Disease
VAT	Value Added Tax

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1. Introduction:

Government of Nepal (GoN) has been modernizing the irrigation systems following the changing contexts in terms of technologies, climate change impacts, and requirements of the beneficiaries. Rani Jamara Kulariya Irrigation System (RJKIS), having approximately 14,300 ha command area, is one of the largest farmer-managed irrigation systems being modernized by GoN, Department of Water Resources and Irrigation (DoWRI). Given that there was sufficient water in the source-Karnali river, the system historically suffered from frequent washout of temporary diversion works and shifting of river course at its intake. Therefore, DoWRI, through RJKIP emanated strengthening the system since FY 2009/10. Similarly, an agreement was signed between GoN and the World Bank (WB) on October 18, 2011, for the development of Phase I which ended in September 2018. Successful completion of Phase 1 led to the structuring of Phase 2 of the project ahead of the planned time frame and another Phase II loan agreement between GoN and WB took place on May 2018 to modernize the system for economic growth and poverty reduction through a gendered and inclusive comprehensive agricultural program that focused on increasing production, productivity, diversification and strengthening post-harvest support. The Phase II agreement remains effective till December 31, 2023.

Rani Canal consists of 19 Sub-Secondary branch canals. Technical investigation identifies twenty types of different structures. The name which are Canal Lining, Head Regulator & Cross Regulator (HR/CR), Hume Pipe, Road Crossing Box Culvert, Escape, Aqueduct, Long Crested Weir (LCW), Protection Work, Drop, Service Road, Cover Slab, New Canal Structure, Inlet, Reshaping, Ramp, Syphon, Bridge, Height Raising, Escape Inlet, Trail Structure etc; detail of with is listed in table 1 below. This package represents activities under modernization of Sub-Secondary Rani Canal. Tertiary canal system will be considered in future through separate package of work.

The proposed subproject lies under Command Area Development (CAD). The canal is in operation since long ago but due to lack of modern structures' farmer were getting difficulties and repetition of problems during peak irrigation periods, during monsoon and dry seasons. The structures are designed based on the requirements at field. The CAD activity includes structural development within canal systems in Rani, Jamara and Kulariya. Main propose of CAD works is to convey smooth water supply, minimize water loss and improve management of water. The project includes modernization through small structures within existing canals mostly in rural areas therefor the potential environmental impacts of the project are expected to be minimal, compared to the development of new canals. However, the project needs to fulfill the necessary national and the WB environmental requirements, and project's safeguard documents. Environment Protection Act (EPA) 1997[1], Environment Protection Regulation (EPR) – 1997 requirements of Government of Nepal (GoN). Safeguard Policies OP 4.01 Environmental Assessment, OP 4.04 Natural Habitats, OP 4.09 Pest Management and OP 4.36 Forests are the World Bank's environmental requirements.

[1] The EPA 2019 has been enacted already, EPR has not been drafted yet.

This Site-Specific Environment Management Plan (SS-EMP) identifies site-specific issues and impacts in and around Rani Irrigation system Command Area Development. The SS-EMP builds on the RJKIP2 safeguard documents prepared during project preparation (including Volume 1: Executive Summary, Volume 2: Environmental Assessment, Volume 3: Bio-diversity Impact Assessment, Volume 4: Integrated Pest Management, etc). It is intended to ensure that the commitments made by the RJKIP to minimize project related environmental impacts are upheld throughout the sites. The Contractors responsibilities during construction will be detailed in "Environmental Specifications for Contractors" which will be included in bidding documents and contracts, will be enforced by the Project. These specifications will be prepared before the start of the bidding process.

Table 1: Summary of Proposed Structures in Sub-Canals of Rani Canal

S.N.	**Structures on Rani Branch**	**Proposed**	**Unit**	**Remarks**
1	Canal Lining	6.1	Km	
2	HR/CR	12	No	
3	Hume Pipe Crossing	46	No	
4	Road Crossing Box Culvert	44	No	
5	Escape	11	No	
6	Aqueduct	12	No	
7	Long Crested Weir (LCW)	108	No	
8	Protection Work	0.43	Km	
9	Drop	0	No	
10	Service road (From Rani WUA building to Satti Road 4 km) (Beluwa Chauraha to Kalakunda-Khakraula 7km)	11	Km	
11	Cover Slab	9	No	
12	New Canal Construction	3	No	
13	Inlet	1	No	
14	Reshaping	1400	m	
15	Ramp	1	No	

16	Syphon	1	No	
17	Bridge	1	No	
18	Height Raise	1	No	
19	Escape Inlet	1	No	
20	Tail Structure	1	No	

2. Objective:

The general objective is to prepare the Site-Specific Environment Management Plan to mitigate adverse impacts due to civil works for proposed canal modernization. Specific objectives of plan are as below:

a) To conserve natural environmental setting at river for sustainable ecosystem services after civil construction.

b) To maintain vegetation resources, conserve biodiversity and spread good practices at river training.

c) To support mitigation and management of site-specific environmental issues and impacts

3. Methodology

For the Site-Specific Environment Management Plan environmental observation/screening around the proposed site was conducted through structured checklist to determine the potential area of concern/impact along the Rani Sub-Secondary Canals corridor. The findings of screening conducted along proposed infrastructures alignment was documented. Issues and challenges of irrigation system, impacts due to proposed structures, impacts during construction and operation were analyzed by public discussion including Badghars (Farmer leader) and community associated with individual canals separately.

Documents reviewed for the study are RJKIP2 environmental reports including Executive Summary (Volume1), Environmental Assessment (Volume 2), Biodiversity Impact Assessment (Volume 3), Integrated Pest Management (Volume 4). Systematic Focused Group Discussion (FGD), and Transit Walk Survey were major tools applied during the assessment. Discussions with stakeholders and project team, review of Project documents, available online resources and other sources was carried out.

4. Project Information:

4.1 Background

Project work includes installation of small structures for irrigation system modernization. Proposed structures for Rani Sub-Secondary Canal system with estimated number of structures is illustrated in table above, however few minor structures will be added based on social and environmental findings and needs after final field verification/ survey. The construction structures are within community, the social and cultural value is typically different. The process of construction starts with contractor mobilization. The civil works activities like stripping, excavation, transportation, collection of materials, concrete structure, gabion structures, earth work, temporary routs, collection sites, disposal sites, labor camps etc.; that impact local environment. The project is the modernization of an existing facilities, therefor the potential environmental impacts of the project are expected to be low compared to the development of entirely new alignments with massive civil works. Considerations will be taken to address the adverse environmental impacts due to the proposed work.

The SS-EMP consists of the set of mitigation measures, responsible institutional base to implement and reduce adverse environmental impacts at acceptable limit as a result of project activities during planning, implementing and operation phase of project cycle. Below is the list of Sub-Secondary Rani Canals with number of proposed structures.

Table 1: List of Rani Sub-Secondary Canals

S.N	Name of Sub-Secondary Canal	Number of structures	Remarks
1	Rajipur	12	
2	Fireline	14	
3	Bist Tole	23	
4	Satgaun	23	
5	Sahipur	23	
6	Nuklipur	20	
7	Muharniya	16	
8	Bashanta	28	Work postponed / disputed
9	Indriyani	6	
10	Simreni I	8	
11	Simreni II	8	
12	Narayanpur	14	
13	Lachhinapur	9	

14	Padampur	18	
15	Beluwa	25	
16	Jhunga Baidi	21	
17	Suryapur	15	
18	Bauniya	25	
19	Batanpur	16	

4.2 Existing Environmental Condition

The Command area of RJKIP lies in the Terai plain. The head/ intake of irrigation system is at West bank of Karnali River near Chisapani. It is a historical irrigation system of Kailali district that dates back to more than century managed by the farmers (Tharu community) led Water User Association (WUA). The project area receives average annual rainfall of 1,693 mm. Rainfall is concentrated mainly on four months from June to September. Rainfall is usually one month late as compared to the Eastern region. Enclosed between the rivers and forest the project area has good ground water potential with water table variation between 3 to 5 m. The secondary canals Rani, Jamara, Kulariya not only function as irrigation canals but also convey water drained into from some part of the command area. The tail end part of majority of canals including branch canals function as drainage canals called escape canal that redirect water back to river.

Temperature of area is lowest in the winter and highest in the summer. With the season, the project area witnesses winter from December to February, spring from March to May, summer from April to June and autumn from September to November. In winter, there is much less rainfall than in summer. As described in the Environment Assessment Report of RJKIP, the average temperature in Tikapur is 24.6 °C. The average annual rainfall is 1757 mm. The driest month is November. There is 4 mm of precipitation in November. Most precipitation falls in July, with an average of 516 mm. With an average of 31.0 °C, May is the warmest month. In January, the average temperature is 15.6 °C. It is the lowest average temperature of the whole year. The area is vulnerable due to flood hazard, it is because of low elevation and presence of rivers that accumulate huge volume of water. Major rivers responsible for floods are Karnali, Mohana, Pathraiya, Kanda etc.; The present land cover in the command area is Agriculture land, Bush area, Forest area, Flood plain (sandy area), Grass land, Orchard, Water bodies, Swampy areas etc. The composition by percentage is shown in table below.

Table 2: Land Cover in directly impact area of Rani Canal

SN	Land Cover	Percentage	Remarks
1	Cultivated Area	91.44	
2	Bush Area	3.43	
3	Forest Area	2.86	
4	Sandy Area	1.49	
5	Grass Land	1.08	
6	Orchard	0.45	
7	Water Body	0.18	
8	Swampy Area	0.06	

Source: Environment Assessment Report of RJKIP

Erosion of the river bank and flooding of associated agricultural land due to Karnali, Pathariya, Mohana and tributaries is evident in the command area. Since long ago, farmers are diverting

water from the Karnali River or its branches directly hence, there is higher sediment deposition in the irrigation canal. Moreover, widening of canals and raising their beds due to bank erosion and sedimentation is also seen during field visit. The proposed activities in Sub-Secondary Canals are aligned with existing canal structures along agriculture land of rural areas. The population composition of RJKIP command area in average is unique. The Indigenous Tharu community has highest population of 48% followed by Chhetri (17%), Brahmin (10%), Dalit (15%) and others (7%) (National Census 2011).

For the construction of proposed structures large volume of quarry materials like mud, sand, gravel and stones will be required. Environmental concerns will be taken at collection sites. Along the alignment there exist sparse vegetations, Tharu community/culture, issues of water drainage/way-out, air and sound pollution in community, cultural issues and economic burden due to loss of standing crops because of temporary routes identified mostly during field assessment. Appropriate considerations will be taken in SSEMP for identified impacts. Google map below shows the overview of image in CAD area.

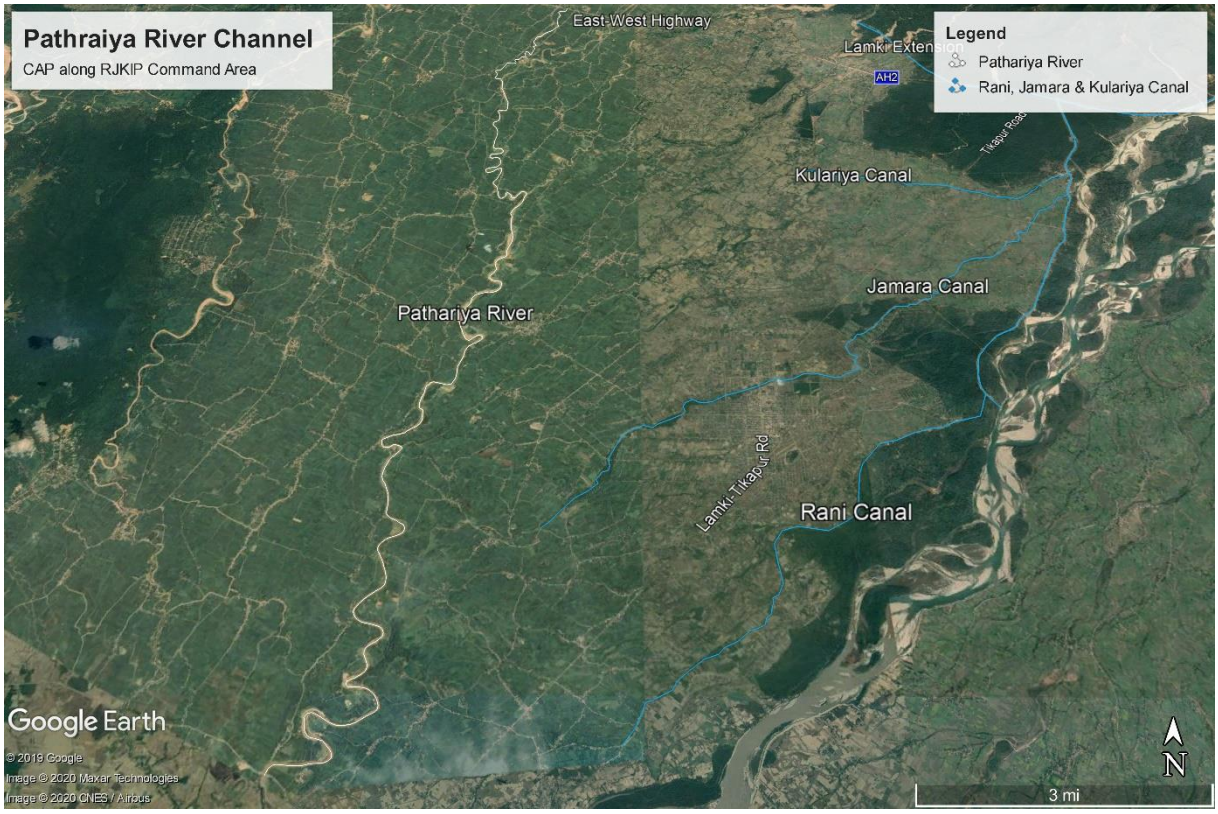

Figure 2: Google image CAD Area

5. Environmental Issues/Impacts and mitigations

5.1 Physical Impacts and mitigations

5.1.1 Dust and noise pollution

Issues/ impacts and site: During construction of proposed structures dust and noise will be generated in large amount due to vehicular emission and movement in earthen dusty roads. Air pollution is expected high for roadside community near earthen /gravel roads. It will affect the construction workers, settlements and local people. The movement heavy equipment like tipper, excavator etc.; will cause noise and vibrations. The impact will be higher in Basanta Tol, Laxinapur Sukumbasi Tol, Simrani Magar Tol, Kalika Tol, Naya Bast of Balewa, Dibyapur, Partipur, Baidi Khakraula, Sunahaphata areas because of higher movement.

Mitigation: To reduce dust pollution there will be provision of water sprinkling twice in working day, dry days. The hood of truck will be covered during carriage and pressure horns will be restricted to avoid unwanted sounds. Temporary route, if needed, to the construction site will be through escaping settlements and sensitive areas as far as possible. Speed limitation regulated will also be applied for vehicles near settlements. National Ambient Air Quality Standards (2003), Nepal Vehicle Mass Emission Standard (2012), National Ambient Sound Quality Standard (2012) that will be followed by the Contractor.

5.1.2 Operation of new structure and outlet

Issues/ impacts and site: After construction of proposed structures inflow of water will be increased. Farmer will get good access of inlet but the problems will arise with the proper handling of new structures, maintenance and outlets. This will cause inundation of farmlands, houses etc. Problems of outlet management is expected in Indrewa, Nuklipur, Beluwa and Batanpur canals.

Mitigation: The flow of water will be controlled at HR/CR and unused will be passed through escape. Farmers will be oriented about the operation and maintenance of new constructed structures Structural mitigation will be applied to manage the problem, cross drainage at appropriate low-lying area. Escape of above-mentioned canals will be modernized with proper outlet.

5.1.3 Change in land use practice

Issues/ impacts and site: Mostly all the proposed structures are within or along agriculture land and rural roads. The temporary routes, movement of workers, construction vehicles disturb agriculture mainly standing crops. Though the effects are temporary and in the long term, modernization of canal will help community for smooth irrigation.

Mitigation: The temporary routes will be prepared with minimum disturbance to agricultural crops. A mechanism will be set to calculate loss of standing crops for compensation, in coordination with RJKIP-ACIU and WUA. Farmers will be compensated for distraction of standing crops. Farmers will be trained for modern agriculture practices, maximize water use for better benefits /yield. All the pits will be filled, labelled and compacted by contractor during and after construction.

5.1.4 Impact due to quarrying site

Issues/ impacts and site: For the construction of proposed structures huge volume of sand and gravel will be needed. The quarrying of these materials will cause long term adverse environmental impacts around site if not accessed properly. The site for the construction materials collection is Satti Ghat of Karnali River and Sankatti Ghats in Karnali river.

Mitigation: The site will be legally permissible (allowed by Local Government) to quarry. Legality of quarry site will be checked/monitored during construction.

5.1.6 Siltation & Sedimentation

Issues/ impacts and site: After modernization of canal the water inflow is expected to be higher with increased velocity. The water in canals will carry certain amount of sediments with it, the accumulated amount of silt will reduce agriculture production in long term if not treated properly.

Mitigation: Water regulation mechanism will be set after installation of these structures. Farmers will be trained for proper water use, operation and maintenance of new structures and silt control. Silt settlement ponds will be constructed as far possible.

5.1.7 Spoil Disposal

Issues/ impacts and site: In the proposed structures the amount of spoil will be little. The volume of spoil generated during construction only needed management and mitigation. Removed vegetations, worn out vehicle parts, oil and grease, waste from camp site will need to be manage properly.

Mitigation: The removed vegetation cover needs to be managed during construction. Spoils generated from excavation will be used for back filling on same structure. Management approach of filling, compaction and labeling will be applied far from the canal. The vehicle parts, oil and grease, food and non-food wastes should be managed by contractors. These wastes are restricted to release in water canal, burn or spread around construction/camp site.

5.2 Biological Impacts and mitigations

5.2.1 Disturbance in natural habitat

Issues/ impacts and site: The construction proposed structures have minimum impacts on biological environment. The vegetation cover along the proposed sites in not environmentally significant. Not any protected species (animal/plant) affected by project activities but use of forest products for cooking, hunting animals and migratory birds in nearby community forests by the workers will impact biological environment. These impacts are temporary up to duration of construction.

Mitigation: All the workers will be oriented before construction on the environmental issues working areas. Hunting of wild birds and animals is restricted, contractor should manage LPG for cooking at camp sites. Greenery will be maintained around site for the beautification, ecosystem management and to control soil erosion.

5.2.2 Spoilage of toxic materials, oil and lubricants

Issues/ impacts and site: Spillage of toxins, oils and lubricants into land and water bodies, burning such things will spread toxicity in environment. It adds pollutant in air, water and soil.

Mitigation: Spoilage of toxins and other lubricants will be strictly controlled and prohibited. Plastic waste, oil, grease and lubricants will be managed by contractors separately. Emission of such things in local environment is prohibited.

5.2.2 Risk of accidents

Issues/ impacts and site: Structures proposed in Sub-Secondary Rani canal are along the community. The structures like elongated syphon at Sitapur on Satgaunwa Canal and elongated lining at Urdipur, Bagmara, Laxmipur, Junga will increases the chances of accidents at community mostly for children and domestic animals. The problem will raise during operation phase if mitigation not applied.

Mitigation: Protective measure will be applied at such structures, awareness to community for such accident will be required after completion. Capacity development for safety measure should be oriented by RJKIP. Protective wires will be installed on both side of syphon.

5.3 Socio-Cultural Impact and mitigations

5.3.1 Labor Camp Management

Issues/ impacts and site: Safety of camp site is prime issue for personal safety and security of labor and security for vehicles, instruments and materials. There will be chances of accidents due to hazards like fire, flood, animal attack etc. The socio-cultural issues between community and migrated labour will hamper the work so proper identification of camp site is important issue for project.

Mitigation: Proper area will be identified for the labor camp in consultation with RJKIP and local publics. Appropriate water supply and separate sanitary toilets for male and female workers, adequate lighting, waste disposal, fire extinguisher, first aid box and other necessary materials will be managed by contractor. Use of LPG for cooking, proper disposal of waste

Contractor should follow the Labor Camp Guidelines, contractors' clause mentioned in bid document and EMP prepared before construction in line with these guidelines, and World Bank standard of PPE materials and precaution should be followed by contractor.

5.3.2 Occupational safety and health (OSH)

Issues/ impacts and site: The worker will be exposed to various risks and hazards during the work. Potential impacts to health are respiratory and eye diseases due to dust, infection of communicable disease etc. Higher chances of accidents during work and due to construction equipment will impacts workers and their family.

Mitigation: Workers will be oriented before starting the work on health and safety, all types of construction related injuries and first-aids. Labor camp management guidelines will be followed by workers and representatives of contractors for effective implementation. Awareness about Sexually Transmitted Disease (STD) to workers and orientation on occupational health and safety will be made mandatory to the Contractor. Proper use of Personal Protective Equipment (PPE) such as Helmets, Gumboots, Masks, and Goggles etc will be oriented. Contractor should follow the Occupational Health and Safety Guidelines,

contractors' clause mentioned in bid document and EMP prepared before construction in line with these guidelines.

5.3.3 Obstruction of Access

Issues/ impacts and site: During construction of proposed structure water flow in the canal will be checked, community will not get access for certain period of time. So construction during peak season (during paddy nursery bed preparation, paddy cultivation) will impact the socio-economic status of farmers throughout the year.

The Road Crossing Box Culverts (45 number), Hum pipe (66 number), Bridge (1 number), Service Road (11km) during construction will cause obstruction of access and increases chances of accidents.

Mitigation: Water flow will be continued in peak seasons based on crop calendar, mostly on season of paddy nursery bed preparation and paddy cultivation. Signs for causation with alternative will be installed in both sides during construction in roads.

5.3.4 Intrusion in local culture, discrimination and abuse

Issues/ impacts and site: During construction contractor will mobilize the work force, that will cause intrusion in local culture and traditions if the worker were migrated from different cultural society. There will be chances of female discrimination and child labour.

Mitigation: Culture, traditions and beliefs of local community will be respected by worker force and contractor. Contractor will be made convince to use local workforce as far possible. Workers will be made aware before starting the work if they are migrated from external community with different culture. Male and females will be paid equally for same level of effort. Child labor will not be accepted for any types of work.

6 Environment Management Plan

6.1 Salient feature of EMP

Table 2: Salient feature of EMP

Total EMP Cost	3825000.00
EMP cost with respect to project cost	
Turfing (m2)	NA
Labor camp management cost	150000
Relocation of private structures	NA
Relocation of public structures (if any)	NA
Number of trees in project site	NA
Awareness and Orientation programs cost	30000
Compensation for loss of standing crops	600000 projected
Plantation cost (Rs)	40000
Major Environmental concern	General environmental (Dust and noise), cultural

6.2 Site Specific Environment Management Plan

Table 3: Site Specific Environment Management Plan of Rani Kulo

Canal location	Physical Activity	Significant Environmental Issue	Suggested Mitigation Measures	Time of Action	Responsibility	Remarks
All Canals	Surface stripping, removal of vegetation and sediments	Soil erosion and impact aesthetic beauty	Precaution should be taken for Minimum disturbance to farm land, Awareness to workers on protection.	During construction	Contractor	
			Plantation on open spaces of canal areas for erosion control & beautification	After Construction	RJKIP /Contractor	
Basanta Tol, Laxinapur Sukumbasi Tol, Simrani Magar Tol, Kalika Tol, Naya Bast of Balewa, Dibyapur, Partipur, Baidi Khakraula, Sunahaphata areas.	Transportation of materials	Heavy road traffic, Dust pollution, sound pollution and accidents	Water sprinkling to control dust mainly in sensitive areas of village on dry days. (9AM and 2PM) Transport materials with covering hoods of truck Restriction in night time work, avoid pressure horns.	During Construction	Contractor	National standards for Air Quality, Vehicular emission, Sound Quality need to be complied with and made mandatory to the Contractor.

Canal location	Physical Activity	Significant Environmental Issue	Suggested Mitigation Measures	Time of Action	Responsibility	Remarks
			Excavation and carriage limit during day hours only, Avoid pressure horns.			
			Limit speed up to 10 km/hour in earthen & 20 km/hour on graveled routes	During Construction	Contractor	
		Burrow pits management	Burrow pits should be far from settlement and filled-up and compacted after work	During and after construction	contractor	
	Construction materials and temporary routes	Loss of standing crops impacts agriculture production	Set a mechanism to compensate loss and damage due to proposed structure (Coordination between WUA, agriculture unit and RJKIP)	During construction	RJKIP	Ref: ACIU-RJKIP Productivity per hector Rice-6MT/Ha. Wheat- 5MT/Ha etc
All Canals	Erosion due to Water flow in canals	Sedimentation, siltation, Issues of Operation and maintenance	Train WUA members in operation and maintenance of new structures Orient for Sediment control and flush out system	After construction	RJKIP	

Canal location	Physical Activity	Significant Environmental Issue	Suggested Mitigation Measures	Time of Action	Responsibility	Remarks
			Plant Long rooted vegetation along canal with erosion Construct silt settlement pond if possible	After construction	RJKIP/WUA	
Indrewa, Nuklipur, Beluwa and Batanpur canal		Reduce Flow of accumulated water during monsoon cause denudation	Cross drainage and outlet management required for smooth flow.	After construction	RJKIP /contractor	
All Canals	Construction of structures in canal	Disturb crop calendar, chances of accident	Regulate water in Peak seasons for agriculture Install information board of work on progress and giver alternative routes as possible	During construction	contractor	
Camp Site and Work sites	Deposition and disposal of materials	Loss Agricultural production, pollution	Temporary storage of construction materials and waste on fallow lands only Land should be cleared as initial form if incase used for storage	Before and during construction	contractor	Farmer will be Agreed if private land is used for it.

Canal location	Physical Activity	Significant Environmental Issue	Suggested Mitigation Measures	Time of Action	Responsibility	Remarks
		Disposal of remnants	Disposal not allowed on agricultural land, canal banks	During and After construction	contractor	
			Site should be labeled and compacted after disposal	During and After construction	contractor	
Camp Site	Labor Camp	Occupational Safety and Health	Good quality PPEs should be applied First-aid box and fire extinguishers available at labor camp Contact information for emergency services (ambulance, fire, police) posted at work site/camp	Before and During construction	Contractor	PPEs: - Hardhats, Masks, Safety Glasses, Gloves, Harnesses and Safety Boots, etc.
		Sanitation and disease control	Awareness to carry out work in a safe and disciplined manner designed to minimize impacts on neighboring residents and environment.	Before and During construction	Contractor	

Canal location	Physical Activity	Significant Environmental Issue	Suggested Mitigation Measures	Time of Action	Responsibility	Remarks
			Proper toilet, water supply and waste management at labor camp Awareness on Health and Sanitation on camp			

6.3 Cost estimate of SSEMP

Table 4: Cost estimate for the proposed work

SN	Proposed Activities	Unit	Unit Cost	Numbers	Total Cost	Remarks
1	Drain outlet structure (Scape management)	no	150000	4	600000	
2	Tree plantation for erosion control	no	10	1500	15000	
3	Tree Plantation for beautification	no	50	500	25000	
4	PPEs, Fire extinguisher and First-aid materials	-	-	-	100000	
5	Labor Camp water supply, sanitation and Management	-	-	-	150000	
6	Water sprinkling in Road to control dust	-	-	-	500000	Major Settlements, sensitive sites
7	Strengthening Capacity of WUA on regulation, Operation & Maintenance of new structures	No of Participants	206	2500	515000	1-day trainings to WUA of all Branch canals
8	Training to farmers - On farm water management	No of Participants	400	3000	120000	2-day training (lead farmers /farmers)
9	Compensate farmers for lost standing crops	Ha	150000	4	600000	Assumed Crop- Rice Price- 25/kg)
10	Information board installation	no	10	1000	10000	
11	Monitoring of Air and Noise quality	no	1	30000	30000	During construction
12	Awareness	-	15000	2	30000	
	Total Cost of EMP				**3825000**	

Annex 1: Environment Screening Checklist

Rani Jamara Kulariya Irrigation Project, Tikapur, Kailali

Field Monitoring Checklist

General Information	
Name of Sub Project: River Training Work	Name of Contractor: …….
Location/Chainage: Mohana Pathraiya (Along Dolphin Area)	Date of Monitoring: ……..

S.N.	**Parameter**	**Availability number**	**Use in Number**
1	**Safety Gears**		
1.1	Boot/Closed Shoes		
1.2	Hard Hat		
1.3	Mask/ Gloves/ Safety Glasses as required		
1.4	Other …		
2.	**First Aid Kit**		
3	**Labor Camp**		
3.1	Closed shed/house/tent with enough ventilation, light and space as per spec		
3.2	Elevated Bed, with provision for protection against harsh weather conditions (heat, cold, rain, etc.), snakes, Mosquitoes and/or other insects, etc.		
3.3	Toilet (s) for male and female workers with water and waste pit		
3.4	Kitchen and drinking water		

1. OSH and labor camp compliance monitoring

2. Status of Environmental Safeguard

S.N.	Major issues mentioned in EMP relevant to the visited site(s) (Construction period)	Mitigation measure	Percentage progress
1			
2			
3			

3. Implementation of Site-specific Environmental Mitigation Measures

Location/Chainage	Identified Issue/Significance	Recommended Mitigation and Enhancement Measures	Implemented Measure	Remarks

4. Were there any special unforeseen issues that have been encountered during construction? Please mention how were those solved?

What Issue?	Where?	How solved?	Remarks

5. Any impressive or good practices?

6. Any comments on works done/not done and performance

7. Conclusion

8. Recommendation

Annex 2: List of Community Consultation Meetings on Safeguard issues.

Social and Environmental Safeguard community consultation meeting at Secondary Canal of Rani Kulo

S. N.	Rani Secondary Canal Name	Address	Date	Total participants		Ethnicity					Total
				Male	Female	Dalit	Janajati	Brahmin	Chhetri	other	
1	Rajipur	Tkp -02 Bijaynagar	2076.08.11	14	19	0	33	0	0	0	33
2	Fireline	Tkp -02 Bijaynagar	2076.08.11	25	24	46	2	0	1	0	49
3	Bista Tole	Tkp -02 Rajipur	2076.08.11	22	3	12			12	1	25
4	Mahuraniya	TKP -04 Mauraniya	2076.08.19	63	7	0	66		4		70
5	Satgaunwa Bagmara	TKP-04	2076.08.19	7	8		10	5			15
6	Basanta Kulo	TKP -05	2076.08.19	7	30		36		1		37
7	Sahipur Kulo	TKP-05	2076.08.20	15	11		18		8		26
8	Nuklipur Kulo	TKP-05	2076.08.20	13	4		16		1		17
9	Simreni 1	TKP- 05	2076.08.22	12	8	15	5				20
10	Simreni 2	TKP- 05	2076.08.22	16	8	7	12	4	1		24
11	Laxinapur Kulo	TKP-06	2076.08.23	27	12	1	38				39
12	Indrayani Kulo	TKP -04	2076.08.23	56	13		66		3		69
13	Padampur Kulo	TKP-06	2076.08.24	22	9		28	1	2		31
14	Narayanpur Kulo	TKP-06	2076.08.24	20	13	3	27			3	33

15	Beluwha Kulo	TKP-07	2076.08.25	25	8		32		1		33
16	JhungaKulo										0
17	payalgaon Bauniya	TKp-09	2076.08.29	42	25		64	1	2		67
18	Batanpur Kulo	TKP-08	2076.08.29	46	21	22	31	8	6		67
19	Suryapur Kulo	TKP -08	2076.08.30	25	5		24	2	4		30
Total				**457**	**228**	**106**	**508**	**21**	**46**	**4**	**685**

Annex 4: Summary of Field Assessments

1. Name of Sub-Project: Kuntipathabhar Kulo Modernization,

Janaki-9 Kntipathabhar

Name of Work: HR/CR, Lining, Hume Pipe, LCW, Canal Cover; Total 23 structures

Neighboring HHs: 47,

Environmental Status-

Environmental Impacts/Issues on	**Status**	**Remarks**
Protected Area	NA	
Forest Area	NA	
Protected Species	NA	
Erosion Prone Area	NA	
Flood Prole/river cutting/low lying	NA	
Water bodies	NA	
Public Places/ main settlements	NA	
Area of significance tourism/aesthetic/cultural value	NA	
Add pollution on air, water, soil, sound	Less Significant	
Any other..	Standing Crops	

Major issues/negative impacts as of date – Not any significant environmental issues identified.

Major positive Impacts after completion of sub-project: Regular supply of water for irrigation, increase on agricultural productivity

2. Name of Sub-Project: Layakpur Kulo Modernization,

Janaki-9 Layakpur

Name of Work: Protection Wall, Box culvert, Hume Pipe, LCW;

Neighboring HHs: 36,

Environmental Status-

Environmental Impacts/Issues on	**Status**	**Remarks**
Protected Area	NA	
Forest Area	NA	
Protected Species	NA	
Erosion Prone Area	NA	
Flood Prole/river cutting/low lying	Drainage problem	Accumulated water from agriculture and disturb canal (Outlet needed) GPS-176
Water bodies	NA	
Public Places/ main settlements	NA	
Area of significance tourism/aesthetic/cultural value	NA	
Add pollution on air, water, soil, sound	Less Significant	
Any other..	Standing Crops	

Major issues/negative impacts as of date - Flooding during the rainy season, conflict for water during the winter

Major positive Impacts after completion of sub-project: Regular supply of water for irrigation, increase on agricultural productivity

3. Name of Sub-Project: Jagatpur Kulo Modernization

Janaki-6 & 9 Jagatpur

Name of Work: HR/CR, Lining, LCW, Culvert, Bridge;

Neighboring HHs: 62

Environmental Status-

Environmental Impacts/Issues on	**Status**	**Remarks**
Protected Area	NA	
Forest Area	NA	
Protected Species	NA	
Erosion Prone Area	NA	
Flood Prole/river cutting/low lying	NA	
Water bodies	NA	
Public Places/ main settlements	NA	
Area of significance tourism/aesthetic/cultural value	NA	
Add pollution on air, water, soil, sound	Less Significant	
Any other..	Standing Crops	

Higher erosion due to Jamara Canal, protection reiquired

Major issues/negative impacts as of date - Flooding during the rainy season, conflict for water during the winter

Major positive Impacts after completion of sub-project: Regular supply of water for irrigation, No flooding, conflict mitigation, increase on agricultural productivity

4. Name of Sub-Project: Dharmapur Kulo Modernization

Janaki- 6,1

Name of Work: HR/CR, Hume Pipe, LCW, box culvert, Gate etc;

Neighboring HHs: 31,

Environmental Status-

Environmental Impacts/Issues on	**Status**	**Remarks**
Protected Area	NA	
Forest Area	NA	
Protected Species	NA	
Erosion Prone Area	NA	
Flood Prole/river cutting/low lying	Low lying area 157-158 GPS	
Water bodies	NA	
Public Places/ main settlements	NA	
Area of significance tourism/aesthetic/cultural value	NA	
Add pollution on air, water, soil, sound	Less Significant	
Any other..	Escape problem	

Major issues/negative impacts as of date - Flooding during the rainy season, conflict for water during the winter

Major positive Impacts after completion of sub-project: Regular supply of water for irrigation, No flooding, conflict mitigation, increase on agricultural productivity

5. Name of Sub-Project: Suwarnapur Kulo Modernization

Janaki 3 & 6

Name of Work: HR/CR, Lining, Hume Pipe, LCW, Bridge, escape, etc;

Neighboring HHs: 35,

Environmental Status-

Environmental Impacts/Issues on	**Status**	**Remarks**
Protected Area	NA	
Forest Area	NA	
Protected Species	NA	
Erosion Prone Area	NA	
Flood Prole/river cutting/low lying	Water collects in ag land	GPS point 107
Water bodies	NA	
Public Places/ main settlements	NA	
Area of significance tourism/aesthetic/cultural value	NA	
Add pollution on air, water, soil, sound	Less Significant	
Any other..	Standing Crops	

Higher erosion due to Bjualiya and Latkaniya! Embankment Recommended

Major issues/negative impacts as of date -

Major positive Impacts after completion of sub-project: Regular supply of water for irrigation, No flooding, conflict mitigation, increase on agricultural productivity

6. Name of Sub-Project: Bhagatpur Kulo Modernization

Janaki-3

Name of Work: HR/CR, Lining, Hume Pipe, LCW, escape;

Neighboring HHs: 67,

Environmental Status-

Environmental Impacts/Issues on	**Status**	**Remarks**
Protected Area	NA	
Forest Area	NA	
Protected Species	NA	
Erosion Prone Area	NA	
Flood Prole/river cutting/low lying	NA	
Water bodies	NA	
Public Places/ main settlements	NA	
Area of significance tourism/aesthetic/cultural value	NA	
Add pollution on air, water, soil, sound	Less Significant	
Any other..	Escape problem	Near Hursa irrigation dam Janaki and Tikapur Boundary

Major issues/negative impacts as of date - Flooding during the rainy season, conflict for water during the winter

Major positive Impacts after completion of sub-project: Regular supply of water for irrigation, No flooding, conflict mitigation, increase on agricultural productivity

7. Name of Sub-Project: Bijuliya Kulo Modernization

Janaki-7 Bijuliya

Name of Work: Lining, Hume Pipe, LCW, Box culvert, Escape;

Neighboring HHs: 53,

Environmental Status-

Environmental Impacts/Issues on	**Status**	**Remarks**
Protected Area	NA	
Forest Area	NA	
Protected Species	NA	
Erosion Prone Area	NA	
Flood Prole/river cutting/low lying	Yes	Drainage collection, chances of flood, soil erosion
Water bodies	NA	
Public Places/ main settlements	NA	
Area of significance tourism/aesthetic/cultural value	NA	
Add pollution on air, water, soil, sound	Less Significant	
Any other..	Standing Crops	

Embankment near Rural electricity office

Near GPS 225- Embankment 200 m

Downstream of Durgauli Bridge- River cutting

Laghuran Kulo near HRCT- 200 M embankment

embankment - Dasgajuwa near HRCR 1000 m

- Bhul tol 300 m

Major issues/negative impacts as of date - Flooding during the rainy season, conflict for water during the winter

Major positive Impacts after completion of sub-project: Regular supply of water for irrigation, No flooding, conflict mitigation, increase on agricultural productivity

8. Name of Sub-Project: Birendra Kulo Modernization,

Tikapur-1

Name of Work: HR/CR, Aqueduct, Hume Pipe, Box Culvert, LCW

Neighboring HHs: 19,

Environmental Status-

Environmental Impacts/Issues on	**Status**	**Remarks**
Protected Area	NA	
Forest Area	NA	
Protected Species	NA	
Erosion Prone Area	NA	
Flood Prole/river cutting/low lying	NA	
Water bodies	NA	
Public Places/ main settlements	NA	
Area of significance tourism/aesthetic/cultural value	NA	
Add pollution on air, water, soil, sound	Less Significant	
Any other..	Standing Crops	

Culvert 2

Major issues/negative impacts as of date - Flooding during the rainy season, conflict for water during the winter

Major positive Impacts after completion of sub-project: Regular supply of water for irrigation, No flooding, conflict mitigation, increase on agricultural productivity

9. Name of Sub-Project: Makari Kulo Modernization

Janaki-7

Name of Work: Lining, Box, Culvert, Hume Pipe, LCW, Bridge

Neighboring HHs: 47,

Environmental Status-

Environmental Impacts/Issues on	**Status**	**Remarks**
Protected Area	NA	
Forest Area	NA	
Protected Species	NA	
Erosion Prone Area	Available	Protection proposed
Flood Prole/river cutting/low lying	NA	
Water bodies	NA	
Public Places/ main settlements	NA	
Area of significance tourism/aesthetic/cultural value	NA	
Add pollution on air, water, soil, sound	Less Significant	
Any other..	Standing Crops	

Major issues/negative impacts as of date - Flooding during the rainy season, conflict for water during the winter

Major positive Impacts after completion of sub-project: Regular supply of water for irrigation, No flooding, conflict mitigation, increase on agricultural productivity

10. Name of Sub-Project: Rampur Katanpur Kulo Modernization

Tikapur-3

Name of Work: Lining, Box Culvert, LCW, Canal Cover;

Neighboring HHs: 32,

Environmental Status-

Environmental Impacts/Issues on	**Status**	**Remarks**
Protected Area	NA	
Forest Area	NA	
Protected Species	NA	
Erosion Prone Area	NA	
Flood Prole/river cutting/low lying	NA	
Water bodies	NA	
Public Places/ main settlements	NA	
Area of significance tourism/aesthetic/cultural value	NA	
Add pollution on air, water, soil, sound	Less Significant	
Any other..	Escape problem	Front of Bikuram Ghar

Embankment- Ghiya & Puchhari Connecting Jamara canal

- Jamarpur Tol, Jamara Canal
- Near Ghiya School- in Canal

Major issues/negative impacts as of date - Flooding during the rainy season, conflict for water during the winter

Major positive Impacts after completion of sub-project: Regular supply of water for irrigation, No flooding, conflict mitigation, increase on agricultural productivity

11. Name of Sub-Project: Gyani Kulo Modernization

Janaki-3 Manikapur

Name of Work: HR/CR, Lining, Box Culvert, LCW, etc;

Neighboring HHs: 87,

Environmental Status-

Environmental Impacts/Issues on	**Status**	**Remarks**
Protected Area	NA	
Forest Area	NA	
Protected Species	NA	
Erosion Prone Area	NA	
Flood Prole/river cutting/low lying	NA	
Water bodies	NA	
Public Places/ main settlements	NA	
Area of significance tourism/aesthetic/cultural value	NA	
Add pollution on air, water, soil, sound	Less Significant	
Any other..	Standing Crops	

New canal construction: Need to remove trees and plants (Vegetation assessment needed)

Major issues/negative impacts as of date - Flooding during the rainy season, conflict for water during the winter

Major positive Impacts after completion of sub-project: Regular supply of water for irrigation, No flooding, conflict mitigation, increase on agricultural productivity

12. Name of Sub-Project: Ambasa Beluwabojhi Bhagawanpur Kulo

Modernization,

Tikapur-3,4,6 Tikapur

Name of Work: Box Culvert, Lining, Aqueduct, Syphon LCW, Protection work

Neighboring HHs: 14,

Environmental Status-

Environmental Impacts/Issues on	**Status**	**Remarks**
Protected Area	NA	
Forest Area	NA	
Protected Species	NA	
Erosion Prone Area	NA	
Flood Prole/river cutting/low lying	NA	
Water bodies	NA	
Public Places/ main settlements	NA	
Area of significance tourism/aesthetic/cultural value	NA	
Add pollution on air, water, soil, sound	Less Significant	
Any other..	Standing Crops	

New Canal need to be construct, Nearby community forest

Major issues/negative impacts as of date - Flooding during the rainy season, conflict for water during the winter

Major positive Impacts after completion of sub-project: Regular supply of water for irrigation, No flooding, conflict mitigation, increase on agricultural productivity

13. Name of Sub-Project: Giya Bhartapur Kulo Modernization

Tikapur-3

Name of Work: HR/CR, Lining, Protection work, LCW, Box Culvert, Escape, Aqueduct;

Neighboring HHs: 50

Environmental Status-

Environmental Impacts/Issues on	**Status**	**Remarks**
Protected Area	NA	
Forest Area	NA	
Protected Species	NA	
Erosion Prone Area	NA	
Flood Prole/river cutting/low lying	NA	
Water bodies	NA	
Public Places/ main settlements	NA	
Area of significance tourism/aesthetic/cultural value	NA	
Add pollution on air, water, soil, sound	Less Significant	
Any other..	Standing Crops	

Embankment – Downstream of Puchrighat- 1.5 km demanded in Jamara Canal

Major issues/negative impacts as of date - Flooding during the rainy season, conflict for water during the winter

Major positive Impacts after completion of sub-project: Regular supply of water for irrigation, No flooding, conflict mitigation, increase on agricultural productivity

14. Name of Sub-Project: Motinagar Kulo Modernization

Janaki-7

Name of Work: Lining, Protection work, LCW, Box Culvert;

Neighboring HHs: 47

Environmental Status-

Environmental Impacts/Issues on	**Status**	**Remarks**
Protected Area	NA	
Forest Area	NA	
Protected Species	NA	
Erosion Prone Area	NA	
Flood Prole/river cutting/low lying	Low land	Height raising of lining
Water bodies	NA	
Public Places/ main settlements	NA	
Area of significance tourism/aesthetic/cultural value	NA	
Add pollution on air, water, soil, sound	Less Significant	
Any other..	Standing Crops	

Major issues/negative impacts as of date - Flooding during the rainy season, conflict for water during the winter

Major positive Impacts after completion of sub-project: Regular supply of water for irrigation, No flooding, conflict mitigation, increase on agricultural productivity