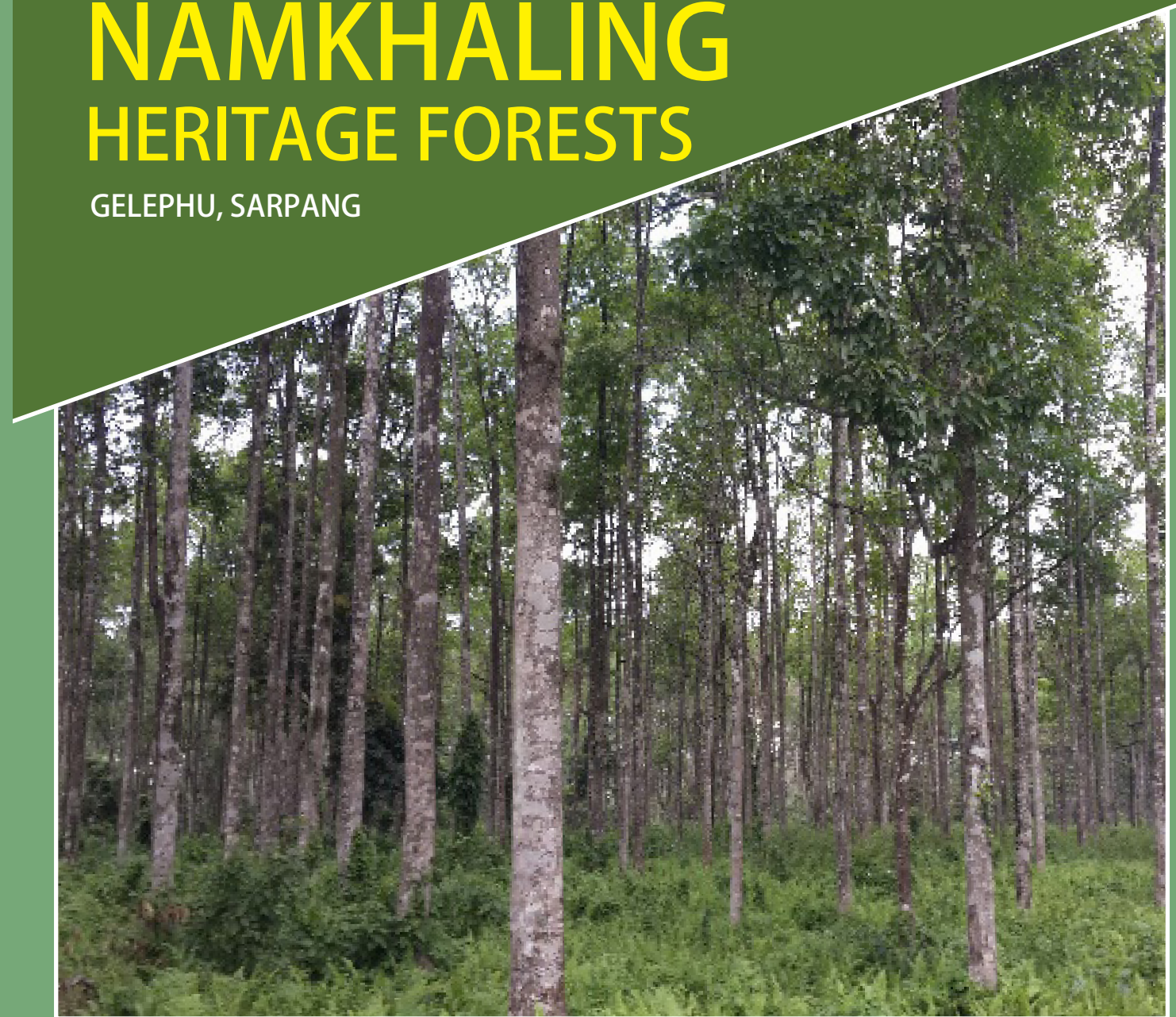


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# MANAGEMENT PLAN FOR NAMKHALING HERITAGE FORESTS

GELEPHU, SARPANG



Divisional Forest Office, Sarpang  
Department of Forests and Park Services  
June 2017

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# MANAGEMENT PLAN FOR NAMKHALING HERITAGE FORESTS (GELEPHU, SARPANG)



Divisional Forest Office, Sarpang  
Department of Forests and Park Services  
June 2017

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## **Acronyms and abbreviations**

RGoB	Royal Government of Bhutan
MoAF	Ministry of Agriculture and Forests
DoFPS	Department of Forests and Park Services
NCD	Nature Conservation Division
WMD	Watershed Management Division
BTFEC	Bhutan Trust Fund for Environmental Conservation
HF	Heritage Forests
DFO	Divisional Forest Office.
PAs	Protected Areas
CF	Community Forests
SRFL	State Reserve Forests Land
TAC	Technical Advisory Committee
FYP	Five Year Plan

## **Glossary of Bhutanese terms**

Dzongkhag	District
Thromde	Municipal
Gewog	Administrative block under the District
Chiwog	Sub-block under a block
Gup	Head of a block
Tshogpa	Head of a sub-block
Thrompon	Municipal head



## FOREWORD

For centuries, Bhutanese have treasured the natural environment and have looked upon it as the source of all life. This traditional reverence for nature has delivered Bhutan into the 20<sup>th</sup> century with an environment still richly intact. The country wishes to continue living in harmony with nature and to pass on this rich heritage to its future generations.

Bhutan has declared protected area (PAs) network covering almost 52 percent of the geographical area. Although substantial area has been declared as PAs, significant areas outside Protected Areas are under increasing threat from various anthropogenic activities. Often small patches of forest or ecosystems lying within a community, which harbours huge ecological and cultural values, are threatened by intentional or unintentional human activities. Thus it is imperative to identify these small areas to bring them under protection and conservation management regime. In this regard, an approach has been developed by the Government in the 11<sup>th</sup> FYP to declare several small areas as Heritage Forests (HF). The establishment of HF in the country will be part of very significant conservation efforts in Bhutan – ensuring balance between humans and nature.

This management plan is developed with an overall objective to protect the existing forests, preserve rich diversity of flora/fauna, provide recreational/educational facilities, rehabilitate degraded forest ecosystem, provide critical ecological services like watershed protection, carbon sequestration, regulate local climate, improve drinking water qualities, conservation of biodiversity and ultimately to serve as **green lungs for Gelephu town**.

I would like to congratulate Divisional Forest Office, Sarpang for coming up with the management plan for Namkhaling Heritage Forest and NCD for the technical support. I sincerely hope that all stakeholders will successfully implement the identified activities towards sustaining resources for present and future generations.



Phento Tshering,  
**Director,**  
Department of Forests and Park Services.



## Executive Summary

An area of 333.6 acres at Namkhaling (Namkhaling Demkhong, Gelephu Thromde, Sarpang), below Gelephu domestic airport has been identified as Heritage Forest. It is located between 26° 51' 57.67" to 26° 52' 52.31" N and 90° 27' 38.56" to 90° 28' 39.83" E. The Sarpang-Gelephu high way forms the northern boundary and the Indo Bhutan international boundary forms the southern boundary of the HF. The altitude of the HF ranges from 229 to 283 masl.

This is the first management plan for Namkhaling HF. This HF Management Plan deals with conservation and management of Namkhaling HF and its surrounding forest. Accordingly this management plan has been developed to provide long-term conservation goal which particularly addresses the sustainability of the ecosystem services, NWFP, recreation, education and conservation of watersheds. It shall also act as a guiding document which will protect the area from undesirable developmental activities and encroachment.

Participation of local communities is an integral part of the planning process. Therefore, the approach adopted is based on participatory planning. Several consultations were conducted with the local communities, Thromde, Dzongkhag administration and other relevant stakeholders. The management plan is developed for 10 years (July 2018-June 2028) and it will be revised after completion of plan period.



## ACKNOWLEDGEMENT

Divisional Forest Office, Sarpang, DoFPS, MoAF would like to extend our gratitude to the following stakeholders for their support during entire process of writing this management plan:

1. Dzongkhag administration, Sarpang.
2. Thromde administration, Gelephu.
3. Gewog administration, Samtenling.
4. Local communities of Samtenling Gewog.
5. Local communities of Namkhaling.
6. Other relevant stakeholders.

Further, Divisional Forest Office, Sarpang would like to acknowledge the financial support from Bhutan REDD+ readiness project and necessary technical support from NCD.

Therefore, DFO, Sarpang would like to thank the Ministry and Department for the management support and policy direction. In addition, many thanks are due to all the institutions and individuals involved in the whole process of management planning.

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## Concept and Background

The Protected Areas network of Bhutan consists of five national parks, four wildlife sanctuaries and one strict nature reserve covering around 52 percent of the geographical area. Although substantial area has been declared as protected areas, significant areas outside protected areas are under increasing threat from various anthropogenic activities. Often small patches of forest or ecosystems lying within a community, which harbors huge ecological and cultural values, are threatened by intentional or unintentional human activities. Thus it is imperative to identify these small areas to bring them under protection and conservation management regime. In this regard, an approach has been developed by the RGoB in the 11<sup>th</sup> Five Year Plan (FYP) to establish several such small areas as national Heritage Forests (HF).

HF is a forest surrounding cultural, religious or historical sites with significant ecological and cultural values that are under increasing threat from anthropogenic pressure. It might be declared to protect the natural forests and rehabilitate degraded forest areas around monasteries, religious or spiritual sites, important monuments, lakes, critical watersheds, etc. Agriculture and livestock are the main sources of livelihood for over 80% of Bhutan's population, and many households practice subsistence mixed farming. Their livelihoods depend directly on the clean water provided by the relatively well-preserved forests and appropriate watershed management practices. In addition, intact forests help regulate water through reduced erosion, slower runoff, and better aquifers' recharge. These services are critical to the country's resilience to increasing climate change impacts - especially those affecting forests and water supplies, such as increasing variability, frequency and intensity of extreme weather events like heavy downpours and droughts.

The RGoB reserves the right to protect and preserve any critical ecosystems for the benefit of the local community and nation at large. As per Forest and Nature Conservation Act 1995, Chapter 6, section 21(A), *“The Royal Government may declare any land in the country to be a National Park, Wildlife Sanctuary, Wildlife Reserve, Nature Reserve, Strict Nature Reserve, Protected Forest, Research Forest, Conservation Area, Cultural or Natural Heritage Sites, Biosphere, or other category of Protected Area for the preservation of areas of natural beauty of national importance, protection of biological diversity, management of wildlife, conservation of soil and water and related purposes”*

The concept was further felt crucial on few incidences recorded a few years ago when the forests below Phajoding monastery in Thimphu were to be harvested to meet timber demands for construction of Wangditse temple located at the edge of the forested area. Phajoding is a sacred site and falls within water catchment area of Thimphu River and many streams that fed to the drinking water supply of the major portion of Thimphu, the capital city of Bhutan. However, the proposal posed huge ecological risk and at the same time affects the sanctity of national cultural heritage of Phajoding monastery. The potential adverse impacts to the area have not gone unnoticed when World Monument Fund (WMF) has enlisted Phajoding monastery as one of the five most endangered cultural monuments in need of help.

NCD with the guidance from DoFPS and MoAF developed a concept on identification and operation of HF in the country. Based on the set criteria's, all Dzongkhags and TFD were informed to submit list of potential sites in consultations with respective local communities which could be established as Heritage Forests.

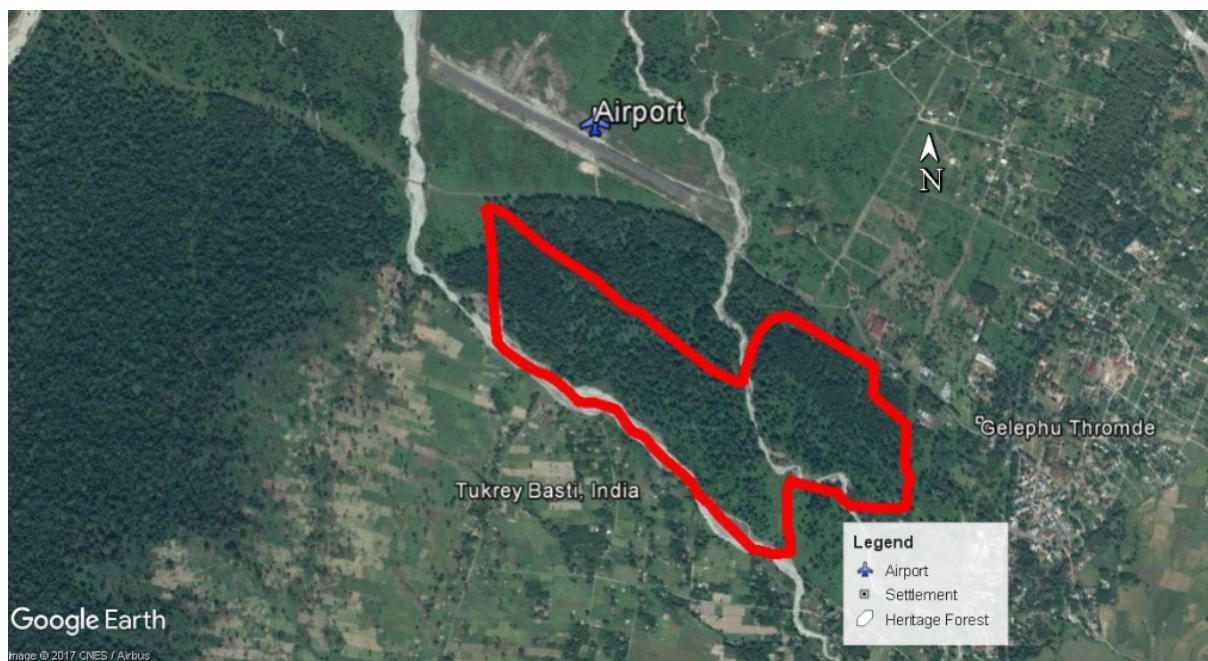
Participation and support of Dzongkhag and local government were an integral part of identification and selection process. Therefore, participatory planning and consultations were conducted with local government leaders, local communities and other relevant stakeholders. The issues and management intervention identified during the consultations and field surveys are incorporated in the current management plan. The management plan of HF shall be implemented by DFO, Sarpang. The plan also emphasizes the importance of monitoring & evaluation processes. A workable mechanism is recommended for regular monitoring and periodic evaluation of the implemented activities during the plan implementation. A final evaluation of the plan is proposed as a mandatory process to verify that the expected outcomes and outputs from the implementation program were achieved as planned.

As a pilot project, in the year 2016 with the funding support from the Bhutan REDD+ Readiness project, World Bank, NCD started working on 6 HF in six different Dzongkhags. WMD facilitated the fund and necessary technical support where possible. Based on the experience of pilot sites, remaining 14 sites will be explored in other Dzongkhags in 2017 and 2018 with the plan by the end 11<sup>th</sup> FYP, the Department would have established 20 HF nationwide.

## 1 Description of Namkhaling Heritage Forests

### 1.1 Area and location

Namkhaling HF is located within Gelephu Thromde and Samtenling gewog comprising total area of 333.6 acres. This patch of forest has been set aside as green zone in the Thromde master plan and will serve as the “Green lungs for Gelephu Thromde”. The HF falls within the State Reserve Forest Land (SRFL) under the administrative jurisdiction of Gelephu Thromde and Samtenling gewog.



The altitude of HF ranges from 229 to 283 m.a.s.l The HF falls inside the plantation area which was created in early seventies

### 1.2 Climate

HF is located in the sub-tropical climatic zone of the Bhutan. Based on the records of Hydromet Division for one year 2016, annual maximum temperature was recorded 36 degree Celsius in the month of August with minimum of 17 degree Celsius in the month of January. The annual maximum rain fall was recorded 324 mm in the month of July and minimum 0.2 mm in the month of January.

### 1.3 Demography and Socio-economic features

The Gelephu Thromde has 6 Demkhongs with population of 9199 (PHCB, 2005). Samtenling gewog has 5 chiwogs and 652 households with total population of 5819 (source: gewog profile, 2012). The people of Namkhaling Demkhong under Gelephu Thromde are mostly engage in commercial activities and some are engage in agriculture. However, the livelihood of Samtenthang village depends on agriculture crops and livestock such as poultry, fishery and

piggery. The main crops cultivated in the villages are rice, maize and cash crops such as cardamom, Oranges, Litchi, and Banana including vegetables.

There are four schools within Thromde and one school under Samtenling gewog ranging from primary to higher secondary. One Regional hospital in Gelephu and one basic health unit in Samtenthang. The gewog has one community forest established since 2006. Moreover, the places are facilitated with road networks, communications and electricity.

## **2 Current Status of Biodiversity and livelihood of Namkhaling Heritage Forests**

### **2.1 Methodology**

The following methods are used to collect biodiversity information;

#### **2.1.1 Vegetation Survey**

The systematic sampling method is used to survey the vegetation coverage. The total of 24 sampling plots was laid with the intervals of 200m between plots. Each sampling plots is size of 20m x 20m and it was used for tree survey. Within same plot, a size of 2m x 2m plot at the center was used for shrub survey and diagonal corners of same size of 2m x 2m was used for herb survey. Species basal area (BA, cm<sup>2</sup>) was calculated from DBH data of tree individuals and calculated the relative proportion of each species' basal area in percent (Relative Basal Area, RBA %). Species diversity and richness were calculated from RBA using Shannon-Weiner index (H').

#### **2.1.2 Avi-fauna Survey**

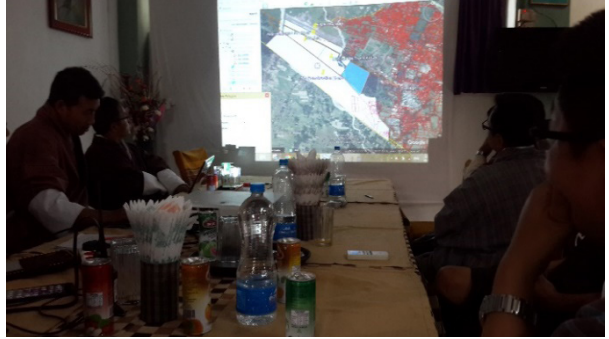
The transect line method was used for bird survey. A transect line of 200 m was laid within the plot. Along the transect line, the sighting of different birds was recorded. For mammals, based on the evidence, the survey was carried out within the plot.

#### **2.1.3 Socio-economy Survey**

The consultation meetings with various stakeholder was conducted to sensitize the concept of Heritage Forest and to collect the information on socio-economy. The following methods were used:

- Step 1: The first consultation meeting was with Thromde administration to sensitize on HF concept. It was also to seek their consensus on the declaration of HF in proposed area within Thromde's jurisdiction. The participants included Thrompoen, Division heads and Demkhong Tshopa. In second consultation meeting, the area for HF was finalized and mapped after Thromde's approval.
- Step 2: The consultation meeting with the Dungkhag and Gewog administration was conducted to also sensitize the concept of HF. The proposed area for HF was finalized.
- Step 3: Key Informant Interviews (KIIs): A total of 48 individuals were interviewed to collect social information using PRA tools.

The draft reports was prepared and presented to the stakeholders. Their feedbacks and comments were incorporated in the report.



*Photo: Consultation meeting with stakeholder and field inventory*



*Photo: HF draft presentation to the stakeholder*



## 2.2 Data Analysis

### 2.2.1 Vegetation diversity

Floristically, a total of 23 tree species belonging to 17 families were recorded. The dominant families were Magnoliaceae (24), Combretaceae (13) and Euphorbiaceae (9). Based on relative basal area, the dominant species were *Mechelia champaca*, *Terminalia myriocarpa*, *Albizia lebbeck* and *Tetrameles nudiflora*. The understory recorded 45 species were dominant species are *Pteridium spp*, *Corton caudatus*, *Tabernaemontana*, *Chromolaena odorata*, *Piper spp.*, *Clerodendrum spp.*, and *Mikania cordata*. Regeneration of 7 species of tree were recorded namely, *Albizia procera*, *Cinnamon sp.*, *Litsea monopetala*, *Michelia Champaca*, *Talauma hodgsonii*, *Terminalia myriocarpa*, *Trewia nudiflora*.

### Forest structure attribute

The structure of the forest were same all over the HF due to plain area. The tree with maximum DBH of 114cm was attained by *Tetrameles nudiflora* and maximum height was *Michelia Champaca* with 30.48m. In the HF, the total basal area is 13165.647m<sup>2</sup> of tree species were recorded and total volume of tree species were 6168.40 m<sup>2</sup>.

### Floristic diversity

Based on Shannon diversity index (H'), the total of tree species diversity is 1.19 and the dominant trees were *Mechelia champaca* with RBA of 27.19% followed by *Terminalia myriocarpa* with RBA 22.45%. The presence of least diversity and species richness clearly indicated that there is high presence of illegal logging both from Bhutan and India border. It also indicated that, the HF area should constantly monitored by using SMART patrol and needs to be protected from the development activities to sustain the remaining forest for green lungs of Gelephu town.

### 2.2.2 Mammal and Avifaunal Diversity

As reported by local community during the PRA exercise, revealed that there is presence of tiger and spotted deer but they said that not seen presence of two species today. Other wildlife like snakes, lizards, leeches and frogs are also seen in that area. The survey result revealed the presence of Golden languor, Squirrel, Asian elephant, wild boar, Barking deer, Monkey, Hare, porcupine, Civet, Gaur, Yellow throated marten and Indian pangolin (annexure IV).

As per the PRA exercise, the community said that it is good habitat for migratory birds in HF. Bird survey was conducted and found that bird diversity and species richness within HF were comparatively good. A total of 48 species of birds were recorded (annexure V). The dominant bird species recorded were red vented bulbul followed by jungle myna and oriental turtle dove.

## 2.3 Dependence on Forests and its resources

HF is situated adjacent to international boundary. The forest benefits to both national and Indian communities. It prevents soil erosion and flash flood towards neighboring Indian communities during monsoon.

The people of Namkhaling Demkhong and Samtenthang chiwog depend on HF for timber, grazing, firewood and NWFPs.

#### **2.4 Perception of Heritage Forests on the economy, social, culture and environment.**

The information gathered through the public consultation and PRAs, have been summarized to view the perceptions of people on HF based on these three aspects;

1. Economy
2. Social and education
3. Environment

##### **2.4.1 Economy**

The Thromde, local government, local community and other respondents are of the opinion that by having HF will bring positive benefits to the people in near future. The HF could be promoted as recreation and tourism site for locals and foreigners. With such promotion, income and employment opportunities and promotion of local goods / services could be enhanced.

##### **2.4.2 Social and Education**

The declaration of HF will help in promoting educational programs for the students such as on importance of conservation and protection of forest. Aside from that, the HF can be used as a site for birding, biking, and other recreational activities.

##### **2.4.3 Environment**

Heritage Forests is a “Green Lungs” to the Thromde. It’s the only remaining patch of forest adjacent to the main town. With the ongoing development activities and rapid increase in number of automobiles, the town is being polluted by green-house gases. Therefore the HF can help to protect critical ecological services like biodiversity conservation, water catchment protection, carbon sequestration and regulating local climate.

The only negative concern shared by the communities in relationship to the HF is increase in human-wildlife conflicts. Excess visitation by tourist can also generate more waste in the forest and along the trail route if not controlled properly.

However, an information revealed mostly positive and only few negative perceptions of HF in relationship to economic, social and environmental benefits.

##### **2.4.4 Willingness to support on establishment of Heritage Forests**

From consultation and survey with Thromde, Dungkhag, Local Government, and local community found positive perspectives and are willing to support the establishment of Namkhaling HF in Sarpang Dzongkhag.

### 3 Issues in the Namkhaling Heritage Forests

Generally, the condition of the HF is good with relatively high vegetation coverage and low deforestation. However, development activities are increasing around the HF due to construction of farm roads, town expansion, extraction and illegal logging. The following issues were identified during the consultation with Dzongkhag and Gewog officials and validated in the field in discussion with the communities:

#### 3.1 Forest Degradation

The forest degradation in HF is the major concern. The HF boundary is adjacent to the International border and Gelephu Thromde. The illegal logging and grazing pressure from across the border still prevails. And the expansion of town through development activities may contribute to the degradation of forest in HF. During summer, the frequent diversion of Aipoly stream result in flash floods in HF.

#### 3.2 Waste management problems

The HF was once used as dumping site. Moreover with settlements on adjacent, there is possibilities for increase in amount of waste discarded.

#### 3.3 Human-wildlife conflict

The HF is once called “Hatisar” which means elephant habitat. Till date, the HF harbor numbers of elephant and other ungulates. Human elephant conflicts still exist in the nearby settlements of HF.

#### 3.4 Other conservation threats

From the field surveys and social surveys using standard forms, following threats were identified: wildlife poaching, illegal harvesting of timber, local climatic change, infrastructure development, grazing, forest fire, increasing livestock and human population and others.

### 4 The plan components

#### 4.1 Goal and General Objectives

The DoFPS under MoAF in the 11<sup>th</sup> FYP has set a target of establishing 20 HF in the Country. As part of this requirement, management plans are to be prepared for all Heritage Forests with the various objectives as listed below.

Management plan for the HF will be developed with a general objective to;

1. Protect the natural forests and rehabilitate degraded forest ecosystems around monasteries, religious and spiritual sites, important national monuments, lakes and critical watersheds.
2. Serve as one of the models for conservation and management of natural resources undertaken

by the community.

3. Ensure continuous supply of critical ecological services like watershed protection, carbon sequestration, regulate local climate, and improve water quality and conservation of biodiversity.
4. To present the implementation of management plans of HF as one of the potential strategic options under REDD+ strategy and action plan for conservation and sustainable management of natural resources.

#### **4.2 Specific Objectives of the management plan for HF:**

- To protect forested area adjoining urban centers that serves as green lungs
- To preserve rich diversity of flora and fauna
- To provide recreational and educational facilities to public and students.
- To keep men connected with nature all the time.

### **5 Management Strategies and Actions**

HF management requires a multi-disciplinary approach involving all relevant stakeholders to ensure integrated and holistic planning and implementation. Based on field survey and the issues identified by stakeholders at the Dzongkhag and Geog levels, management strategies and actions were summarized.

#### **5.1 Forest Protection**

A well planned and an effective protection strategy is crucial for curbing illegal activities inside the HF. HF is located near border country of India, there is high chance of exploitation and illegal of natural resource. Regular patrolling and enforcement mechanisms to prevent and stamp out illegal activities in the HF.

##### **5.1.1 Actions recommended:**

- a. A weekly SMART patrolling is recommended inside HF.
- b. Pest and disease management in HF area.
- c. Fire awareness creation in order to prevent the fire from bordering country.
- d. Setting up of signage's for awareness to the public.
- e. Stream embankment to prevent the flooding during the summer.

#### **5.2 Improvement of Biodiversity**

The improvement of the HF biodiversity is important component in the HF area since the existing forest is purely plantation carried out in seventies century. During the biodiversity survey revealed that only few species of tree species were recorded. HF area was dominated by the champ species and ground is fully covered by the bushes and invasive species.

### **5.2.1 Actions recommended**

- a. Plantation (additional native species, bamboo, orchids) to enrichment of forest cover.
- b. Application of silviculture practice to improve the stand and also to prevent from pest and disease.
- c. Habitat management (eradication of weeds, creation of water holes) to prevent from invasion of weeds and waterholes to get enough water to wild animal during dry season.

## **5.3 Waste Management**

The Namkhaling HF is located near the Gelephu town, there is high chance of waste problem in future. In order to reduce the waste problem, undertake an educational program to raise awareness of the inhabitants within the HF on the importance of proper waste management and impacts of dumping solid waste.

### **5.3.1 Actions recommended:**

- a. Put place in dustbin in HF area where there is frequent visit of public.
- b. Put signage to create awareness on waste management.
- c. Development waste management plan and implement accordingly.
- d. Conduct occasional cleaning campaign involving the community, school and another relevant residence.

## **5.4 Recreational Amenities**

The HF was found to be good recreational area for Gelephu Thromde and also to Indian tourist mainly on bird watching, biking and cycling.

### **5.4.1 Actions recommended:**

- a. To construct foot trail and foot path for birding and cycling to the visitors.
- b. To construct resting place (eco-friendly) for the tourist and nature lover.
- c. To establish the park garden for the tourism and educational purpose to the youth.
- d. Construction of toilets and drinking water to the visitors.
- e. Constructions of stone Chortens (Stupa) to preserve culture of Bhutan.

## **5.5 Human-Wildlife Conflict Management**

HWC such as damage to agricultural crops is reported widely by the villages around the HF mainly by the elephant.

### **5.5.1 Actions recommended:**

- a. To formation of quick response team and mobilize during the conflict.
- b. To regulate visiting hours in order to prevent from disturbance to the elephant and other wild animal.
- c. Installation of electric and live fence around settlement to prevent from agriculture crop loses.
- d. Implement community-based livestock and crop insurance scheme in the Gewogs within the Heritage Forest with high HWC issues.

- e. To conduct research on HWC to keep baseline data, identify problems and their causes to develop or recommend interventions for management in future.

## **5.6 Information and data management**

The information and data management is the important component of HF management. There is need of establishment of proper information in place. The information will be collected through research, PRA from the communities, monitoring and management. A database information system at UWICE, NCD and DFO, Sarpang will be maintained and use information will determine the effectiveness of management in the future.

### **5.6.1 Actions recommended:**

- a. Appoint the focal officer to manage and maintain data and information timely.
- b. Procure computer to keep data and information properly.
- c. Maintain data on biodiversity and socio-economic status of the HF
- d. Update and prepare annual reports on the progress and issues within the HF

## **5.7 Research and monitoring**

Research and monitoring were the important tools to assess both social and ecological aspects in the HF area mainly to study the forest structure and composition, health of the forest, richness of species, and disturbances in nature and dependence on forest resources. The research finding will help the management in prescribing management interventions and monitoring within the HF.

### **5.7.1 Actions recommended:**

- a. Recommended to establish observation vegetation plots further analysis for a deeper understanding of the forest ecosystem.
- b. Research on the social status of villages around the HF to understand the relationship and livelihood aspects.
- c. Conduct survey on bird and animal diversity in HF.

## 6 Implementation strategies and financial mechanism

### 6.1 Implementation

The HF operation and management will be carried out by Divisional Forest Office, Sarpang. With support from Gelephu Thromde and Samtenling Gewog. The guidance and support for implementation of the HF plan will be provided by NCD and the approval of the plan shall be sought from the MoAF.

The table below shows the roles and responsibilities of different stakeholder for Namkhaling HF.

Stepwise Activity	Leading Implementing Agency
1. Heritage Forest concept presentation and funding	NCD and REDD+ Readiness
2. Identification area suitable for HF based on the set criteria	District stakeholders including DASHO DZONGDAG, Divisional Forestry Officer, Chairman of local governments including GUP, MANGMI & TSHOGPAS, District Cultural Officers and any other relevant local community and organizations
3. Prioritization of potential HF site.	DFO, Sarpang and District stakeholder
4. A consultation meeting with local stakeholders on proposed HF sites	DFO, Sarpang
5. Further mapping of Heritage Forest site to assess the feasibility	DFO, Sarpang and Stakeholder
6. Biodiversity and socio-economic survey will be conducted to generate baseline information about the site	DFO, Sarpang
7. Development of draft management plan	DFO, Sarpang in collaboration with district stakeholders
8. Draft plan will be submitted to DoFPS for finalization and endorsement by the Department and the Ministry	DFO, Sarpang and NCD
9. Handing over of HF with management plan to the Forest Territorial Division	DFO, Sarpang collaboration with NCD
10. Implementation of Management plan of HF	DFO, Sarpang and Gelephu Thromde
11. Yearly monitoring and reporting of the progress	DFO, Sarpang
12. Public notification on declaring HF	DFO, Sarpang with approval from the Ministry

## 6.2 Funding

As per the activity matrices in annexure I, it is estimated that a sum of Nu. 11.68 million in 10 years will be required to implement the HF management interventions. All the activities will have to be funded by Royal Government of Bhutan (RGoB) as part of their annual plans. However, in case of inadequate or unavailability of funds for implementing HF management activities, the management plan can be used as a basis to solicit funds from RGoB and any other donors. NCD will also facilitate in sourcing budget through donors as well as to ensure the implementation of planned activities.

## 6.3 Monitoring and evaluation

Monitoring and Evaluation is the one of the important components to see the achievement of management objectives and strategic actions outlined in the management plan. The annual monitoring and evaluation result can be adopted to implement management actions accordingly in future to enhance the HF.

The monitoring of the HF is responsibility of DFO, Sarpang in collaboration with NCD, DoFPS, gewog administration Samtenling, Gelephu Thromde and Sarpang Dzongkhag for development interventions and documentation on annual basis.

Reports on the status of the implementation will be produced annually in order to provide progress updates to stakeholders and local communities. In addition, external mid-term reviews and final evaluation will be conducted to assess the overall impact and outcome of the planned activities.

### Monitoring framework for Heritage Forests

#### 1. Vegetation monitoring framework

Method	Metric of focus	Intensity and coverage	Frequency and distribution	Remarks
Photographic monitoring	Land cover change of succession	Selected habitat types	Every three years interval	Vantage point properly chosen
Quadrat sampling technique	Diversity regeneration rate, volume	Different forest types	Every five years	20 m*20 m permanent sampling plots established

#### 2. Wildlife monitoring framework

Method	Metric of focus	Intensity and coverage	Frequency and distribution	Remarks
Photographic monitoring using camera traps	Avifaunal diversity	Selected habitat types	Every three years interval	



Line transect sampling	Prey density, current carrying capacity for predators	Different habitat types	Every three years	
Point sampling method	Avifaunal diversity	Different habitat types	Every three years	
Presence and absence /sign survey	Relative abundance/density	Using permanent transect established	Patrolling	SMART patrolling protocol
Visual observation and social surveys	Diversity, Population status		Once a year	

### 3. Other monitoring indicators

Method	Metric of focus	Intensity and coverage	Frequency and distribution	Remarks
SMART patrolling	Forest fire, illegal activities, waste management	Throughout the area	Regular	SMART routine
Livelihood of people around	Annual Income	Village wise	Twice a year	NSB report, survey
Potential negative impact	Environmental, social, climate		Every three years	Research based

### 6.4 Revision and amendment

This plan is developed for a period of ten years (July, 2017 to June, 2027). The plan will be reviewed and amended by DFO, Sarpang, DoFPS based on feedback from monitoring and evaluation reports. The final evaluation of the plan at the end of the plan period will be the basis for revising the plan in the next planning cycle.

## 1. Annexure: Tables, figures and maps of Heritage Forests

### 1.1 Annexure I. Activities and budget estimate for HF management plan: July 2017 to June 2027

<i>Sl. No</i>	<i>Year (FY)</i>	<i>Activities</i>	<i>Estimates (Nu. in m)</i>
1	2017-27 (10 years)	<i>Inauguration of HF</i>	<i>0.1</i>
		<i>Plantation in barren area (maintenance and creation)</i>	<i>2.5</i>
2		<i>Trail for biking and birding development</i>	<i>0.5</i>
3		<i>Setting up of signage for awareness</i>	<i>0.1</i>
4		<i>Cleaning and thinning in HF</i>	<i>0.3</i>
5		<i>Put place dust bin in HF on waste management and educational information.</i>	<i>0.1</i>
6		<i>Waste management</i>	<i>0.15</i>
7		<i>Resting place development</i>	<i>1.0</i>
8		<i>Park garden development</i>	<i>2.0</i>
9		<i>QRT formation within and around HF</i>	<i>0.05</i>
10		<i>Installation of electric fence/live fence</i>	<i>0.5</i>
11		<i>Procure one computer for focal officer(data entry)</i>	<i>0.05</i>
12		<i>Community based livestock and crop insurance scheme</i>	<i>0.50</i>
13		<i>To conduct research on Fauna and flora</i>	<i>0.2</i>
14		<i>To conduct research on socio status of people living near the HF</i>	<i>0.2</i>
15		<i>To conduct research on HWC</i>	<i>0.2</i>
16		<i>Construct stream embankment</i>	<i>2.0</i>
17		<i>Clearing of underground bushes</i>	<i>0.2</i>
18		<i>Quarterly monitoring</i>	<i>0.3</i>
19		<i>Maintenance of trails</i>	<i>0.3</i>
20		<i>Environmental educational program</i>	<i>0.08</i>
21	<i>Resting facilities maintenance</i>	<i>0.3</i>	
		<b><i>Total</i></b>	<b><i>11.68</i></b>

The Total budget of **Nu.11.68 million** is estimated for period of 10 years.

## 1.2 Annexure II: Regulations within national Heritage Forests

Permitted Activities	Prohibited Activities
Collection of NTFPs	Felling of trees
Regulated Grazing	Mining activities
Scientific Research	
Field excursions and other environmental education related activities	Removal of saplings either in bare root or with ball of earth.
Plantation of native tree species for ecosystem rehabilitation	Introduction of exotic species
Construction of irrigation channels	
Sanitation and silviculture tending operation when found extremely necessary	

### 1.3 Annexure III: List of ground and tree Species

Scientific name	Family name	Scientific name	Family name
<i>Arisaema spp</i>	Araceae	<i>Talauma hodgsonii</i>	Magnoliaceae
<i>Solanum khasiana</i>	Solanaceae	<i>Ailanthus integrifolia</i>	Simaroubaceae
<i>Solanum spp.</i>	Solanaceae	<i>Albizia lebbek</i>	Fabaceae
<i>Adhatota vasica</i>	Acanthaceae	<i>Anthocephalus cadamba</i>	Rubiaceae
<i>Thunbergia laurifolia</i>	Acanthaceae	<i>Bombax ceiba</i>	Malvaceae
<i>Amaranthus spinosus</i>	Amaranthaceae	<i>Caruga pinnata</i>	Burseraceae
<i>Tabernaemontana</i>	Apocynaceae	<i>Daubanga grandiflora</i>	Lythraceae
<i>Ageratina adenophora</i>	Asteraceae	<i>Gmelina arborea</i>	Verbenaceae
<i>Ageratum conyzoides</i>	Asteraceae	<i>Lagerstroemia hirsuta</i>	Lythraceae
<i>Chromolaena odorata</i>	Asteraceae	<i>Litsea monopetala</i>	Lauraceae
<i>Crassocephalum crepidioides</i>	Asteraceae	<i>Macaranga denticulata</i>	Euphorbiaceae
<i>Mikania cordata</i>	Asteraceae	<i>Mallotus philippinensis</i>	Euphorbiaceae
<i>Mikania micrantha</i>	Asteraceae	<i>Mechelia champaca</i>	Magnoliaceae
<i>Oroxylum indicum</i>	Bignoniaceae	<i>Persea</i>	Lauraceae
<i>Alangium alpinum</i>	Cornaceae	<i>Persea fructifera</i>	Lauraceae
<i>Cyperus difformis</i>	Cyperaceae	<i>Pterospermum acerifolium</i>	Sterculiaceae
<i>Pteridium spp.</i>	Dennstaedtiaceae	<i>Stereospermum chilonoides</i>	Bignoniaceae
<i>Corton caudatus</i>	Euphorbiaceae	<i>Talauma hodgsonii</i>	Magnoliaceae
<i>Trewia nudiflora</i>	Euphorbiaceae	<i>Tectona grandis</i>	Lamiaceae
<i>Axonopus compressus</i>	Gramineae	<i>Terminalia myriocarpa</i>	Combretaceae
<i>Clerodendrum spp.</i>	Lamiaceae	<i>Tetrameles nudiflora</i>	Tetramelaceae
<i>Elsholtzia spp</i>	Lamiaceae	<i>Trewia nudiflora</i>	Euphorbiaceae
<i>Cinnamomum sp.</i>	Lauraceae	<i>Zanthoxylum budrunga</i>	Rutaceae
<i>Cassia tora</i>	Leguminosae		
<i>Talauma hodgsonii</i>	Magnoliaceae		
<i>Sida acuta</i>	Malvaceae		
<i>Triumfetta rhomboidea</i>	Malvaceae		
<i>Triumfetta spp.</i>	Malvaceae		
<i>Ficus spp.</i>	Moraceae		
<i>Phyllanthus bengalensis</i>	Phyllanthaceae		
<i>Piper spp.</i>	Piperaceae		
<i>Persicaria tenella</i>	Plantaginaceae		
<i>Poa annua</i>	Poaceae		
<i>Maesa chisia</i>	Primulaceae		
<i>Fern spp.</i>	Pteridaceae		
<i>Psilanthus bengalensis</i>	Rubiaceae		
<i>Spermacoce latifolia</i>	Rubiaceae		
<i>Physalis divaricata</i>	Solanaceae		
<i>Pterospermum acerifolium</i>	Sterculiaceae		
<i>Boehmeria nivea</i>	Urticaceae		
<i>Boehmeria spp.</i>	Urticaceae		
<i>Dendrocide sinuata</i>	Urticaceae		
<i>Girardinia diversifolia</i>	Urticaceae		
<i>Leea asiatica</i>	Vitaceae		
<i>Cautleya spp</i>	Zingiberaceae		

#### 1.4 Annexure IV: List of mammals in Namkhaling HF

Sl. No.	Common Name	Scientific Name
1	Golden Languor	<i>Trachypithecus geei</i>
2	Squirrel	<i>Sciuridae</i>
3	Asian Elephant	<i>Elephas maximuf</i>
4	Wild Boar	<i>Sus scrofa</i>
5	Barking Deer	<i>Muntiacus muntjak</i>
6	Monkey	<i>Macaca assamensis</i>
7	Hare	<i>Lepus nigricollis</i>
8	Porcupine	<i>Hystrix indica</i>
9	Civet	<i>Viverra zibetha</i>
10	Gaur	<i>Bos gaurus</i>
11	Yellow throated marten	<i>Martes flavigula</i>
12	Indian pangolin	<i>Manis crassicaudata</i>

#### 1.5 Annexure VI: list of birds of Namkhaling HF

Sl. No.	Common name	Scientific Name
1	White throated kingfisher	<i>Haleyon smyrnensis</i>
2	Red-vented bubul	<i>Pycnonotus cafer</i>
3	Indian roller	<i>Coracias bengalensis</i>
4	Black hooded oriole	<i>oriolus xanthornus</i>
5	Great barbet	<i>Megalaima asiatica</i>
6	Rufous treepie	<i>Dendrocitta vagabunda</i>
7	Asian barred owlet	<i>Glaucidium cuculoides</i>
8	Copper smith baret	<i>Megalocium haemacephala</i>
9	Jungle myna	<i>Acridotheres fuscus</i>
10	Chestnut-tailed starling	<i>Sturnia malabarica</i>
11	Large billed crow	<i>Corvus maecrorhynchos</i>
12	Greater yellow nape	<i>Chrysophlegma flavinucha</i>
13	Common myna	<i>Acridotherus tristis</i>
14	Oriental turtle dove	<i>Streptoplia orientalis</i>
15	Pin tailed green pigeon	<i>Treron apicauda</i>
16	Spangled drongo	<i>Dicrurus bracteatus</i>
17	Black drongo	<i>Dicrurus macrocereus</i>
18	Blue beard bee-eater	<i>Nyctornis athertoni</i>
19	Bay woodpecker	<i>Blythipicus pyrrhotis</i>
20	Green bee eater	<i>Merops orientalis</i>
21	Bronzed drongo	<i>Dicrurus aeneus</i>
22	Gray treepie	<i>Dendrocitta formosae</i>

23	Lesser coucal	<i>Centropus bengalensis</i>
24	Rose ringed paraket	<i>Psittacula kramen</i>
25	Great hornbill	<i>Buceros bicornis</i>
26	streaked spinder hunter	<i>Arachnothera magna</i>
27	Kalig pheasant	<i>lophura leucomelanos.</i>
28	Indian pea towl	<i>Pavo christatus</i>
29	Scarlet minivet	<i>Pericrocotus speciosus</i>
30	Indian cuckoo	<i>Cuculus mycropterus</i>
31	Emerald dove	<i>Chalcophaps indica</i>
32	Black crested bubul	<i>pyenotus flaviventris</i>
33	Red jungle towl	<i>Gallus gallus</i>
34	Red watted lapwing	<i>Venellus indica</i>
35	greater flame back	<i>Chrysocolaptes quttacristatus</i>
36	Red whiskered bubull	<i>Pycnonotus nipalensis</i>
37	Brown shrike	<i>Vanius cristatus</i>
38	Maroon oriole	<i>Oriollus traillii</i>
39	Lesser racket-trailed drongo	<i>Dicrurus remifer</i>
40	Common stone chat	<i>Saxicola torquatus</i>
41	Asian pied starling	<i>Gracupica contra</i>
42	Ashy bubul	<i>Memixos flavala</i>
43	Greenish warbler	<i>Phylloscopus trochiloides</i>
44	Blue whistling thrush	<i>Myophonus caerulens</i>
45	Crimson sunbird	<i>Aethopyga siparaja</i>
46	White rumped munia	<i>Conchura striata</i>
47	Grey-caped pygmy woodpecker	<i>Dendrocopos canicapillus</i>
48	Oreintal pied hornbill	<i>Anthracoceros albirostris.</i>

1.6 Annexure VII: Participant list for consultation meeting at Samtenthang Gewog and Namkhaling Demkhong

Details of participants				
Sl.no	Name	Age	Sex	Position in the family
1	Tek Bdr. Rai	28	M	Son
2	Tek Nath Acharya	21	M	-11-
3	Kalu Ram Rai	57	M	Head of family
4	Harka Maya Paise	44	F	-11-
5	Sujata Sarlei	35	F	-11-
6	Sanchi Maya Rai	24	F	-11-
7	Tshewag Dangi	66	M	-11-
8	Nangay Dama	38	F	-11-
9	Pema Zangmo	34	F	-11-
10	Dhan Maya Sarlei	51	F	-11-
11	Pabi Maya Sarlei	27	F	daughter
12	Dil Maya Sarlei	25	F	-11-
13	Yongba	78	M	head of family
14	Tshewag Pelden	35	F	-11-
15	Pabi Maya Tirwa	45	F	-11-
16	Tshewag Gaymo	64	F	-11-
17	Tshermymo	67	F	-11-
18	Priche	59	F	-11-
19	Ugyen Choden	78	F	-11-
20	Tshewag Zangmo	38	F	-11-
21	Phul Maya Sarlei	60	F	-11-
22	Chimi Dulepa	48	M	-11-
23	Nar Maya Oli	41	F	-11-
24	Bishau Maya Pokhrel	29	F	daughter

Details of participants				
Sl.no	Name	Age	Sex	Position in the family
25	Nandha Behr. Rai	65	F	Head of family
26	Dil Kumar Rai	35	M	-11-
27	Shanti Devi Rai	27	F	daughter
28	Indra Kala Dhimel	45	F	-11-
29	Meena Koirala	29	F	daughter
30	Naina Kala Chikung	42	F	wife
31	Kesang Dekei	19	F	daughter
32	Kimberly Wanyo	21	F	-11-
33	Harka Maya Rai	50	F	wife
34	Pabi Maya Rai	50	F	wife
35	Sonam Uulei	41	F	head of family
36	Indra Maya Kami	49	F	wife
37	Harka Maya Rai	1	F	
38	Mun Behr. Rai	30	M	head of family
39	Tirtha Maya Adhikari	30	F	daughter
40	Karma	40	M	
41	Lal Behr. Rai	58	M	head of family
42	Tulsi Maya Rai	45	F	-11-
43	Sita Maya Rai	47	F	-11-
44	Tshewang Paldun	39	F	-11-
45	Nangay Wanyole	51	M	-11-
46	Tika Devi pokhrel	21	F	daughter
47	Dil Maya Rai	29	F	-11-
48	Chandra Behr. Rai	70	M	Head of family
49	Bircha Behr. Rai	63	M	Head of family




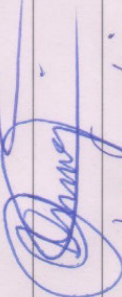

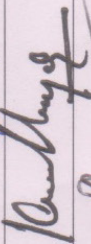



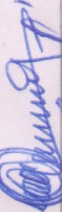
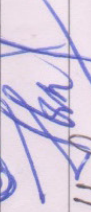
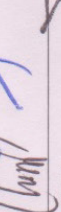
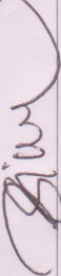


Details of participants				
Sl.no	Name	Age	Sex	Position in the family
1	chandra Bdr Pradhan	68	m	
2	Kaluman Lepcha	21	m	
3	Gopi Gurmung	64	m	
4	Kudli Moya Gurmung.	50	F	
5	Birju Pradhan	27	m	
6	L.N. Pradhan	48	m	
7	Sonam chota	20	F	
8	L.B Biswa	49	m	
9	Mamasat Bhattarai	-	m	
10	Partiman Ghimray.	65	m	
11	Mou Moya Kafley.	55	F	
12	Indra Moya Ghalluy.	66	F	
13	Patsi Moya Gurmung	42	F	
14	Pabitra Mungar	37	F	
15	Duan Kumar Gurmung.	61	m	
16	Dhanapati Homagai	68	m	
17	Sumitra Gurmung.	23	F	
18	chandra Moya Ghalluy.	55	F	
19	Damber	33	m	
20	Bisnu kumari Pradhan	60	F	
21	Tara <del>Bdr</del> Gurmung.	52	m	
22	Kanshita Pradhan	23	F	
23	Puran Ghalluy	53	m	
24	Karun pondrol	18	m	

Details of participants


Sl.no	Name	Age	Sex	Position in the family
25	Tika Maya	40	F	
26	Suk Maya Gurung.	41	F	
27	Kamala Mongar	22	F	
28	Lok Bdr Chhetri	47	m	
29.	Linna Sutar	50	m	
30	Srijana Sharma	20	F	
31	Pabitra Sharma	35	F	
32	Khun Raj Kafley	29	m	
33	Dhan Kumar Poudrel	52	m	
34	Jahar Singh	42	m	
35	Bal Bdr Gurung.	52	m	
36	Saajog Pradhan	34	m	
37	Charama muni. Poudrel	68	m	
38	Kumar Pradhan	32	m	
39	Hema Kumari	52	F	

## 1.7 Annexure IX: Participant list at the draft plan presentation


Participants' registration form for Heritage Forest draft management plan presentation to stakeholders

Sl. no	Name of the participants	Designation	Work place	Signature
1.	Pema	ES	Thromde	
2.	Sawaun Bhang	Dungpa, Gelephu Phendrup, (FO)	Gelephu CFO, Sarpang	
3.	Phub			
4.	Karna Chuki	FO	DFO, Sarpang	
5.	Kumar Monger	Sup	Santulung	
6.	Uthoepeng Duj	Engineer	Thromde	
7.	Lhendup Tshering	Urban Planner		
8.	Sanjog Pradhan	TshogPa	Thromde	
9.	Ugyen Wangchuk	Sup	Gelephu	
10.	Jigme Tshering	Chief, DED	Gelephu Thromde	
11.	Urovelup	Env. offices	Gelephu Thromde	
12.	Singye Wangchuk	Range officer	Gelephu Range	
13.	Dorji Thanda	Offg. Chief - C/O	Gelephu Thromde	
14.	Chulmi Dorsten		Droingehay Adn.	

1.8 Annexure X: No objection letter on establishment of HF



དཔལ་ལྷན་འབྲུག་གཞུང་།  
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 ROYAL GOVERNMENT OF BHUTAN  
 DZONGKHAG ADMINISTRATION  
 SARPANG



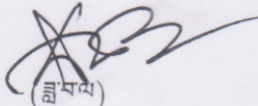
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སྤྱི་ཚུལ་4/6/2072 ལྷ།

ཡིག་ཚང་བཀའ་བློན་།

མཇུག་པོ་ཚེད་འབྲས་ དེ་ནི་ མངའ་སྡེ་ནགས་ཚལ་ལས་ཡིག་ཡང་ ལེས་ལེམ་འཇུག་ཡང་མེད་པའི་ལེས་ལེས་(2)2076-72/7647 ཅན་མ་འབྱོར་བའི་ནང་ དོན་ ལྷན་བཞིན་ནགས་ཚལ་སྤྱོད་བཞག་ནིའི་དོན་ལུ་ ས་གནས་ཡའེ་པོ་ལི་ལུ་ ས་ཆ་རྩོས་འཛིན་འབད་མེ་དེ་ སྤྱི་དབང་གིས་ཆད་ དགོ་ ལེགས་ལུག་དང་ གསལ་སྤྱོད་གི་གཞུང་ལམ་ བསྐྱར་བཅོས་འབད་སྐབས་ གནོད་པ་ཡོད་མེད་ ཉེ་འདབས་དགོ་ལེགས་ལུག་མཁའ་འགྲུལ་གནོད་ ཡོད་མེད་ དགོ་ལེགས་ལུག་དང་པ་གཅོས་ དགོ་ལེགས་ལུག་མཁའ་འགྲུལ་ བསམ་གཏན་གླིང་ཚེད་ མངའ་སྡེ་ནགས་ཚལ་ རྫོང་ཁག་སྤྱོད་པ་ སྤྱི་ཚུལ་འགོ་དཔོན་བཅས་ཀྱི་ ཞིབ་དཔྱད་འབད་ཐོག་ནས་ ~~མཇུག་པོ་ཚེད་འབྲས་~~ **ཚུན་ལུ་ འཇུག་པོ་ འཇུག་པོ་**

  
 (ལྷ་པལ་)  
 རྫོང་བདག་།

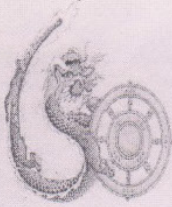
འདྲེ་ 1. དགོ་ལེགས་ལུག་དང་པ་ལུ་ ཞིབ་དཔྱད་ཚེད།  
 2. བསམ་གཏན་གླིང་ཚེད་ལུ།  
 3. མངའ་སྡེ་ནགས་ཚལ་འགོ་དཔོན་ལུ། འགོ་འདྲན་འཐབ་ཚེད།

*Perman. FO  
 This is hand and reference  
 [Signature]*

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PABX-365173, FAX - 365145, DZONGDAG - 365100, DZONGRAB - 365194, LRO - 365184, HRO - 365230,  
 FINANCE - 365263, ADMINISTRATION - 365264

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ལྷན་པོ། ལམ་གྱི་རྒྱུ་འདྲན་ལས་ཁུངས།  
 ལྷན་པོ་དོན་དང་བརྒྱུད་འབྲེལ་རྩན་ལག། དཔལ་ལྷན་འབྲུག་གཞུང་།  
 Department of Air Transport  
 Paro International Airport  
 Ministry of Information & Communications  
 Royal Government of Bhutan



DoAT/GEL/051/1674

Date: 16/06/2017

**The Offtg. Chief Forestry Officer**  
 Divisional Forest Office  
 Sarpang

**Sub: Clearance for establishment of Heritage Forest.**

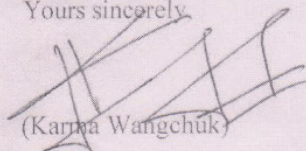
Dear Sir,

This is with reference to your letter no SFD/RMS/HF-9/2016-17/1732 dated June 7, 2017 regarding establishment of Heritage Forest. In this regard, the Department highly appreciates your endeavor in the establishment of Heritage Forest in the patch of forest situated below the Gelephu Domestic Airport.

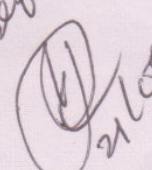
The Department has no objection in the establishment of Heritage Forest.

Thanking you

Yours sincerely

  
 (Karma Wangchuk)

**DIRECTOR**  
 Department of Air Transport  
 Paro : Bhutan

*Paro, FO,  
 for send and  
 reference.  
  
 21/06/17*

Post Box No. 1299, Paro Int. Airport ,Tel: (+975) 8-271403, Fax: (+975)-8-271751 Email: kwangchuk@doat.gov.bt  
 Website: <http://www.doat.gov.bt>