

Bhutan For Life

**Environmental and Social
Management Plan for National
Plant Protection Centre**

January 2023 - June 2024

National Plant Protection Centre / Semtokha

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Bhutan for Life
Environmental and Social Management Plan for National Plant Protection Centre
(NPPC) for January 2023 - June 2024

1. Introduction

1.1 Project Background

The Bhutan for Life (BFL) project aims to ensure a robust network of Protected Areas (PAs) and Biological Corridors (BCs) that secure human well-being, biodiversity conservation and increase climate resilience in Bhutan. The project shall sustain for 14-years, in this duration an immediate improvement to the management of Bhutan's protected areas for climate resilience and biodiversity gains are sought. Meanwhile the country would gradually ratchet up its own financing resources.

BFL seeks to achieve the following objectives:

- Help Bhutan remain carbon neutral by increasing forest and vegetative cover within the Protected Area System;
- Enhance the socio-economic wellbeing of communities in the vicinity of the PAS through climate-informed natural resources management;
- Maintain stable, thriving, and diverse populations of key species contributing toward national and global biodiversity goals; and
- Strengthen organizational, institutional, and financial capacity for effective management of PAS. BFL includes five components that reflect these goals, divided into 16 milestones (or outputs) and over 80 detailed activities.

1.2 Scope of ESMP

The preparation of this Environmental and Social Management Plan (ESMP) was deemed necessary in order to manage the environmental and social impacts. The mitigation actions required to implement the project was in accordance with the requirements of WWF's Social Safeguards Integrated Policies and Procedures (SIPP), the project's Environmental and Social Management Framework (ESMF), and the applicable national legislation and regulations.

The ESMP provides an overview of the environmental and social baseline conditions on the routes of the proposed second segment of the project, summarizes the potential impacts associated with the proposed activities and sets out the management measures required to mitigate any potential negative impacts.

This ESMP will be implemented by BFL focal person in each park authority (PA) and biological corridor (BC), and by the contractor to be commissioned by each PA/BC for the project.

1.3 Purpose of ESMP

This site-specific ESMP is a project-specific source document detailing the environmental and social protection requirements to mitigate and minimize the adverse impacts. The ESMP's primary purpose is to ensure that the environmental requirements and social commitments associated with the project are carried forward into implementation and operational phases of the project and are effectively managed. The specific objectives of this ESMP are as hereunder:

- Minimizing any adverse environmental, social and health impacts resulting from the project activities;
- Conducting all project activities in accordance with the relevant RGoB Laws and WWF's safeguard operational policies and guidelines;
- Preventing environmental degradation as a result of either individual subprojects or their cumulative effects;
- Enhancing the positive environmental and social outcomes of project activities;
- Ensuring that the proposed mitigation measures are feasible and cost-efficient;
- Providing an Action Plan to ensure that the project impact mitigation measures are properly implemented and monitored; and
- Ensuring that all stakeholders are engaged in the project activities' preparation and implementation, and their concerns are fully addressed.

1.4 Applicable law, policies, and regulation

This ESMP is developed in strict adherence and compliance to the guidelines set forth in BFL's ESMF.

Applicable RGoB laws and policies include the Constitution of the Kingdom of Bhutan, 2008; legislation on land and moveable property (Land Act of Bhutan 2007; Land Rules, 2007; The Moveable Cultural Property act of Bhutan, 2005); legislation and regulations on forests and protected areas (National Environment Protection Act, 2007; Forest and Nature Conservation Act of Bhutan, 1995; Forest and Nature Conservation Rules and Regulations of Bhutan, 2017; National Forest Policy, 2011); legislation on water and waste prevention (Water Act of Bhutan, 2011; Waste Prevention and Management Act, 2009); legislative requirements on environmental assessment (Environmental Assessment Act, 2000 and Regulations on the Environmental Clearance of Projects, 2001); and other relevant laws (The Local Government Act of Bhutan, 2009; Livestock Act of Bhutan, 2001; The Biodiversity Act of Bhutan, 2003; The Pesticides Act of Bhutan, 2000; The Penal Code of Bhutan, 2004; National Access and Benefit Sharing (ABS) Policy (Draft), 2014), and Local Government Act of Bhutan, 2009.

WWF's safeguards policies that are relevant to this project are as follows:

- Policy on Environment and Social Risk Management;
- Policy on Protection of Natural Habitats;
- Policy on Involuntary Resettlement; Policy on Indigenous Peoples;
- Standard on Pest Management;
- Policy on Accountability and Grievance System;
- Standard on Physical Cultural Resources;
- General standards on both occupational and community health and safety and energy efficiency.

In general, RGoB's laws, policies, and guidelines are in line with the WWF's environmental and social safeguards requirements. However, there are a few differences between the two systems. Regarding environmental impacts, there are no direct contradictions between the RGoB laws and regulations and the WWF's SIPP, but the requirement of the latter is more extensive. All project activities should fully comply both with the RGoBs Regulations on the Environmental Clearance of Projects, and with the procedures and mitigation measures prescribed in this ESMF. In case the

WWF's SIPP requirements turn out to be extensive, strict, or detailed compared to RGoB legislation and policies, the former will apply to all project activities.

Regarding social impacts, the status of non-title holders and informal land use, and the commitment to participatory decision-making processes conclude the primary discrepancies between the RGoB laws and regulations and the WWF's SIPP. First, according to the WWF's SIPP, all users of land and natural resources (including people that lack any formal legal ownership title or usage rights) are eligible to some form of assistance or compensation if the project adversely affects their livelihoods. The RGoB laws only recognize the eligibility of land owners or formal users to receive compensation in such cases. Second, the WWF's SIPP require extensive community consultations during the project in order to develop various safeguards documents. RGoB legislation does not include three requirements reflected in SIPP. For the purpose of the BFL project, the provisions of the WWF's SIPP shall prevail over the RGoB legislation in all cases of discrepancy.

2. Environmental and Socio-Economic Conditions

The National Plant Protection Centre as the Apex institution in National PP Program oversees the PP program in the country thus providing direction and guidance to the PP Program in the country, function as a national referral & coordinating agency for all PP activities, be the repository centre of pest and plant protection products information and be the authority to review, update and recommend appropriate plant protection products and technologies. The core vision of National Plant Protection Centre is to be a premier National Institution for Excellence in Integrated Pest Management and the mission to generate pest management technologies that are safe for human health and the environment, to disseminate pest management technologies for effective adoption by farmers and to reduce or maintain crop losses to pest organisms at an economically acceptable level.

Maize and paddy losses by farmers due to wildlife are in the order of USD 4-5 million per year (The Agriculture Sector in Bhutan: Issues, Institutions and Policies). In addition to crop losses, wildlife damage to crops also encourage farmers to leave land fallow and migrate to urban areas for jobs. It has been estimated that fallowing of land has resulted in the loss of USD 13 million paddy equivalent for wetland and USD 44 million maize equivalent for dryland. So, to boost the crop production and prevent the crop loss to wildlife, interventions against wildlife such as electric fencing and bioacoustics technology has become a desperate need for farmers. Moreover, such technologies become an integral part of IPM technology of crop protection.



Figure 1 (L & R): Picture of portable e-fencing at Gasa, Damji

Samdrup Jongkhar (Orong, Lauri)

Samdrup Jongkhar Dzongkhag is situated in the southeastern corner of the country, sharing its southern and northern borders with the Indian states of Assam and Arunachal Pradesh respectively. To its west lies Pemagatshel Dzongkhag and to its north Trashigang Dzongkhag. The Dzongkhag is in the sub-tropical climate zone, with an elevation of 200 meters to 3600 meters with major portion of the land within 600 meters to 1200 meters. Its southern strip consists of fertile plain lands. The temperature ranges from a minimum of 14°C to a maximum of 36°C during the peak summer of the year. The average annual temperature is 23.8°C. About 2749 mm of precipitation falls annually. More than three quarters of its area is under forest cover - higher than the national coverage and of mostly the broad leaved sub-tropical evergreen type.

In addition, being within/near to the protected areas, the farmers frequently encounter different cases with wild animals, especially elephants. The wild animals in search of food encroach the settlements with cultivated farmlands which provides them with easy access to food. At times, they lose their crop yields to wild elephants, monkeys, and wild boars. Other times, confrontation with wild elephants also lead to the properties being damaged and people being injured/displaced for days until they can safely return to their homes. Such incidences demotivate the farmers as farming is labor intensive and there are also concerns from the forestry officials on the retaliation from the farmers.

To support farmers and their livelihoods, e-fencing have been installed in some of the HWC prone areas and these interventions have been found efficient in reducing wildlife encroachment. Therefore, has proposed to install the portable electric fencing in the Orong and Lauri gewog of the Dzongkhag.

Tashi Yangtse (Yangtse and Boomdeling)

Trashi Yangtse covers an area of 1,437.9 square kilometers (555.2 sq mi). At an elevation of 1750–1880 m. The Dzongkhag receives approximately annual average rainfall of 90 mm with annual temperature of 15 °C.

Farming is the dominant livelihood of the people in the Dzongkhag where people grow the major field crops such as Maize, Paddy, wheat, and vegetables. The agriculture production is hugely challenged by the HWC since, Boomdeling Wildlife Sanctuary covers the major portion of the Dzongkhag. So, HWC management technological interventions such as Electric Fencing and Bioacoustics technology is critically required for the farmers of the Dzongkhag.

Lhuentse (Kurtoed and Khoma)

Lhuentse Dzongkhag is bordered by Bumthang in the West, Tashi Yangtse in the East, Mongar in the South and China in the North. The Dzongkhag covers an area of approximately 2853.55 sq. km with altitudes ranging from 600 to 5800 meters above sea level. It has warm summer and cold winter. The annual average temperature rises to 24 °C in summer and falls to 15 °C in winter. Annual rainfall ranges from 1000 to 1500 mm.

The Dzongkhag being near or within the protected areas the farmers encounter major HWC. To support farmers and their livelihoods, e-fencing have been installed in some of the HWC prone areas and these interventions have been found efficient in reducing wildlife encroachment. Therefore, has proposed to install the portable electric fencing in the Kurtoe and Khoma gewogs of the Dzongkhag.

Sarpang (Senggye and Chuzanggang)

With an area of 1655 sq.km, Sarpang Dzongkhag is located in the central part of southern Bhutan with an elevation ranging from 200 meters to 3600 meters above the sea level. It shares a border with Assam state of India with direct contact with Kokrajhar and Chirang districts. Internally, Sarpang shares a border with Zhemgang in the east, Tsirang in the west and Trongsa to the north. The Dzongkhag's population of 49,439 (of which 49.54% are female) people from 10,388 households are spread across 12 gewogs, 61 chiwogs and a Thromde A with more concentration in Gelephu Thromde followed by Gelephu and Dekililng Gewogs. The least populated is the Tareything Gewog with only 491 people.

Sarpang takes pride in being very rich in biodiversity. With 88% of its land under forest cover, Sarpang is host to Royal Manas Park and Phibsoo Wildlife Sanctuary which provide natural habitat to numerous species of animals, birds, fishes and reptiles – some of which are globally endangered. While elephants, golden langur, gaur, spotted deer, wild buffaloes, hornbill, hare, etc are sighted most frequently – often coming in conflict with - these two protected areas are also homes for Royal Bengal tiger which is one of the globally endangered animal species.

Sarpang is also one of the gateways to Bhutan from India through Gelephu and is one of the developing socio-economic zones in Bhutan. It serves as the commercial center with its catchment from surrounding areas including Trongsa, Zhemgang, Tsirang and Dagana and Bumthang.

Trongsa (Nubi and Tangsibje)

Trongsa Dzongkhag is located in the heart of the country. It covers an area of about 1807 km², with elevation ranging from 800 meters to 4,800 meters above sea level with a total population of 15562 as of July 2012. It shares boundaries with Bumthang Dzongkhag to the northeast, Wangdiphodrang Dzongkhag to the west and Zhemgang Dzongkhag to the south.

Though the East-West and Trongsa-Gelephu highway passes through the Dzongkhag, most settlements are scattered and still remote due to lack of feeder roads. This combined with the rugged terrain makes delivery of services difficult and costly. Still, every Gewog in the Dzongkhag has a BHU, RNR centers and a School each providing basic services.

Trongsa Dzongkhag consists of five gewogs. Agriculture farming is the main source of income for majority of the population. Farmers grow almost all kinds of crops but in some areas, potatoes are the main source of cash income.

Jigme Singye Wangchuck National Park that covers an area of 1723 km² is a home for many globally endangered rare flora and fauna, and it's a habitat for one of the most globally endangered species, Golden Langur. The Park was gazetted in 2000, in order to protect large area of virtually untouched ecosystem, ranging from mixed conifer in the north to chir pine / broadleaf forest in the south. The Monpa the earliest habitants reside on the lower parts of the Jigme Singye Wangchuck National Park.

The Mangduechhu River flows through the heart of the Dzongkhag dividing the Dzongkhag almost into two halves. The Dzongkhag enjoys a mixed climate, that is, warm humid and warm temperate with soil type of sandy loam and clayey loam. The topography is rugged with deep gorges to the north and steep slope in the south.

Wangdue Phodrang (Sephu and Thedtsho)

Wangdue Phodrang Dzongkhag covers an area of approximately 4029 Sq. km with the altitude of 800-5000masl. The Dzongkhag has population of approximately 50000.

Around 70% of the area is covered by forest with protected area covering 9951 acres. The major occupation of the people residing the Dzongkhag is farming. The dzongkhag has dryland area of 7056 acres, wetland of 6739 acres and Orchard of 54 acres.

With major portion of the area covered by forest the farmers residing within the Dzongkhags has reportedly experienced HWC and even requested National Plant Protection Centre to come up with an intervention to protect their farmlands from the Wildlife.

3. Planned activities for January 2023 - June 2024

3.1 Installation of portable electric fencing at Orong and Lauri gewog

- a. Budget: Nu. 1,200,000
- b. Timeline: January - December, 2023
- c. Location: Orong and Lauri Gewog

As a part of HWC management intervention, the portable electric fencing will be installed at Orong and Lauri gewogs to minimize crop loss. It will benefit covered households in the community from wild elephants, boars, monkeys, and other wildlife attacks. As a part of this activity, following activities will be carried out.

- Procurement of portable electric fencing items like metal fencing post, energizer, polywires, insulators, cellotapes,
- Erection fencing post after digging hole and clearing unwanted plants from proposed area.
- Preparation of EF bylaws and payment for technical person

3.2 Installation of portable electric fencing at Yangtse and Boomdeling gewog

- a. Budget: Nu. 1,200,000
- b. Timeline: January - December, 2023
- c. Location: Yangtse and Boomdeling Gewog

As a part of HWC management intervention, the portable electric fencing will be installed at Yangtse and Boomdeling gewogs to minimize crop loss. It will benefit covered households in the community from deer, boars, monkeys, and other wildlife attacks. As a part of this activity, following activities will be carried out.

- Procurement of portable electric fencing items like metal fencing post, energizer, polywires, insulators, cellotapes,
- Erection of the fencing post after digging hole and clearing unwanted plants from proposed area.
- Preparation of EF bylaws and payment for technical person

3.3 Installation of portable electric fencing at Kurtoe and Khoma Gewog

- a. Budget: Nu. 1,200,000
- b. Timeline: January - December, 2023
- c. Location: Kurtoe and Khoma Gewog

As a part of HWC management intervention, the portable electric fencing will be installed at Kurtoe and Khoma gewogs to minimize crop loss. It will benefit covered households in the community from boars, monkeys, and other wildlife attacks. As a part of this activity, following activities will be carried out.

- Procurement of portable electric fencing items like metal fencing post, energizer, polywires, insulators, cellotapes,
- Erection of GI-wire and fencing post after digging hole and clearing unwanted plants from proposed area.
- Preparation of EF bylaws and payment for technical person

3.4 Installation of bioacoustics device at Kurtoe and Khoma under Lhuentse Dzongkhag

a. Budget: Nu. 62,000

b. Timeline: January - December, 2023

c. Location: Kurtoe and Khoma Gewog

As a part of HWC management intervention, the Bioacoustics Animal Repellent Device will be installed at Kurtoe and Khoma gewogs of Lhuentse dzongkhag to minimize crop loss. It will benefit covered households in the community from deer, boars, monkeys, and other wildlife attacks. As a part of this activity, following activities will be carried out:

- Procurement of bioacoustics device.
- Installation post after digging hole and clearing unwanted plants from proposed area.
- Training the farmers on the device operation, maintenance and e-waste management.

3.5 Installation of bioacoustics device at Chuzagang and Senggye Gewogs under Sarpang Dzongkhag

a. Budget: Nu. 62,000

b. Timeline: January - December, 2023

c. Location: Chuzagang and Senggye Gewog

As a part of HWC management intervention, the Bioacoustics Animal Repellent Device will be installed at Chuzanggang and Senggye Gewogs gewogs of Sarpang Dzongkhag to minimize crop loss. It will benefit covered households in the community from deer, boars, monkeys, and other wildlife attacks. As a part of this activity, following activities will be carried out:

- Procurement of bioacoustics device.
- Installation post after digging hole and clearing unwanted plants from proposed area.
- Training the farmers on the device operation, maintenance and e-waste management.

3.6 Installation of bioacoustics device at Sephu and Thedtsho Gewog under Wangdue Phodrang Dzongkhag

a. Budget: Nu. 62,000

b. Timeline: January - December, 2023

c. Location: Sephu and Thedtsho Gewog

As a part of HWC management intervention, the Bioacoustics Animal Repellent Device will be installed at Sephu and Thedtsho gewogs of Wangdue Phodrang dzongkhag to minimize crop loss.

It will benefit covered households in the community from deer, boars, monkeys, and other wildlife attacks. As a part of this activity, following activities will be carried out:

- Procurement of bioacoustics device.
- Installation post after digging hole and clearing unwanted plants from proposed area.
- Training the farmers on the device operation, maintenance and e-waste management.

3.7 Installation of bioacoustics device at Nubi and Tangsibje Gewogs under Trongsa Dzongkhag

a. Budget: Nu. 62,000

b. Timeline: January - December, 2023

c. Location: Nubi and Tangsibje Gewog

As a part of HWC management intervention, the Bioacoustics Animal Repellent Device will be installed at Nubi and Tangsibje gewogs of Trongsa dzongkhag to minimize crop loss. It will benefit covered households in the community from deer, boars, monkeys, and other wildlife attacks. As a part of this activity, following activities will be carried out:

- Procurement of bioacoustics device.
- Installation post after digging hole and clearing unwanted plants from proposed area.
- Training the farmers on the device operation, maintenance and e-waste management.

4. Potential social and environmental impacts

4.1 Installation of portable electric fencing

The main likely environmental impacts for the activities related to construction of electric fencing are generation of waste from the workers and minor disturbance to the soil through the digging of holes to install fencing poles. On the social impact, it will largely be beneficial to the communities directly benefitting from the proposed activity. The electric fencing is likely to help farmers to maintain their food and livelihood through farming activities without the risk of being attacked by the wild animals. Nonetheless, the occupational health and safety of the workers will have to be taken care and create community safety measures by providing awareness on voltage requirement and procedures to follow in terms of possible current leakages.

Following is some of the possible common environmental and social impacts foreseen during the implementation of the proposed activities:

i. Environment Impacts:

- Solid waste generation at camp sites
- Minor disturbance to the soil – digging of holes

ii. Social Impacts

- Occupational worker's health and safety

4.2 Installation of bioacoustics device

The main likely environmental impacts for the activities related to installation of bioacoustics devices are generation of e-waste. On the social impact, it will largely benefit the communities to overcome Human Wildlife Conflict and therefore no social impact is anticipated.

Following is some of the possible common environmental and social impacts foreseen during the implementation of the proposed activities:

i. Environment Impacts:

- Generation of e-waste generation at camp sites

ii. Social Impacts: None anticipated

5. Mitigation Measures for Environmental and Social Impacts

Potential impacts to the environment and society along with the mitigating measures are listed below in the table:

Potential impact	Impact scale	Proposed mitigation measures	Responsible Party	Costs (million)
Activity 1: Installation of portable electric fencing at Ngantshothang under Orong and Lauri Gewogs of Samdrup Jongkhar Dzongkhag				Nu. 450,000
Activity 2: Installation of portable electric fencing at Yangtse and Boomdeling Gewogs of Tashi Yangtse				Nu. 450,000
Activity 3: Installation of Portable Electric fencing at Kurtoe and Khoma Gewog of Lhuntse Dzongkhag				Nu. 450,000
Generation of e-waste	Short term minor	<ul style="list-style-type: none"> • Identification and segregation of the different waste types at the activity site. • Proper containers/waste bins should be provided at the activity site. • Dumping of waste on the sides of the road, on private land, or in other non-designated places should be prohibited; and • Collection, transportation, and final disposal of all waste to designated waste disposal site will be undertaken regularly. • Provide awareness to the beneficiaries on the current requirement to deter animals from entering the farmlands. • Practical demonstration on the handling of electric fencing; and • Ensure use of quality electric fencing (EF) materials approved by technical working group at NPPC during the implementation of the work, carry out quality check before implementation of work – to avoid current leakage. 	Gewog Agriculture Extension and Dzongkhag Agriculture Officers	To be included within the activity cost
Minor disturbance to soil – digging of holes	Short term minor	<ul style="list-style-type: none"> • Holes on the soils should be dug as per the technical guidance mentioned in the ‘Reference Manual for electric fence’; and • Distance between poles should be maintained so that only required portion of soil surfaces are dug. 	Gewog Agriculture Extension and Dzongkhag Agriculture Officer	

Worker's health and safety	Short term minor	<ul style="list-style-type: none"> • Comply with worker's health safety guidelines. • Ensure decent work conditions, including an appropriate salary, working hours, accommodation and other essential amenities as per the Operational Health and Safety Guidelines are available for workers. • Access to health facilities for the workers pre and during construction activities need to be available; and • Ensure first aid kit is available at construction site all the time 	Gewog Agriculture Extensions and Dzongkhag Agriculture Officer	
Activity 4: Installation of bioacoustics device at Khoma under Lhuenste Dzongkhag				Nu. 31,000
Activity 5: Installation of bioacoustics device at Kurtoe under Lhuentse Dzongkhag				Nu. 31,000
Activity 6: Installation of bioacoustics device at Chuzagang under Sarpang Dzongkhag				Nu. 31,000
Activity 7: Installation of bioacoustics device at Senggye under Sarpang Dzongkhag				Nu. 31,000
Activity 8: Installation of bioacoustics device at Sephu under Wangdue Phodrang Dzongkhag				Nu. 31,000
Activity 9: Installation of bioacoustics device at Thedtsho Gewog under Wangdue Phodrang Dzongkhag				Nu. 31,000
Activity 10: Installation of bioacoustics device at Nubi under Trongsa Dzongkhag				Nu. 31,000
Activity 11: Installation of bioacoustics device at Tangsibje under Trongsa Dzongkhag				Nu. 31,000
Generation of e-waste	Short term minor	<ul style="list-style-type: none"> • Identification and segregation of the different waste types at the activity site. • Proper containers/waste bins should be provided at the activity site. • Dumping of waste on the sides of the road, on private land, or in other non-designated places should be prohibited; and • Collection, transportation, and final disposal of all waste to designated waste disposal site will be undertaken regularly. 	Gewog Agriculture Extension and Dzongkhag Agriculture Officer	To be included within the activity cost

6. ESMP Implementation arrangements

The Dzongkhag Administrations of Samdrup Jongkhar, Lhuentse, Trashi Yangtse, Sarpang, Wangdue Phodrang, Trongsa will implement the project in collaboration with National Plant Protection Centre. The mentioned Dzongkhag Administrations will be responsible for the compliance of all procedures outlined in this ESMP, as well as compliance with any requirements to obtain clearances, permits, approvals, or consent documents from relevant authorities and stakeholders.

This ESMP should be part of the contract that the Dzongkhag Administration and NPPC will sign for implementation of the planned activities mentioned in this ESMP in January 2023 – December 2023. National Plant Protection Centre is obligated to perform all proposed preventive or mitigation environmental and social measures in this plan and to keep the evidence of any documents related

to applying these measures (e.g., letter asking the municipality for disposal of inert waste, records on OHS information session performed for all workers before start of activities, all developed OHS plans, etc.). An OHS information session should be organized by the contractor for all workers prior to the start of the project activities and prior to any specific tasks with high health risks.

The NPPC, Dzongkhag Agriculture Office along with the Gewog Agriculture Extensions should monitor the implementation of the activities with physical checking, reviewing the records of evidence that the measures have been applied and ask the contractor to apply the measures as soon as possible. Non-compliances should be recorded and the Report on any non-compliances should be reported to the ESS officer immediately, and the ESS officer will report it to the PCU (M&E Officer). Each non-compliance to the guidelines should be resolved with appropriate measures and the evidence should be maintained.

Disbursement of project funds to the contractors will be contingent upon their full compliance with the requirements.

7. ESMP monitoring arrangements

The BFL focal of NPPC will closely monitor the implementation of all planned activities and the required mitigation measures and ensure that they fully comply with this ESMP. The terms and conditions included in the environment clearances issued by RGoB's national authorities wherever and whenever required must be strictly followed. The NPPC management is also fully responsible for the compliance of all external contractors and service providers with the safeguard requirements outlined in the OHS annexed. Protocol for monitoring of activities under this ESMP will be carried out as follow:

Sl. No	Activities	Monitoring team	Timeline		Location	Means of Verification
			Start	Complete		
1	Installation of portable electric fencing at Orong and Lauri Gewog	Field Focal	Jan, 2023	December 2023	Orong and Lauri	Field visits and Reports
		ESS Focal	Jan, 2023	December 2023		Field visits and Reports
		BFLFS	Jan, 2023	December 2023		Reports
2	Installation of portable electric fencing at Yangtse and Bomdeling Gewogs of Trashi Yangtse Dzongkhag	Field Focal	Jan, 2023	December 2023	Yangtse and Boomdeling	Field visits and Reports
		ESS Focal	Jan, 2023	December 2023		Field visits and Reports
		BFLFS	Jan, 2023	December 2023		Reports
3	Installation of portable electric fencing at Kurtoe and Khoma Gewogs of Lhuentse Dzongkhag	Field Focal	Jan, 2023	December 2023	Kurtoe and Khoma	Field visits and Reports
		ESS Focal	Jan, 2023	December 2023		Field visits and Reports
		BFLFS	Jan, 2023	December 2023		Reports
4		Field Focal	Jan, 2023	December 2023		Field visits and Reports

	Installation of bioacoustics devices at Kurtoe and Khoma	ESS Focal	Jan, 2023	December 2023	Kurtoe and Khoma	Field visits and Reports
		BFLFS	Jan, 2023	December 2023		
5	Installation of bioacoustics devices at Chuzagan g and Senggye Gewogs under Sarpang Dzongkhag	Field Focal	Jan, 2023	December 2023	Chuzagan g and Senggye	Field visits and Reports Field visits and Reports Reports
		ESS Focal	Jan, 2023	December 2023		
		BFLFS	Jan, 2023	December 2023		
6	Installation of bioacoustics devices at Sephu and Thedtsho Gewog under Wangdue Phodrang Dzongkhag	Field Focal	Jan, 2023	December 2023	Sephu and Thedtsho	Field visits and Reports Field visits and Reports Reports
		ESS Focal	Jan, 2023	December 2023		
		BFLFS	Jan, 2023	December 2023		
7	Installation of bioacoustics devices at Nubi and Tangsibje Gewogs under Trongsa Dzongkhag	Field Focal	Jan, 2023	December 2023	Nubi and Tangsibje	Field visits and Reports Field visits and Reports Reports
		ESS Focal	Jan, 2023	December 2023		
		BFLFS	Jan, 2023	December 2023		

Monitoring by ESS Focal officer at PCU:

- Monitoring through photographic/video evidence submitted by the IAs during the implementation as per the given dateline in the table above;
- Reports by ESS officer to BFL Fund Secretariat - Semi-annual reports submitted to the BFL Fund Secretariat in July 2023 and January, 2024; and
- Bi-annual reports of the Secretariat to WWF US (as part of mid-year and final Annual Performance Reports).

8. Capacity Need and Budget

The two activities under this ESMP will be implemented by the BFL focal person at NPPC, Chief Forestry Officer, supervising engineer, and a contractor that will employ workers as mentioned in the contract agreement.

Sl. No.	Activity	Amount (Nu.)	Budget for ESS mitigation
1	Installation of portable electric fencing at Orong and Lauri Gewogs of Samdrup Jongkhar Dzongkhag	450,000	To be met from activity cost
2	Installation of portable electric fencing at Yangtse and Boomdeling Gewogs under Lhuntse Dzongkhag	450,000	To be met from activity cost
3	Installation of portable electric fencing at Kurtoe and Khoma Gewogs under Lhuentse Dzongkhag	450,000	To be met from activity cost

4	Installation of bioacoustics devices at Kurtoe and Khoma	62,000	To be met from activity cost
5	Installation of bioacoustics devices at Chuzanggang and Senggye Gewogs under Sarpang Dzongkhag	62,000	To be met from activity cost
6	Installation of bioacoustics devices at Sephu and Thedtsho Gewog under Wangdue Phodrang Dzongkhag	62,000	To be met from activity cost
7	Installation of bioacoustics devices at Nubi and Tangsibje Gewogs under Trongsa Dzongkhag	62,000	To be met from activity cost
Total		1,598,000	

The proposed activities are of very small scale and there are no adverse social and environmental impacts which require mitigation measures. Therefore, separate fund for mitigation measures is not proposed.

9. Consultation and Disclosure Mechanisms

The ESMP has been prepared by NPPC management in consultation with the beneficiary Dzongkhags. The detailed minutes of the consultation meeting/ official correspondences will be kept as a requirement for this ESMP, along with a full list of participants (disaggregated by gender and age). Any grievance during the consultation or implementation will have to be noted and resolved in line with the BFL Grievance Redressal Mechanism and Dzongkhag Grievance Redressal system.

The full English version of this ESMP, as well as an executive summary in Bhutanese, shall be disclosed/uploaded on the website of MoENR, MoAL, BFL and WWF. The hard copies of the ESMP would be made available at the NPPC and at the PCU Office.

10. Stakeholder engagement plan

The Dzongkhag Administrations with technical support from the NPPC along with the Gewog Administrations and local communities would be the main stakeholders in the proposed activity. The concerned Gewog Administration officials will be engaged in execution of the activity at site and the regular supervision.

The ESS focal will submit the consultation reports to the PCU (M&E officer) one week after their receipt. The PCU (M&E officer) will report to the Secretariat on a semi-annual basis.

Annexure 1

BFL: Suggested Occupational Health and Safety Standards

Employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. Implementing entities should hire contractors that have the technical capability to manage the occupational health and safety issues of their workers, extending the application of the hazard management activities through formal procurement agreements.

This section provides guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety. It is based on the IFC's Environmental, Health, and Safety Guidelines (April 30, 2007) and the Occupational Health and Safety Guidelines of Bhutan's Construction Development Corporation Ltd., which relies on the national Regulation on Occupational Health, Safety and Welfare 2012, Regulation on Working Conditions 2012 and Labour Act 2007, and in compliance to Sl. No. 21 of Regulation on Occupational Health, Safety and Welfare 2012.

1. General Facility Design and Operation

Integrity of Workplace Structures

Permanent and recurrent places of work should be designed and equipped to protect occupational health and safety:

- Surfaces, structures and installations should be easy to clean and maintain, and not allow for accumulation of hazardous compounds.
- Buildings should be structurally safe, provide appropriate protection against the climate, and have acceptable light and noise conditions.
- Fire resistant, noise-absorbing materials should, to the extent feasible, be used for cladding on ceilings and walls.
- Floors should be level, even, and non-skid.
- Heavy oscillating, rotating or alternating equipment should be located in dedicated buildings or structurally isolated sections.

Severe Weather and Facility Shutdown

- Workplace structures should be designed and constructed to withstand the expected elements for the region and have an area designated for safe refuge (e.g., in case of earthquake).

Workspace and Exit

- The space provided for each worker, and in total, should be adequate for safe execution of all activities, including transport and interim storage of materials and products.

Fire Precautions

The workplace should be designed to prevent the start of fires through the implementation of fire codes applicable to industrial settings. Other essential measures include:

- The workplace shall be provided with adequate means of protection and escape in case of fire.
- The workplace shall be provided with adequate number of relevant fire extinguishers.

- Workers shall wear shoes without iron or steel nails or any other exposed ferrous materials which is likely to cause sparks by friction.
- Smoking, lightening, or carrying of matches, lighters or smoking materials shall be prohibited.
- All other precautions, as are reasonably practicable, shall be taken to prevent initiation of ignition from all other possible sources such as open flames, frictional sparks, overheated surfaces of machinery or plant, chemical or physical, chemical reaction and radiant heat.
- At every workplace adequate provision of water supply for firefighting shall be provided and maintained.
- Equipping facilities with firefighting equipment (e.g., fire extinguishing bottle). The equipment should be maintained in good working order and be readily accessible. It should be adequate for the dimensions and use of the premises, equipment installed, physical and chemical properties of substances present, and the maximum number of people present.
- Manual firefighting equipment shall be easily accessible and simple to use.
- Fire extinguishers and emergency alarm systems that are both audible and visible should be in place.

Lavatories and Showers

- Adequate lavatory facilities (toilets and washing areas) should be provided for the number of people expected to work in the facility (at least one for every 20 workers). Toilet facilities should also be provided with adequate supplies of hot and cold running water and soap.

Potable Water Supply

- Adequate supplies of potable drinking water should be provided to workers at the work site.

Clean Eating Area

- Where there is potential for exposure to substances poisonous by ingestion, suitable arrangements are to be made for provision of clean eating areas where workers are not exposed to the hazardous or noxious substances.

Lighting

- Workplaces should, to the degree feasible, receive natural light and be supplemented with sufficient artificial illumination to promote workers' safety and health, and enable safe equipment operation. Supplemental 'task lighting' may be required where specific visual acuity requirements should be met.
- Emergency lighting of adequate intensity should be installed upon failure of the principal artificial light source to ensure safe shut-down, evacuation, etc.

Safe Access

- Passageways for pedestrians and vehicles within and outside buildings should be segregated and provide for easy, safe, and appropriate access.
- Equipment and installations requiring servicing, inspection, and/or cleaning should have unobstructed, unrestricted, and ready access.
- Covers should, if feasible, be installed to protect against falling items.
- Measures to prevent unauthorized access to dangerous areas should be in place.

First Aid

- The employer should ensure that qualified first-aid can be provided at all times. A sufficient number of first aid boxes or cupboards shall be provided and maintained so as to be readily available during all working hours, provided that the distance of the nearest first aid box or a cupboard shall be not more than 200m from any working place.
- First aid kits include all equipment outlined in Annex 1 to these Guidelines.
- Remote sites should have written emergency procedures in place for dealing with cases of trauma or serious illness up to the point at which patient care can be transferred to an appropriate medical facility.

Work Uniform

- The contractor shall provide a working uniform to each worker.
- All workers shall be required to attend the duty in proper uniform unless otherwise instructed by the Contractor.

Air Supply

- Sufficient fresh air should be supplied for indoor and confined workspaces. Factors to be considered in ventilation design include physical activity, substances in use, and process related emissions. Air distribution systems should be designed so as not to expose workers to draughts.
- Re-circulation of contaminated air is not acceptable. Heating, ventilation and air conditioning (HVAC) systems should be equipped, maintained and operated so as to prevent growth and spreading of disease agents (e.g. Legionella pneumophila) or breeding of vectors (e.g. mosquitoes and flies) of public health concern.

2. Information Provision on Occupational Health and Safety (OHS)

- The Contractor is responsible to hold an information session to familiarize all workers with the OHS procedures specified in these guidelines, in order to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow workers.
- The information session should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Any site-specific hazard or color coding in use should be thoroughly reviewed as part of orientation training.

3. Physical Hazards

- Physical hazards represent potential for accident or injury or illness due to repetitive exposure to mechanical action or work activity.

Rotating and Moving Equipment

Injury or death can occur from being trapped, entangled, or struck by machinery parts due to unexpected starting of equipment or unobvious movement during operations. Recommended protective measures include:

- Designing machines to eliminate trap hazards and ensuring that extremities are kept out of harm's way under normal operating conditions. Examples of proper design considerations include two-hand operated machines to prevent amputations or the availability of emergency stops dedicated to the machine and placed in strategic locations.

- Where a machine or equipment has an exposed moving part or exposed pinch point that may endanger the safety of any worker, the machine or equipment should be equipped with, and protected by, a guard or other device that prevents access to the moving part or pinch point. Guards should be designed and installed in conformance with appropriate machine safety standards.

Noise

- No worker should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
- The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB(A).
- Although hearing protection is preferred for any period of noise exposure in excess of 85 dB(A), an equivalent level of protection can be obtained, but less easily managed, by limiting the duration of noise exposure. For every 3 dB(A) increase in sound levels, the ‘allowed’ exposure period or duration should be reduced by 50 percent.
- Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible.
- Periodic medical hearing checks should be performed on workers exposed to high noise levels.

Vibration

Exposure to hand-arm vibration from equipment such as hand and power tools, or whole-body vibrations from surfaces on which the worker stands or sits, should be controlled through choice of equipment, installation of vibration dampening pads or devices, and limiting the duration of exposure.

Electrical

Exposed or faulty electrical devices, such as circuit breakers, panels, cables, cords and hand tools, can pose a serious risk to workers. Overhead wires can be struck by metal devices, such as poles or ladders, and by vehicles with metal booms. Vehicles or grounded metal objects brought into close proximity with overhead wires can result in arcing between the wires and the object, without actual contact. Recommended actions include:

- Marking all energized electrical devices and lines with warning signs
- Locking out (de-charging and leaving open with a controlled locking device) and tagging-out (warning sign placed on the lock) devices during service or maintenance
- Checking all electrical cords, cables, and hand power tools for frayed or exposed cords and following manufacturer recommendations for maximum permitted operating voltage of the portable hand tools
- Double insulating / grounding all electrical equipment used in environments that are, or may become, wet; using equipment with ground fault interrupter (GFI) protected circuits
- Protecting power cords and extension cords against damage from traffic by shielding or suspending above traffic areas

- Appropriate labeling of service rooms housing high voltage equipment (‘electrical hazard’) and where entry is controlled or prohibited
- Establishing “No Approach” zones around or under high voltage power lines
- Rubber tired construction or other vehicles that come into direct contact with, or arcing between, high voltage wires may need to be taken out of service for periods of 48 hours and have the tires replaced to prevent catastrophic tire and wheel assembly failure, potentially causing serious injury or death
- Conducting detailed identification and marking of all buried electrical wiring prior to any excavation work

Eye Hazards

Solid particles from a wide variety of industrial operations, and/or a liquid chemical spray may strike a worker in the eye causing an eye injury or permanent blindness. Recommended measures include:

- Use of machine guards or splash shields and/or face and eye protection devices, such as safety glasses with side shields, goggles, and/or a full-face shield. Frequent checks of these types of equipment prior to use to ensure mechanical integrity is also good practice.
- Where machine or work fragments could present a hazard to transient workers or passers-by, extra area guarding or proximity restricting systems should be implemented, or PPE required for transients and visitors.
- Provisions should be made for persons who have to wear prescription glasses either through the use overglasses or prescription hardened glasses.

Welding / Hot Work

Welding creates an extremely bright and intense light that may seriously injure a worker’s eyesight. In extreme cases, blindness may result. Additionally, welding may produce noxious fumes to which prolonged exposure can cause serious chronic diseases. Recommended measures include:

- Provision of proper eye protection such as welder goggles and/or a full-face eye shield for all personnel involved in, or assisting, welding operations. Additional methods may include the use of welding barrier screens around the specific work station (a solid piece of light metal, canvas, or plywood designed to block welding light from others). Devices to extract and remove noxious fumes at the source may also be required.

Working Environment Temperature

Exposure to hot or cold working conditions in indoor or outdoor environments can result temperature stress-related injury or death. Use of personal protective equipment (PPE) to protect against other occupational hazards can accentuate and aggravate heat-related illnesses. Extreme temperatures in permanent work environments should be avoided through implementation of engineering controls and ventilation. Where this is not possible, such as during short-term outdoor work, temperature-related stress management procedures should be implemented which include:

- Monitoring weather forecasts for outdoor work to provide advance warning of extreme weather and scheduling work accordingly
- Providing temporary shelters to protect against the elements during working activities or for use as rest areas
- Use of protective clothing
- Providing easy access to adequate hydration such as drinking water or electrolyte drinks, and avoiding consumption of alcoholic beverages

Ergonomics, Repetitive Motion, Manual Handling

Injuries due to ergonomic factors, such as repetitive motion, overexertion, and manual handling, take prolonged and repeated exposures to develop, and typically require periods of weeks to months for recovery. These OHS problems should be minimized or eliminated to maintain a productive workplace. Controls may include:

- Facility and workstation design with 5th to 95th percentile operational and maintenance workers in mind
- Use of mechanical assists to eliminate or reduce exertions required to lift materials, hold tools and work objects, and requiring multi-person lifts if weights exceed thresholds
- Selecting and designing tools that reduce force requirements and holding times, and improve postures
- Incorporating rest and stretch breaks into work processes, and conducting job rotation
- Implementing quality control and maintenance programs that reduce unnecessary forces and exertions

Working at Heights

Fall prevention and protection measures should be implemented whenever a worker is exposed to the hazard of falling more than two meters; into operating machinery; into water or other liquid; into hazardous substances; or through an opening in a work surface. Fall prevention / protection measures may also be warranted on a case-specific basis when there are risks of falling from lesser heights. Fall prevention may include:

- Installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area
- Proper use of ladders and scaffolds by trained workers
- Use of fall prevention devices, including safety belt and lanyard travel limiting devices to prevent access to fall hazard area, or fall protection devices such as full body harnesses used in conjunction with shock absorbing lanyards or self-retracting inertial fall arrest devices attached to fixed anchor point or horizontal life-lines
- Appropriate training in use, serviceability, and integrity of the necessary PPE
- Inclusion of rescue and/or recovery plans, and equipment to respond to workers after an arrested fall

Illumination

Work area light intensity should be adequate for the general purpose of the location and type of activity, and should be supplemented with dedicated work station illumination, as needed. Controls should include:

- Use of energy efficient light sources with minimum heat emission
- Undertaking measures to eliminate glare / reflections and flickering of lights
- Taking precautions to minimize and control optical radiation including direct sunlight.
- Exposure to high intensity UV and IR radiation and high intensity visible light should also be controlled
- Controlling laser hazards in accordance with equipment specifications, certifications, and recognized safety standards. The lowest feasible class Laser should be applied to minimize risks.

4. Personal safety equipment for workers

All workers are equipped with the following personal safety equipment: helmet, gloves, ordinary boots and reflective vest.

Workers that are exposed to dust should also be provided with eye protection glasses and face mask. Workers that are exposed to noise should be provided with ear plugs. Workers that need to work in the dark should be provided with hand and cap lamps. Workers are instructed regarding safety equipment as follows:

- Always wear complete set of protective wear.
- Do not wear loose clothing, such as overhang shirt, jackets, mufflers etc.
- Tuck shirt and jacket well.
- Secure helmet with belt under the chin.
- Tuck the bottom sleeves of trouser inside safety boot.
- Dress with reflector

5. Standards for workers' accommodation

1. General living facilities

- The location of the facilities is designed to avoid flooding or other natural hazards
- The living facilities are located within a reasonable distance from the worksite.
- Transport is provided to worksite safe and free.
- The living facilities are built using adequate materials, kept in good repair and kept clean and free from rubbish and other refuse.

2. Drainage

- The site is adequately drained.

3. Heating, air conditioning, ventilation and light

- Living facilities are provided with adequate heating, ventilation, and light systems including emergency lighting.

4. Water

- Workers have easy access to a supply of clean/ potable water in adequate quantities.
- The quality of the water complies with national/local requirements or WHO standards.
- Tanks used for the storage of drinking water are constructed and covered to prevent water stored therein from becoming polluted or contaminated.
- The quality of the drinking water is regularly monitored.

5. Wastewater and solid waste

- Wastewater, sewage, food and any other waste materials are adequately discharged in compliance with national and/or international standards and without causing any significant impacts on camp residents, the environment or surrounding communities.
- Specific containers for rubbish collection are provided and emptied on a regular basis.
- Pest extermination, vector control and disinfection are undertaken throughout the living facilities at least once.

6. Rooms/dormitories facilities

- Rooms/dormitories are kept in good condition.
- Rooms/dormitories are aired and cleaned at regular intervals.
- Rooms/dormitories are built with easily cleanable flooring material.
- Rooms/dormitories and sanitary facilities are located in the same buildings.
- Residents are provided with enough space.

- The number of workers sharing the same room/dormitory is minimized.
- Doors and windows are lockable and provided with mosquito screens when necessary.
- Mobile partitions or curtains are provided.
- Adequate number of furniture such as table, chair, mirror, and lamps are provided for all workers.
- Separate sleeping areas are provided for men and women.

7. Bed arrangements and storage facilities

- A separate bed is provided for every worker.
- The practice of “hot-bedding” is prohibited.
- There is a minimum space of 1 meter between beds.
- The use of double deck bunks is minimized.
- If double deck bunks are in use, there is enough clear space between the lower and upper bunk of the bed.
- Workers are provided with comfortable mattresses. Workers may be expected to use their own pillows and bed linens.
- Workers wash bed linen frequently and applied with adequate repellents and disinfectants (where conditions warrant).
- Adequate facilities for the storage of personal belongings are provided.
- Separate storages for work clothes and PPE and depending on condition, drying/airing areas are provided.

8. Sanitary and toilet facilities

- Sanitary and toilet facilities are constructed from materials that are easily cleanable.
- Sanitary and toilet facilities are cleaned frequently and kept in working condition.
- Toilets, showers/bathrooms and other sanitary facilities are designed to provide workers with adequate privacy including ceiling to floor partitions and lockable doors.
- Separate sanitary and toilet facilities are provided for men and women.
- Toilet facilities are conveniently located and easily accessible.
- Toilet facilities are environmentally friendly (e.g., pit toilet) and sewage is not disposed into the worksite.
- Open defecation in the vicinity of project sites should be prohibited.
- An adequate number of hand wash basins and showers/bathrooms facilities are provided.
- Shower facilities are provided with water heating facilities.

9. Cooking and laundry facilities

Cooking and laundry facilities should be available for workers at the worksite or in close vicinity to it. These facilities should be kept in clean and sanitary conditions.

10. Leisure, social and telecommunications facilities

- Basic social collective spaces should be available to workers.
- Workers are provided with dedicated places for religious observance, as appropriate.
- The employer provides workers with local sim cards that can be used for communication on their personal cell phones.

Contents of first aid box or cup-boards

The first aid boxes or cup-boards shall be distinctively marked with white cross on a green background and shall contain the following equipment:

1. Small sterilized dressings (12)
2. Medium size sterilized dressings (6)
3. Large size sterilized dressings (6)
4. Large size sterilized burn dressings (6)
5. (1/2 oz.) Sterilized cotton wool (6 packets)
6. (2oz.) Bottle containing a two per cent alcoholic solution of iodine (1)
7. (2oz.) Bottle containing Betadine (antiseptic solution) having the dose and mode of administration indicated on the label (1)
8. Roll of adhesive plaster (1)
9. A snake bite lancet (1)
10. Torch light (1)
11. Pair of scissors (1)
12. Tablets Aspirin (5gms) 2 dozen
13. Burn Ointment (2 tubes)
14. Dettol (2 phial, about 2 ozs)
15. Bandages 4 inches wide
16. Bandages 2 inches wide
17. Triangular bandages (2)
18. Packets of safety pins (1)
19. A supply of suitable splint