

Bhutan For Life

**Environmental and Social
Management Plan for Phibsoo
Wildlife Sanctuary**

January 2023 - June 2024

Phibsoo Wildlife Sanctuary / Sengye

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Bhutan for Life
Environmental and Social Management Plan for Phibsoo Wildlife Sanctuary (PWS) 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 ESMF 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

2.1 Geological and topographical conditions

Phibsoo Wildlife Sanctuary (PWS) was created in 1974 along with five other protected areas as Phibsoo Reserved Forest. Later in 1993, it was upgraded to a wildlife sanctuary following a comprehensive review and revision of the national protected areas system. However, it only started its management independency in September 2014 upon separation from Sarpang Forest Division with its conservation management plan 2012-2017. Phibsoo Wildlife Sanctuary, the smallest protected area in Bhutan encompasses an area of 286.68sq.km. It is located in the Himalayan foothills of south central Bhutan. The wildlife Sanctuary is divided into two range offices, Phibsoo Range with 147.78 sq.km to the east and Nichula Range office with 138.9 sq.km to the west. The northern part of wildlife sanctuary shares Beteni gewog boundary under Tsirang Dzongkhag between 26°51'51.04"N, 90°1'12.88"E to 26°50'58.69"N, 90°7'51.52"E with Biological Corridor (BC3) connecting the wildlife sanctuary on north eastern side. Eastern part of wildlife sanctuary falls in Singe gewog under Sarpang Dzongkhag between 26°51'0.02"N, 90°8'43.85"E to 26°46'22.37"N, 90°11'35.01"E. It's southern boundary follows Indo Bhutan international border with Ripu-Chirang Reserved Forest on the Indian side starting from Border pillar 117/1 to 145/1 till Senge gewog. While it's western boundary shares the gewog boundary of Lhamoyzingkha, Deorali, and Tsendagang from 26°42'36.01"N, 89°51'40.45"E to 26°51'5.56"N, 89°59'26.59"E flanked by Sunkosh river.

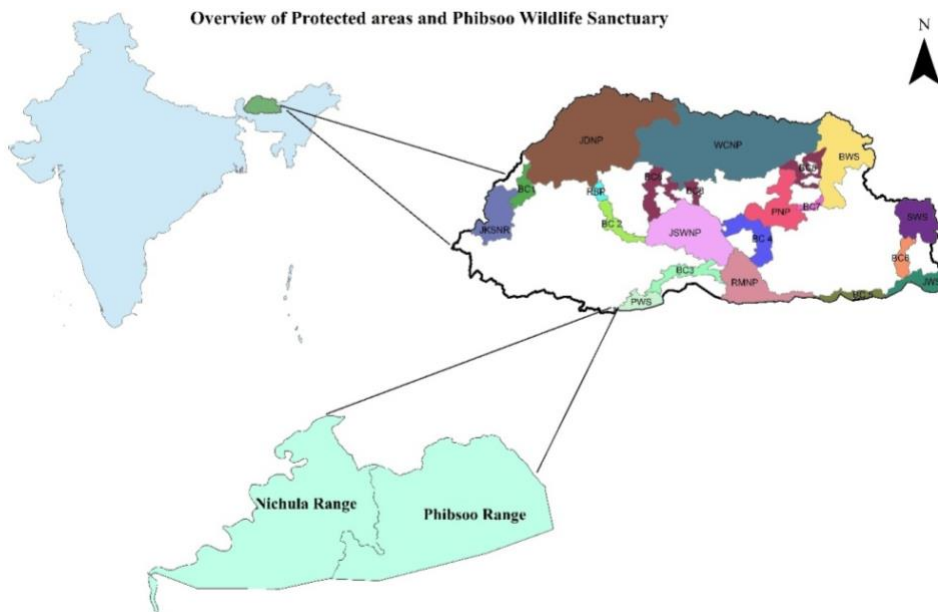


Figure 1: Location of Phibsoo Wildlife Sanctuary

PWS shares the fertile soil of southern Bhutan with loamy and sandy loam soil covering the entire region of Wildlife Sanctuary. The soil favors the growth of various cereals and crops to the resident of PWS. The Wildlife Sanctuary falls under humid subtropical climate of the country and experiences hot summer and cold winter ranging in its elevation from 75 masl -1800 masl. It is also known for the lowest elevation range in Bhutan at Nichula gewog under Dagana Dzongkhag. PWS receives incessant summer rainfall which remains wet for the entire season while winter is often welcomed by dry and sunny weather

2.2 Climatic conditions

PWS falls in Sarpang and Dagana district with elevation ranging from less than 200 to 3000 meter above sea level (FRMD, 2017). Sarpang district experiences maximum temperature of 27.6° C with annual total rainfall of 5930.3 mm (BSC, 2017). The district is dominated by subtropical and warm broadleaved forest with forest coverage of 78% (NFI, 2016). On the other hand, Dagana district ranges its elevation from 100 m to 4700 m above sea level. It falls in subtropical zone with annual rainfall ranging from 750 mm to 2000 mm. Therefore, PWS experiences hot summer with incessant monsoon and cool winter at an average.



Rangers crossing swollen rivers in Monsoon



Rangers clearing roadblocks

2.3 Hydrological conditions

Besides perennial and transitional rivers formed during monsoon, Sunkosh River, one of the major river in Bhutan drains through the plains of the Wildlife Sanctuary. The river source two hydroelectric power projects in Bhutan viz. PHPA I and PHPA II. Perennials Rivers such as Longa River, Phibsoo River and Nichula River forms an important watershed of PWS. These rivers shelter the home to critically endangered White-bellied Heron in Bhutan. Waterholes and spring water sources are distributed in the Wildlife Sanctuary contributing to the functioning of ecosystem. Waterholes are distributed densely in lower foothills of the Wildlife Sanctuary.

2.4 Flora and fauna

PWS is of immense conservation significance for Bhutan, the region and the world at large. Not only does the sanctuary protect the country's southernmost variant of sub-tropical Himalayan forest ecosystem but is also critical source of several seasonal and perennial water bodies which contribute to the fertility of the Assam Duars. The sanctuary happens to be the easternmost limit of spotted deer (*Axis axis*), common pea fowl (*Pavo cristatus*) and sal (*Shorea robusta*) bearing forests. It is also the only place where natural stand of sal and spotted deer can be sighted. At the same time, PWS is the western most limit of the globally threatened golden langur (*Trachypithecus geei*) and the rare and valuable agar tree (*Aquillaria malaccensis*). It also provides refuge to a number of charismatic and globally threatened species including the Asian elephant (*Elephas maximus*), Bengal tiger (*Panthera Tigris tigris*), Chinese Pangolin (*Manis pentadactyla*), Rufous-necked hornbill (*Aceros nipalensis*) and White-bellied Heron (*Ardea insignis*). Besides, lush alluvial grassland provides safe refuge to the prey species for keystone species.

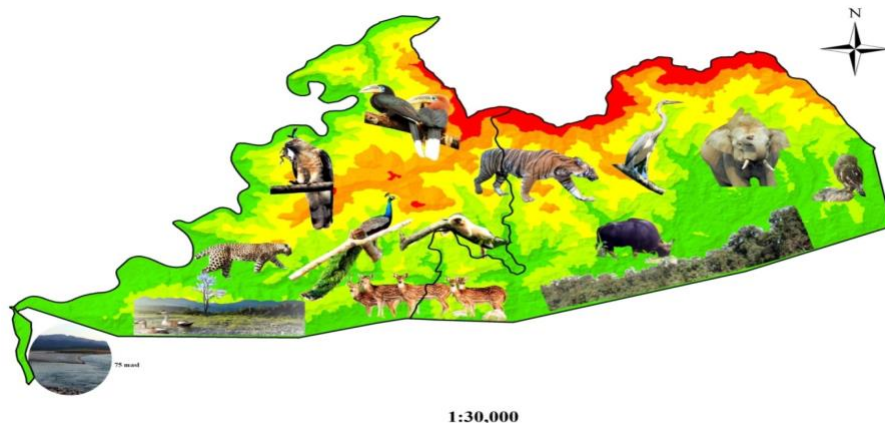


Figure 2: Icons of Phibsoo Wildlife Sanctuary

Vegetation surveys recorded 358 species of plant belonging to 75 families. Total of 137 trees were distributed in 47 families, 81 shrubs in 30 families, 96 herbs in 31 families and 44 orchids in orchidae family. Overall PWS harbors about 17.5% of the country's mammal diversity and most of them being globally important. Among faunal diversity 59% is avifauna and current status of bird record is 418 species belonging to 81 families. The rapid biological survey on herpeto-fauna in 2020 results 60 species belonging to 16 families. Rapid fish survey conducted in 2020 has recorded 23 species of fishes belonging to 7 families. Rapid butterfly diversity conducted in 2020 recorded 177 species belonging to five families. Nymphalidae constitute 46% followed by Lycaenidae 18%, Pieridae 13% Papilionodae 12% and Hesperidae 11%.

Zonation of the wildlife sanctuary was carried out following protected area zonation guideline 2020 which constitute of four zones; Core zone (22%), Transition zone (52.86%), Buffer zone (13.14%) and Multiple use zone (12%) (Figure 3).

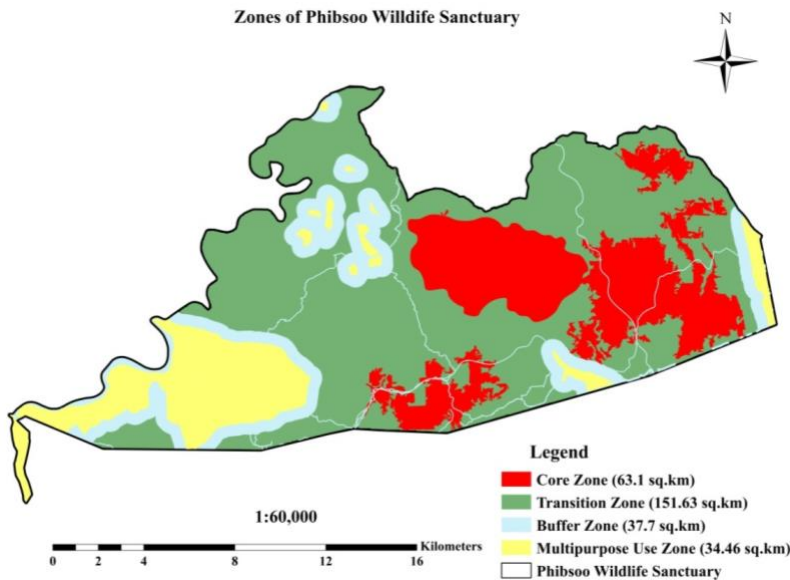


Figure 3: Zones of Phibsoo Wildlife Sanctuary

2.5 Socio-economic conditions

The PWS socio-economic survey, carried out in May 2017, lists 21 villages and hamlets in PWS. These villages and hamlets shelter total population of 2,611, of which 1,254 people (48%) live inside the sanctuary with population density of 4.7 people /km². PWS has settlements of two gewogs with total of 366 residents and 80 Gungtongs. The total population is 2957 with 1925 in Singye gewog and 1032 in Nichula Gewog.

3. Planned activities for January 2023 - June 2024

3.1 Improvement of lowland grasslands

- Budget: Nu. 1,000,000
- Timeline: January - December, 2023
- Location: Phibsoo Outpost

PWS is known for vast grassland with more than 100 hectares providing habitats for mammals like spotted deer, barking deer, elephant, gaur, etc. The activity will be conducted in Phibsoo Outpost which has vast grassland playing pivotal role towards wildlife ecology. Preliminary surveys were carried out in 75 hectares of grassland to understand the grassland ecosystem and ecology in PWS in the third year. The survey involved vegetation survey, regeneration survey and wildlife surveys focusing on butterfly, birds and mammals. Seasonal removal of grasses with twice a year, uprooting and prescribe burning compartment wise are recommended for management of grassland in PWS.

The activity will be implemented twice a year in two prescribed seasons as per the recommendation of the survey. It will be carried out once each in winter (November to February) and spring (April

to June). Total of 70 hectares of grassland will be managed in year 5 of BFL. The management will be done as per the recommendation of preliminary survey. Management will be done compartment wise with the use of a tractor for invasive species removal involving 3 to 4 staffs. They will be accommodated in Phibsoo Outpost and basic amenities like water and housing will be provided from Phibsoo Outpost. Since activity site is located far from the settlement area (25 km away), they won't be sharing community resources, rather they will be provided from Phibsoo outpost. The recommendations of the surveys and activity to be conducted are detailed below:

A. Seasonal uprooting and cutting of invasive species

Chromolaena odorata and *Mikania micrantha* are abundant and most prolific seed dispersal weeds which impacted the health of grassland in PWS. Cutting and burning of grass has improved the health of grassland only in the season of implementation. However, for eradication, seasonal uprooting of invasive species once in summer and once in winter is found to be necessary so that the invasive species can be controlled. In summer, all the invasive species are tender and in the early stage without flowers. Besides, during monsoon season continuous rain makes the soil loose and makes the uprooting easy. Further, for a proper scientific management, sub-compartments were developed so that uprooting can be taken effectively. As per the lessons learnt from year-4 of BFL, grass cutting by tractor has been found most effective as it can cover vast area of grassland under management with involvement of only a few staffs.

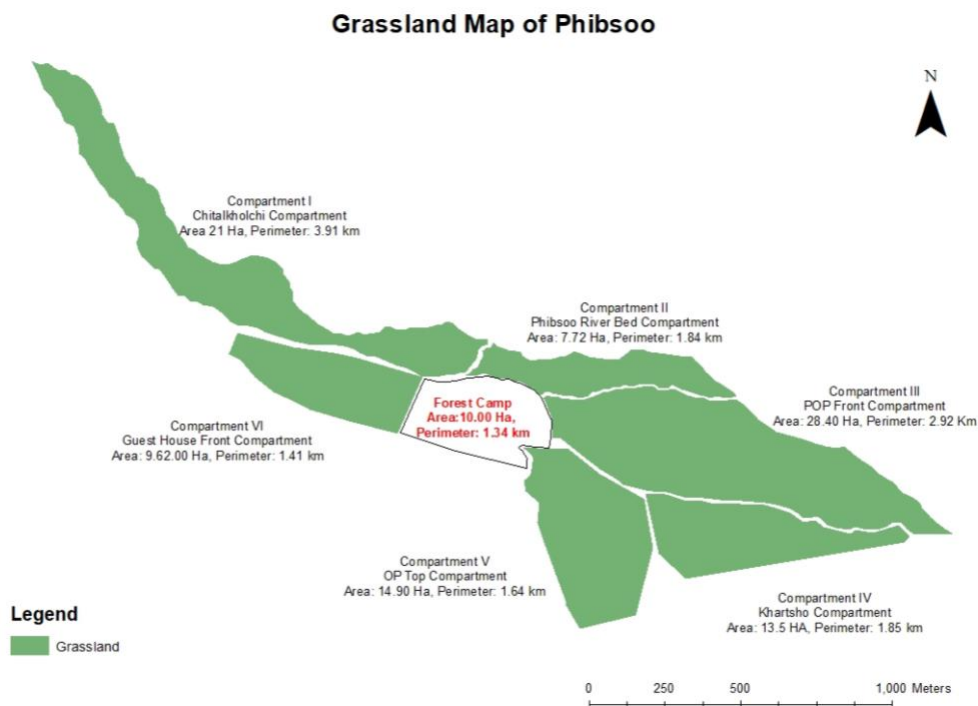


Figure 3: PWS Grassland

B. Prescribed burning of grassland

Prescribed burning in compartments is recommended, which would give small mammals, herpetofauna and rodents a space to find shelter and movement (Wangmo et al., 2018). Traditional burning seems to have impacted on the small mammals as the grassland is put to fire without any proper prescription. So, to have safe space for small animals during burning the grassland, compartments will be developed. In between the compartments minimum distance of 15 meters will be maintained to control the spread of fire to other compartments. This 15 meters gap will be maintained and cleaned for fire line without the presence of any fuel wood.

Figure 7: Prescribed burning



3.2

Maintenance of patrol routes

- a. Budget: Nu.500,000
- b. Timeline: January - December, 2023
- c. Location: Phibsoo Outpost

Patrol Route connecting Singye gewog to Phibsoo outpost with distance of 25 km is an important route connecting the Range office and the outpost. The route is mainly used by Rangers of Phibsoo Wildlife Sanctuary as their Spatial Monitoring and Reporting Tool (SMART) routes, Royal Bhutan Army by their patrol routes protecting the wildlife and natural resources of the wildlife sanctuary. By the location of wildlife sanctuary in the southern region, incessant rainfall during summer leads to flashfloods and erosion which requires frequent interventions and maintenance. The road is maintained yearly with construction of causeways, filling of potholes and clearing of bushes with radius of 50 meters on both the sides. The activity is mainly implemented to make sure the duty at outpost is not hampered throughout the year due to roadblocks and landslides. Moreover, clearing of bushes 50 meter radius from the road prevents rangers from being ambushed by poachers and other miscreants. Keeping weather into consideration, the works are scheduled from July 2023 to December 2023 especially during winter when the season remains dry.

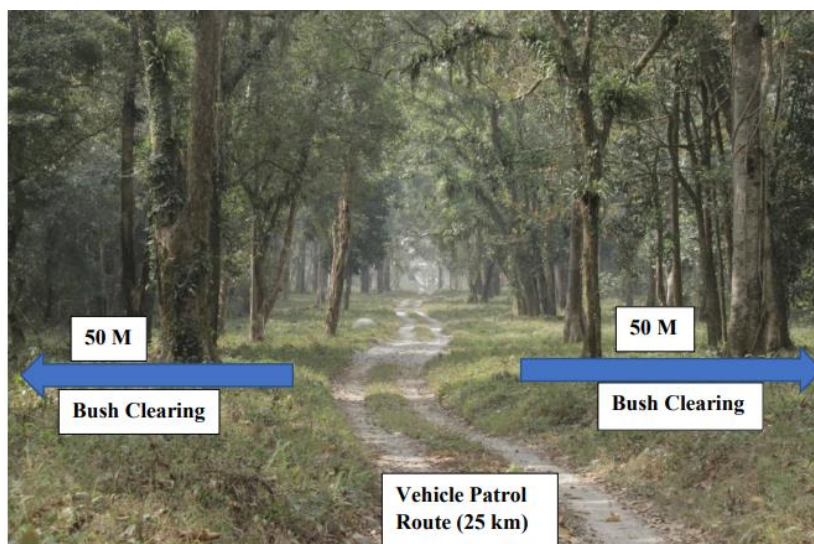


Figure 8: Bush clearing done in earlier year

Both vehicle and foot patrol route are managed by Rangers of Phibsoo Wildlife Sanctuary. The patrol route maintenance involves filling of potholes with gravels, construction of small causeways in eroded areas besides bush clearing. Bush clearing is done with involvement of local people of singye gewog. As per the past records, averages of 60 workers are involved in bush clearing for 20 days. Filling of potholes will be carried out using JCB machines and trucks for loading of sands and gravels and digging foundation of eroded roads and walls. The workers will be accommodated in Phibsoo outpost during the entire work execution period. Basic amenities like water and shelter for the workers will be provided from wildlife sanctuary based on past experiences. The nearest distance to the work site from settlement is 5 Km with 13 household near to it. The people in the locality are dependent on agriculture and farming for their livelihood. The activity will further have positive advantage for the people as it will create easy access to natural resources like firewood collection, NWFP collection and it also serves as a route for their livestock. Maintenance of patrol route will also assist in controlling wildlife poaching through regular monitoring by making it easily accessible as and when required.



Maintenance by JCB Machine



Flood Protection wall and causeways



Figure 9: Maintenance of patrol route carried out in earlier year

3.3 Implementation of Nichula Watershed Management Plan - construction of water reservoir tank

- a. Budget: Nu. 2,000,000
- b. Timeline: January - December, 2023
- c. Location: Nichula

Nichula Gewog is located in one of the remote places of Dagana Dzongkhag. The gewog has 104 households on the ground grouped by five different chewogs. With an altitude ranging from 200 m to 1500 m, the resident depends on agriculture as their main source of livelihood. During the consultation meeting on the development of the integrated watershed management plan 2022, residents shared the need of constructing water reserve tanks in their water sources. After the verification by the team, it was found that the community had used multiple tapping from the sources due to a lack of common reserve tanks. Constructing reserve tanks will address the issues of multiple tapping from sources and water scarcity issues in the gewog.

Four water reserve tanks will be constructed in Nichula Gewog which will benefit five chewogs. It will be constructed in water sources of Yarphelling, Dramseykesa-Damchuna, Dangreybug and Gangtokha in the gewog. The activity will solve the issues of multiple tapping of water from sources, and enough water reserves in tanks addressing the issues of water scarcity. The activity will also connect reserve tanks and sources through a water pipeline. Community workers of around 30 individuals will be employed for the work. The work will be executed through a community contract where local youths and residents are employed. Since the area is located in the community, accommodation will be arranged by the workers themselves which is the common system followed by workers in the community. However, proper wage rate and hygiene and safety

will be ensured during the whole process of work execution. After completion of work, social arrangements for maintenance will be included in the standard operating procedure.

3.4 Installation of Solar Pump in Phibsoo

- a. Budget: Nu. 800,000
- b. Timeline: January - December, 2023
- c. Location: Phibsoo

Waterholes are important wildlife habitat as it is the main source of nutrients. Waterholes are a source of water for wildlife especially in winter when the source remains dry. The main reason for implementing the activity yearly is to basically assist wildlife with basic needs, especially in winter. This would also assist in the reduction of human-wildlife conflict as the availability of basic requirements in forests doesn't have much reason for wildlife to encroach on settlements. Today with climate change and ecological issues, water has dried causing difficulty and challenges for wildlife in winter. As an activity, solar pumps will be installed to draw water from drilling the underground water in Phibsoo. Since underground water tapping is a possibility in the area, it can save costs from normal water tapping from water sources and at the same time will be energy efficient and wildlife friendly.

4. Potential social and environmental impacts

4.1 Restoration to enhance quality and resilience of lowland grasslands

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

i. Environment Impacts:

- Risk of forest fire during the prescribed burning
- Risk of introducing invasive grasses

ii. Social Impacts

- Risk of fire burns during the prescribed burning
- Occupational health and safety of the workers

4.2 Maintenance of patrol routes

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

i. Environment Impacts:

- Waste generation for the construction materials for causeways
- Dust generation during construction

ii. Social Impacts

- Occupational health and safety of the workers

4.3 Implementation of Nichula Watershed Management Plan - construction of water reservoir tank

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

i. Environment Impacts:

- Waste issues: Use of cements and other construction is likely to create waste issues

ii. Social Impacts

- Workers Health and Safety

4.4 Installation of Solar Pump in Phibsoo

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

i. Environment Impacts:

- Waste issues: Use of panels and wires

ii. Social Impacts

- Workers Health and Safety:

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 mitigations measures	Responsibility party	Cost
Activity 1: Restoration to enhance quality and resilience of lowland grasslands				Nu. 1,000,000
1. Risk of forest fire during the prescribed burning	Minor (Short term)	<ul style="list-style-type: none"> • If fire is required as control measure, controlled/ prescribed burning (fire lines, fuel load reduction, backfiring etc.) will be carried out; <p>Precondition: Time of prescribed burning should be informed to site in charge.</p> <p>During Improvement:</p> <ul style="list-style-type: none"> • Avoid unnecessary grassland fires • Prescribed burning to be done in morning 	Range Office	To be incorporated in activity budget
2. Risk of introducing invasive grasses	Minor (Short term)	<ul style="list-style-type: none"> • Assess appropriateness of species in terms of biodiversity, water efficiency, forest fire, local needs, cultural sensitivity, survival, etc; • Ensure that only native species are planted; and • Regular weeding and control measures need to be carried out. Biological control measures (broadcasting desired species) need to be emphasized; and • Invasive species if grown at the site shall be uprooted and burned properly (without seed 	NCS Section, BFL Focal, Range Office	To be incorporated in activity budget

		proliferation).		
3. Risk of fire burns during the prescribed burning	Minor (Short term)	<ul style="list-style-type: none"> Comply with the workers' health and safety guidelines and comply with measures identified under sl. no. 4. 		To be incorporated in activity budget
4. Occupational health and safety of the workers	Minor (Short term)	<ul style="list-style-type: none"> Follow the workers' health and safety guidelines as attached to the ESMP (BFL guidelines); Ensure regular health screening for the workers pre and during activities; Ensure that no underage workers, or children are engaged; Decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers; Workers are employed on the principle of equal opportunity and fair treatment, and there is no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, job assignment, termination of employment or retirement, and disciplinary practices; and A grievance mechanism for workers to raise work place concerns should be in place. 	Site In charge	To be incorporated in activity budget
Activity 2: Maintenance of Patrol Route				Nu. 500,000
1. Waste generation for the construction materials for causeways		<p>Pre-maintenance: Requirements for appropriate waste management should be included in work order.</p> <p>During Maintenance: Segregation of different waste types at work site (soil, cement, sand, and food, plastic etc.);</p> <ul style="list-style-type: none"> Provide proper container and waste bins at project sites; 	BFL Focal	To be incorporated in bidding document

		<ul style="list-style-type: none"> • Waste dumping beside designated sites prohibited; • Waste disposable and dumping done weekly; • Concept of Reduce, Reuse and Recycle must be followed and implemented; and • Burning of waste will be prohibited. 		
2. Dust generation during construction	Minor (Short term)	<ul style="list-style-type: none"> • Precondition: Requirement to limit emission should be included in work order and site in charge should be well informed. • During maintenance: Patrol route, materials and vehicles should be water-sprayed on dry and windy days. BFL focal and concern section 18; • Fitness and emission test of the vehicles shall be performed; • Ensure there is use of protective masks for the workers in dust; • Vehicles speed must be regulated in dust areas; and • Vehicles and machines maintenance are done regularly to reduce the leakages of motor oils and emissions. 	BFL Focal	To be incorporated in bidding document
3. Occupational health and safety of the workers	Minor (Short term)	<ul style="list-style-type: none"> • Follow the workers' health and safety guidelines as attached to the ESMP (BFL guidelines); • Ensure regular health screening for the workers pre and during activities; • Ensure that no underage workers, or children are engaged; • Decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers; 	BFL Focal	To be incorporated in bidding document

		<ul style="list-style-type: none"> Workers are employed on the principle of equal opportunity and fair treatment, and there is no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, job assignment, BFL Focal and site in charge 20 termination of employment or retirement, and disciplinary practices; and A grievance mechanism for workers to raise workplace concerns should be in place. 		
Activity 3: Implementation of Nichula Watershed Management Plan - construction of water reservoir tank				Nu. 2,000,000
1. Waste generation	Minor (Short term)	<ul style="list-style-type: none"> Include waste collection procedures in contract agreement; Monitor construction sites by the monitoring in charge Provide proper container and waste bins at project sites; Concept of Reduce, Reuse and Recycle must be followed and implemented; and Burning of waste will be prohibited. 	Nichula Range	To be incorporated in bidding document
2. Worker's health and Safety	Minor (Short term)	<ul style="list-style-type: none"> Follow the workers' health and safety guidelines as attached to the ESMP (BFL guidelines); Ensure regular health screening for the workers pre and during activities; Ensure that no underage workers, or children are engaged; Decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers; 	Site In-Charge	To be incorporated in bidding document

		<ul style="list-style-type: none"> Workers are employed on the principle of equal opportunity and fair treatment, and there is no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, job assignment, termination of employment or retirement, and disciplinary practices; and A grievance mechanism for workers to raise work place concerns should be in place. 		
Activity 4: Installation of Solar Pump in Phibsoo				Nu. 800,000
1.Waste generation	Minor (Short term)	<ul style="list-style-type: none"> Cleaning regularly and brief in charges to collect e-waste after completion of daily assigned task; Provide proper container and waste bins at project sites; Waste dumping beside designated sites prohibited; Concept of Reduce, Reuse and Recycle must be followed and implemented. 	Phibsoo Range	To be part of the activity cost
2. Worker's health and Safety	Minor (Short term)	<ul style="list-style-type: none"> Follow the workers' health and safety guidelines as attached to the ESMP (BFL guidelines); Ensure regular health screening for the workers pre and during activities; Ensure that no underage workers, or children are engaged; Decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers; Workers are employed on the principle of equal opportunity and fair treatment, and there is no discrimination with respect 	Phibsoo Range	To be part of the activity cost

		<p>to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, job assignment, termination of employment or retirement, and disciplinary practices; and</p> <ul style="list-style-type: none"> • A grievance mechanism for workers to raise work place concerns should be in place. 		
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6. ESMP Implementation arrangements

The implementation of project activities will be carried out by the BFL focal person in PWS. The focal person will be responsible for compliance with 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 PA will sign with the Contractor(s) for implementation of the planned activities in PWS in 2023. The contractor/site in charge 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/ work implementers for all workers prior start the project activities and prior any specific tasks with high health risks.

The PWS's Supervising Engineer needs to monitor the implementation of proposed measures by the Contractor and Contractor's subcontractors with visual 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 noncompliance should be reported to the ESS consultants immediately, and the ESS consultants will report it to the PCU (M&E Officer). Non-compliance should be closed with appropriate measure/s and the evidence should be kept.

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

7. ESMP monitoring arrangements

The BFL focal person in PWS will closely monitor the implementation of all planned activities and the required mitigation measures, and ensure that they fully comply with this ESMP and with the terms and conditions included in the environment clearances issued by RGoB's national authorities. PWS's PA is also fully responsible for the compliance of all external contractors and service providers working in the PWS with the safeguards requirements outlined in the ESMP. The monitoring of activities under this ESMP will be carried out in the following manner:

Sl. No.	Activities	Monitoring team	Timeline		Location	Means of Verification
			Start	Complete		
1	Restoration to enhance quality and resilience of lowland grasslands	Field Focal	January 2023	December 2023	Phibsoo outpost	Field visits and reports
		ESS Focal	June 2023	June 2023		Field visits and reports
		BFLFS	January 2024	January 2024		Reports
2	Maintenance of Patrol Route	Field Focal	January 2023	December 2023	Phibsoo outpost	Field visits and reports
		ESS Focal	June 2023	June 2023		Field visits and reports
		BFLFS	January 2024	January 2024		Reports
3	Implementation of Nichula Watershed Management Plan - construction of water reservoir tank	Field Focal	January 2023	December 2023	Nichula	Field visits and reports
		ESS Focal	October 2023	October 2023		Field visits and reports
		BFLFS	January 2024	January 2024		Reports
4	Installation of Solar Pump in Phibsoo	Field Focal	January 2023	December 2023	Phibsoo	Field visits and reports
		ESS Focal	September 2023	September 2023		Field visits and reports
		BFLFS	January 2024	January 2024		Reports

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 report 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

Activities under this ESMP will be implemented by the BFL focal person, supervising engineer, and contractor that will employ workers as mentioned in the contract agreement. The budget for the activities are as bulleted below;

Sl. No.	Activity	Amount (Nu.)	Budget for ESS mitigation
1	Restoration to enhance quality and resilience of lowland grasslands	1,000,000	To be part of the activity cost
2	Maintenance of Patrol Route	500,000	To be part of the activity cost
3	Implementation of Nichula Watershed Management Plan - construction of water reservoir tank	2,000,000	To be part of the activity cost
4	Installation of Solar Pump in Phibsoo	800,000	To be part of the activity cost
	Total	4,300,000	

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

This ESMP has been prepared in a participatory manner, and a community consultation was carried out on the following dates and location to inform local communities regarding the planned project activities, solicit their opinions, and enable them to question proposed mitigation measures. The main issues that were raised during the consultation meeting include the following:

- ❖ **Patrol Route Maintenance:** Due to COVID 19 restrictions, meetings and consultations were not allowed. However, main bodies of community including local leaders (Tshokpa, Mangmi and Gup) were informed about the works that needed to be carried out in PWS via PWS/ADM/2020-2023/ dated 15th February 2022. The notification assisted in managing of labors and help in addressing grievances to public as per earlier. Moreover, past experiences show good story of effective community coordination with the work as it is win-win measure. Since the site for activity is the same, there isn't a need for a separate meeting.
- ❖ **Management of Lowland grassland:** Consultation was held on 6/12/2019 for Nichula and 27/01/2020 for Singye gewog on importance of grassland management, waterholes and forest management to Nichula and Singye gewog. The notification on similar kind of activities to the public are issued with letters PWS/FPES/2020-2023/ 315. The activity site being in the same location for implementation will not have any impacts on community.
- ❖ **Implementation of Watershed Management Plan (Construction of Reserve Tanks):** Consultation meeting on integrated watershed management plan was conducted with all five chewogs of Nichula Gewog. The activity is included in watershed management plan of PWS.
- ❖ **Installation of Solar Pumps:** Consultation was held on: 29/11/2019 for Nichula and 27/01/2020 for Singye gewog on awareness on waterholes restoration grassland management and forest management. Moreover, notification of similar kind of activity conducted were issued to the public with letter PWS/FPES/2020-2023/315. Moreover, it has been included in management plan of PWS on waterhole management section.

The detailed minutes of the consultation meetings are attached to this ESMP, along with a full list of participants (disaggregated by gender and age).

The full English version of this ESMP, as well as an executive summary in Bhutanese, shall be disclosed on the website of MoENR and WWF, Bhutan Program. Hard copies of the ESMP should also be available at the PA Management Office and at the PCU Office.

10. Stakeholder engagement plan

The local community that resides in the vicinity of the planned BFL activities in PWS will be engaged throughout the implementation of these activities.

Management of Lowland Grassland

Dates of Consultation: 6/12/2019 for Nichula and 27/01/2020 for Singye gewog

Agenda: Conservation awareness on importance of grassland management, waterholes and forest Management

Location: Nichula and Singye Gewog

Notification on similar kind of activities issued as per **PWS/FPES-01/2020-2023/315**

Feedbacks and Issues raised during public Consultation

PWS has completed year four without a single issues raised by people regarding BFL funded activities. Rather, most people share their agreement on the importance of habitat management to their livelihood and wildlife. They believe management of grassland effectively assist for wildlife and cattle forage besides creating job opportunities to community during implementation. Moreover, habitat enrichment activity like saltlick enrichment, waterhole creation and habitat enrichment are believed by the people to be reducing human wildlife conflict. People shared the stories in past when forest is filled with fodder trees and waterholes, the correlation of HWC was very minimum. Implementation of BFL activities are the hopes of people to bring back that minimum HWC correlation. Besides that, conservation awareness increases the knowledge on the importance of wildlife and environment to the society. People shared their support for work implementation.

Construction of Reserve Tanks:

Date of Consultation: Consultation for construction was done on 2/4/2022-6/4/2022

Location: Nichula

Agenda: Integrated Watershed Management Plan development

Notification on Construction of activity **PWS/ADM-03/2021-2022/407**

Community Feedback:

During the consultation meeting on the development of the integrated watershed management plan 2022, residents of five chewogs shared the need of reserve tanks in their water sources to address water insufficient issues. They shared that with these reserve tanks, the issue of multiple tapping points and water scarcity will be addressed. The community members also shared their support during the work implementation.

Annexure 1

List of participants (disaggregated by gender and age) for the consultation

APA Progress, FNCR 2017 Review, BFL Five Year Target setting, Pre-consultation (zonation) and E-Pems Awareness Meeting

Venue: Nichula Range

Date: December 4th 2019



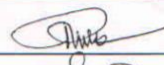
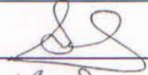

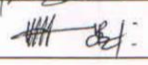
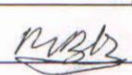
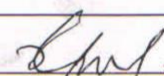
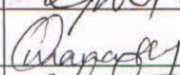
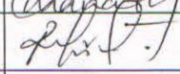
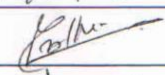
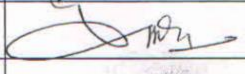
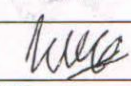

Sl. No.	Name of Participant	Gender		Designation	Signature
		Male	Female		
1	Laxji Rabten	✓		PM, PWS	
2	Wangchuk Chidup	✓		PRO	
3	Chitren Wangden	✓		Sr. FR	
4	Phuntsho Tobgay	✓		Sr. FO	
5	Kencho Rigzin	✓		F.O.	
6	Laxman Tamang	✓		Sr. FR	
7	Tashi Phuntsho	✓		FR-II	
8	Karma Chedup	✓		FR-II	
9	Tenzel Wangdi	✓		FR-II	
10	Shewab Dorji	✓		Driver	
11	Sonam Dorjee	✓		AA I	
12	Nangay Dorji	✓		Asst. fr.	
13	Karma	✓		- " -	
14	Chandra Maya Gurung		✓	Caretaker	
15	Sanja Zangpo		✓	Adm. Asst.	
16	Lynza Nulor	✓		FO	
17	Deki Teshey		✓	Sr. FR	

14 3

Public Consultation for Local Forest Management Plan Preparation

Venue: Nichula Range





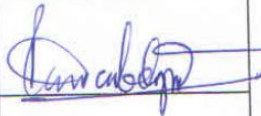





Date: December 5th 2019





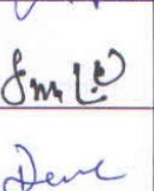
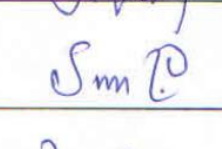
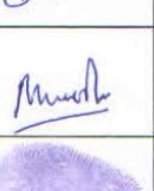
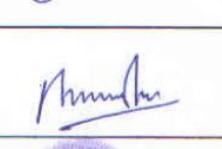



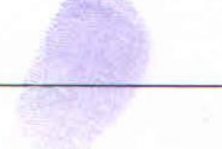








Sl. No.	Name of Participant	Gender		Village	Signature
		Male	Female		
1.	Karna Bdr. Powrel	✓		Dangrebu	
2.	Toya Nath	✓		Dangrebu	
3.	Bal Bdr. Bista	✓		Alley	
4.	Nar Bir Gurung	✓		"	
5.	Ganga Man Karki	✓		Dangrebu	
6.	Purna Bdr Bista	✓		Dangrebu	
7.	Kumar Karki	✓		"	
8.	Dhak Bdr Bista	✓		Dangrebu	
9.	Man Bdr. Bhandari	✓		Alley	
10.	Saraswati Adhikari		✓	"	
11.	Rajna Sdr. Powrel	✓		Katana	
12.	Pranath Bhattarai	✓		Danchura	
13.	Rajesh Monga	✓		Gangtokha	
14.	Kharaka Bdr. Chhetri			Gangtokha	
15.	Biswajit Rai	✓		Daragan	
16.	Bhimraj Limbu	✓		Gangtokha	
17.	Lala Bdr. Khatri	✓		Gangtokha	
18.	ASH Bdr. Tamang	✓		Karpheling	
19.	Ganga Bir Gurung	✓		Soluday/Mangdelip	

18 1

Sl. No.	Name of Participant	Gender		Designation	Signature
		Male	Female		
20	Tit Bdr. Majhi	✓		Apagachi/Omchungang	
21	Ashi Kumar Majhi	✓		Hangtoteha	
22	Aita Raj Limbu	✓		Omchungang	
23	Kabi Raj Gurung	✓		Yampheling	
24	Pendel Wangdi	✓		FR-II	
25	Karma Chedup	✓		"	
26	Yueing Nidup	✓		Sr. FR	
27	Linga Nambu	✓		FO	
28	Phutcho Takyang	✓		Sr. FO	
29	Kenecho Rigzin	✓		FO	
30	Sorji Rabten	✓		FM	
31	Sanam Dorjee	✓		AA I	
32	Sangga Zaymo		✓	Adm. Asst.	
33	Chiku Wangdi	✓		Sr. FR	
34	Tashi Phuntso	✓		FR-II	
35	Laxman Tany	✓		Sr. FR	
36	Karma	✓		Asst. Forester	
37	Chandra Maya		✓	Caretaker	
38	Shroto Dey	✓		Driver	
39	Deki Yedney		✓	Sr. FR	
		17	3		
		38	4		


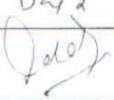






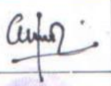
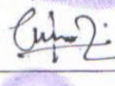


17 3

Watershed Consultation Meeting at Kataray 3 Saturday.					
SL.No	Name	Male	Female	Day 1	Day 2
1.	Tashi Phuntscho	✓			
2	Narapati Adhikari	✓			
3	Tulsi Ram Dhakal	✓			
4	Khemprasad Adhikari	✓			
5	Bikash Powrel	✓			
6	Amber Bdr. Bista	✓			
7	Padam Bdr. Gurung	✓			
8	Ratna Bdr. Powrel	✓			
9	Sukeraj Gurung	✓			
10	Chaital Adhikari	✓			
11	Taramra Gurung	✓			
12	Nar Bdr Gurung	✓			
13	Kabiraji Gurung	✓			
14	Bhim Nath Kafley	✓			








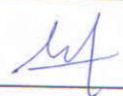


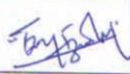
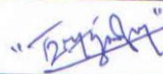




SL.No	Name	Male	Female	Day 1 (15)	Day 2 (15)
15	Khinama Subei		✓		
16	Kenulca Adhikeri		✓		
17					
18	Nardh Rizal	✓			
19	San Man Auring	✓			
20	Devi Charan Rigzal	✓			
21	Mon Maya Rigzal		✓		
22	Hemlal Pownel	✓			
23	Mon Bdr. Pownel	✓			
25	Tam prasad Adhikeri		✓		



Watershed Consultation Meeting with Dangreybug Chowry					
SL.No	Name	Male	Female	Day 1	Day 2
1	Purna Bdr. Bista	✓			
2	Surabir Basnet	✓			
3	Sumitla Basnet		✓		
4	Dilim Basnet	✓			
5	Santi Ram Furagai	✓			
6	Radika Karki		✓		
7	Shyam Kumar Bhattacharai	✓			
8	Dewaki Bhattacharai		✓		
9	Sita Dasjee		✓		
10	Karna Bdr. Karki	✓			
11	Krishna Bdr. Bista				
12	Ghani Maya Maidali		✓		
13	Sarada Pokhrel		✓		
14	Bir Bdr. Rai				

Consultation meeting at Gangtokha					
SL.No	Name	Male	Female	Day 1	Day 2
1	Jasraj Gurung	✓			
2	Purna Bdr. Khatri			Prati	Prati
3	Sujan Limbo			Pura	Pura
4	Chandra Bdr. Biswa	M		SH	SH
5	Biswa Jit Rai	M			
6	Aitany Limbo				
7	Ash Kumar Maji				
8	Chunke Goral		✓		
9	Kharka Bdr. Chhetri	M			
10	Deepak Maya Rai		✓		
11	Naini Maya		✓		
12	Budhi Man Rai		✓		
13	Rajesh Mongar	M		dehi	dehi
14	Deewar Rai	M		Deja	Deja

SL.No	Name	Male	Female	Day 1	Day 2
16	Jagath Gurug	✓			
16	Marita Bdr. linau		✓		
17	Alin Man. Icani	✓			
18	Bhim Raj Limbo	✓			
19	Ganga Bdr. kani	✓			
20	Lal Bdr. kheti	✓			

Waterried Consultation Meeting at Dameluna.

SL.No	Name	Male	Female	Day 1	Day 2
1	Tashi Phuntso	✓			
2.	Omrath Shetkar	✓		Cumnaty	Cumnaty.
3.	Janga Bdr Gurung	✓		Janga	Janga
4	Mani Kumar Bhandari	✓			
5	Koina Devi Chetwar		✓		
6.	Asher mathi		✓	uifi	uifi.
7	Monik Gurung		✓		
8.	Meenuka Sharma		✓	Me:	Me:
9.	Prem Mishra	✓			
10.	Tanka Bdr Karki	✓		Tanka	Tanka
11	Tulashi Dulal	✓			
12	Dilli Bdr Bista	✓			
13	Duk Bdr. Bista	✓		DB.	DB.
14.	Birxpati Adhikari	✓			

SL.No	Name	Male	Female	Day 1	Day 2
15	Jagad Gurung	✓			

Annexure 2

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 of 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 in 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