

DENKALING RENYSA COMMUNITY FOREST MANAGEMENT PLAN (1st Revision)



**Gangzur Gewog
Lhuentse Dzongkhag**

Plan Period: 2023 –2033

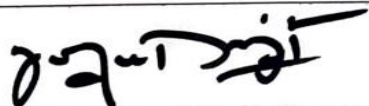

APPROVAL SHEET FOR COMMUNITY FOREST MANAGEMENT PLAN

Name of Community Forest	Dengkaling Renysa
Village	Thoshopang, Dengkaling and Rushong
Chiwog	Jang - Ngar
Gewog	Gangzur
Dzongkhag	Lhuentse
Production area (ha)	68.26 ha
Protection area (ha)	5 ha
Total Community Forest area	73.26 ha
Total CFMG member (No. of HH)	14

Prepared and Submitted for Approval

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Approval No. DoFPS/FRPMD/FRPIS/CF 2-2/2022-2023/846 Dated 28th March 2023

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I. ACRONYMS & GLOSSARY

AAC	Annual Allowable Cut
CF	Community Forest
CFMG	Community Forest Management Group
CFMP	Community Forest Management Plan
CFO	Chief Forestry Officer
CFMC	Community Forest Management Committee
DBH	Diameter at Breast Height
DoFPS	Department of Forests & Park Services
DFO	Divisional Forests Office
FNCRR	Forest & Nature Conservation Rules & Regulations
RO	Range Officer
Ha	Hectare
H/H	Household
Nu	Ngultrum
NWFP	Non-Wood Forest Products
RGoB	Royal Government of Bhutan
RNR	Renewable Nature Resources
N	Non-timber
T	Timber

Cham	Beam/rafter
Dangchung	Poles
Drashing	Trees above 4' girth
Dzongdag	Head of District/Governor
Dzongkhag	District
Geog	Block
Gup	Elected head of the Block
Resoop	Forest watcher
Tsim	Roof strut

2. EXECUTIVE SUMMARY

Ganzur Dengkaling Reneysa Community Forest (CF) was first established in the year 2012 with objective to manage the timber and NWFPs for 10 years from 2012-2022. It was managed by 36 members with an area of 74.88 hectares. During the first plan period, Community Forest Management Group (CFMG) had managed and utilized timber and bamboo (NWFP) sustainably.

With the revision of the plan, the CF is renamed as Denkaling Reneysa CF since the members from the Gangzur village has voluntarily withdrawn from the CF members due to unavoidable reason. Denkaling Reneysa CF has total area of 73.26 hectares comprising of 14 households from three villages viz; Dengkaling, Rushong and Thoshopang. The Forest type is mixed broad-leaved forest comprising *Schima* spp, *Acer* spp and *Persea* spp as dominant species. As per the resource assessment result, the CF has enough numbers of drashing, cham, tsim and firewood to meet the demand of the CF members. The analysis from the resource assessment showed that, the CF has excess firewood and has potential to generate income through sale of it and other non-wood forests products (NWFPs).

The overall objectives of CF are as follows:

- ✓ Sustainable utilization and management of timber and Non-wood Forest Products.
- ✓ Protection and management of existing water sources and catchment areas.
- ✓ Conservation and management of the forest.
- ✓ Income generation through sale of the surplus timber and NWFPs to enhance the livelihoods of the CFMGs.

To achieve the above-mentioned objectives, CFMG will manage the forest resources and services following the annual work plan prescribed. The main activities include the harvesting and utilization of timber, plantation, cleaning and thinning, water catchment management in the designated CF area.

PART A: MANAGEMENT PLAN

3. INTRODUCTION

Denkaling Reneyesa CF, located in Gangzur geog, Lhuentse Dzongkhag, was established in 2012. The total CF area was 74.88 hectares, handed over to 36 households in Gangzur, Denkaling, Rushong, and Thoshopang villages. During the first plan period, the Community Forest Management Group (CFMG) had managed and utilized timber and bamboo (NWFP) sustainably. As of July 20, 2022, the total funds accumulated in the group savings are Nu.109000 (one lakh, nine thousand), and Nu.60000 (sixty thousand) is lent within the CF members as a community loan at a low interest rate as compared to other financial institutions, ultimately enhancing the livelihoods of the community. The sources of funds were the annual membership fee collection, forest product utilization fees, fines and penalties, etc.

For the past 10 years, 192 numbers of drashing, 116 numbers of firewood, and 320 numbers of small bamboos were harvested for new rural house construction, renovation, and other purposes that were within the limits of AAC. In terms of resource utilization and protection of forest resources from intruders, the communities benefited from their community forest. Despite being able to fulfill the members' demand for timber and NWFPs, the CFMG was able to support the renovation of the community Lhakhang at Gangzur village by supplying timber from the designated CF area.

After the first plan period (2012-2022), Gangzur Denkaling Reneyesa CF is renamed as Denkaling Reneyesa CF, with an area of 73.26 hectares and 14 hhs from three villages, namely Dengkaling, Rushong, and Thoshopang. 20 households from Gangzur village have voluntarily withdrawn from the CFMG as the designated CF area is located at a distance from their village, making it difficult for the members to attend the CF management activities. The main forest type is mixed broadleaved forest, comprising *Schima* spp., *Acer* spp., and *Persea* spp. as dominant species. As per the resource assessment, the CF has enough drashing, cham, tsim, and firewood to meet the demand of the CF members. The regeneration status of the forest is very scattered. This CF is also home to fauna such as barking deer, wild dogs, wild pigs, porcupines, Himalayan

black bears, and common leopards, and it also serves as a preferable habitat for the Rufous-Necked Hornbill and other bird species.

The analysis from the resource assessment showed that the CF has excess firewood and has the potential to generate income through the sale of it and other non-wood forest products (NWFPs). The livelihoods of CFMG presently depend on agriculture, livestock, and other off-farm activities. The CFMG will be governed by a set of bylaws and adhere strictly to the management plan. The CFMG should not exceed the annual allowable cut under any circumstances. The excess timber meant for commercial marketing has to be sold in sawn form. Fines and penalties for any illegal activities will be imposed in accordance with the FNCRR, 2017 and amendment. Since the whole CF block falls inside Biological Corridor No. 7, they have agreed to abide by the FNCRR in addition to their CFMP.

The CF is established for sustainable utilization, management, and protection of forest and forest resources to improve the livelihoods of the CFMGs. The knowledge gained over the last ten years has assisted people in understanding the significance and benefits of the CF program in rural livelihood. Therefore, the CFMG has come forward to revise the management plan with the hope for better management, to foster active participation in conservation and sustainable resource utilization, and to improve livelihood through income generation.

4. TOTAL COMMUNITY FOREST AREA

The Denkaling Renyesa CF has a total area of 73.26 ha. The previously managed Tsamdro near Tshenmagang in Lhuentse Dratshang is also included in the community forest area.

5. COMMUNITY FOREST MAP

5.1 Map of the CF

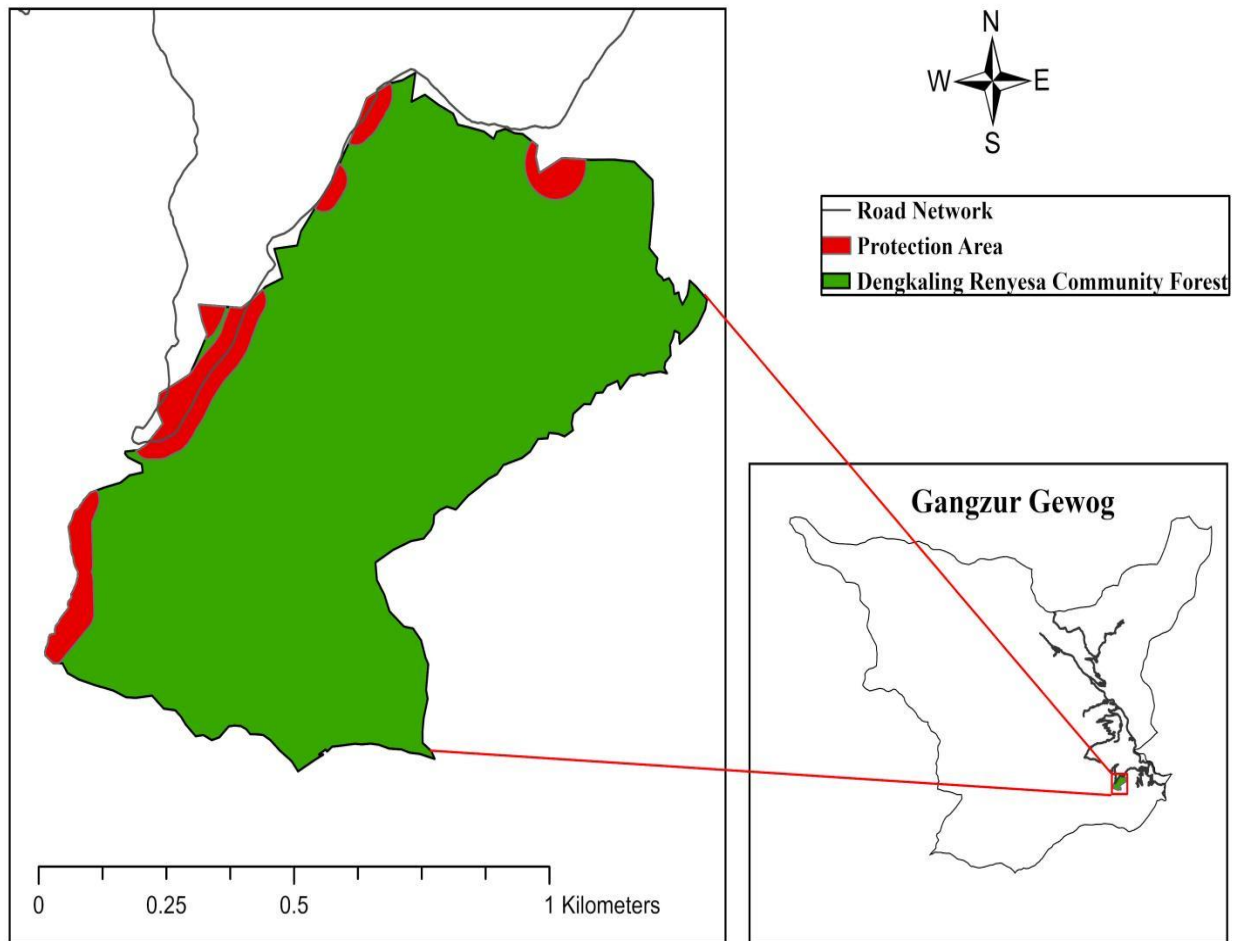


Figure 1: Location Map of the Denkaling Renyesa CF

5.2 Google Map of Denkaling Renysa Community Forest.



6. COMMUNITY FOREST BOUNDARIES

Table 1: CF boundary details

Boundaries	Description of permanent features
West	Renysa
East	Tshemagang
South	Dhodom
North	Ngar Farm Road

7. SOCIAL INFORMATION

Table 2: Social Information

	Descriptions
Name of the village	Denkaling, Thoshopang & Rushong.
Ethnic groups with CFMG	Kurtoep
Basic amenities	Farm road, electricity, drinking water & mobile connectivity
Total household (HH) number of CFMG	14
Population of CF MG	56
% male and % female	50% male & 50% female
Main source of income	Agricultural
Cattle population of CFMG	17
Main crops	Paddy and maize
Cropping pattern	Mixed cropping
Average Annual Income	Nu. 21000/-
If any add:	

8. FOREST INFORMATION (WHOLE FOREST)

8.1 History of the Forests

In the past, the people of Denkaling and Gangzur villages used the forest to extract rural house building timber, firewood, and NWFP. The nearby settlements also use the land as free grazing grounds for their cattle. Some parts of the forest were even used as Lhuentse Dratshang's seasonal grazing area for cattle. This forest area is a catchment area for drinking water sources for water users in the Lhuentse municipal area and Lhuentse Higher Secondary School. Ngar farm road is present and runs through the current CF area.

8.2 Block Information

Format 1. Forest Resource Assessment Format (Complete this format for each block)	
Name of Community Forest	Denkaling - Renysa
Date of Assessment	16/06/2022-20/06/2022
Name of block	Renysa
Block area	73.26ha
Name of recorder	Tenzin Wangpo, FR-I, Chimi Rinzin, FR-I, Gyeltshen, FR-I, Ngawang Tenzin, Sr. Fr

Forest & Habitat Type (tick all those present, Refer definition below)			
Forest <input checked="" type="checkbox"/>	Thicket/pole stage <input type="checkbox"/>	Shrub land <input type="checkbox"/>	
Grassland <input type="checkbox"/>	Plantation <input checked="" type="checkbox"/>	Other <input type="checkbox"/>	
Vegetation type			
Subtropical forest <input type="checkbox"/>	Chirpine forest <input type="checkbox"/>	Warm broad leaved forest <input type="checkbox"/>	Blue pine forest <input type="checkbox"/>
Cool Broad leaved forest <input type="checkbox"/>	Mixed <input checked="" type="checkbox"/>	Fir forest <input type="checkbox"/>	Other <input type="checkbox"/>

Definitions	
Broad leaf 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	Vegetation > 3m in height consisting of young trees usually < 40 cm dbh
Shrubs	Non-tree species > 2 m in height (often thorny and multi - stemmed)
Shrub-land	Vegetation dominated by woody multi-stemmed plants or single stemmed plants and regeneration mostly < 3m 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 meters tall but greater than 30cm tall
Seed trees	Mature trees with healthy crowns capable of producing flowers and seed
Soil Cover	The percentage of the area with soil surface covered either by live vegetation or a layer of other plant vegetation

Forest Condition (complete if the block is mainly forest)

Write the names of main tree species

Local name	Scientific name
Phumshing	<i>Schima khasiana</i>
Tshekpashing	<i>Persia</i>
Kharshing	<i>Michelia champaca</i>
Phangkayma	<i>Quercus lamellosa</i>
Serkaling	<i>Acer campbelii</i>

Plantation

Is there any plantation?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Approximate height Of planted trees (m) - 0.3
Year planted - 2017	Is the plantation? Under stocked <input type="checkbox"/> Stocked <input checked="" type="checkbox"/> Overstocked <input type="checkbox"/>		

Forest Condition – Age

Mature <input checked="" type="checkbox"/>	Pole stage <input type="checkbox"/>	Shrub land <input type="checkbox"/>	Any <input type="checkbox"/>
Main canopy of mature trees	Main canopy of pole-stage trees	Main canopy of shrubs, young trees or regeneration	No continuous canopy. Isolated trees only

Forest Condition – Canopy density (tick main canopy)

Dense <input type="checkbox"/>	Open <input checked="" type="checkbox"/>	Very open <input type="checkbox"/>
Canopy density > 70%	Canopy density < 70%	No real canopy. Isolated trees only

Forest Condition – Regeneration (including coppice regrowth)

Abundant <input type="checkbox"/>	Scattered/few <input checked="" type="checkbox"/>	None <input type="checkbox"/>
Regeneration easy to find in most places	Regeneration only in some places and hard to find	No regeneration

Write the names of the 3 main tree species in the regeneration

1) <i>Schima khasiana</i>	2) <i>Beilschmiedia spp</i>	3) <i>Persia spp</i>
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Regeneration: Seedlings > 30cm and < 1.3m height

Forest Condition – Approximate density of seed trees

High <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Low <input type="checkbox"/>
> 50 seed trees per ha	10-50 seed trees per ha	< 10 seed trees per ha

Block Condition – Summary*(Use the forest condition class box below to get an average condition for the block)*

Poor	<input type="checkbox"/>	Average	<input type="checkbox"/>	Good	<input checked="" type="checkbox"/>	Very Good	<input type="checkbox"/>
Does the main forest canopy consist of large, mature trees?				Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>

Forest Condition Class Box

Age	Canopy density	Regeneration	Seed tree class	Condition
Mature forest	Dense	Abundant		Very good
		Scattered/few		Good
	Open	Abundant		Good
		Scattered/few		Average
Pole stage forest	Dense	Abundant		Good
		Scattered/few		Average
	Open	Abundant		Average
		Scattered/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)	<i>2 hectares</i>
Dominant vegetation type in the open space	<i>Small bamboos and herbs</i>
Cause of open space e.g., grazing, fire, harvesting, etc.	<i>Over harvesting, cattle grazing and illegal logging</i>

Grazing and fodder (complete if the forest block is used for grazing or fodder)

Grass land type			
Natural	<input checked="" type="checkbox"/>	Man-made	<input type="checkbox"/>
Mixture	<input type="checkbox"/>	Predominantly forest	<input type="checkbox"/>

Main fodder species being used (<i>list 3 only</i>)	
Local name	Scientific name
Romdangshing	<i>Ficus spp</i>
Yeoshing	<i>Celtis spp</i>

Pasture quality (list the 3 dominant species in the grassland)		
Local name	Scientific name	Palatable/unpalatable
Ngon	<i>Rumex chinensis</i>	Unpalatable
Khampa	<i>Artemesia</i> spp	Unpalatable

Use pattern	<input type="checkbox"/>	Seasonal	<input checked="" type="checkbox"/>	All year	<input type="checkbox"/>
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Type of user	Migratory	<input type="checkbox"/>	Local	<input type="checkbox"/>	Both	<input checked="" type="checkbox"/>
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Catchment Condition (use catchment condition class box below)

(i) Catchment condition – soil cover

Soil cover	Soil cover class
>50% of the soils are covered by vegetation	high <input checked="" type="checkbox"/>
25-50% of the soils are covered by vegetation	moderate <input type="checkbox"/>
<25% of the soils are covered by vegetation	low <input type="checkbox"/>

(ii) Catchment Condition – Soil type and erosivity

Soil type (colour, texture and type)

Erosive	<input type="checkbox"/>	Non-erosive	<input checked="" type="checkbox"/>
Disperses and/or breaks up in water easily		Stable to water flow	

(i) Catchment Condition –Slope

Slope(degrees)	Slope steepness class
<10°	Gentle <input type="checkbox"/>
10°–30°	Moderate <input checked="" type="checkbox"/>
>30°	Steep <input type="checkbox"/>

Catchment Condition – Summary (Use the catchment condition class box below to get the average condition for the block)

Less critical	<input type="checkbox"/>	Moderately critical	<input checked="" type="checkbox"/>	Highly critical	<input type="checkbox"/>
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Catchment Condition Class Box

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	Less critical
		Low	Moderately critical
Steep	Erosive	Moderate or high	Moderately critical
		Low	Highly critical
	Non erosive	Moderate or high	Moderately critical
		Low	Highly critical

Fauna (List any animal or bird species seen or which are known from the block)	
Local Name	Scientific name
Barking Deer	<i>Axis Axis</i>
Wild pig	<i>Sus scrofa</i>
Common Leopard	<i>Uncia uncia</i>
Great hornbill	<i>Buceros bicornis</i>
Kalij Pheasant	<i>Lophura leucomelanus</i>
Monkey	<i>Macaca Assamneses</i>
Capped Langur	<i>Trachypithecus pileatus</i>
Porcupine	<i>Erethizondorsatum</i>
Himalayan black bear	<i>Ursus thibetanus</i>
Samber deer	<i>Rusa unicolor</i>
Blue whistling thrush	<i>Myophonus caeruleus</i>
Wild dog	<i>Lycaonpictus</i>
Red Vented bulbul	<i>Pycnonotus cafer</i>
Oriental turtle dove	<i>Streptopelia orientalis</i>
Common Hoopoe	<i>Upupaepops</i>
Great Barbet	<i>Megalaimavirens</i>

Biotic Pressures (tick those present)			
Fire	Common <input type="checkbox"/>	Occasional <input type="checkbox"/>	Absent <input checked="" type="checkbox"/>
Grazing	Heavy <input checked="" type="checkbox"/>	Limited <input type="checkbox"/>	Absent <input type="checkbox"/>
Fodder collection (list main species used)	Common <input type="checkbox"/>	Limited <input checked="" type="checkbox"/>	Absent <input type="checkbox"/>
NWFP collection (list the main products including bamboo &cane)	Common <input type="checkbox"/>	Limited <input checked="" type="checkbox"/>	Absent <input type="checkbox"/>
Leaf litter collection	Common <input type="checkbox"/>	Limited <input checked="" type="checkbox"/>	Absent <input type="checkbox"/>
Encroachment	Common <input type="checkbox"/>	Occasional <input type="checkbox"/>	Absent <input checked="" type="checkbox"/>
Pole harvesting	Common <input type="checkbox"/>	Occasional <input checked="" type="checkbox"/>	Absent <input type="checkbox"/>
Fuel wood harvesting	Common <input checked="" type="checkbox"/>	Occasional <input type="checkbox"/>	Absent <input type="checkbox"/>
Timber harvesting	Common <input checked="" type="checkbox"/>	Occasional <input type="checkbox"/>	Absent <input type="checkbox"/>
Hunting	Common <input type="checkbox"/>	Occasional <input type="checkbox"/>	Absent <input checked="" type="checkbox"/>
Others(describe)			

Potential Management Options (<i>list any potential management options for the CF/block</i>)	
1	Cleaning and thinning of forest stand
2	Plantation in tree felled/degraded area
3	Harvesting of timbers
4	Protection of forest
5	Manage natural regeneration.
6	Water source protection

8.3 Annual Allowable Cut (for each block)

Table 3: Annual Allowable Cut of timber

Annual Allowable Cut Table							
Annual Allowable Cut (AAC)	Dangchung m3	Tsim m3	Cham m3	Drashing m3	Firewood m3	Flag Poles	Fencing Posts
Block I	0.32	1.22	22.68	59.88	64.91	3.08	0.08
Total AAC	0.32	1.22	22.68	59.88	64.91	3.08	0.08

Notes: For CFMG's understanding, m3 can be converted into cft. ($1 \text{ m}^3 = 35.32 \text{ cft}$). Volume can also be converted into number of trees using the following factors (Adapted from FRMD);

- Trees/firewood (standing form) = 61.79 cft (Broadleaf)/70.62 cft (conifer)
- Cham sized tree = 10.59 cft (BL)/14.122 cft (Conifer)
- Tsim/Flag poles = 3.53 cft (Both)
- Dangchung/Fencing posts = 1.41cft (BL)/1.76 cft (Conifer)

Table 4: Annual Allowable Cuts of NWFP

NWFP	Blocks (for harvesting)		Quantity to be harvested annually
	No.	Name	
Fern	1	Tsenmagang	100 Bundles
<i>Elastotema</i>	1	Renysa	100 Bundles
Small Bamboo	1	Renysa	200 Nos.

9. FOREST MANAGEMENT

9.1 Block Wise Management Procedures

Table 4: Block Wise Management Procedures

Produce/services	Timber (Drashing, Cham, Tsim & D/chung	Firewood & flag post	NWFPs
Main species	<i>Michelia champaca</i> , <i>Acer</i> spp, <i>Persia</i> , <i>Schima wallichii</i> & <i>Beilchimedia</i> spp.	<i>Quercus lamellosa</i> and small bamboo	Cane, fern, mushroom, <i>Elastotema</i>
Problems	Inadequate stock in community forest area	Trees along the roadside are overexploited for firewood purposes.	No market
Opportunities	Plant desirable timber species to meet timber demand in future	Use lops and tops of felled trees, diseased, deformed and dying trees.	Increase CFMG fund through sale of NWFP
Management objectives (reflecting problems and/or opportunities)	Sustainable utilization and management of timber and Non-wood Forest Products	<ul style="list-style-type: none"> ➤ Conservation and management of the forest ➤ Income generation through sale of the surplus timber and NWFPs to enhance the livelihoods of the CFMGs. 	Protection and management of existing water sources and catchment areas
Activities to achieve the objective (mark as H, M or L)	<ul style="list-style-type: none"> ➤ Single tree marking in presence of Resoop (H) ➤ Plantation of native tree in degraded area (H) ➤ Identification and retention of mother trees (H) ➤ Issuance of permit to harvest NWFP (M) ➤ Sale of excess forest resources (M) 	<ul style="list-style-type: none"> ➤ Thinning and cleaning (H) ➤ CFMG shall buy energy saving devices to reduce firewood consumption (M) ➤ Marking should be done with valid permit and should not exceed AAC (H) 	<ul style="list-style-type: none"> ➤ Retention of trees and plantations near the water source area(H)

Procedures	➤ Allocate timber in accordance with the AAC and avoid causing damage to other standing trees during tree felling and marking, site selection for plantation, site preparation, seedling arrangement, and seedling planting through labor contribution	➤ Obtain permits for the marking of trees and conduct CFMG meetings annually for planning the activities for timber allotment, marking, and the issuance of permits	➤ A suitable site will be identified for a plantation near a water catchment area
Responsibilities	CFMG executive members, CFMG members and concerned forest official.		

9.2 Forest Management Objectives (whole CF)

- Sustainable utilization and management of timber and Non-wood Forest Product
- Protection and management of existing water sources and catchment areas
- Conservation and management of the forest
- Income generation through sale of the surplus timber and NWFPs to enhance the livelihoods of the CFMGs.

10. FOREST PRODUCT DEMAND OF CFMG

Table 5: Forest Product demand of the CFMG members

Produce	Annual household requirement (estimated)		Number of households using the produce (if all then write “all”)	Total requirement (over 10 years)	
	No. of trees	Volume (cft)		No. of trees	Volume (cft)
Drashing	27	1668.33	4 (1 new, 1 Hhs renovation, and 2 Hhs other construction)	270	16683.3
Cham	0	0	0	0	0
Tsim	0	0	0	0	0
Dangchung	0	0	0	0	0
Firewood	64	3954.56	16	160	9886.4
Flag Poles	0	0	0	0	0
Fencing Posts	50	70.5	2	500	705
NWFPs (bamboo)	200		5	2200000	2000

11. COMPARISON OF AAC AND DEMAND

Table 6: Comparison of AAC and demand for timber

Produce	Total AAC		Total Annual Demand		Difference		Comments
	<i>No. of trees</i>	<i>Volume (either in m³)</i>	<i>No. of trees</i>	<i>Volume (either in m³)</i>	<i>No. of trees</i>	<i>Volume (either in m³)</i>	
Drashing	34	59.88	27	47.23	+7	+12.65	<i>The CFMG shall sale excess timber after meeting their annual demand.</i>
Cham	76	22.68	0	22.68	+76	+22.68	<i>Cham size trees shall be retained to attain Drashing size.</i>
Tsim	12	1.22	0	1.22	+12	+1.22	<i>The CFMG shall carry out plantation since CF has not much small trees, which is a sign of poor regeneration</i>
Dangchung	8	0.32	0	0	+8	+0.32	<i>The CFMG shall carry out plantation since CF has not much small trees, which is a sign of poor regeneration</i>
Firewood	37	64.91	16	9.14	+21	+55.77	<i>The excess firewood tree shall be sold for commercial purposes</i>
Fencing Post	2	0.08	50	2.49	-48	-2.39	<i>The fencing post will be met through conversion of excess firewood trees</i>
Flag poles	3	3.08	0	0	+3	+3.08	<i>All the flag poles requirement shall be met from small bamboo (Rawa).</i>
NWFPs (<i>list all NWFPs</i>)							

12. PARTICIPATORY ENVIRONMENTAL ASSESSMENT

Table 7: Participatory Environment Assessments

Completed Participatory Environmental Assessment Chart								
	Potential Environmental Effects				Potential Socio-Economic Effects			
Activity proposed in CFMP	Soil	Water	Wild animals	Plants	Traditional forest use	Cultural and religious values	Local employment	Local benefits from forest produce
Harvesting of timber/fuel wood/fencing posts/etc.	-	-	-	-	-	-	+	+
Plantation	+++	+++	+++	+++	+++	++	++	+++
Control illicit cutting	+++	+++	+++	+++	++	++	-	-
Removal of unwanted trees and undergrowth	-	-	-	++	+	+	+	++
Thinning	-	-	-	++	+	-	+	++
NWFP Collection	-	-	-	+	+	+	++	+++
Over Grazing	-	-	-	-	+	+	0	0
Protection of water and catchment	+++	+++	++	+++	+++	++	+	+
NB: (O) = No impact at all, (-) = Negative impact, (+) = Slight positive impact,								
(++) = More positive impact, (+++) = Much more positive impact.								

Procedures to Address Potential Negative Environmental Effects	
Activity	Procedure
Timber harvesting	<ul style="list-style-type: none"> ✓ Precaution must be taken to ensure minimum damage to the regeneration and undergrowth while felling the tree. ✓ It will be done based on the single tree selection system and ensure that the good mother trees are retained for future regeneration.
Thinning	<ul style="list-style-type: none"> ✓ Only unwanted deformed trees will be removed ✓ Area for thinning will be identified by looking at the forest condition and growth rate.

13. FOREST PRODUCT AND SPECIES PREFERENCE

Table 8: Forest product and species preferences

Species Local name ↓	Uses →	Timbers	Fire wood	Fencing Post	Flag post	Fodder	Leaf litter
Takashing	Preference	XXX	X	X	X	X	X
	Availability	Y	Y	Y	Y	Y	Y
Karshing	Preference	XXX	X	X	X	X	X
	Availability	YY	YY	YY	YY	YY	YY
Domphushing	Preference	X	X	X	XXX	X	X
	Availability	YYY	YYY	YYY	YYY	YYY	YYY
Pragolishing	Preference	XX	X	X	XX	X	X
	Availability	Y	Y	Y	Y	Y	Y
Sisishing	Preference	X	XXX	XXX	X	X	X
	Availability	YY	YY	YY	YY	YY	YY
Puyumshing	Preference	XX	XX	XX	XX	X	X
	Availability	YYY	YYY	YYY	YYY	YYY	YYY

XXX= Highly preferred XX= Medium preferred X= Least Preferred

YYY= Highly Preferred YY= Medium abundant Y= Scarcely abundant

14. MONITORING PLAN BY CFMG

Table 9: Monitoring plans by CFMG

Forest Resources Monitoring				
Activities (as per AWP)	Indicator	How it will be monitored	Responsibility	Comments
Timber harvesting	Supply of adequate timber as per the construction approval, No. of illegal case detected. Conduct CFMG meeting annually for planning the activities for timber allotment, marking and issuance of permit.	Conduct a CFMG meeting annually for planning the activities for timber allotment, marking, and issuance of permits. Checking whether the demands of CFMG members are being met or not	CFMG members, Range Officer, SFES and CFO	CFMG will follow the CF management plan.
Issuance of Permit				
Marking of trees				
Patrolling				
Environmental Monitoring Plan				
Potential impact (negative)	Indicator	How it will be monitored	Responsibility	Comments

Cleaning and thinning	Hygiene of forest maintained in CF. No. of seedling planted/surviving, species planted	Executive members will keep records of all the activities carried out.	All the CFMG members.	
Plantation				
Social & Institutional Monitoring Plan				
General CFMG meeting	No. of minutes of meeting kept	Monitor whether the meeting is held or not as per the plan	All the CFMG members and respective forest official.	

15. ANNUAL WORK PLAN

Table 10: Annual Work plan of the CFMG

Year					
Management objective	Activity	Block or location	Quantity	Unit	Month
<i>Sustainable utilization and management of timber and Non-wood Forest Products</i>	Plantation of native desired timber species trees.		0.5	Acre	May and June
	Timber and firewood permit issuance.				All round the year
	Marking of trees for firewood and timbers.	Whole CF area			All round the year
	CFMG training on book and recording keeping		All the executive members	Nos.	December
	CFMG general meeting.		1	Nos.	October (Annually)
<i>Protection and management of existing water sources and catchment areas</i>	Plantation in the watershed area		0.5	Acre	May and June
	Creation of waterhole and cleaning of natural waterhole inside CF.	Tsenmagang Top	2	Nos	November & December
<i>Conservation and management of the forest</i>	Clearing of unwanted climbers nearby the cane growing area.		0.5	Acre	February
	Clearing of unwanted bushes/shrubs and climbers inside plantation area.	Tsenmagang	0.5	Acre	March

	Cleaning campaign for waste management	Dengkaling-Ngar farm road	All the CFMG members	Nos.	Bi-annually.
<i>Income generation through sale of the surplus timber and NWFPs to enhance the livelihoods of the CFMGs</i>	Conduct CFMG meeting and sale of excess forest resources and monitoring of CF activities.	Whole CF area	CFMC and CFMG members	Nos.	Monthly
	Patrolling	Whole CF area	12	Nos.	Monthly

PART B: BY LAWS

Name of Community Forest Management Group and Community Forest

The name of this community forest had to be changed because the entire village of Gangzur voluntarily resigned its membership. The Gangzur community resigned from membership since the villages are far away from the community forest area and they face difficulties attending meetings and other CF management activities

16. MEMBERSHIP ARRANGEMENT

- Only households in Denkaling, Rushong, and Thoshopang can be members of the community forest
- The head of household with Gung & Thram can be membership as per existing guidelines
- A new member who wishes to join should complete a new membership registration application form and submit it to the chairperson, who will then approve his or her membership during the annual meeting. Then forward a copy of the membership form to the Forest Range office for information and update.
- A new member must pay a lump sum entry fee of Nu.5,000 at the time of registration.
- If a member leaves for a legitimate reason and under unavoidable circumstances, he or she should be relieved of 100% of his or her own annual fee from the time of his or her membership if he or she has not used forest produces.
- Members are not entitled to any compensation during their withdrawal, even if they have a legitimate reason, if they have used the forest produce during their active membership
- Voluntary withdrawal from the membership is allowed at any time, but the member is not entitled to any claim or compensation at any costs.
- If a person withdraws from the community forest, he or she will not be allowed to rejoin under any circumstances.
- Joining or leaving members should use Annexures 12 and 13, respectively.
- No outsider will be accepted to enroll as a CF member.

17. MANAGEMENT COMMITTEE FORMATION

The CFMG management committee includes five posts: chairperson (Thrizin), secretary (Drungchen), treasurer/accountant (Tsi-Zinpa) and two reservists (Caretakers) to manage the community forest. The committee members shall be elected among the CF members and should serve for tenure of 5 years.

17.1 Criteria for eligibility of the members

Every member has the right to become an executive committee member unless he or she meets the following criteria:

- He/she should be the legal member of the CFMG.
- He/she should be able to read and write.
- He/she should be above 18 years and below 60 years of age.
- He/she should be mentally sound.

17.2 Election of the CFMG Executive Member

During the 4th annual CFMG meeting, the five CFMG executive members will be elected. They shall be elected through the casting of votes or through the raising of the hand. The person with the highest votes will be elected. In the event that an executive member dies, a chairperson will serve until the annual meeting is held and the vacant position is filled. The formal handing and taking of any documents shall be done in the presence of all the CFMG members

17.3 Procedure for Leaving the Committee

The executive committee members are not allowed to leave their posts until the end of the term. In an unavoidable case, any executive member shall write a resignation letter with genuine reasons to the chairperson prior to the CFMG meeting, and the chairperson shall forward a copy to the concerned range officer for information. The CFMG management committee as well as CFMG members shall be terminated from the group without any benefit if they are found to have indulged in corruption practices. No compensation will be paid to the executive committee members by the CFMG.

Table 11: CFMC executive member list

Sl. No.	Name of person	Gender	Address	Post	Contact No.	Tenure
1	Tshering Denu	Male	Denkaling	Chairperson	17786913	5 years
2	Tshewang Rinzin	Male	Denkaling	Secretary	77632787	5 years
3	Nima Lhamo	Female	Denkaling	Treasurer	17476542	5 years
4	Gyeltshen	Male	Denkaling	Resoop	77223991	5 years
5	Ngawang Samten	Male	Denkaling	Resoop	77350931	5 years

18. TERMS OF REFERENCE FOR CFMG MANAGEMENT COMMITTEE

- Represents the CFMG in its interactions with other agencies including the forestry staff.
- Represents CFMG members during preparation and implementation of the CF Management Plan.
- Coordinates and organises the administration of CF activities and ensures that CFMG members fulfil their management responsibilities.
- Responsible for the equitable distribution of benefits amongst CFMG members.
- Responsible for management of forest resources.
- Responsible for enforcing the by-laws and rules of the CFMG and for collecting fines and penalties.
- Responsible for ensuring that all the legal requirements for CF are met (including all types of records that need to be kept).
- Responsible for establishing and maintaining the CFMG fund using fund collected from various sources.
- Responsible for organising and conducting CFMG meetings as and when required.

18.1 ToR of Chairperson

- Control overall administrative matters and CF management activities of the CFMG.
- Coordinate meetings whenever necessary and inform CF members about date, time and place and the agenda for the meeting.
- Chairs and facilitates meetings and makes sure each person is allowed to speak, thereby giving everyone a fair chance to raise issues.

- Approves applications for forest products (with secretary).
- Coordinate overall CF management activities.
- Countersigns payment authorisation (with treasurer).

18.2 ToR of Secretary

- Assists the chairperson as required.
- Manages the correspondence (writing of letters and minutes of meetings) for the CFMG.
- Keeps the files of the CFMG.
- Maintains the list of CFMG members.
- Approves applications for forest products (with chairperson).
- Keeps minutes of CFMG meetings.
- Prepares annual progress report (with other CFMG Management Committee members).

18.3 TOR of Treasurer

- Looks after any financial transactions on behalf of the CFMG.
- Keeps records of expenditure and labour contribution during CF activities.
- Gives a detailed account of how much money or labour has been contributed, how much has been spent and how much is still left, at every CFMG meeting (or as required).
- Prepares the annual financial report (with the assistance of other CFMG Management Committee members) and submit to the CFO through the GFEO.
- Countersigns payment authorisation (with chairperson).

18.4 TOR of Resoop

- Inform the CFMG members in their respective area about the information or any instructions given by Chairperson pertaining to CF activities execution and meetings.
- Lead CFMG members in his/her area for the collection of seeds for the nursery
- Inform Chairperson or Secretary about if any unlawful activities are going on in the CF.
- Participate during Management Committee meetings.

18.5 Roles and Responsibility of CFMG and CFMG members

- To follow the procedures and rules of the CFMG as outlined in the CF Management Plan and By-laws.
- Participation in CFMG planning and decision-making.
- Election of CFMG Management committee members.
- Participation in drafting of the CF management plan and CFMG by-laws.
- To participate in every meeting.
- Co-operation with the CF Management Committee in carrying forest management and other management operations especially by contributing labour if required.
- Co-operation with the CFMG Management Committee regulating forest use by other CFMG members and by outsiders
- Become involved in other CFMG activities as planned.
- Be responsible for protecting Community Forest from illegal activities.

20. FEES

Table 12: Annual fees and fees for forest products

Sl. No	Forest Products/ Membership Fees	Procedures	Fees (Nu)
1	Membership fees	Annual fee of Nu.600/- will be collected from each member during annual CFMG meeting.	Nu.600/- annually
2	Drashing	The Secretary shall collect Nu.50/- for other broadleaf trees and Nu.200/- per Champ and walnut tree. Permit shall be issued upon payment of fees	Nu.50/- for other broad leaf & Nu.200/- for walnut and Champ.
3	Cham	All the cham size trees shall be retained to attain drashing.	Nu.30/- per tree
4	Fencing post	Trees that are not sound for timber shall be allotted in thinning basis.	Nu.10/-
5	Ferns/ <i>Elatostema</i>	The members shall collect freely for	Nu.2/- per bundle

6	Cane shoot	domestic consumption and for sale the members shall obtain permit from CFMC. The fees for NWFPs sale shall be collected by Treasurer and issue money receipt.	Nu.50/- per shoot.
7	Stones	Surface collection of stones for rural purpose.	Nu.50/- per Truckload.
8	Dangchung	No demand	Nu.10/-
9	Rawa	Both outsider and CFMG member shall be permitted to collect bamboo on cleaning/thinn basis upon obtaining permit. The Culms of less than one year old should be left intact and should not collect during sprouting of new shoots.	Nu.2/-
10	Firewood	Only non-timber trees shall be allotted as firewood and each house is eligible for 1T/L firewood annually.	Nu.180/-
11	Tsim	No demand	Nu.20/-
12	Flagpoles	Bamboo shall be allotted instead of trees for the purposes of Flagpole.	Nu.2/-
13	Special class and A class tree	For domestic use	Nu.200/-

21. FINES AND PENALTIES

Table 13: Product-wise fines and penalties

Timber/Products/ Activities	CFMG members		Non CFMG members	
	Fines/penalty	Products	Fines/penalty	Products
1. Drashing	As per the FNCRR	Release	As per the FNCRR	Seized
2. Cham	As per the FNCRR	Release	As per the FNCRR	Seized
3. Tsim	As per the FNCRR	Release	As per the FNCRR	Seized
4. Dangchung	As per the FNCRR	Release	As per the FNCRR	Seized
5. Firewood	As per the FNCRR	Release	As per the FNCRR	Seized
6. Flag poles	As per the FNCRR	Release	As per the FNCRR	Seized
7. Fencing posts/poles	As per the FNCRR	Release	As per the FNCRR	Seized
8. Stone	As per the FNCRR	Release	As per the FNCRR	Seized
9. Absent during works	Nu.600/- will be collected per occasion.			
10. Absent during meeting	Nu.600/- will be collected per occasion.			
11. Illegal collection of NWFPs	As per FNCRR			

22. MANAGING CFMG FUND AND CREDIT

- The CFMG shall collect funds from its annual membership fee, forest produce collection fee, entry fee from new members, fines and penalties, sale of excess forest produce, loan interest, and other sources
- The CFMG shall continue to maintain a savings account in the name of the CFMG, which shall be operated jointly by the Chairperson, Secretary, and Treasurer, for proper management of the CFMG fund
- The joint signatory members shall withdraw cash from their savings accounts. The deposit of cash can be done by any member, provided that the depositor should produce the receipts of the money deposited for the purpose of keeping financial records
- The treasurer should keep a record of any financial transaction, such as cash generated and expenditures made, and should give clear information to the CFMG members during the CF meeting.
- The fund shall be used as per the CFMG fund management guidelines to meet expenses for CFMG meetings, CF development activities and for loan.

- The CFMG has decided that the funds will be utilized for plantation of economically desired timber species within their community forest area.
- The fund shall be also used for payment of taxi fare and food expenses while going to bank to deposit and withdraw fund.
- Loans shall be sanctioned to CFMG members in need at a 12% interest rate per annum, mainly for agricultural activities, during death or sickness, and shall have to be liquidated within one year.

23. BENEFIT SHARING MECHANISM

- Forest produce should be prioritized to needy CFMG member in case of insufficient forest produce during allotment.
- Allotted timber should be strictly used for bona fide rural use, and is prohibited for sale.
- Timbers for construction of new and renovations of structure for common use and strictly falling in the community will be provided at free of royalty in line with ACC.
- Sale of excess timber from CF should be in sawn form at NRPC rate. Sawing and logging shall be done by the CFMG members with work charges calculation.
- Victims of natural disaster will be provided timber on free royalty based on required volume/tree number but shall maintain record in timber utilization
- Wild vegetables will be allowed to collect by CFMG at free of royalty for domestic consumption.

24. MEETINGS

The general meeting of CFMG shall be conducted in January of each year to discuss the annual work plan, whereas CFMG committee meetings are organized frequently depending on need. During the general CFMG meeting, the executive members shall show the CF fund accumulated and the record of timber issued for transparent management of the CFMG. The secretary should keep notes of the meeting and prepare minutes with a record of the agenda, issues discussed, and actions decided in Annexure 2 Format 9 of the Community Forest Manual 2018 to be filed for future reference.

25. CONFLICT MANAGEMENT

- The conflict among CFMG members will be settled by the executive members.
- If the dispute between the CFMG members can't be resolved, it will be forwarded to Gewog Administration for settlement
- If the conflict is not resolved by the Gewog Administration, it will be forwarded to Forest Range Office.
- A further case will be forwarded to DFO if the dispute is not settled by the concerned Range Office.
- It will be then forwarded to Royal court of Bhutan for dispute settlement.

26. AMENDMENT OF CFMP AND BY-LAWS

- The amendment to the CF management plan for minor changes will be made during the annual CFMG general meeting and should be endorsed
- The meeting resolution that needs approval should be submitted to Range Officer.
- The major amendment of CFMP shall take place after consultation with DoFPS.

27. POWERS OF THE DEPARTMENT

Although the CFMG has an approved management plan, the DoFPS still reserves right for Cancellation/Suspension of Community Forest Certificate as stated in FNCRR, 2017 as:

- As per section 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.
- As per section 102 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.
- As per section 103 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.

- As per section 104 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.
- As per section 105 the period of 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.

28. ANNEXURES

28.1 List of CFMG Members

Sl. No	Name of CFMG	Address/village	CID No.	House No.	Thram No.
1	Chimi Dekar	Denkaling	10601000250	CHA-1-37	122
2	Ngochumo	Thoshopang	10601000301	CHA-1-416	476
3	Tshering Wangmo	Denkaling	10601000209	CHA-1-Nil-165	509
4	Pema Dekar	Denkaling	10601000349	CHA-1-42	467
5	Ugyen Wangmo	Denkaling	10601000236	CHA-1-36	22
6	Tshewang Dema	Thoshopang	10601000109	CHA-1-85	24
7	Kiba	Rushong	10601000199	CHA-1-33	25
8	Chengamo	Rushong	10601000320	CHA-1-21	20
9	Uygen Dema	Thoshopang	10601000225	CHA-1-35	23
10	Karma Jimba Namda	Trashy Yangkheel	10601000686	CHA-1-386	26
11	Choney Wangmo	Rushong	10601002206	CHA-1-Nil/47	385
12	Rinchen Lhamo	Rushong	10601000331	CHA-1-41	322
13	Gyeltshen	Thoshopang	10601000288	CHA-1-383	518
14	Tshewang Dema	Thoshopang	10601000320	CHA-1-40	20

28.2 CF Boundary GPS Coordinates

Way Points	Latitude	Longitude
Water source	27°39'19.52"N	91° 9'12.87"E
Tsenmagang	27°39'34.92"N	91° 9'17.67"E
Bridge	27°39'32.27"N	91° 9'14.07"E
Ngar farm road	27°39'50.30"N	91° 9'30.21"E
Renysa	27°39'15.45"N	91° 9'27.11"E
Footpath	27°39'46.92"N	91° 9'40.12"E
Stream	27°39'20.87"N	91° 9'6.84"E

28.3 Compilation Sheet

28.3.1 *Beilschimedia* species

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)										
1. CF Name: Dengkaling - Renyesa						4. Block Area: 170 Ha				
2. Block Name						5. Compiling date: 18/6/2022				
3. No of plots: 71						6. Species group: <i>Beilschimedia</i>				
Species	Suitability	<i>col1</i>	<i>col2</i>	<i>col3</i>	<i>col4</i>	<i>col5</i>	<i>col6</i>	<i>col7</i>	<i>col8</i>	<i>col9</i>
				(3 decimals)	(3 decimals)	(3 decimals)	(0 decimals)	(2 decimals)	(2 decimals)	(2 decimals)
		dbh class (cm)	class basal area (m ²)	class volume (m ³)	plot size (ha)	expansion factor	Tally	nrha (stems/ha)	basha (m ² /ha)	volha (m ³ /ha)
<i>Beilschimedia</i>	T	10-19	0.017	0.086	0.05	0.282		0	0	0
	N									
	T	20-29	0.047	0.305	0.05	0.282	1	0.28	0.01	0.09
	N									
	T	30-39	0.093	0.714	0.05	0.282		0	0	0
	N									
	T	40-49	0.156	1.351	0.05	0.282	2	0.56	0.09	0.76
	N									
	T	50-59	0.233	2.252	0.05	0.282		0	0	0
	N									
	T	60-69	0.327	3.448	0.05	0.282		0	0	0
	N									
	T	70-79	0.436	4.967	0.05	0.282	2	0.56	0.25	2.8
	N									
	T	80-89	0.561	6.837	0.05	0.282		0	0	0
	N									
Total =	T							0	0	0
	N									
sum for all dbh classes										

Explanation:

<p><i>col3</i> : look up in volume table, for given species group and dbh class</p> <p><i>col4</i> : plot size for given dbh class</p> <p><i>col5</i> : (1 / <i>col4</i>) / (nr. of plots)</p>	<p><i>col6</i> : count, and fill in</p> <p><i>col7</i> : <i>col5</i> * <i>col6</i></p> <p><i>col8</i> : <i>col7</i> * <i>col2</i></p> <p><i>col9</i> : <i>col7</i> * <i>col3</i></p>
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(When rounding: round to the nearest EVEN digit; e.g., 0.635 to 0.64 but 0.665 to 0.66)

28.3.2 *Schima* species

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)										
1. CF Name: Dengkaling - Renyesa						4. Block Area: 170 Ha				
2. Block Name						5. Compiling date: 18/6/2022				
3. No of plots: 72						6. Species group: <i>Schima</i> spp.				
Species	Suitability	<i>col1</i>	<i>col2</i>	<i>col3</i>	<i>col4</i>	<i>col5</i>	<i>col6</i>	<i>col7</i>	<i>col8</i>	<i>col9</i>
				(3 decimals)	(3 decimals)	(3 decimals)	(0 decimals)	(2 decimals)	(2 decimals)	(2 decimals)
		dbh class (cm)	class basal area (m2)	class volume (m3)	plot size (ha)	expansion factor	Tally	nrha (stems/ha)	basha (m2/ha)	volha (m3/ha)
<i>Schima</i>	T	10-19	0.017	0.089	0.05	0.282	1	0.28	0.00	0.03
	N		0.017	0.089	0.05	0.282	0	0.00	0.00	0.00
	T	20-29	0.047	0.319	0.05	0.282	1	0.28	0.01	0.09
	N		0.047	0.319	0.05	0.282	0	0.00	0.00	0.00
	T	30-39	0.093	0.750	0.05	0.282	2	0.56	0.05	0.42
	N		0.093	0.750	0.05	0.282	1	0.28	0.03	0.21
	T	40-49	0.156	1.425	0.05	0.282	1	0.28	0.04	0.40
	N		0.156	1.425	0.05	0.282	3	0.84	0.13	1.20
	T	50-59	0.233	2.381	0.05	0.282	3	0.84	0.20	2.01
	N		0.233	2.381	0.05	0.282	7	1.97	0.46	4.69
	T	60-69	0.327	3.653	0.05	0.282	6	1.69	0.55	6.17
	N		0.327	3.653	0.05	0.282	1	0.28	0.09	1.03
	T	70-79	0.436	5.273	0.05	0.282	8	2.25	0.98	11.88
	N		0.436	5.273	0.05	0.282	1	0.28	0.12	1.48
	T	80-89	0.561	8.418	0.05	0.282	0	0.00	0.00	0.00
	N		0.561	8.418	0.05	0.282	1	0.28	0.16	2.37
	T	90-99	0.701	9.671	0.05	0.282	1	0.28	0.20	2.72
	N		0.701	9.671	0.05	0.282	2	0.56	0.39	5.45
	T	100-109	0.714	12.504	0.05	0.282	3	0.84	0.60	10.56
	N		0.714	12.504	0.05	0.282	0	0.00	0.00	0.00
Total =	T							0	0	0
	N									
sum for all dbh classes										

28.3.3 *Michelia* species

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)										
1. CF Name: Dengkaling - Renyesa						4. Block Area: 170 Ha				
2. Block Name						5. Compiling date: 18/6/2022				
3. No of plots: 72						6. Species group: <i>Michelia</i> spp.				
Species	Suitability	<i>col1</i>	<i>col2</i>	<i>col3</i>	<i>col4</i>	<i>col5</i>	<i>col6</i>	<i>col7</i>	<i>col8</i>	<i>col9</i>
				(3 decimals)	(3 decimals)	(3 decimals)	(0 decimals)	(2 decimals)	(2 decimals)	(2 decimals)
		dbh class (cm)	class basal area (m2)	class volume (m3)	plot size (ha)	expansion factor	Tally	nrha (stems/ha)	basha (m2/ha)	volha (m3/ha)
<i>Michelia</i>	T	10-19	0.017	0.086	0.05	0.282	0	0.00	0.00	0.00
	N									
	T	20-29	0.047	0.270	0.05	0.282	0	0.00	0.00	0.00
	N									
	T	30-39	0.093	0.715	0.05	0.282	0	0.00	0.00	0.00
	N									
	T	40-49	0.156	1.258	0.05	0.282	0	0.00	0.00	0.00
	N									
	T	50-59	0.233	2.066	0.05	0.282	0	0.00	0.00	0.00
	N									
	T	60-69	0.327	3.121	0.05	0.282	1	0.28	0.09	0.88
	N									
	T	70-79	0.436	4.446	0.05	0.282	2	0.56	0.25	2.50
	N									
	T	80-89	0.561	6.061	0.05	0.282	0	0.00	0.00	0.00
	N									
	T	90-99	0.701	7.983	0.05	0.282	0	0.00	0.00	0.00
	N									
	T	100-109	0.714	10.270	0.05	0.282	0	0.00	0.00	0.00
	N									
Total =	T							0	0	0
	N									
sum for all dbh classes										

28.3.4 *Persea* species

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)										
1. CF Name: Dengkaling - Renyesa						4. Block Area: 170 Ha				
2. Block Name						5. Compiling date: 18/6/2022				
3. No of plots: 72						6. Species group: <i>Persea</i> spp				
Species	Suitability	<i>col1</i>	<i>col2</i>	<i>col3</i>	<i>col4</i>	<i>col5</i>	<i>col6</i>	<i>col7</i>	<i>col8</i>	<i>col9</i>
		dbh class (cm)	class basal area (m2)	class volume (m3)	plot size (ha)	expansion factor	Tally	nrha (stems/ha)	basha (m2/ha)	volha (m3/ha)
<i>Persea</i>	T	10-19	0.017	0.086	0.05	0.282	1	0.28	0.00	0.02
	N		0.017	0.086	0.05	0.282	1	0.28	0.00	0.02
	T	20-29	0.047	0.295	0.05	0.282	0	0.00	0.00	0.00
	N		0.047	0.295	0.05	0.282	0	0.00	0.00	0.00
	T	30-39	0.093	0.673	0.05	0.282	0	0.00	0.00	0.00
	N		0.093	0.673	0.05	0.282	0	0.00	0.00	0.00
	T	40-49	0.156	1.250	0.05	0.282	1	0.28	0.04	0.35
	N		0.156	1.250	0.05	0.282	1	0.28	0.04	0.35
	T	50-59	0.233	2.051	0.05	0.282	1	0.28	0.07	0.58
	N		0.233	2.051	0.05	0.282	1	0.28	0.07	0.58
	T	60-69	0.327	3.099	0.05	0.282	2	0.56	0.18	1.75
	N		0.327	3.099	0.05	0.282	2	0.56	0.18	1.75
	T	70-79	0.436	4.384	0.05	0.282	0	0.00	0.00	0.00
	N		0.436	4.384	0.05	0.282	0	0.00	0.00	0.00
	T	80-89	0.561	6.016	0.05	0.282	0	0.00	0.00	0.00
	N		0.561	6.016	0.05	0.282	0	0.00	0.00	0.00
	T	90-99	0.701	7.921	0.05	0.282	0	0.00	0.00	0.00
	N		0.701	7.921	0.05	0.282	0	0.00	0.00	0.00
	T	100-109	0.714	10.147	0.05	0.282	0	0.00	0.00	0.00
	N		0.714	10.147	0.05	0.282	0	0.00	0.00	0.00
Total =	T							0	0	0
	N									
sum for all dbh classes										

28.3.5 *Acer* species

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)										
1. CF Name: Dengkaling - Renyesa						4. Block Area: 170 Ha				
2. Block Name						5. Compiling date: 18/6/2022				
3. No of plots: 72						6. Species group: <i>Acer campbellii</i>				
Species	Suitability	<i>col1</i>	<i>col2</i>	<i>col3</i>	<i>col4</i>	<i>col5</i>	<i>col6</i>	<i>col7</i>	<i>col8</i>	<i>col9</i>
				(3 decimals)	(3 decimals)	(3 decimals)	(0 decimals)	(2 decimals)	(2 decimals)	(2 decimals)
		dbh class (cm)	class basal area (m2)	class volume (m3)	plot size (ha)	expansion factor	Tally	nrha (stems/ha)	basha (m2/ha)	volha (m3/ha)
<i>Acer</i>	T	10-19	0.017	0.113	0.05	0.282	0	0.00	0.00	0.00
	N		0.017	0.113	0.05	0.282	1	0.28	0.00	0.03
	T	20-29	0.047	0.334	0.05	0.282	0	0.00	0.00	0.00
	N		0.047	0.334	0.05	0.282	0	0.00	0.00	0.00
	T	30-39	0.093	0.691	0.05	0.282	1	0.28	0.03	0.19
	N		0.093	0.691	0.05	0.282	1	0.28	0.03	0.19
	T	40-49	0.156	1.190	0.05	0.282	1	0.28	0.04	0.33
	N		0.156	1.190	0.05	0.282	3	0.84	0.13	1.00
	T	50-59	0.233	1.839	0.05	0.282	4	1.13	0.26	2.07
	N		0.233	1.839	0.05	0.282	0	0.00	0.00	0.00
	T	60-69	0.327	2.642	0.05	0.282	5	1.41	0.46	3.72
	N		0.327	2.642	0.05	0.282	1	0.28	0.09	0.74
	T	70-79	0.436	3.605	0.05	0.282	3	0.84	0.37	3.05
	N		0.436	3.605	0.05	0.282	2	0.56	0.25	2.03
	T	80-89	0.561	4.733	0.05	0.282	6	1.69	0.95	8.00
	N		0.561	4.733	0.05	0.282	0	0.00	0.00	0.00
	T	90-99	0.701	6.026	0.05	0.282	1	0.28	0.20	1.70
	N		0.701	6.026	0.05	0.282	0	0.00	0.00	0.00
	T	100-109	0.714	7.491	0.05	0.282	1	0.28	0.20	2.11
	N		0.714	7.491	0.05	0.282	1	0.28	0.20	2.11
Total =	T							0	0	0
	N									
sum for all dbh classes										

28.3.6 *Quercus* species

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)										
1. CF Name: Dengkaling - Renyesa						4. Block Area: 170 Ha				
2. Block Name						5. Compiling date: 18/6/2022				
3. No of plots: 72						6. Species group: <i>Quercus</i> spp				
Species	Suitability	<i>col1</i>	<i>col2</i>	<i>col3</i>	<i>col4</i>	<i>col5</i>	<i>col6</i>	<i>col7</i>	<i>col8</i>	<i>col9</i>
				(3 decimals)	(3 decimals)	(3 decimals)	(0 decimals)	(2 decimals)	(2 decimals)	(2 decimals)
		dbh class (cm)	class basal area (m2)	class volume (m3)	plot size (ha)	expansion factor	Tally	nrha (stems/ha)	basha (m2/ha)	volha (m3/ha)
<i>Quercus</i>	T									
	N	10-19	0.017	0.088	0.05	0.282	0	0.00	0.00	0.00
	T									
	N	20-29	0.047	0.310	0.05	0.282	0	0.00	0.00	0.00
	T									
	N	30-39	0.093	0.718	0.05	0.282	0	0.00	0.00	0.00
	T									
	N	40-49	0.156	1.348	0.05	0.282	0	0.00	0.00	0.00
	T									
	N	50-59	0.233	2.233	0.05	0.282	0	0.00	0.00	0.00
	T									
	N	60-69	0.327	3.401	0.05	0.282	0	0.00	0.00	0.00
	T									
	N	70-79	0.436	4.877	0.05	0.282	1	0.28	0.12	1.37
	T									
	N	80-89	0.561	6.686	0.05	0.282	0	0.00	0.00	0.00
	T									
	N	90-99	0.701	8.851	0.05	0.282	0	0.00	0.00	0.00
	T									
	N	100-109	0.714	11.390	0.05	0.282	0	0.00	0.00	0.00
Total =	T							0	0	0
	N									
sum for all dbh classes										

28.3.7 Other Broadleaf Species

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)										
1. CF Name: Dengkaling - Renyesa						4. Block Area: 170 Ha				
2. Block Name						5. Compiling date: 18/6/2022				
3. No of plots: 72						6. Species group: Other Broad leaved				
Species	Suitability	col1	col2	col3	col4	col5	col6	col7	col8	col9
				(3 decimals)	(3 decimals)	(3 decimals)	(0 decimals)	(2 decimals)	(2 decimals)	(2 decimals)
		dbh class (cm)	class basal area (m2)	class volume (m3)	plot size (ha)	expansion factor	Tally	nrha (stems/ha)	basha (m2/ha)	volha (m3/ha)
Broadleaf	T	10-19	0.017	0.073	0.05	0.282	2	0.56	0.01	0.04
	N		0.017	0.073	0.05	0.282	4	1.13	0.02	0.08
	T	20-29	0.047	0.265	0.05	0.282	2	0.56	0.03	0.15
	N		0.047	0.265	0.05	0.282	10	2.82	0.13	0.74
	T	30-39	0.093	0.628	0.05	0.282	7	1.97	0.18	1.24
	N		0.093	0.628	0.05	0.282	22	6.20	0.58	3.89
	T	40-49	0.156	1.202	0.05	0.282	6	1.69	0.26	2.03
	N		0.156	1.202	0.05	0.282	27	7.60	1.19	9.14
	T	50-59	0.233	2.021	0.05	0.282	8	2.25	0.52	4.55
	N		0.233	2.021	0.05	0.282	16	4.51	1.05	9.10
	T	60-69	0.327	3.116	0.05	0.282	10	2.82	0.92	8.77
	N		0.327	3.116	0.05	0.282	11	3.10	1.01	9.65
	T	70-79	0.436	4.660	0.05	0.282	7	1.97	0.86	9.19
	N		0.436	4.660	0.05	0.282	8	2.25	0.98	10.50
	T	80-89	0.561	6.252	0.05	0.282	10	2.82	1.58	17.60
	N		0.561	6.252	0.05	0.282	5	1.41	0.79	8.80
	T	90-99	0.701	8.916	0.05	0.282	3	0.84	0.59	7.53
	N		0.701	8.916	0.05	0.282	7	1.97	1.38	17.58
	T	100-109	0.714	10.824	0.05	0.282	7	1.97	1.41	21.34
	N		0.714	10.824	0.05	0.282	5	1.41	1.00	15.24
Total =	T							0	0	0
	N									
sum for all dbh classes										

28.4 Stand & Stock Table

28.4.1 Sheet 1 – Number of Trees

Format 5: Stand & stock Table: Number of Trees													
1. Name of CF		: Denkaling – Renysa											
2. Block Name/No		: Dengkaling											
3. Number of sample plots		: 72											
Dbh class (cm). write in all values to 2 decimals													
Species group	Suitability	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100-109	Total	%
Beilschimedia	T		0.28		0.56			0.56				1.4	1.84%
	N											0	
Schima	T	0.28	0.56	0.28	0.84	1.69	2.25		0.28	0.84		7.02	9.22%
	N			0.28	0.84	1.97	0.28	0.28	0.28	0.56		4.49	5.90%
Michelia	T						0.28	0.56				0.84	1.10%
	N												
Persea	T	0.28			0.28	0.28	0.56			1		2.4	3.15%
	N	0.28			0.28	0.28	0.56					1.4	1.84%
Acer	T			0.28	0.28	1.13	1.41	0.84	1.69	0.28	0.28	6.19	8.13%
	N	0.28		0.28	0.84		0.28	0.56				2.24	2.94%
Broadleaf	T	0.56	0.56	1.97	1.69	2.25	2.82	1.97	2.82	0.84	1.97	17.45	22.93%
	N	1.13	2.82	6.2	7.6	4.51	3.1	2.25	1.41	1.97	1.41	32.4	42.57%
Quercus	T												
	N							0.28				0.28	0.38%
total broadleaf		2.81	4.22	9.29	13.21	12.11	11.54	7.30	6.48	5.49	3.66	76.11	100.00%
total all species		2.81	4.22	9.29	13.21	12.11	11.54	7.30	6.48	5.49	3.66	76.11	100.00%
%		3.70	5.54	12.21	17.36	15.91	15.16	9.60	8.51	7.21	4.74	100.00%	100.00%

28.4.2 Sheet 2 – Basal Area

Format 6: Stand & Stock Table: Basal Area														
1: Name of CF: Denkaling – Renysa														
2. Block Name/No: Dengkaling														
3: No. of sampling units: 72														
4. Estimated Parameter: Average Basal Area per Ha (m2/ha)														
<i>Dbh class (cm). Write all values to 2 decimals</i>														
Species group	Suitability	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100-109	110-119	total	%
<i>Beilschimedia</i>	T		0.01		0.09			0.25					0.35	1.49%
	N													
<i>Schima</i>	T		0.01	0.05	0.04	0.20	0.55	0.98		0.20	0.60		2.63	11.22%
	N			0.03	0.13	0.46	0.09	0.12	0.39				1.38	5.89%
<i>Michelia</i>	T						0.09	0.25					0.34	1.45%
	N													
<i>Persea</i>	T				0.04	0.07	0.18						0.29	1.24%
	N				0.04	0.07	0.18						0.29	1.24%
<i>Acer</i>	T			0.03	0.04	0.26	0.46	0.46	0.37	0.95	0.20	0.20	2.97	12.67%
	N			0.03	0.13		0.09	0.25			0.20		0.70	2.99%
<i>Broadleaf</i>	T	0.01	0.03	0.18	0.26	0.52	0.92	0.86	1.58	0.59	1.41		6.36	27.13%
	N	0.02	0.13	0.58	1.19	1.05	1.01	0.98	0.79	1.38	1.00		8.13	34.68%
<i>Quercus</i>	T													
	N						0.12							
total broadleaf		0.03	0.18	0.90	1.96	2.63	3.69	4.15	3.13	3.12	3.41	0.20	23.44	100.00%
total all species		0.03	0.18	0.90	1.96	2.63	3.69	4.15	3.13	3.12	3.41	0.20	23.44	100.00%
%		0.13%	0.77%	3.84%	8.36%	11.22%	15.74%	17.70%	13.35%	13.31%	14.55%	0.85%	100.00%	100.00%

28.4.3 Sheet 3 - Volume

Format 7: Stand & stock Table: Volume													
1. Name of CF: Denkaling - Renysa													
2. Block Name/No: Dengkaling													
3. Number of sample plots: 72													
4. Estimated parameter: average Volume per Ha (m3/ha)													
<i>Dbh class (cm) Write all values in 2 decimals</i>													
Species group	Suitability	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100-109	total	%
<i>Beilschimedia</i>	T		0.09		0.76			2.80				3.65	1.47%
	N												
<i>Schima</i>	T	0.03	0.09	0.42	0.40	2.01	6.17	11.88		2.72	10.56	34.28	13.77%
	N			0.21	1.2	4.69	1.03	1.48	2.37	5.45		16.43	6.60%
<i>Michelia</i>	T						0.88	2.50				3.38	1.36%
	N												
<i>Persea</i>	T				0.35	0.58	1.75					2.68	1.08%
	N				0.35	0.58	1.75					2.68	1.08%
<i>Acer</i>	T		0.19	0.33	2.07	3.72	3.05	8.00	1.70	2.11		21.17	8.50%
	N	0.03		0.19	1		0.74	2.03			2.11	6.1	2.45%
<i>Broadleaf</i>	T	0.04	0.15	1.24	2.03	4.55	8.77	9.19	17.60	7.53	21.34	72.44	29.10%
	N	0.08	0.74	3.89	9.14	9.1	9.65	10.5	8.8	17.58	15.24	84.72	34.04%
<i>Quercus</i>	T												
	N							1.37				1.37	0.55%
total broadleaf		0.18	1.26	6.28	17.3	25.23	33.79	49.75	30.47	35.39	49.25	248.9	100.00%
total all species		0.18	1.26	6.28	17.3	25.23	33.79	49.75	30.47	35.39	49.25	248.9	100.00%
%		0.07	0.51	2.52	6.95	10.17	13.57	19.99	12.24	14.22	19.79	100.00%	100.00%