



# SERTENA COMMUNITY FOREST MANAGEMENT PLAN

(1<sup>st</sup> Revision)

Gakiling Range, JKSNR, Haa, 2023

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དཔལ་ལྷན་འབྲུག་གཞུང་།  
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ROYAL GOVERNMENT OF BHUTAN  
MINISTRY OF ENERGY & NATURAL RESOURCES  
DEPARTMENT OF FORESTS & PARK SERVICES

FOREST RESOURCES PLANNING AND MANAGEMENT DIVISION



No. DoFPS/FRPMD/FRPIS/CF\_1(b)/2022-2023/ 300

September 29, 2023

## NOTE SHEET

### Sub: Approval of Revised Community Forest Management Plans (CFMPs)

Following the completion of their 10-year management plan periods, the community forests listed in *Table 1* undertook revisions and submitted their plans for review and approval by the department. These Community Forest Management Plans (CFMPs) were developed by the respective Forest Division in collaboration with Community Forest Management Groups (CFMGs).


The development of these CFMPs has been guided by the Forest and Nature Conservation Code of Best Management Practices of Bhutan, Volume III: Sustainable Forest Management, ensuring strict adherence to its guidelines and requirements. This collaborative effort reflects the priorities and needs of the CFMGs, taking into consideration both environmental and social safeguards. The process has placed a high priority on stakeholder engagement, emphasizing transparency, accountability, and long-term success.

The revised CFMPs include objectives, prescribed management strategies, and by-laws to regulate the functioning of the CFMGs. Additionally, they contain detailed information on forest inventories, biodiversity conservation measures, resource utilization plans, benefit-sharing mechanisms, and community capacity-building strategies.

The technical assessment and review of these CFMPs were meticulously conducted by the Forest Resources Planning and Implementation Section (FRPMS). It is worth noting that the revised CFMPs strongly emphasize community participation, with a focus on promoting conservation, sustainable resource utilization, community development, and the integration of traditional knowledge with modern scientific practices.

In accordance with Section 9(4) of the Forest and Nature Conservation Act 2023, the approval for the implementation of these revised CFMPs is hereby granted, based on the recommendation of the CFO, FRPMD.

Recommended by:

  
(Sonam Tenzin)  
Chief Forestry Officer




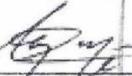
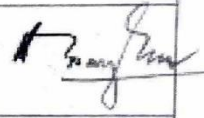
Approved By:

  
(Director)  
Department of Forest and Park Services


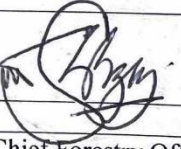
## Approval Sheet

Name of Community Forest	Sertena Community Forest
Village	Sertena
Chiwog	Sertena
Gewog	Gakiling
Dzongkhag	Haa
Production area (Hectare/ Acre)	151.72 Hectare/ 374.75 Acre
Protection area (Hectare/ Acre)	11.35 Hectare/ 28.03 Acre
Total Community Forest Area (Hectare/ Acre)	163.07 Hectare/ 402.78 Acre
Total CFMG Members (No. of Households)	34

### Prepared and Submitted for Approval

	Community Forest Management Group	Forestry Representative (CFMG facilitator)	Gewog Administration	Social Forestry Section	Divisional/ Park Office
Signature					
Name	Som Dhan Rai	Dophu	Wang Tshering	Akey Dorji	Ugyen Wangchuk
Title	Chairperson		Gup	Head	Chief Forestry Officer

### Reviewed and Recommended for Approval

Signature		
Name		
Title	Focal Officer	Chief Forestry Officer
Division/Section	Forest Resources Planning and Implementation Section	Forest Resources Planning and Management Division

Approved By:



Director/Director General  
Department of Forests and Park Services

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**Acronyms**

AAC	Annual Allowable Cut
BL	Back Load
CF	Community Forest
CFMG	Community Forest Management Group
CFMC	Community Forest Management Committee
Cham	DBH girth (30-40) cm of a tree.
Dangchung	DBH girth (10-20) cm of a tree.
Drashing	DBH girth (>40) cm of a tree.
GPS	Geographical Positioning System
SRF	State Reserve Forest
Gung	House Number
NWFP	Non-Wood Forest Products
Resoops	Community Forest guard nominated by CFMG.
Thram	Private registered land number
ToRs	Terms of Reference
Tsim	DBH girth (20-30) cm of a tree.
DBH	Diameter at breast height
SFED	Social Forestry Extension Division
Kg	Kilogram

## **Executive Summary**

This is the first revised CFMP for Sertena Community Forest for next ten years (2022-2032) plan period. The structure of this management plan is as per the contexts of the CF manual, 2018. The management plan specifies how the community forestry management group (CFMG) members will manage the community forest mutually.

Sertena Community forest falls under Haa Dzongkhag and lies within the latitude and longitude of E 27.113517°, N 89.286537°, E 27.091122°, N 89.268927°, E 27.116229°, N 89.274796°, and E 27.113517°, N 89.286537°. The Sertena village falls extremely southeast of Haa Dzongkha, which shares the Dzongkhag boundary with Samtse.

The Sertena CF management plan revision was carried out immediately after the completion of the CF evaluation. The CF area is extended as per chapter III FOREST MANAGEMENT PLANNING AND PLAN IMPLEMENTATION of the FNCR 2017, and the Forest Management Code of Bhutan which states that “v) *the maximum ceiling of CF area to be allotted to the individual household (hh) shall be as follows: c) Mixed broadleaved and other forest types 5 ha/hh*”. The total CF area is 163.07 Hectares/ 402.78 Acres for Sertena CF for the next ten years (2022-2023).

The total number of CFMG members of Sertena CF is 34 households for the 2022-2032 CF management plan. Thus, the CFMG members aim to manage and improve their CF resources as well as to improve the livelihood of the local community through the proper and equitable utilization of the CF benefits/services. The overall CF management objectives of the Sertena CF are as follows:

- ❖ Utilization of forest products sustainably;
- ❖ Water source protection;
- ❖ Income generation from the sale of surplus timber and NWFPs from community forests; and
- ❖ CF Protection.

The forest resource inventory was carried out by Social Forestry and Extension Section, JKSNR, and Gakiling Range along with the CFMG members of the Sertena CF in November 2022. The standard CF inventory technique was used, with data being collected for the trees >10 cm DBH. A total of 289 sample plots were laid throughout the CF at a spacing of 73 meters distance from plot to plot. Only 270 sample plots out of 289 sample plots were able to enumerate 19 sample plots were inaccessible in the field. The sample plot of a 12.62-meter radius was taken, representing an area of 0.05 hectares. The inventory was designed with a target sampling error of +/- 10% and a coefficient variation of 85%. The main objective of the inventory was to provide essential background information for calculating the AAC for the CF.



## **Part I: Community Forest management plan**

### **1. Introduction**

Sertena CF was established in years 2012 with financial support from Participatory Forest Management Project (PFMP) through the Dzongkhag budget. Sertena Community Forest under Gakiling Range was the first CF initiated in Haa Dzongkhag. The total area of community forest was 128 hectares for the 2012-2022 plan period. The total number CFMG members of Sertena CF was 27 households in the first CF management plan. The overall CF management objectives of the Sertena CF was as follows:

1. To manage the community forest resources in a sustainable way;
2. Income generation of the CFMG from community forest through the sale of excess timber and NWFP resources;
3. Water source protection for a continuous supply of clean drinking and irrigation water; and
4. To improve the vegetative coverage of open and degraded areas.

The Sertena CF evaluation was carried out from November 15<sup>th</sup> to 18<sup>th</sup> 2022 at Sertena community forest office as a preparation for the CF management plan revision. In the event of the CF management plan evaluation, all the CFMG members of Sertena CF were present for the discussion and evaluate the management plan. The main purpose of conducting the CF evaluation was to find out, whether the community forest management group has implemented the activities as per the management plan. On the other hand, the CF establishment in the community benefited CFMG members and bring about changes in the CF and the community. Subsequently, addressing shortcomings of the management plan and incorporating in the next ten years management plan period while carrying out CF management plan revision.

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The altitude of Sertena CF ranges from 1425 masl to 2365 masl and vegetation is dominated by warm broadleaved forest. In lower altitudes timber species such as *Castanopsis* sp, *Beilschmiedia* sp, and *Schima* sp. are found dominant in the CF area. On the other hand, at a higher elevation, species such as *Acer* sp, *Quercus* sp, and *Toona* sp are found comparatively more than other timber tree species. The CF is having adequate non-timber trees for firewood and fodder tree.

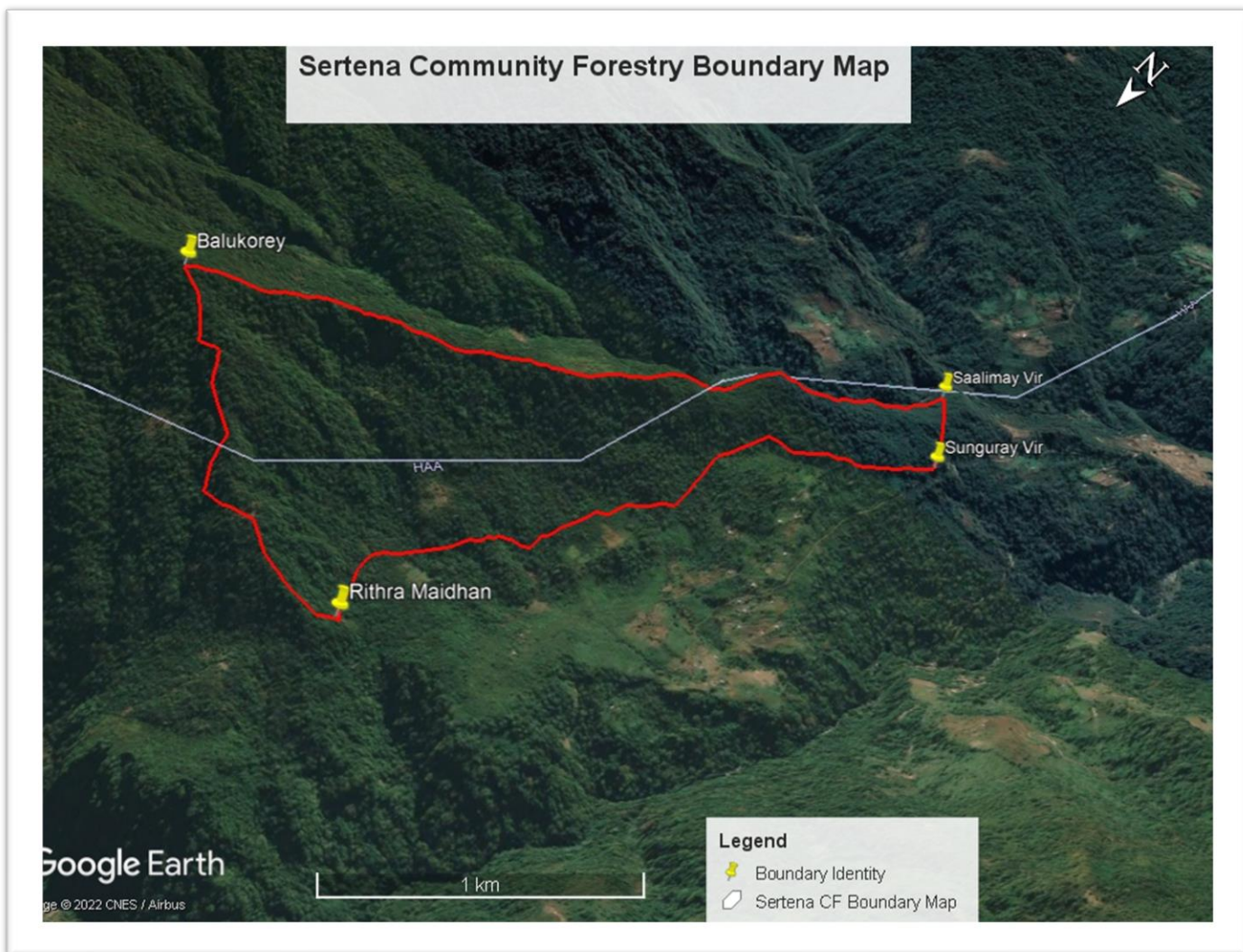
The Sertena community forest management plan is divided into two parts i.e. Management plan and CFMG by-laws. The information regarding community forests and its management aspects are mentioned in the management part. The information gathered for the plan is reflected mostly in the form of tables and others details are given in the Annexure. Another part of the CF management plan is By-Laws, which are framed by CFMG members to bind themselves to implement the CF management plan successfully.

## 2. Community Forest Area

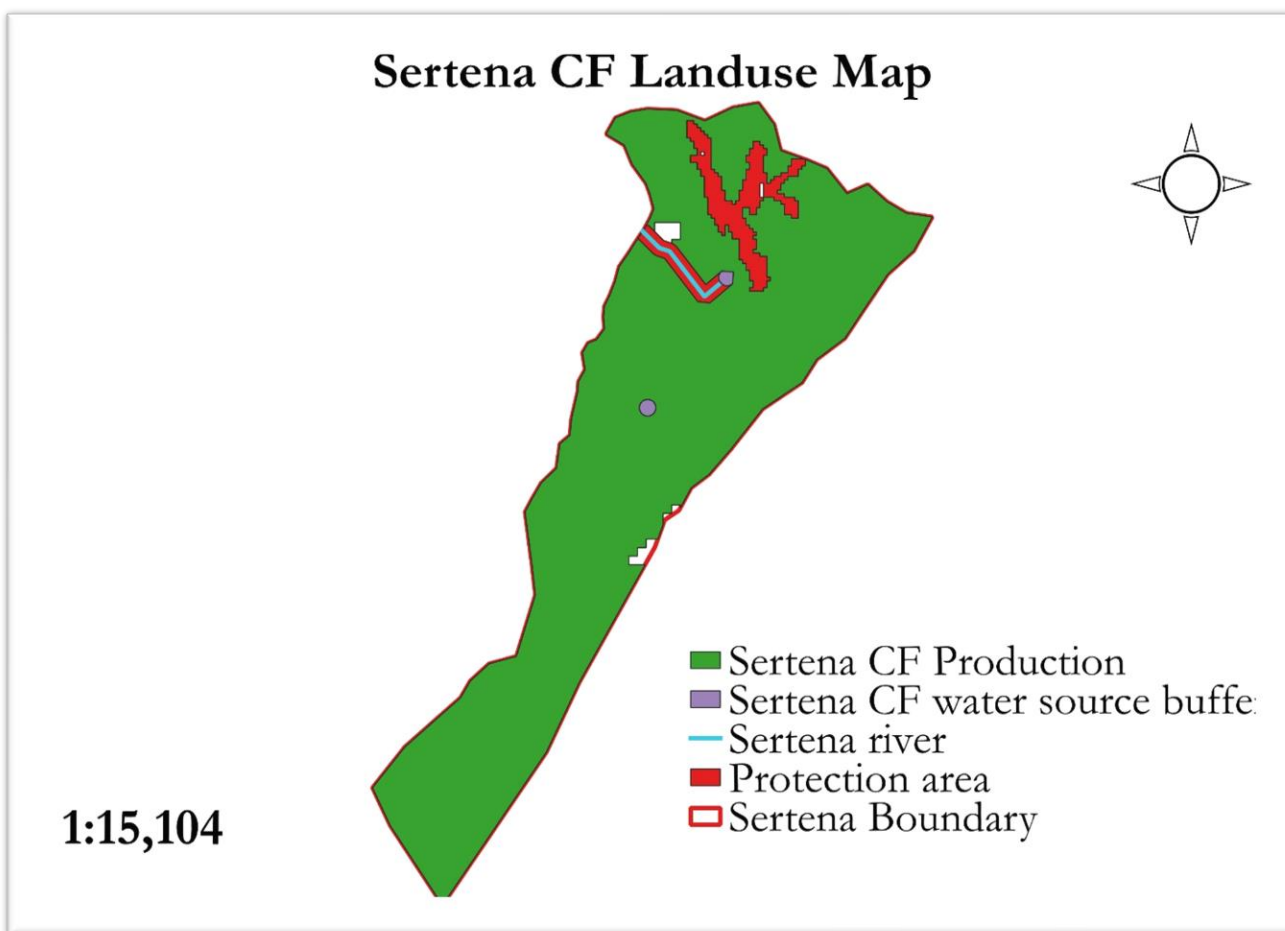
### i. Total community forest area = 163.07 Hectares/ 402.78 Acres

- ❖ CF net production area = 151.72 Hectares/ 374.75 Acres
- ❖ CF protection area = 11.35 Hectares/ 28.03 Acres

### ii. Community forest map (1: map with boundary)



iii. GIS land use/land cover map, showing net production area of the CF



**3. Community forest boundaries**

Boundaries	Permanent Features
West	Sertena Village
East	Tipgina
South	Saalimay Vir
North	Balukorey

**4. Social Information**

	Description
Name of the villages	Sertena
Ethnic groups with CFMG	Lhotsham, Ngalong and Sharshop
Basic amenities	Farm road (2017) Electricity 2019, ORC 2008. School 2009, CF Office 2012, RWSS



	2009, Irrigation 2015, Tarayana support (2016) ECCD 2019. Tashicell network 2021, Bridge 2014. Electric fencing 2022, Bee keeping (2005)
Total Households (HH)numbers of CFMG	34
Population of CFMG	277
% male and % female	55% Male, 45% Female
Main source of income	Cardamom, bee keeping
Cattle population of the CFMG	120
Main crops	Maize
Cropping pattern	Seasonal
Any other information	

## 5. Forest information

The Sertena CF consists of 75% or more of the tree species present in hardwoods. Thus, the CF falls under forest and habitat type and vegetation type “Warm Broadleaved Forest”. The CF area doesn’t fall under any sort of plantation and is an entirely natural forest. The main species found inside the CF are *Acer sp*, *Alnus nepalensis*, *Juglans regia*, *Morus laevigata*, *Persea fructifera*, *Quercus sp*, *Schima wallichii*, and *Toona ciliate*. The CF has abundant fodder tree species which will be sufficient for the domestic animals of the CFMG members. Besides, CF will not have forest resources scarcity in terms of firewood collection as CF has ample non-timber species trees.

The Sertena CF is a mature forest stand with more than 70% forest canopy density. Perhaps due to the dense forest canopy, regeneration is very rare in the CF. Scattered or few regenerations are found inside the CF. The density of seed tree is moderate, the CF have 10-50 seed trees per hectare.



The catchment condition is considered less critical as per the field observation by inventory crew members. More than 50% of the CF area is covered with vegetation. Which is categorized as a high soil cover class in terms of catchment condition as per the CF manual. The soil type is sandy loam and soils are non-erosive and stable to water flow. The CF has a gentle slope with a 10° to 30° gradient in most of the areas.

The Sertena CF is home to various wildlife and bird species. Some of the wildlife encountered directly or observed evidence during field inventory by crew members are *Cervus unicolor* (Shawa), *Muntiacus muntjac* (Kasha), *Sus scrofa* (Ripha), *Macaca assamensis* (Cha), *Lophura leucomelanos* (Leko), and *Aceros nipalensis* (Rufus necked hornbill).

The Sertena CF has potential in NWFPs development to generate income to improve livelihood of the CFMG members. Patcha and bamboos resources are grown ample in wild. Wangpem are also found growing vigoursly


## 5.1 Forest conditions


<b>Format 1. Forest Resource Assessment Format (Complete this format for each block)</b>	
Name of Community Forest	Sertena community forest
Date of Assessment	17/11/2022
Name of Block	Whole CF
Block Area	163 Ha
Name of recorder	Dorji Wangchuk, Dophu, Sangay Wangchuk, Wangchuk


Forest & Habitat Type (tick all those present, Refer definition below)			
Forest 	Thicket/pole stage	Shrub land	
Grassland	Plantation	Others	
Vegetation type			
Subtropical forest	Chir pine forest	Warm broadleaved forest 	Blue pine forest
Cool broadleaved forest	Mixed conifer forest	Fir forest	Others


<b>Definitions</b>	
Broadleaf forest	75% or more of the tree species present are hardwoods
Conifer forest	75% or more of the tree species present are coniferous
Mixed forest	All other combinations of tree species
Mature forest	Vegetation dominated by mature trees (trees > 40 cm dbh)
Thicket/pole stage	Vegetation > 3 m in height consisting of young trees usually < 40 cm dbh
Shrub	Non-tree species > 2 m in height (often thorny and multi-stemmed)
Shrub-land	Vegetation dominated by woody multi-stemmed plants of single stemmed plants and regeneration mostly < 3 m tall
Grassland	Vegetation dominated by grass species and where only a small part of the area is covered by trees or shrubs.
Crown cover	The percentage of the area covered by the crowns of trees forming the main canopy (usually mature trees)
Regeneration	Seedlings, saplings and coppice regrowth of naturally occurring tree species that are less than 1.3 m tall but greater than 30 cm tall
Seed trees	Mature trees with healthy crowns capable of producing flowers and seed
Soil Cover	The percentage of the area surface covered either by live vegetation or a layer of other plant vegetation.

*Sertena Community Forest Management Plan (1<sup>st</sup> Revision), Haa, JKSNR*

<b>Forest Condition (Complete if the block is mainly forest)</b>	
Write the names of the main species	
Local name	Scientific name
Gama shing	<i>Alnus nepalensis</i>
Tabshing	<i>Acer sp</i>
Betula	<i>Betula utilis</i>
Morus	<i>Morus laevigata</i>
Quercus	<i>Quercus sp</i>
Pumri/Kawla	<i>Persea fructifera</i>
Puyam	<i>Schima wallichii</i>
Toona	<i>Toona ciliate</i>
Walnut	<i>Juglans regia</i>
Plantations	
Is there any plantations? Yes                      No 	Approximate height of planted trees (m)
Year planted	Is the plantation? Under stocked                      Overstocked

<b>Forest condition- Age</b>			
Mature  Main canopy of mature trees	Pole stage Main canopy of pole stage trees	Scrubland Main canopy of shrubs, young trees or regeneration	Any No continuous canopy. Isolated trees only

<b>Forest condition- Canopy density (tick main canopy)</b>		
Dense  Canopy density >70%	Open Canopy density < 70%	Very open No real canopy. Isolated trees only

<b>Forest condition- Regeneration (including coppice regrowth)</b>		
Abundant Regeneration easy to find in most places	Scattered/ few Regenerations only in some places and hard to find 	None No regeneration
Write the names of the 3 main tree species in the regeneration		
1) <i>Alnus nepalensis</i>	2) Shepshing (local)	3) Shenam (local)
Regeneration: Seedling > 30 cm and <1.3 m height		

*Sertena Community Forest Management Plan (1<sup>st</sup> Revision), Haa, JKSNR*

Forest Condition – Approximate density of seed trees		
High > 50 seed trees per ha	Moderate ✓ 10 - 50 seed trees per ha	Low < 10 seed trees per ha

Block Condition-Summary (Use the forest condition class box below to get an average condition for the block)			
Poor	Average	Good ✓	Very Good
Does the main forest canopy consist of large, mature trees?			Yes ✓ No

Forest Condition Class Box				
Age	Canopy density	Regeneration & Coppice	Seed tree class	Condition
Mature forest	Dense	Abundant		Very good
		Scatted/few		Good
	Open	Abundant		Good
		Scatted/few		Average
Pole stage forest	Dense	Abundant		Good
		Scatted/few		Average
	Open	Abundant		Average
		Scatted/few		Poor
Shrub land and young growth	Dense		Moderate or High	Average
	Dense		Low	Average
	Open		Low	Poor
Any	Very open	None		Poor

Open spaces (Complete if there are significant open spaces in the block)	
Approximate total open space area (Ha)	NA
Dominant vegetation type in the open space	NA
Cause of the open space e.g. grazing, fire, harvesting, etc.	Grazing

Grazing and fodder (Complete if the block is used for grazing or fodder)			
Grassland type			
Natural	Man-made	Mixture ✓	Predominantly forest



Main fodder species being used ( <i>list 3 only</i> )	
Local name	Scientific name
Dhudelo	<i>Ficus sp</i>
Gogun	<i>Saurauria nepaulensis</i>
Phaledo	<i>Erythrina arborecens</i>

Pasture quality ( <i>list the 3 dominant species in the grassland</i> )		
Local name	Scientific name	Palatable/unpalatable
NA		
NA		
NA		

Use pattern	Seasonal ✓	All year
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Type of user	Migratory	Local	Both ✓
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## 5.2 Catchment conditions

<b>Catchment Condition</b> ( <i>use catchment condition class box below</i> )	
<b>(i) Catchment condition - soil cover</b>	
<b>Soil cover</b>	<b>Soil cover class</b>
> 50% of the soils are covered by vegetation	High ✓
25 - 50% of the soils are covered by vegetation	Moderate
< 25% of the soils are covered by vegetation	Low
<b>(ii) Catchment Condition - Soil type and erosivity (Black)</b>	
<b>Soil type</b> ( <i>colour, texture and type</i> ) (Sand loamy)	
Erosive Disperses and/or breaks up in water easily	Non-erosive Stable to water flow ✓
<b>(iii) Catchment Condition – Slope</b>	
<b>Slope</b>	
Slope (degrees)	Slope steepness class
<10°	Gentle
10° -30°	Moderate ✓
> 30°	Steep
<b>Catchment Condition – Summary</b> ( <i>Use the catchment condition class box below to get the average condition for the block</i> )	
Less critical ✓	Moderately critical
	Highly critical

<b>Catchment Condition Class Box</b>			
Slope category	Soil erosivity	Cover class	Condition class
Flat	Erosive	Moderate or High	Moderately critical
		Low	Highly critical
	Non-erosive	Any	Less critical
Moderate ✓	Erosive	Moderate or High	Moderately critical
		Low	Highly critical
	Non-erosive	Moderate or High	Moderately critical
		Low	Moderately critical
Steep	Erosive	Moderate or High	Moderately critical
		Low	Highly critical
	Non-erosive	Moderate or High	Moderately critical
		Low	Highly critical

### 5.3 Fauna

<b>Fauna (List any animal or bird species seen or which are known from the block)</b>	
Local name	Scientific name
Shawa	<i>Cervus unicolor</i>
Kasha	<i>Muntiacus muntjac</i>
Ripha	<i>Sus scrofa</i>
Cha	<i>Macaca assamensis</i>
Leko	<i>Lophura leucomelanos</i>
Rufus necked hornbill	<i>Aceros nipalensis</i>

### 5.4 Biotic Pressure indications (Which of the following biotic pressures are present?)

<b>Biotic Pressure (tick those present)</b>			
Fire	Common	Occasional ✓	Absent
Grazing	Heavy	Limited ✓	Absent
NWFP collection (ferns (nakay), mushrooms, cane, <i>Trichosanthes lepiniana</i> & bamboo)	Common ✓	Limited	Absent
Encroachment	Common	Occasional	Absent ✓
Hunting	Common	Occasional ✓	Absent
Fodder collection (List main species used)	Common ✓	Limited	Absent
Leaf litter collection	Common	Limited ✓	Absent
Pole harvesting	Common	Occasional ✓	Absent
Firewood harvesting	Common ✓	Occasional	Absent
Timber harvesting	Common ✓	Occasional	Absent
Others (describe)			

<b>Potential Management Options (List any potential management options for the CF/block)</b>	
1	NWFP development

## **6. Annual Allowable Cut (AAC)**

### **6.1 Annual Allowable Cut (AAC) by Volume:**

Net Operable are=151.72 and after reduction of 25% (reduction factor) is

$$\begin{aligned}
 \text{Annual Allowable Cut by volume (T) trees} &= \frac{\text{Net operable area (X) Average volume per hectare}}{\text{Rotation age}} \\
 &= \frac{113.79 \times 134.79}{110 \text{ years}} \\
 \text{Annual Allowable Cut (AAC)} &= 139.43 \text{ m}^3 \text{ or } 4924.81 \text{ cft} \\
 \\ 
 \text{Annual Allowable Cut by volume (N) trees} &= \frac{\text{Net operable area (X) Average volume per hectare}}{\text{Rotation age}} \\
 &= \frac{113.79 \times 99.09}{110 \text{ years}} \\
 \text{Annual Allowable Cut (AAC)} &= 102.50 \text{ m}^3 \text{ or } 3620.44 \text{ Cft}
 \end{aligned}$$

*(Note: Net production area is further reduced using 25% reduction factor as recommended in FNCCBMPB Vol.III)*

### **AAC for All species**

Timber category	<b>Dangchung</b>	<b>Tsim</b>	<b>Cham</b>	<b>Drashing</b>	<b>Total</b>
Avreage volume/ha (m3)	2.94	15.05	26.01	189.88	233.88
<b>AAC (m<sup>3</sup>) all trees</b>	<b>3.05</b>	<b>15.56</b>	<b>26.90</b>	<b>196.43</b>	<b>241.94</b>
<b>AAC (cft) all trees</b>	<b>107.52</b>	<b>549.71</b>	<b>950.19</b>	<b>6937.67</b>	<b>8545.10</b>

### **AAC for timber species**

Timber category	<b>Dangchung</b>	<b>Tsim</b>	<b>Cham</b>	<b>Drashing</b>	<b>Total</b>
(T) Trees Avreage volume/ha (m3)	1.57	5.57	12.12	115.53	<b>134.79</b>
<b>AAC (m<sup>3</sup>) (T) trees</b>	<b>1.62</b>	<b>5.76</b>	<b>12.53</b>	<b>119.51</b>	<b>139.43</b>
<b>AAC (cft) (T) trees</b>	<b>57.22</b>	<b>203.39</b>	<b>442.78</b>	<b>4221.26</b>	<b>240.52</b>

**AAC for non-timber species**

Timber category	Dangchung	Tsim	Cham	Drashing	Total
(N) Trees Avreage volume/ha (m3)	1.38	9.48	13.89	74.35	<b>99.09</b>
AAC (m <sup>3</sup> ) (N) trees	<b>1.43</b>	<b>9.80</b>	<b>14.36</b>	<b>76.91</b>	<b>102.50</b>
AAC (cft) (N) trees	<b>50.31</b>	<b>346.32</b>	<b>507.41</b>	<b>2716.41</b>	<b>176.82</b>

**6.2 Annual Allowable Cut (AAC) by number of trees:**

$$\begin{aligned}
 &\text{Annual Allowable Cut by No. of (T) trees} = \frac{\text{Net operable area (X) No. of trees per hectare}}{\text{Rotation age}} \\
 &= \frac{113.79 \times 93.41}{110 \text{ years}} \\
 &\text{Annual Allowable Cut (AAC)} = 97 \text{ Numbers of tree} \\
 &\text{Annual Allowable Cut by No. of (N) trees} = \frac{\text{Net operable area (X) No. of trees per hectare}}{\text{Rotation age}} \\
 &= \frac{113.79 \times 106.30}{110 \text{ years}} \\
 &\text{Annual Allowable Cut (AAC)} = 110 \text{ Numbers of tree}
 \end{aligned}$$

**AAC for All species**

Timber category	Dangchung	Tsim	Cham	Drashing	Total
Avreage No. of trees/ha	31	51	39	78	200
<b>AAC all trees</b>	<b>32</b>	<b>53</b>	<b>40</b>	<b>81</b>	<b>207</b>

**AAC for timber species**

Timber category	Dangchung	Tsim	Cham	Drashing	Total
No. of (T) Trees/ha	15	18	18	43	<b>93</b>
AAC no. of (T) trees	<b>16</b>	<b>18</b>	<b>19</b>	<b>44</b>	<b>97</b>

**AAC for non-timber species**

Timber category	Dangchung	Tsim	Cham	Drashing	Total
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*Sertena Community Forest Management Plan (1<sup>st</sup> Revision), Haa, JKSNR*

No. of (N) Trees/ha	16	33	21	35	<b>106</b>
AAC no.of (N) trees	<b>17</b>	<b>35</b>	<b>22</b>	<b>37</b>	<b>110</b>

## 7. Forest Management

Sertena community forestry will be managed by 34 households formed as Community Forest Management Group.

### 7.1 Forest management objectives:

The overall CF management objectives of the Sertena CF are as follows:

- ❖ Utilization of forest products sustainably;
- ❖ Water source protection;
- ❖ Income generation from the sale of surplus timber and NWFPs from community forest; and
- ❖ CF Protection.

## 8. Demand assessment

Forest Produce Demand Assessment (Summary)				
Produce	Annual household requirement (estimated)	No. of HH required annually	Total HH requirement annually	Total HH requirement in 10 years
	Number	Number	Number	Number
<b>New construction</b>				
Drashing	6 nos. for 1 storied 12 nos. for 2 storied	2	12	120
		2	24	240
<b>Renovation</b>				
Drashing	2	1	2	20
Firewood	34	1	34	340
Fencing post	50	5	250	2500
Bamboo	50	34	1700	17000
Cane	20	34	680	6800
Fodder	30	10	300	3000

### 8.1 AAC and demand comparison

Produce	Total AAC	Total Annual Demand	Difference	Comments
	Numbers	Numbers	Numbers	
Drashing	44 (T), 37 (N)	38	6 (T)	Surplus
Cham	19(T), 22 (N)	No demand	19 (T)	Surplus
Tsim	18(T), 35(N)	No demand	18 (T)	Surplus

Dangchung	16(T), 17(N)	No demand	16 (T)	Surplus
Firewood	59 (N) trees	34	55	Drashing and cham
F/ Posts	52 (N)	250	sufficient	Tsim and Dangchung
NWFPs	NA	NA	NA	
Bamboo	NA	1700	NA	
Cane	NA	680	NA	

*Note: If the timber resource supply from CF surpasses the demand from CFMG members, the surplus timber will be sold by CF at the prevailing market rate.*

## 9. Participatory Environmental assessment including procedure to address negative environmental effects

<i>Example of a Completed Participatory Environmental Assessment Chart</i>								
	Potential Environmental Effects				Potential Socio-Economic Effects			
Activity proposed in CFMP	Soil	Water	Wild animals	Plants	Traditional forest use	Cultural and religious	Local employment	Local benefits from forest
Fire wood harvesting	--	-	--	---	+	---	+	+++
Timber harvesting	---	---	--	--	---	---	++	+++
Fodder Collection	-	--	---	---	---	---	++	+++
Forest protection	+++	+++	+++	+++	+++	+++	--	+++
Collection of NWFPs	-	-	---	--	--	--	++	+++
Thinning	-	-	-	+++	+++	+++	+++	+++
Sanitation activities	--	--	---	+++	++	++	--	++
<i>The more numbers of symbol more the intensity and vice versa.</i>								

## 10. Climate hazard assessment

Climate Hazard Matrix					
	Drought (3)	Hail storm (0)	Reduced crop yield(1)	Pest on crops (4)	Erratic rain fall (2)
Drought	X				
Hail storm	Drought	X			
Reduced crop yield	Drought	Reduced crop yield	X		
Pest on crops	Pest on crops	Pest on crops	Pest on crops	X	
Erratic rain fall	Drought	Erratic rain fall	Erratic rain fall	Pest on crops	X

Result: 0 = Vulnerable, 1 = Low vulnerable, 2 = Medium vulnerable, 3 = High vulnerable, 4 = Very high vulnerable

### 11. Forest produce ranking matrix

<b>Forest product</b>	NWFPs	Bamboo	Timber	Firewood	Water	Fodder	Grazing
NWFPs	<b>X</b>						
Bamboo	Bamboo	<b>X</b>					
Timber	Timber	Timber	<b>X</b>				
Fire wood	Firewood	Firewood	Timber	<b>X</b>			
Water	Water	Water	Water	Water	<b>X</b>		
Fooder	NWFP	Bamboo	Timber	Firewood	Water	<b>X</b>	
Grazing	NWFPs	Grazing	Timber	Firewood	Water	Grazing	<b>X</b>

### 12. Monitoring plans (Forest Resources Monitoring Plan, social & institutional monitoring plan)

Objective	Block	Activities	Priority (H,M,L)	Procedures	Responsibilities
1.Sustainable utilization and management of forest	CF	1.1 Marking	H	Marking should on single tree selection system for valid permit holder.	Resoop/Treasurer/Range and chairperson
	CF	1.2 Harvesting limit	H	Allotment should be as per AAC.	Chairperson, executive members &CFMG
	CF	1.3 Retain mother tree	H	Retain elite trees. Retain 10 to 15 no. of mother tree per ha.	CFMG/ Committee members &Resoop will monitor
2. Water source protection	CF	2.1 Plantation & Fencing water source	H	CFMG will plant trees & fence the water source.	Committee members, chairperson &Resoop
				No felling trees within	

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				100 feet radius of water source.	
	CF	2.2 Grazing control	H	Restrict grazing around water source.	Resoop, CFMG & chairperson
3. CF Protection	CF	3.1 Patrolling	H	Monthly patrolling by Resoops.	Chairperson & executive members are responsible
	CF	3.2 Case compounding	M	Resolve issues and conflicts.	Chairperson, executive members & Resoop.
				Resolve illegal cases.	
	CF	3.3 Utilization of forest produces	H	Monitor and evaluation forest products allotment.	CFMG executive members with guidance from forest people
				Records checking and auditing.	
4. Income generation	CF	4.1 Sale of the surplus forest products	H	Identify the potential forest products and marketing.	Chairperson, CFMG & Range
	CF	4.2 Collection of fines and fees.	H	Timely collection of fees and fines.	Chairperson & executive members.

### 13. Annual Work Plan

Location	Activity	Year of operation										Responsibility
		1	2	3	4	5	6	7	8	9	10	
Whole Sertena CF	Mother tree selection	x										CFMG, support from Range)
Ningokha and Totena	Water sources protection	x	x	x	x	x	x	x	x	x	x	CFMG
Okhor Botey, Gomjey, Bitona, Ningokha	Plantation of 1 Acre		x		x		x		x			CFMG



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Whole sertena CF	Boundary Demarcation Patrolling, Signboard and awareness	x	x	x	x	x	x	x	x	x	x	x	Resoop
Okhorbotey& Gomjee	NWFP development, Bamboo development	x											CFMG
Sertena CF	Meeting	x	x	x	x	x	x	x	x	x	x	x	CFMG
Sertena CF	Nursery Development.	x		x		x		x		x			CFMG
Sertena CF	Tending operation	x	x	x	x	x	x	x	x	x	x	x	CFMG & Range
Sertena CF	Forest product harvesting	x	x	x	x	x	x	x	x	x	x	x	CFMG & Range

**14. Activities CFMG think to carry out in an attempt to address the climate hazard impacts**

<b>Social group</b>	<b>Activities</b>
Rich people	Minimize buying chemicals and over use of forest resources like timber Adopt sense of appreciation to nature.
Medium and poor people	Waste collection Utilization of FYM in fields, other resources of less harm to environment.

**15. Participatory Forest Resource and Services Monitoring**

<b>Objective</b>	<b>Indicator</b>	<b>How it will be monitored</b>	<b>Responsibility</b>	<b>Comments</b>
1. Water source protection	Timber quality	Stand assessment in CF	Executive members and Range	Report to HQ, JKSNR, Haa
2. CF protection.	Evidence of illegal felling.	Monthly patrolling.	Resoop and CFMG	Report to the chairman after patrolling.
3. Income generation.	Bank balance records	Review the bank balance annually.	Committee members	During the general meeting

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4. Sustainable resources management and utilization.	Harvesting limit.	Check the annual timber approval records.	Chairman	Range and HQ, JKSNR, Haa
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**16. Forest Produce preference Ranking**

Species		Timber	Firewood	Flag Post	Agri tool	Fodder	Other
Kawla	Prefrences	xx	xxx	xxx	0	0	
	Availablity	xx	xx	xx	0	x	
Katus	Prefrences	xx	xxx	xxx			
	Availablity	xxx	xxx	xxx	xxx	0	
Chilawaney	Prefrences	xx	xxx	xx	xxx	0	
	Availablity	xx	xxx	xxx	Xxx		
Piple	Prefrences	x	x	0	0	0	
	Availablity	x	x				
Tooni	Prefrences	xxx	0	0	0	0	
	Availablity	x	0	0	0	0	
Tarshing	Prefrences	x	xx				
	Availablity	x	x				
Kimbu	Prefrences	xxx	0	xxx	xxx	xx	
	Availablity	x		x	x	x	
Kapasey	Prefrences	xxx	x	0	0	0	
	Availablity	xx	xx	0	0	0	
Malagiri	Prefrences	xxx	xx			xx	
	Availablity	x	x	x	x	x	
Michelia	Prefrences	xxx	xx	0	0	0	
	Availablity	x	x	0	0	0	
Walnut	Prefrences	xxx	0	0	0	0	
	Availablity	x					
Acer	Prefrences	xxx	xx	x	xxx	0	
	Availablity	xx	x	x	x	0	

## **Part II: By-Laws**

### **Membership Arrangements**

1. Name of the Community Forest: Sertena Community Forest
2. Membership arrangement: the CFMG members of the Sertena Community Forest management group has agreed that the whole community of Sertena chiwog will be eligible to join as CFMG member provided:
  - ❖ The new joining member; having proper Gung and Thram number in the village, upon payment sum of Nu.6000/- (six thousand) only as an entry fee will be
  - ❖ enrolled as a new CFMG member; and
  - ❖ For the household joining as a new member from an already CFMG member (family bifurcation) should pay the sum of Nu. 1000 as an entry fee to be a new CFMG member.
3. In the event of a member withdrawing from CFMG membership, the CFMG member should compensate the CF for the forest resource availed as a CFMG member. The compensation for the forest products availed will be at the prevailing commercial rate.
4. In the event of a member withdrawing from CFMG membership as he/she is not capable to continue as a member will be allowed to withdraw from CFMG membership without any benefit as well as any penalty.

### **Benefit sharing**

Individual CFMG is eligible to get their own share of benefit from the CF. Equitable distribution on a priority basis to ensure equity regarding the benefit sharing of any forest products from their Community Forest.

Special consideration will be given to the old aged and the physically challenged CFMG member to implement the community forest activities. The preference for the allotment of forest products should be given to the affected family of the CFMG members during times of natural calamities.

The CF will follow FNCR for the timing of the forest produce harvesting, tending, and regeneration. The procedures for the allotment of forest products for the CFMG members are as follows:

### **Timber**

- ❖ Application to Chairman, form collection
- ❖ Application approval by Chairman, permit
- ❖ Marking
- ❖ Follow AAC

### **Firewood**

- ❖ Unsuitable for HBT and N-trees
- ❖ Lops and tops free access
- ❖ Application to Chairman
- ❖ Application approval
- ❖ Marking, Extraction, and felling
- ❖ Follow AAC

### **Bamboo**

- ❖ Application and Approval
- ❖ Follow AAC

### **Fodder**

- ❖ Free access to CFMG
- ❖ Time for harvesting
- ❖ Follow the seasonal calendar

### **NWFPs**

- ❖ Free access for domestic consumption for CFMG
- ❖ Sale of the product will be done by the group
- ❖ Follow NWFP harvesting guidelines

### **Special provision:**

- a) **Childless couple**
  - ❖ After the age of 60 he/she will be exempted from labor contribution but he/she will get equal benefits.
- b) **Emergency** (house destruction by natural catastrophic events like fire, storm, earthquake, etc.):
  - ❖ Will be given priority to get forest produce and the timber will be allotted free.
- c) **Women-headed family**
  - ❖ 25% less fee for the forest product from the CF area
  - ❖ Till the eldest child attends 15 years of age.
  - ❖ Labor contribution
  - ❖ Should contribute 50% of the total labor contributed by individual CFMG.

### **Management Committee formation**

#### **Terms of Reference for CF Management Committee**

1. Represent the CFMG in its interactions with other agencies including the forestry staff
2. Represent CFMG members during preparation and implementation of the CFMP

3. Coordinates and organize the administration of CF activities and operations and ensure that CFMG members fulfill their management responsibilities.
4. Responsible for the equitable distribution of benefits amongst CFMG members.
5. Responsible for management of forest resource.
6. Responsible for enforcing the by-laws of the CFMG and collecting fines and penalties.
7. Responsible for ensuring that all the legal requirements of CF are met (including all types of records that need to be kept).
8. Responsible for establishing and maintaining CFMG fund using moneys collected from various sources.
9. Responsible for organizing and conducting CFMG meetings when required.
10. Responsible to settle the case and penalize offenders as per this law or FNCRR.

**Terms of Reference for Chairperson**

1. Lead the CFMG
2. Calls meetings whenever necessary and informs concerned persons about date, time and place and the reasons for the meeting.
3. Chairs and facilitates meetings and makes sure each person is allowed to speak, thereby giving everyone a fair chance to speak and raise issues.
4. Approves applications for forest products (with Secretary)
5. Countersigns financial transaction and authorization to draw cash from bank account (with treasurer).

**Executive Member:**

- i. Chairman: Som Dhan Rai (77277343)
- ii. Secretary: Mon Maya Rai (77287610)
- iii. Treasurer: Bijay Rai (77465995)

**Observer**

- i. Chandara Bdr. Karki (77485538)
- ii. Abey Maya Rai (77272082)
- iii. Purna Maya Rai (77669419)
- iv. Bikash Rai (77733294)

**Resoop:**

- i. Harka Bdr. Rai C(77272793)
- ii. Najur Shing Rai (77780238)
- iii. Amber Shing Rai (77669652)

Tenure of the Executive Member and Observer is 5 years.



### **Financial Arrangement**

1. Membership fee/entry fee
2. Sale of Cf products
3. Fines and penalties
4. Donation
5. Interest from loan

### **Fees**

Membership fee Nu.100/annum/HH

Nu. 100 /household will be deposited in the month of October (1<sup>st</sup>-31<sup>st</sup>) as a membership fee every year.

### **Offenses and Penalties**

The offenses and penalties will be dealt according with to FNCR by the CFMG members of the Sertena CF while implementing the CF management plan.

### **Plantation and grazing control**

1<sup>st</sup> Offence-The owner of cattle should pay Nu.150 per cattle and should replace all the seedlings by the owner of cattle or pay the amount of the cost of seedlings and labour charge as per the norms and standard of nursery and plantation.

2<sup>nd</sup> offence:-Double of the expenditure from the 1<sup>st</sup> Offence.

3<sup>rd</sup> Offence:-should be aligned with the rule in the FNCR

### **Absentees From CF related Activities**

For 1<sup>st</sup> Occasion, one Should pay one day's wages per day if absent during labour contribution.

For the 2<sup>nd</sup> Occasion, if the same person is absent from labour contribution the one should be penalized with a double fine of the 1<sup>st</sup> occasion.

For the 3<sup>rd</sup> Occasion, thrice the fine of the 1<sup>st</sup> occasion should be levied. And if not paid should be served with a warning letter, and finally should be expelled from Cf membership after the realization of the commercial value of the benefit availed from CF.

### **Fund Utilisation**

- ❖ CF Development 50%
- ❖ Loan 25%
- ❖ Office equipment and Stationaries 15%
- ❖ Enterntainment 10%

Treasures should deposit the amount when the sum reaches 3000/- within a week and if he fails to deposit, a penalty of 24% per annum should be applied.

### **Loan interest**

A loan will be given to CFMG members at an interest rate of 5% per annum. The repayment of the loan should be done within a year.

### **Meeting**

- ❖ The CFMG will conduct meetings, 2 times a year.
- ❖ The executive members should meet four times a year.
- ❖ *An emergency meeting will be conducted as and when required.*

### **Conflict Management**

Conflict



Application to Chairman



Chairman and CF committee



Geog administration



Range Office/JKSNR



Court

### **Amendment of CFMP and By-Laws**

The chairman in consultation with the CFMG members along with the Range officer, and the CFO can make changes to the management plan provided that the amendments are in line with the Forest & Nature Conservation Rules, 2017.

### **Powers of Department**

AS per the chapter III FOREST MANAGEMENT PLANNING AND PLAN IMPLEMENTATION of the FNCR 2017 Cancellation/Suspension/Reinstatement of Community Forest Certificate

102. In the event the members of the CFMG decide to cancel CF certificate in accordance with this Rules, the Community Forest Certificate shall be cancelled with effect from the date of notification of the decision to the CFO. The CFMG shall then surrender the Certificate to the Department.

103. The CFO shall have the right to enquire about the reason for such cancellation to ensure that no offence has been committed, as outlined under this Rules.

104. In the event the number of member household in the CFMG fall below five or the group otherwise ceases to meet the requirements under this Rules; the CFO shall notify the CFMG that its certificate shall be cancelled.

105. The Department shall suspend the rights and privileges of the CFMG to control, manage and utilize the CF upon the recommendation of the CFO, in the event of the following:

1. The CFMG is unable to manage the Community Forest according to its management plan or otherwise fails to meet their responsibilities; and
2. The CFMG has engaged in any activity in contravention of the provisions of the Act, Rules, by-laws or the management plan.

106. The suspension shall be for a minimum period of 3 years. During the suspension period, the CFMG members shall not be eligible for any forest produce from the SRF.

107. The CFMG may apply for reinstatement of the Community Forest after the suspension period, if they have taken appropriate corrective measures. The following procedures shall be followed:

- 1) Submit the application to the CFO;
- 2) The CFO shall recommend to the Department;
- 3) The Department shall review and approve/reject

Annexes

CF application along with CFMG member list signed

Annexure VI: Application to Establish Community Forests

ROYAL GOVERNMENT OF BHUTAN  
MINISTRY OF AGRICULTURE & FORESTS  
Department of Forests & Park Services

APPLICATION TO ESTABLISH COMMUNITY FOREST

PART A: (To be filled by the applicant)

The Gup,

In accordance with the Forest and Nature Conservation Rules and regulations, 2017, I, Som Dhan Rai, the Chairman of the Community Forest Management Group of Sertena villages(s) consisting of 34 households, would like to submit this application for establishment of Community Forest (map attached).

a) Gewog: Grakiling

b). Description of the State Forest land proposed for establishment of Community Forest:

i). Name of the forest: Sertena Community forest

ii). Boundary description:

N. Balukorey

S. Saalimay Vir

E. Tipginga

W. Sertena Village

iii). Estimated area: 163.07 (ha)

iv). Forest type: Warm Broadleaved forest

Signature: Som Dhan Rai

Name of the CFMG Chairman: Som Dhan Rai

Date: 13/11/2022

I have reviewed the application and hereby recommend for the formation of CF in the proposed area.

Name and Signature of Gup:.....

Gewog:.....

Date:.....

**PART B: (To be certified by Range Officer)**

We have evaluated the area applied for the qualifications of the group to manage it according to the criteria established in the Forest and nature Conservation Rules and regulations of Bhutan, 2017. We recommend/do not recommend, the application for establishment of the Community Forest.

Justification for approval/rejection:

1. The proposed area feasible for the establishment of.....
2. a community forest.....

Signature:.....

Name:.....

Name of Range:.....

Date:..... 13/11/2022.....

**PART C: (To be certified by the CFO)**

I have reviewed the application and I am satisfied/not satisfied, with the details provided in the application and the area is suitable/ unsuitable for Community Forest Management. I accept/do not accept the application for establishment of Community Forest.

**Justification:**

1. The proposed area feasible for establishment of a.....
2. community forest. Thus, recommended for the..... establishment of a community forest in a village.....

Signature:.....








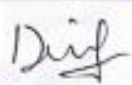






Name of CFO:.....













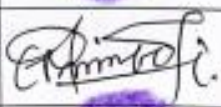


Division/Park:.....






Date:.....

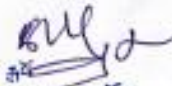


**Sertena Community Forest Management Group Membership**

Sl. No.	Name	CID No.	House No.	Thram No	Signature
1	Chotay Rai	11210001704	CHA-6-214	46	
2	Karna Bdr. Rai	11210000511	CHA-6-232	Nil	
3	Ragu Bir Rai	11210001848	CHA-6-266	524	
4	Kencho Bidha	10504002399	CHA-6-213	139	
5	Amber Bdr. Rai	11210001721	CHA-6-220	589	
6	Aita Bdr. Rai	11210001845	CHA-6-212	202	
7	Lok Bdr. Rai	11210001847	CHA-6-212	525	
8	Dil Kumar Rai	11210001720	CHA-6-220	43	
9	Budhi Maya Rai	11210000509	CHA-6-210	42	
10	Samdrup Zangmo	10501000262	CHA-6-284	561	
11	Dhan Bdr. Rai	11210001675	CHA-6-217	513	
12	Harka Bdr. Rai 'B'	11210001676	CHA-6-277	Nil	
13	Harka Bdr. Rai 'A'	11210001812	CHA-6-277	257	
14	Tan Dorji	10504002397	CHA-6-560	265	

15	Ran Man Rai	10506000198	CHA-6-273	45	
16	Purni Maya Rai	11210001693	CHA-6-Nil	263	
17	Durga Bdr. Rai	11210001755	CHA-6-208	201	
18	Narzer Singh Rai	11210001691	CHA-6-216	50	
19	Abir Maya Rai	11210001722	CHA-6-220	589	
20	Harka Bir Rai.	11210001724	CHA-6-225	47	
21	Nar Bir Rai	11210001685	CHA-6-216	50	
22	Mon Maya Rai	11210001760	CHA-6-296	671	
23	Ganga Maya Rai	11210001782	CHA-6-231	550	
24	Gangi Maya Rai	11210001802	CHA-6-211	48	
25	Purna Maya Rai	11210001737	CHA-6-281	532	
26	Towkay Rai	12210001703	CHA-6-260	515	
27	Jai Bdr. Rai	11210001786	CHA-6-218	49	
28	Suk Bir Rai	11210001783	CHA-6-295	549	
29	Pushpalal Rai	11210001735	CHA-6-282	529	

30	Som Dhan Rai	11210001813	CHA-6-221	51	
31	Amber Singh Rai	10506000612	CHA-6-222	45	
32	Prem Bdr. Rai	11210000886	CHA-6-144	607	
33	Harka Bdr. Rai C	11210001805	CHA-6-211	516	
34	Dhan Dhoj Rai	11210001733	CHA-6-29	Nil	

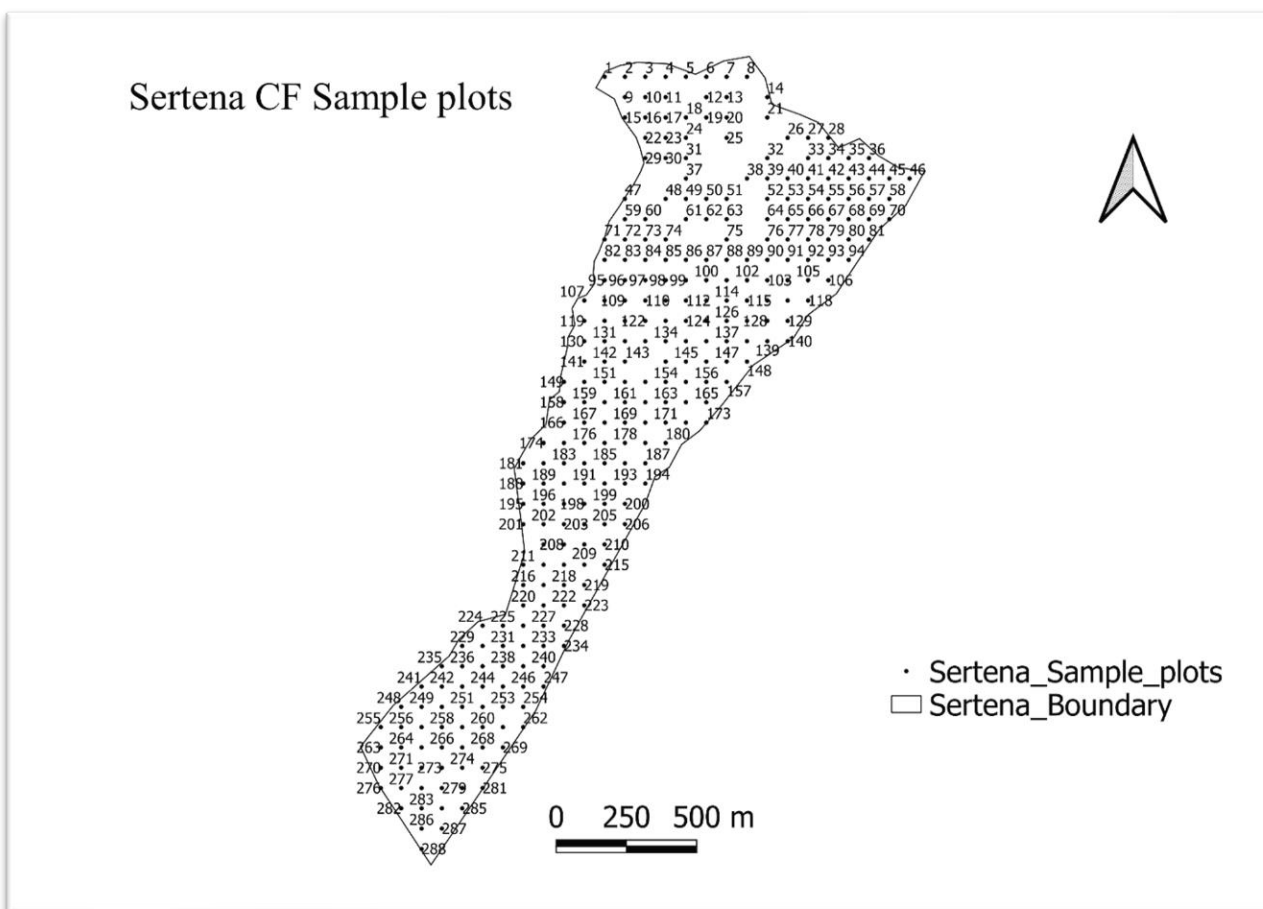
  
 རྒྱལ་ཁྲིམས་འཛིན་ཆེན་པོའི་འཕྲུལ་པ་  
 ལྷ་ཁྲིམས་ཁྲིམས་པ་



**CF boundary GPS coordinates**



**CF sample plots GPS coordinates**





**Stand and Stock table sheet 1- Number of trees per hectare**

STAND & STOCK TABLE SHEET 1 - NUMBER OF TREES												
1. CF Name						Sertena						
2. Stratum						Warm Broadleaved						
3. No. of sampling units						270						
4. Estimated parameter : Average Number of Trees per Ha						200						
	Dbh class (cm)											
Species group	10 to 19	20- 29	30- 39	40- 49	50- 59	60- 69	70- 79	80- 89	90- 99	100- 109	Tot al	%
Timber species												
Acer	0.96	2.37	1.93	1.41	1.19	0.89	0.22	0.22	0.15		9.33	4.67
Albizia sp	0.00	0.07	0.22	0.15	0.22	0.07	0.07				0.81	0.41
Alnus	0.00	0.00	0.22	0.07	0.22	0.07	0.07				0.67	0.33
Angaray	0.07	0.37	0.89	1.04	0.44	1.19	0.22	0.52	0.15	0.22	5.11	2.56
Beilschmiedia sp	0.52	1.41	1.48	1.70	1.26	1.19	0.96	0.81	0.15		9.48	4.75
Betula sp	0.07	0.00	0.00	0.00	0.07	0.00	0.00	0.07			0.22	0.11
Castanopsis sp	8.30	6.96	5.63	3.26	0.59	0.07	0.22	0.30	0.00	0.15	25.48	12.76
Exbucklandia (T)	0.81	0.30	0.96	0.52	0.52	1.33	0.44	0.07	0.15	0.30	5.41	2.71
Kawlo	0.00	0.81	0.67	0.81	0.44	0.37	0.00	0.37	0.15	0.07	3.70	1.85
Malagiri	0.07	0.30	0.07	0.22	0.00	0.30	0.15	0.07	0.00	0.00	1.19	0.59
Michelia	0.00	0.22	0.15	0.30	0.07	0.37					1.11	0.56
Morus	0.00	0.07	0.00	0.00	0.00	0.00	0.07	0.07	0.07	0.00	0.30	0.15
Pailya	0.00	0.37	0.44	0.44	0.15	0.15	0.07				1.63	0.82
Patragi	0.07	0.07	0.37	0.07	0.07	0.07	0.15				0.89	0.45
Pumsi	0.07	0.07	0.15	0.15	0.15	0.00	0.22				0.81	0.41
Quercus sp	0.37	0.30	1.41	0.81	1.11	0.96	0.59	0.30	0.30	0.07	6.22	3.12

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Schima sp	3.48	3.4 1	2.4 4	0.6 7	0.5 2	0.5 2	0.8 9	0.2 2	0.1 5	0.15	12.4 4	6.23
Toona	0.22	0.5 2	0.9 6	1.5 6	1.1 9	1.3 3	0.8 9	0.6 7	0.0 7	0.00	7.41	3.71
Walnut	0.07	0.0 7	0.0 7	0.0 0	0.3 0	0.3 0	0.0 0	0.3 0	0.0 7	0.00	1.19	0.59
<b>Total (T) Trees</b>	<b>15.11</b>	<b>17. 70</b>	<b>18. 07</b>	<b>13. 19</b>	<b>8.5 2</b>	<b>9.1 9</b>	<b>5.2 6</b>	<b>4.0 0</b>	<b>1.4 1</b>	<b>0.96</b>	<b>93.4 1</b>	<b>46.7 7</b>
(N) Trees	14.52	29. 19	16. 74	12. 96	6.6 7	5.7 8	0.0 0	1.1 9	0.2 2	0.59	87.8 5	43.9 9
Fodder (N) Trees	1.78	4.0 0	4.5 9	3.3 3	3.1 1	1.4 8	0.0 7	0.0 0	0.0 7	0.00	18.4 4	9.24
<b>Total (N) Trees</b>	<b>16.30</b>	<b>33. 19</b>	<b>21. 33</b>	<b>16. 30</b>	<b>9.7 8</b>	<b>7.2 6</b>	<b>0.0 7</b>	<b>1.1 9</b>	<b>0.3 0</b>	<b>0.59</b>	<b>106. 30</b>	<b>53.2 3</b>
<b>Total all species</b>	<b>31.41</b>	<b>50. 89</b>	<b>39. 41</b>	<b>29. 48</b>	<b>18. 30</b>	<b>16. 44</b>	<b>5.3 3</b>	<b>5.1 9</b>	<b>1.7 0</b>	<b>1.56</b>	<b>199. 70</b>	<b>100. 00</b>
<b>%</b>											<b>1.00</b>	

**Stand and Stock table sheet 2- Basal area (m<sup>2</sup>) per hectare**

STAND & STOCK TABLE SHEET 2 - BASAL AREA												
1. Inventory area							Sertena					
2. Stratum							Warm Broadleaved forest					
3. No. of sampling units							270					
4. Estimated parameter : Average Basal Area per ha (m²/ha)							28.61					
	Dbh class (cm)											
Species group	10 to 19	20- 29	30- 39	40- 49	50- 59	60- 69	70- 79	80- 89	90- 99	100- 109	Tot al	%
Timber species												
Acer	0.02	0.1 1	0.1 8	0.2 2	0.2 8	0.2 9	0.1 0	0.1 2	0.1 0		1.4 19	4.95 9
Albizia sp	0.00	0.0 0	0.0 2	0.0 2	0.0 5	0.0 2	0.0 3				0.1 56	0.54 4
Alnus	0.00	0.0 0	0.0 2	0.0 2	0.0 5	0.0 2	0.0 3				0.1 56	0.54 4
Angaray	0.00	0.0 2	0.0 8	0.1 6	0.1 0	0.3 9	0.1 0	0.2 9	0.1 0	0.19	1.4 37	5.02 1
Beilschmiedia sp	0.01	0.0 7	0.1 4	0.2 7	0.2 9	0.3 9	0.4 2	0.4 6	0.1 0		2.1 40	7.48 1
Betula sp	0.00	0.0 0	0.0 0	0.0 0	0.0 2	0.0 0	0.0 0	0.0 4			0.0 60	0.21 0
Castanopsis sp	0.14	0.3 3	0.5 2	0.5 1	0.1 4	0.0 2	0.1 0	0.1 7	0.0 0	0.13	2.0 53	7.17 6

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Exbucklandia sp	0.01	0.01	0.09	0.08	0.12	0.44	0.19	0.04	0.10	0.25	1.348	4.713
Kawlo	0.00	0.04	0.06	0.13	0.10	0.12	0.00	0.21	0.10	0.06	0.827	2.892
Malagiri	0.00	0.01	0.01	0.03	0.00	0.10	0.06	0.04	0.00	0.00	0.260	0.908
Michelia	0.00	0.01	0.01	0.05	0.02	0.12					0.209	0.730
Morus	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.04	0.05	0.00	0.129	0.452
Pailya	0.00	0.02	0.04	0.07	0.03	0.05	0.03				0.243	0.851
Patragi	0.00	0.00	0.03	0.01	0.02	0.02	0.06				0.157	0.548
Pumsi	0.00	0.00	0.01	0.02	0.03	0.00	0.10				0.173	0.605
Quercus sp	0.01	0.01	0.13	0.13	0.26	0.31	0.26	0.17	0.21	0.06	1.548	5.410
Schima sp	0.06	0.16	0.23	0.10	0.12	0.17	0.39	0.12	0.10	0.13	1.584	5.538
Toona	0.00	0.02	0.09	0.24	0.28	0.44	0.39	0.37	0.05	0.00	1.886	6.592
Walnut	0.00	0.00	0.01	0.00	0.07	0.10	0.00	0.17	0.05	0.00	0.396	1.383
<b>Total (T) Trees</b>	<b>0.26</b>	<b>0.84</b>	<b>1.68</b>	<b>2.07</b>	<b>1.98</b>	<b>3.00</b>	<b>2.29</b>	<b>2.24</b>	<b>0.99</b>	<b>0.83</b>	<b>16.18</b>	<b>56.56</b>
Fodder (N) Trees	0.03	0.19	0.43	0.52	0.72	0.48	0.03	0.00	0.05	0.00	2.459	8.595
(N) Trees	0.25	1.37	1.56	2.02	1.55	1.89	0.00	0.66	0.16	0.51	9.97	34.85
<b>Total (N) Trees</b>	<b>0.28</b>	<b>1.56</b>	<b>1.98</b>	<b>2.54</b>	<b>2.28</b>	<b>2.37</b>	<b>0.03</b>	<b>0.66</b>	<b>0.21</b>	<b>0.51</b>	<b>12.43</b>	<b>43.44</b>
<b>Total all species</b>	<b>0.53</b>	<b>2.40</b>	<b>3.66</b>	<b>4.61</b>	<b>4.26</b>	<b>5.38</b>	<b>2.33</b>	<b>2.91</b>	<b>1.19</b>	<b>1.33</b>	<b>28.61</b>	<b>100.00</b>
<b>%</b>											<b>1.00</b>	

**Stand and Stock table sheet 2- Volume (m<sup>3</sup>) per hectare**

STAND & STOCK TABLE SHEET 3 - VOLUME												
1. CF Name						Sertena						
2. Stratum						Warm Broadleaved Forest						
3. No. of sampling units						270						
4. Estimated parameter: Average volume per Hectare (m3/ha)						233.88						
	Dbh class (cm)											
Species group	10 to 19	20- 29	30- 39	40- 49	50- 59	60- 69	70- 79	80- 89	90- 99	100- 109	Tot al	%
Timber species												
Acer	0.11	0.79	1.33	1.67	2.18	2.35	0.80	1.05	0.89		11.178	4.779
Albizia sp	0.00	0.02	0.14	0.18	0.44	0.22	0.31				1.309	0.560
Alnus	0.00	0.00	0.14	0.09	0.44	0.22	0.31				1.200	0.513
Angaray	0.01	0.12	0.61	1.23	0.82	3.13	0.80	2.45	0.89	1.66	11.742	5.020
Beilschmiedia sp	0.06	0.47	1.02	2.03	2.32	3.13	3.47	3.86	0.89		17.248	7.375
Betula sp	0.01	0.00	0.00	0.00	0.18	0.00	0.00	0.53			0.714	0.305
Castanopsis sp	0.94	2.33	3.89	3.88	1.09	0.20	0.80	1.40	0.00	1.11	15.630	6.683
Exbucklandia sp	0.09	0.10	0.67	0.62	0.95	3.52	1.60	0.35	0.89	2.22	11.015	4.710
Kawlo	0.00	0.23	0.43	0.97	0.87	1.10	0.00	2.14	1.13	0.73	7.596	3.248
Malagiri	0.01	0.08	0.05	0.26	0.00	0.88	0.63	0.43	0.00	0.00	2.337	0.999
Michelia	0.00	0.06	0.09	0.35	0.15	1.10					1.755	0.750
Morus	0.00	0.02	0.00	0.00	0.00	0.00	0.31	0.43	0.57	0.00	1.329	0.568
Pailya	0.00	0.10	0.28	0.28	0.29	0.44	0.31				1.716	0.734
Patragi	0.01	0.02	0.24	0.05	0.15	0.22	0.63				1.304	0.558
Pumsi	0.01	0.02	0.09	0.09	0.29	0.00	0.94				1.449	0.619
Quercus sp	0.03	0.08	0.90	0.52	2.18	2.86	2.51	1.71	2.26	0.73	13.786	5.895

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Schima sp	0.28	0.9 5	1.5 6	0.4 3	1.0 2	1.5 4	3.7 7	1.2 9	1.1 3	1.45	13.4 15	5.73 6
Toona	0.02	0.1 4	0.6 2	0.9 9	2.3 2	3.9 6	3.7 7	3.8 6	0.5 7	0.00	16.2 49	6.94 8
Walnut	0.01	0.0 2	0.0 5	0.0 0	0.5 8	0.8 8	0.0 0	1.7 1	0.5 7	0.00	3.81 5	1.63 1
<b>Total (T) Trees</b>	<b>1.57</b>	<b>5.5 7</b>	<b>12. 12</b>	<b>13. 65</b>	<b>16. 25</b>	<b>25. 75</b>	<b>20. 98</b>	<b>21. 22</b>	<b>9.7 9</b>	<b>7.90</b>	<b>134. 79</b>	<b>57.6 3</b>
Fodder (N) Trees	0.20	1.3 4	3.1 7	3.9 7	5.7 2	3.9 1	0.2 7	0.0 0	0.4 5	0.00	19.0 26	8.13 5
(N) Trees	1.18	8.1 4	10. 71	15. 44	13. 07	17. 16	0.0 0	6.8 6	1.7 0	5.80	80.0 6	34.2 3
<b>Total (N) Trees</b>	<b>1.38</b>	<b>9.4 8</b>	<b>13. 89</b>	<b>19. 41</b>	<b>18. 79</b>	<b>21. 07</b>	<b>0.2 7</b>	<b>6.8 6</b>	<b>2.1 4</b>	<b>5.80</b>	<b>99.0 9</b>	<b>42.3 7</b>
<b>Total all species</b>	<b>2.94</b>	<b>15. 05</b>	<b>26. 01</b>	<b>33. 06</b>	<b>35. 04</b>	<b>46. 82</b>	<b>21. 25</b>	<b>28. 08</b>	<b>11. 93</b>	<b>13.7 0</b>	<b>233. 88</b>	<b>100. 00</b>
<b>%</b>											<b>1.00</b>	