

CHANGRAY COMMUNITY FOREST MANAGEMENT PLAN

(Revised plan for second term management)



Plan Period: November 2022 – October 2032

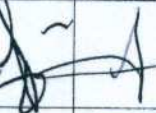
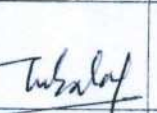
Village:	Changray
Chiwog:	Kuengarabten
Gewog:	Drakteng
Dzongkhag:	Trongsa

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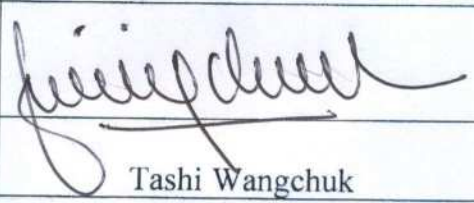
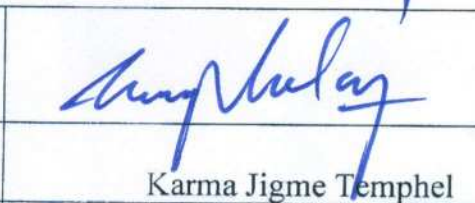
APPROVAL SHEET

Name of Community Forest	Changray
Village	Changray
Chiwog	Kuenga Rabten
Gewog	Drakteng
Dzongkhag	Trongsa
Production Area (Ha/Acre)	91.42 Hactares
Protection Area (Ha/Acre)	3.04 Hactares
Total Community Forest Area (Ha/Acre)	94.46 Hactares
Total CFMG Member (No. of HH)	19

Prepared and Submitted for Approval

Agencies	Community Forestry Representative	Forestry Representative (CFMP facilitator)	Gewog Administration	Social Forestry Section	Divisional/Park Office
Signature					
Name	Lhajay	Tashi	Dubala	Karma Dorji	Pankey Dukpa
Title	Chairperson	Sr. FR - I	Gup	Head	Chief Forestry Forest Officer

REVIEWED and RECOMMENDED FOR APPROVAL

Signature		
Name	Tashi Wangchuk	Karma Jigme Temphe
Title	Focal Officer	Chief Forestry Officer
Division	Social Forestry and Extension Division	Social Forestry and Extension Division

APPROVED BY:


DIRECTOR

DEPARTMENT OF FORESTS AND PARK SERVICES

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Acronyms

ac.:	Acres
AAC:	Annual Allowable Cut
CF:	Community Forest
CFMC:	Community Forest Management Committee
CFMG:	Community Forest Management Group
CFO:	Chief Forestry Officer
Cfts.:	Cubic feet
Chiwog:	Village Hemlet
DFO:	Divisional Forest Office
DoFPS:	Department of Forests and Park Services
FIRMS:	Forest Information and Resources Management System
FNCRR:	Forest and Nature Conservation Rules and Regulations
GT:	Gewog Tshogde
Gup:	Locally elected leader
ha.:	Hectares
m ³ :	Cubic meter
LULC:	Land Use Land Cover, 2016
NRPC:	Natural Resources Pricing Committee
SRFL:	State Reserved Forest Land
Tshogpa:	Representative of the CFMG in CF Management Committee

Executive Summary

Changray Community Forest was first established in 2010 under the technical support of erstwhile Dzongkhag Forestry Sector, Trongsa. The second term management plan was revised only in 2022 due to COVID-19 pandemic. CFMG proposed to cancel CF due to its far location from village, loss of interest and inaccessibility issues but 19 households realized its future benefits and came forward to continue management for second term. Ten households submitted their resignation in writing to Chairperson of CFMG due to loss of interest.

Chungdeylep block was excluded due to steep terrain and accessibility issues faced by CFMG for which extension of Barab block was done till the national highway of Trongsa-Zhemgang. The gross area of CF is 94.46 hectares of which 3.04 hectares was identified as protection zone. The forest type of CF is cool broadleaved forest and warm broadleaved forest dominated by Oak Forest towards North. The basal area of CF is 24m²/ha. There are few timber trees such as Walnut, Persea spp., Champ and Betula spp. The CF also caters good habitat for birds, wild animals like Tigers. Bubja waterfall originates from CF through irrigation canal.

The Annual Allowable Cut of CF is 18 cubic meters (timber trees) and 220 cubic meters (non-timber trees) with annual demand of 36 cubic meters (timber trees) and 64 cubic meters (non-timber trees). More than 50% of demand for timber trees may be allotted from Bumthang area whereas CFMG have scope to sell surplus non-timber trees (firewood) by deploying eco-friendly technologies such as cable cranes for extractions. CFMG shall meet demand for firewood, fencing posts and flag poles from CF only.

Plantations, thinning/cleaning, boundary clearing and patrolling are some of the major activities that CFMG shall implement during the 10 years management period.

Technical support for plantations, thinning and CF record keeping shall be rendered by DFO, Bumthang and Trongsa Range Office in future. Financial support for CF development works particularly for plantation activities should be requested from Gewog Administration, Drakteng Gewog.

CFMG need to explore options to solve their problems in extracting timber and firewood from CF to improved their livelihood and generate income during the management period. The CF fund balance as of April, 2022 was little more than Nu. 0.30 million.

PART A: MANAGEMENT PLAN

Introduction

Changray Community Forest (CF) is located between geocoordinates ranging from 27.420° to 27.432° North and 90.492° to 90.516° East which is North of Changray and Bubja villages under Drakteng Gewog, Trongsa dzongkhag. It is located above Bubja water fall. CF was established in November 2010 under the technical guidance of erstwhile Dzongkhag Forestry Sector, Trongsa dzongkhag with overall objective to protect from serious grazing and collection of forestry resources pressure by the outsiders.

This is the second term management plan revised after proper public consultations, meetings and participatory forest resource assessments. Chudeynyep block is excluded from CF due to steep terrain and inaccessibility issues. The boundary of Barbab block is extended to Zhemgang-Trongsa national highway. CF constitutes 94.46 hectares of which 91.42 is production area and 3.04 is protection zone.

There are 19 households to manage CF during this management term of another ten years. Ten households have resigned from the memberships due to loss of interest. We could not trace out 38 households mentioned in the first term management plan but only 29 households could be confirmed. The fund balance as of 31/3/2022 is Nu. 301748.34. Cash book and money receipts are misplaced and not available during the revision period.

The forest type ranges from warm to cool broadleaved forest with dominant species of oaks (*Quercus lamellosa*, *Castanopsis spp.*, *Lithocarpus spp.*, *Quercus lanata*, *Quercus griffithii*) and *Symplocus spp.* There are few desired timber species such as *Persea spp.*, and *Juglans regia*. CF harbours habitat for Tigers, dhole, Himalayan Black Bear, Sambar, barking deer and many bird species including hornbills.

CFMG have scope to sell excess firewood in future if farm roads are constructed from the national highway since overmatured firewood trees are located far from the accessible road head. On the contrary, CFMG will depend on SRFL of Bumthang to fulfil their timber requirements. The CF area have basal area of 24m²/ha. CF is rich in NWFPs such as fern tops, mushrooms, wild vegetables (*Elatrostemma spp.*) and bamboo.

The AAC of timber species is 18 cubic meters (1 Drashing, 2 Chams, 4 Tsims and 7 Dangchungs) whereas non-timber species is 221 cubic meters (111 Drashings, 36 Chams, 121 Tsims and 109 Dangchungs). The demand for firewood, fencing posts and flag poles shall be met from CF whereas timber for construction and renovations/extensions will have to be allotted from Bumthang areas.

Following are the forest management objectives;

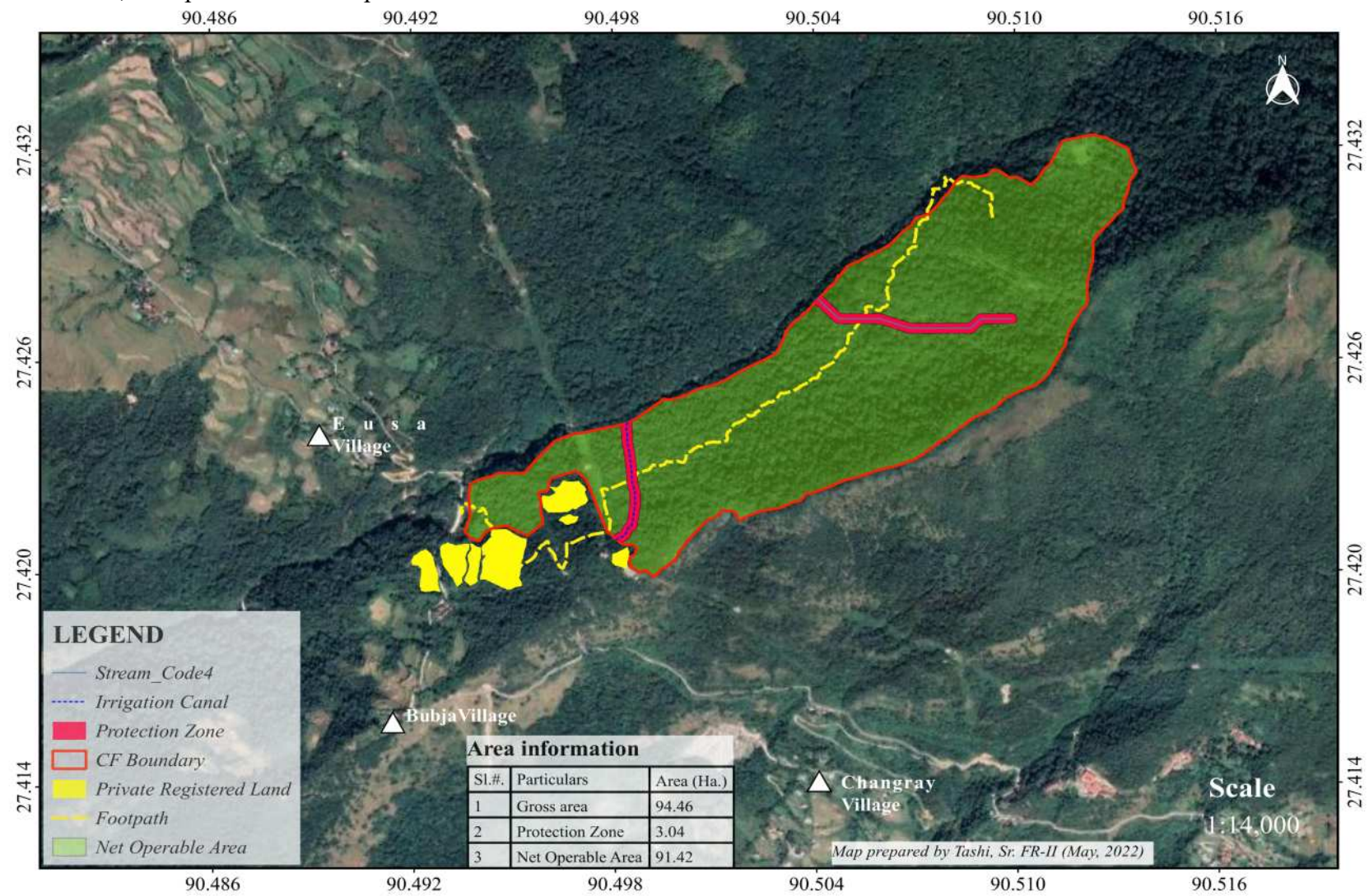
- To promote and improve existing forest conditions
- To harvest forestry resources on sustainable basis and share among the CFMG members on equitable basis.
- To generate income

First section of this plan describes managements aspects and following section contains by-laws of CFMG.

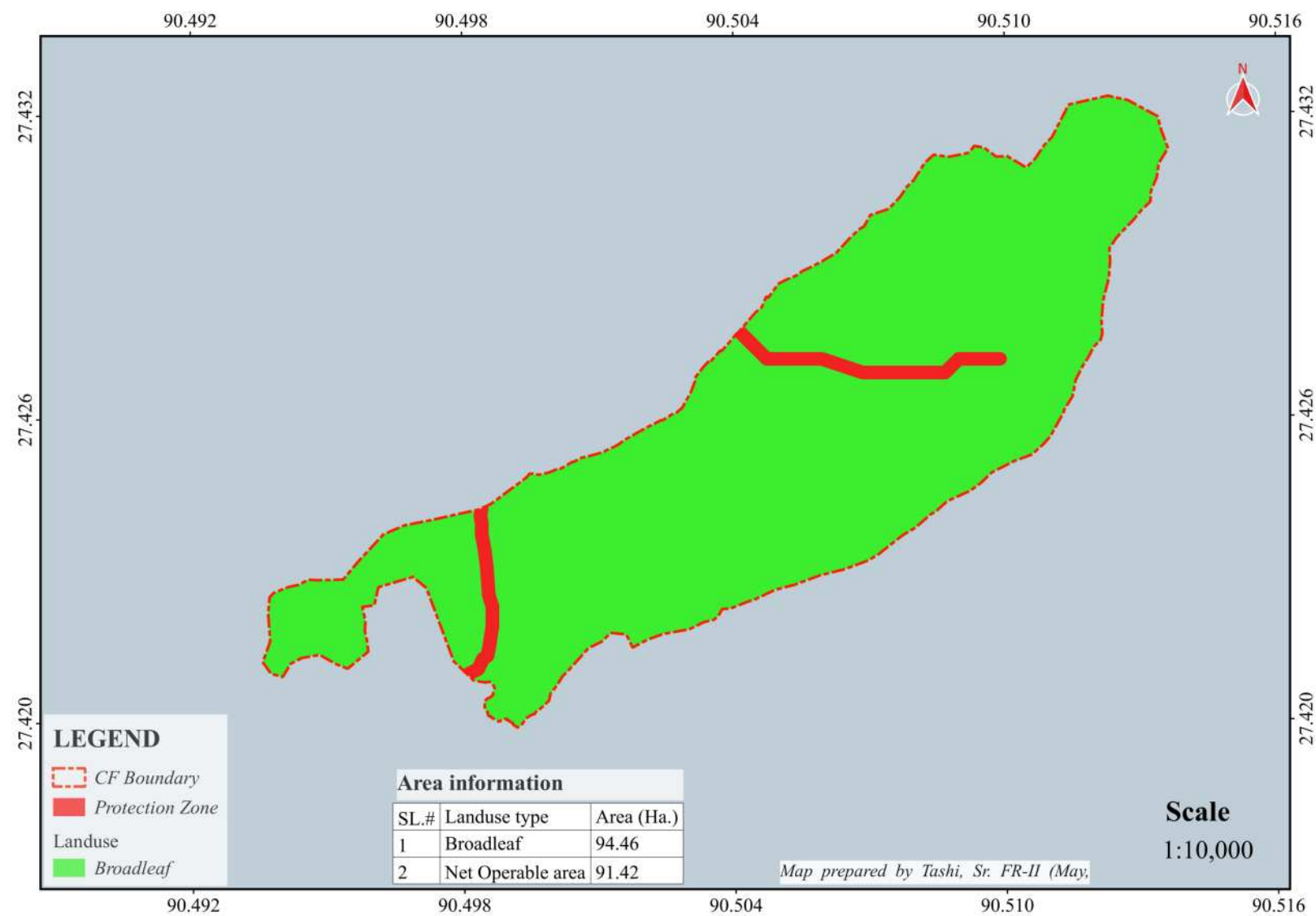
The resource assessment designs were made deploying QGIS (version 3.18.0) and assigned a total of 74 regular plots (circular plots with major and minor plots). Data was collected using forms in the field by Foresters of Trongsa Range and CFMG members.

CF Map

CF Map showing boundaries, net operable area and protection zones



Land use and land cover map of CF



Community Forestry Boundaries

Boundaries	Features
West	Yeshigang
East	Menchugang Guyung
South	Barab Goenpa
North	Baktsana

Planning Process

Dates	CFM Planning Activities
19/4/2022	Public consultations and validations of CFMG members (Listing of resigned members)
20-22/4/2022	Forest Resources assessments
23-25/4/2022	Planning and by-laws formulations

Social Information

Name of the villages	Changray & Bubja
Ethnic groups with CFMG	Mangdep, Sharchop, Ngalop, Bumthab
Basic amenities	School, electricity, health facility, RNR office, Lhakhang, irrigation canal, farm road, shop, MPU
Total households (HH) number of CFMG	19
Population of CFMG	104
% Male and % female	47% and 53%
Main source of income	Vegetable, dairy products, remittances, off-farm business, MHPA employee.
Cattle population of the CFMG	90
Main crops	Paddy, bitter buckwheat, sweet buckwheat, citrus, guava, peach, plum,
Cropping pattern	Paddy nursery (April)>irrigation (May/June) > Weeding (July/August), Harvest (October). Buckwheat (January) seed broadcast> May (Harvest).

Forest Information

Changray CF have only one block which is entirely covered by warm and cool broadleaved forest with Oak dominants. There are few desirable timber species in the forest. Inaccessibility makes CFMG difficult to extract the timber and firewood which they will have to sort out appropriate solutions in future since firewood and poles/fencing post have to be met from the forest. The basal area of the CF is 24m²/ha. NWFPs such as mushroom and fern tops are collected by CFMGs as well as the people of Eusa and Taktse. Bamboo (*Borinda grossa*, *Yushania spp.*, & *Chimonobambusa callosa*) is also collected illegally by outsiders as monitoring is difficult due to far location of the bamboos.

Name of Community Forest	Changray
Date of Assessment	20/05/2022
Name of block	Barab
Block area	Gross area = 94.46 hectares, net production area = 91.42 acres
Name of recorder	Chimi Dema, Forest Ranger II, Trongsa Range

Forest & Habitat Type				
Forest <input checked="" type="checkbox"/>	Thicket/pole stage <input type="checkbox"/>	Shrubland <input type="checkbox"/>		
Grassland <input type="checkbox"/>	Plantation <input type="checkbox"/>	Other <input type="checkbox"/>		
Vegetation type				
Subtropical forest <input type="checkbox"/>	Chir pine forest <input type="checkbox"/>	Warm broadleaved forest <input checked="" type="checkbox"/>	Blue pine forest <input type="checkbox"/>	
Cool broadleaved forest <input checked="" type="checkbox"/>	Mixed conifer forest <input type="checkbox"/>	Fir forest <input type="checkbox"/>	OTHER <input type="checkbox"/>	

Local name	Scientific name
Sokeyshing	<i>Castanopsis spp.</i>
Kharshing	<i>Michelia dolsopa</i>
Guliselchu	<i>Persea spp.</i>
Tagpashing	<i>Betula alnoides</i>
Dombushing	<i>Symplocus spp.</i>
Tago	<i>Juglans regia</i>
Gamashing	<i>Alnus nepalensis</i>
Pangkawshing	<i>Quercus lamellosa</i>
Sisishing	<i>Quercus griffithii</i>
Puyamshing	<i>Schima wallichii</i>
	<i>Daphniphyllum chartraceum</i>
Plantation	
Is there any plantation? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Approximate height of planted trees (m) 5meters
Year planted	Is the plantation? Under stocked <input checked="" type="checkbox"/> Stocked <input type="checkbox"/> Overstocked <input type="checkbox"/>

Forest Condition – Age			
Mature <input checked="" type="checkbox"/> Main canopy of mature trees	Pole stage <input type="checkbox"/> Main canopy of pole-stage trees	Shrubland <input type="checkbox"/> Main canopy of shrubs, young trees or regeneration	Any <input type="checkbox"/> No continuous canopy. Isolated trees only
Forest Condition - Canopy density			
Dense <input type="checkbox"/> Canopy density > 70%	Open <input checked="" type="checkbox"/> Canopy density < 70%	Very open <input type="checkbox"/> No real canopy. Isolated trees only	

Forest Condition – Regeneration		
Abundant <input type="checkbox"/>	Scattered/few <input checked="" type="checkbox"/>	None <input type="checkbox"/>
3 main tree species in the regeneration		
1. <i>Symplocus spp.</i>	2. <i>Quercus lamellosa</i>	3. <i>Castanopsis hystrix</i> .
Regeneration: Seedlings > 30cm and < 1.3m height		

Forest Condition – Approximate density of seed trees
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High <input type="checkbox"/>	Moderate <input checked="" type="checkbox"/>	Low <input type="checkbox"/>
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Block Condition – Summary		
Poor <input type="checkbox"/>	Average <input checked="" type="checkbox"/>	Good <input 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"/>

Open spaces	
Approximate total open space area (ha)	3 acres
Dominant vegetation type in the open space	<i>Artemesia spp.</i>
Cause of open space e.g., grazing, fire, harvesting, etc.	Grazing

Grazing and fodder			
Grassland 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
Baa	<i>Borinda grossa</i>
Guleselchu	<i>Persea spp.</i>

Pasture quality (3 dominant species in the grassland)		
Local name	Scientific name	Palatable/unpalatable
	<i>Rumex nepalensis</i>	unpalatable
Cream		Palatable
Somchey		Palatable
Use pattern	Seasonal <input checked="" type="checkbox"/>	All year <input type="checkbox"/>

Type of user	Migratory <input type="checkbox"/>	Local <input checked="" type="checkbox"/>	Both <input type="checkbox"/>
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Catchment Condition	
(i) Catchment condition – soil cover	
Soil cover	Soil cover class
> 50% of the soils are covered by vegetation	high <input type="checkbox"/>
25 - 50% of the soils are covered by vegetation	moderate <input checked="" type="checkbox"/>
< 25% of the soils are covered by vegetation	low <input type="checkbox"/>
(ii) Catchment Condition - Soil type and erosivity	
Soil type (color, 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
(iii) 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	
Less critical <input checked="" type="checkbox"/>	Moderately critical <input type="checkbox"/> Highly critical <input type="checkbox"/>

Fauna	
Local Name	Scientific name
Tag	<i>Panthera tigris tigris</i>
Kasha	<i>Muntiacus muntjak</i>
Shaw	<i>Cervus unicolor</i>
Phag	<i>Sus scrofa</i>

Wam	<i>Ursus thibetanus</i>
Dhole	<i>Cuon alpinus</i>
Himalayan Cuckoo	<i>Cuculus saturatus</i>
Green-backed Tit	<i>Parus monticolus</i>
Large-billed Crow	<i>Corvus macrohynchos</i>
Large Hawk Cuckoo	<i>Hierococcyx sparverioides</i>
White-throated Laughingthrush	<i>Garrulax albogularis</i>
Yellow-breasted Greenfinch	<i>Carduelis spinoides</i>
Ashy Drongo	<i>Dicrurus leucophaeus</i>
Eurasian Cuckoo	<i>Cuculus canorus</i>
Oriental Turtle Dove	<i>Streptopelia orientalis</i>
White-crested Laughingthrush	<i>Garrulax leucolophus</i>
Straited Laughingthrush	

Biotic Pressures			
Fire	Common <input type="checkbox"/>	Occasional <input type="checkbox"/>	Absent <input checked="" type="checkbox"/>
Grazing	Heavy <input type="checkbox"/>	Limited <input checked="" 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 checked="" type="checkbox"/> Mushroom Bamboo Fern tops <i>Elatrostemma spp.</i>	Limited <input type="checkbox"/>	Absent <input type="checkbox"/>
Leaf litter collection	Common <input type="checkbox"/>	Limited <input type="checkbox"/>	Absent <input checked="" 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"/>
Fuelwood harvesting	Common <input type="checkbox"/>	Occasional <input checked="" type="checkbox"/>	Absent <input type="checkbox"/>
Timber harvesting	Common <input type="checkbox"/>	Occasional <input checked="" type="checkbox"/>	Absent <input type="checkbox"/>
Hunting	Common <input type="checkbox"/>	Occasional <input type="checkbox"/>	Absent <input checked="" type="checkbox"/>
Potential Management Options			
1	Thinning and cleaning pole sized <i>Symplocus spp.</i>		
2	Harvest overmatured trees for firewood		
3	Plantation in barren areas (Approximately 3 acres)		

Forest Management Procedures

CFMG shall follow the management procedures as depicted in the table below;

Produces/ services	Timber	Firewood	Poles	NWFPs	Water	Bamboo
Main species	<i>Betula</i> , <i>Walnut</i> , <i>Acer spp.</i> , <i>Persea spp.</i> , <i>Michelia spp.</i>	<i>Q. lamellosa</i> , <i>Castanopsis spp.</i> , <i>Daphniphyllum</i> <i>spp.</i> , <i>Q. glauca</i> , <i>Q.</i> <i>lanata</i> , <i>Q. griffithii</i>	<i>Symplocus spp.</i> , <i>Castanopsis</i> <i>spp.</i> , <i>Quercus</i> <i>lamellosa</i>	Fern, <i>Elatrostema</i> <i>spp.</i> , mushroom, Namnam, stones, rock sand, <i>Daphne</i> <i>spp.</i>	Brakchugang	Hikchu (<i>Yushania</i> <i>spp.</i>), Rabay (<i>Chimonobambusa</i> <i>callosa</i>) and Rui (<i>Borinda</i>)
Problems	<ul style="list-style-type: none"> • Few desirable trees • Crooked stem and hollow/dead/broken trees 	<ul style="list-style-type: none"> • Inaccessibility • Over matured trees 	<ul style="list-style-type: none"> • Inaccessibility • Over matured trees 	<ul style="list-style-type: none"> • Far from CF • Illegal harvest by people of Eusa, Kuengarabten and Taktse 		Far from the area, Illegal collection by people of Taktse, Eusa and Kuengarabten
Opportunities	<ul style="list-style-type: none"> • Plantation of desired species (<i>Walnut</i> and <i>P. bhutanica</i>) • Timber allotment from potential area • Install cable crane to extract over matured trees • Enumerate overmatured trees in the forest 	<ul style="list-style-type: none"> • Relocation of transmission line poles (proposal). • Installation of cable crane for extraction of firewood 	<ul style="list-style-type: none"> • Relocation of transmission line poles (proposal) • Installation of cable crane for extraction of firewood 	<ul style="list-style-type: none"> • Commercialize <i>Daphne spp.</i> 	Explore ideas for establishment of Cafeteria near water fall	<ul style="list-style-type: none"> • Conduct strict surveillance and patrol • Sell bamboo (Hikchu, Rabay & Rui) for construction purposes
Management objectives	<ul style="list-style-type: none"> • To promote and improve existing forest conditions • To harvest forestry resources on sustainable basis and share on equitable basis 	<ul style="list-style-type: none"> • To harvest forest resources on sustainable basis and share on equitable basis. • To generate income through sale of firewood 	<ul style="list-style-type: none"> • To harvest forest resources on sustainable basis and share on equitable basis. • To generate income by sale of firewood 	<ul style="list-style-type: none"> • To harvest forest resources on sustainable basis and share on equitable basis. 	To generate income through sale of firewood and environmental services	<ul style="list-style-type: none"> • To generate income through sale of firewood and environmental services

Activities	<ul style="list-style-type: none"> • Reforest barren area (walnut, blue pine) • Cleaning and pruning • Study potential to install cable crane 	<ul style="list-style-type: none"> • Extract firewood • Select over-matured trees • Sell surplus firewood 	<ul style="list-style-type: none"> • Thinning and cleaning • Fell dead, dying and top broken trees 	<ul style="list-style-type: none"> • Patrol area to prevent illegal collection by neighboring villages 		<ul style="list-style-type: none"> • Patrolling • Boundary clearing
Procedures	<ul style="list-style-type: none"> • Request Gewog for supply of seedlings and seek technical advices from Beat Office, during the time of plantations • Seek technical support for enumeration of overmatured trees. • Involve crane owner, CFO and CFMG for potential survey and assessments for crane installation and request Gup for financial support • Distribute timber trees to needy and genuine HH for construction and renovation /extension of houses. • The timber deficits will be requested from SRFL of Bumthang as per FNCRR 	<ul style="list-style-type: none"> • Extract firewood once in two years. • CFMG shall submit application during 12th Bhutanese month with validity of 3 months • CFMG shall extract firewood during 1st and 2nd Bhutanese month • Trees should be measured, calculate volume and mark within the permissible AAC 	<ul style="list-style-type: none"> • Extract flag poles during dead cases and need basis 	<ul style="list-style-type: none"> • CFMG shall be allowed to collect NWFPs (fern, mushroom and <i>Namnam</i>) without requirement of permit • Restrict outsiders to collect the NWFPs 		<ul style="list-style-type: none"> • Sell to Taktse, Eusa and Kuengarabten. • The collection area will be allowed from <i>Baktsana</i> area • Extraction shall be allowed during 1st and 2nd Bhutanese month • CFMG shall issue permit with validity of 3 months
Responsibility	Chairperson, CFMG, Beat In-charge and concerned CFO	CFMC	CFMC to approve and issue permits	CFMC to approve and issue permits	CFMC to approve and issue permits	CFMC to approve and issue permits

Annual Allowable Cut

The AAC of the CF is tabulated in the following table;

Sl.#.	Name of Block	Annual Allowable Cut (cubic meter)	
		Timber	Firewood
1	Barab	18	221

AAC of timber and non-timber trees in ‘number of trees’ is tabulated as follows for convenient allotment by CFMG but the volume ceiling should be guiding factor in calculating AAC of forest produce.

Timber trees				
Drashing	Cham	Tsim/flag poles	Dangchung/fencing post	Remarks
1	2	4	7	
Non-timber trees				
112	38	125	116	Fencing posts will be converted from Drashing and Cham-sized non-timber.

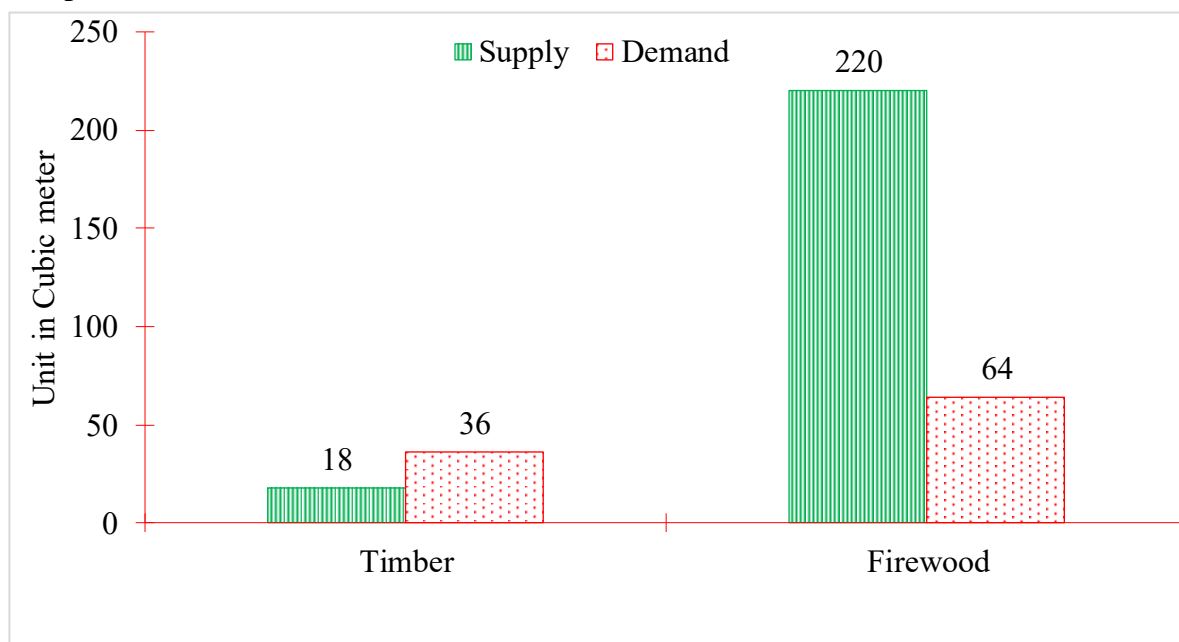
Demand Assessment for Forest Resources

Produce	Annual estimated requirement		No. of hh requiring annually (C)	Total requirement of the produce annually		Total requirement of produce in 10 years	
	Number (A)	Vo. in cft (B)		Number	Vol. in cft	Number	Vol. in cft
New constructions							
Drashing	18	1271.20	0.50	9	635.58	90	6355.80
Dangchung	80	140.80	0.50	40	70.40	400	704
Sub-total	98	1412		49	714.98	490	7059.80
Renovation							
Drashing	4	282.48	0.70	2.80	197.73	28	1977.30
Dangchung	40	70.40	0.70	28	49.28	280	492.80
Sub-total	44	352.88		31	247.01	308	2470.10
Fencing Posts	3	31.77	19	57	603.63	570	6036.30
Flag poles (death cases)	29	102.37	3	87	307.11	870	3071.10
Firewood (drashing-sized)	3	185.37	9	27	1668.33	270	16683.30
Note:							
<ul style="list-style-type: none">• Conversion factor based on FRDD, 2004 (10.2)• Demand for firewood, fencing post, flags poles should be met from CF and timbers from Bumthang area.							

Other Forest Resources Allotment

NWFPs shall be allotted on free of collection fees that includes mushroom, fern, rock sand and boulders. However, for the outsiders, CFMG management Committee shall uphold authority to levy appropriate collection fees.

Comparison of AAC and Annual Demand



The timber deficit of 18 cubic meter shall be allotted from Bumthang area. However, fencing post is categorized under non-timber tree as CFMG will extract fencing post by sawing the overmatured trees. Demand for Fencing posts, flag poles and firewood shall be met from CF only.

AAC and annual demand in number of trees is tabulated as below for easy understanding of CFMG but the basis of AAC should be calculated either in cubic meter or the Cubic feet by the concerned technical staff in implementation of this plan. The trees should be marked on standing volume basis and control over AAC should be strictly followed by the marking officer from Drakteng Beat Office.

Participatory Environment Assessment

Activity proposed in Changray CF	Potential Environmental Effects				Potential Socio-Economic Effects			
	Soil	Water	Wild animals	Plants	Traditional forest use	Cultural and religious values	Local employment	Local benefits from forest produce
Timber harvesting	-	-	-	-	0	0	+++	+++
CF forest patrolling	++	+	+	+++	0	0	0	+++
Thinning	+++	0	0	+++	0	0	+	+++
CF boundary and bush clearing	0	0	0	+++	0	0	0	0
Farm road construction	-	-	0	-	0	-	+	+++
Plantation maintenance and new creation	++	++	+	++	0	+	+	++
Extraction of stones and rock sand through surface collection mode	-	0	0	-	+	-	++	+++

+++ Positive effect - - - Negative effects 0 - No effect

Procedures to Address Potential Negative Effects

Activity	Procedure
Timber harvesting/thinning/sanitation works	Felling directions should be considered so that regenerations and surrounding stands are not damaged. Silviculture considerations must be taken during tree marking. Avoid felling within 15 meters of streams and water sources and 30 meters uphill and 30 meters downhill of the farm road.
Farm road construction	Obtain Environment Clearance from Dzongkhag Administration, follow best practices of road constructions and avoid damages to water sources and the trees. Construct retention and base wall from bifurcated site of national highway.
Extraction of stones through surface collection mode	No excavation works will be allowed. No blasting will be carried out.

Forest Produce Ranking

	Timber	Firewood	Poles	NWFP	Water	Bamboo
Timber		Firewood	Poles	Timber	Water	Bamboo
Firewood			Poles	Firewood	Water	Firewood
Poles				Poles	Water	Poles
NWFP					Water	Bamboo
Water						Water
Bamboo						

Score details: Water (5), Poles (4), Firewood (3), Timber (1), Bamoo (1), NWFP (1)

Monitoring Plans- Participatory Forest Resource Monitoring

Activity	Indicator	How it will be monitored	Responsibility	Comments
Plantations	<ul style="list-style-type: none"> Area planted Number of seedlings planted 	<ul style="list-style-type: none"> Physical monitoring and annual CF monitoring Report survival percent and provide technical recommendation for maintenance and appropriate species 	CFMG, RO of Trongsa Range. Drakteng Beat Office shall provide on-site technical assistance	The barbed wire of previous plantations may be lifted and used in the new plantation site
Patrolling	No. of patrolling conducted and offenders apprehended	Regular patrolling	CF Secretary will make schedule of members	The patrol team will cover whole forest area
Thinning and cleaning	Area thinned and quantity of cleaning works carried out.	Physical monitoring from Forestry Offices	Forest Range Office in collaboration with CFMC. Drakteng Beat Office	
CF boundary clearing	Length of boundary cleared	Physical verification and labour contribution by the CFMG	CFM Committee and Drakteng Beat Office	Bumthang Forest Range to provide technical advises

Monitoring Plans- Participatory Social and Institutional Impact Monitoring

Activity	Indicator	How it will be monitored	Responsibility	Comments
CFMG general meeting	Number of participants in the meeting	Review and CF record books	CFMG executive and Trongsa Forest Range	Invite CFO & GT Chairperson during 5 th year and 9 th year M&E
Book Keeping training	<ul style="list-style-type: none"> • Number of trainings conducted. • Crosschecking books of accounts 	• Books of accounts	DFO Bumthang	Involve Trongsa Forest Range for monitoring
Resource sharing on equity basis	• Resources allocated to needy member	• CF record books	CFMG management committee	The deficit timber will be allotted from Bumthang area
CF Management Committee Meeting	• Number of women attended the committee meetings	• CFMG record books	CFMG	

Monitoring Plans- Participatory Environmental Impact Monitoring

Possible negative impact	Indicator	How it will be monitored	Responsibility	Comments
Over exploitations of resources creating vast openings	<ul style="list-style-type: none"> • Increased openings of forest • Status of regenerations 	• Regeneration surveys should be conducted	DFO, Site In-Charge and CFMG members	Regeneration survey methods adapted in FMUs shall be followed

Plan of Operation

Location	Activity	Year										Responsibility
		1	2	3	4	5	6	7	8	9	10	
Rabaythang, Barab Goenpa & Shachapsa	Plantation											Chairman, Secretary and CFMG
Rabaythang, Barab Goenpa & Shachapsa	Plantation maintenance (fence maintenance)											Chairman, Secretary and CFMG
Whole Forest	Study potential to install cable crane and farm road construction											CFMG committee, Gewog Administration
Shachapsa Lasa	Thinning and cleaning (1 acres)											CFMG, CFM Committee
Barab	Construct farm road											
Shachapsa Lasa & Dajay Lhamoi Lasa	Remove dead, dying and top broken trees (Over matured trees) and explore marketing surplus firewood											CFMG, CFM Committee
Whole CF	Patrolling											Patrolling Team
Whole Forest	Boundary clearing											CFMG
Baktsana	Sell Bamboo (Hikchu & Rui)											CFM Committee
Whole CF	Sell excess firewood											
	Training on record and book keeping											

Evaluation of CF Management Plan

Changray Cf management plan shall be evaluated jointly by a team from Divisional Forest during **last quarter of the 5th year** of the plan period and final evaluation and revision shall be done at the **last quarter of the 9th year** of the plan period.

Annual monitoring reports shall be conducted by Trongsa Range and Drakteng Beat Office and submitted to Division for compilation and record. The usual entry into FIRMS shall be done by the Beat Office.

PART B: CFMG BY-LAWS

Membership Arrangement

Name of CFMG: Changray Community Forest Management Group.

Resident households from Changray village having census in the village and holding *Thram* and *Gung* shall be eligible to join as member of the CF excluding those households who resigned from the CFMG. CFMG members shall contribute Nu. 100/- per household to the common fund as annual membership fee.

New Membership

Any household wishing to join the CFMG after separation from the existing member household shall be accepted without having to pay any contribution. However, he/she will be ineligible for any share from the common fund before his/her entry.

The daily wage shall be based at the rate of Nu. 800/- per day

Resignation from membership

Withdrawal from membership shall be allowed as per the interest of the CFMG members on the following terms and conditions;

- He/she should write resignation application to Chairperson and in turn Chairperson shall seek acceptance from the rest of CFMG members.
- Chairperson shall accept resignation based on the disabilities (old age, labor shortage) and is permissible for 50% of share accumulated in the community fund on the basis of his/her labor contribution.
- Members withdrawing from the CFMG due to lack of interest, he/she shall not be eligible for any of the benefits from CF and cannot rejoin in future.
- CFMG member(s) moving permanently for resettlement shall be given 100% of the share accumulated in the CF common fund by calculating individual share.

Management Committee Formation

The CFMG shall form five members to function as Management Committee. The committee will be the highest decision-making body of CF management. Following are the members of CF management committee;

1. Chairperson	: Mr. Lajay (Sumcho)	17685239
2. Secretary	: Mr. Jurmi Dorji	17619046
3. Treasurer	: Mrs. Tandin Bidha	17319795
4. Tshogpa	: Mr. Rinzin Dorji	17324361
5. Auditor	: Mr. Dawa Penjor	17772134

Terms of reference for CF Management Committee

- The elected CF Management Committee shall function smoothly for the welfare of CFMG and development of CF.
- Shall supervise, coordinate and monitor the CF activities.
- Ensure proper management and utilization of CF funds.
- Take lead role in planning, implementing and evaluating CF activities.
- Maintain proper records for any kind of CF activities.
- Resolve conflicts and disputes within CFMG level.
- Seek technical support from the stakeholders when required.
- Ensure equitable distribution of forest produce to CFMG.

Tenure of CF Management Committee

CFMG executive committee members shall serve for five years. Any committee members propose for resignation due to unavoidable domestic problems shall be accepted with proper justification due process. He/she will have to put up his/her resignation in writing to Chairperson who will in turn consult CFMG member during general meeting. Based on the general decision, he/she will be considered after proper handing-taking of his/her responsibilities after the new member is elected.

Incentives for the CF Management Committee

Collect from CFMG members and pay concerned member at the rate of Nu. 800/- per day for patrolling, marking and official activities.

Terms and References of Chairperson

- Chair any type of meeting
- Fix schedule for meeting

- Supervise all CF activities as per management plan
- Build good relation with government and other related agencies
- Signatory authority for official correspondence and permits.
- Resolve any inter conflicts
- Attend visitors
- Organize patrolling team on rotation basis

Terms and References of Secretary

- Officiate in the absence of Chairperson
- Maintain minutes of meetings
- Issue forest produce collection permits
- Maintain proper records in labor and meeting attendance register, meeting minutes, annual work plan and progress, records of forest produce utilization, stock register
- Coordinate and supervise implementation of field activities such as thinning, pruning, boundary clearing, bush clearing and surface collections.
- Countersigns for withdrawal of CF fund from the Bank
- Attend any official correspondences.
- Prepare annual work plan and submit to GT through Chiwog Tshogpa for endorsement.
- Submit annual progress report to Trongsa Forest Range who shall further forward to CFO, Bumthang.

Terms and References of Treasurer

- Collect membership fees, forest produce collection fees, fines and penalties, contributions
- Maintain proper records in record of penalty and compensation, cash book, and loan record.
- Issue money receipts for any incoming cash/transactions.
- Collect and deposit any cash in the bank with consideration of retaining CF contingency fund of Nu. 5000/-.
- Present the CF accounts (income and expenditure) during the CFMG general meeting.
- Countersigns for the withdrawal of CF fund from the Bank.

Responsibility of Tshogpa

- Inform CFMG members for a meeting or CF works
- In absence of Chairperson, Secretary and Treasurer, shall monitor or supervise the CF activities
- Be obedient to Chairperson and Secretary

Responsibility of Auditor

- Conduct annual auditing of CF fund and records
- Seek support from DFO for technical activity audits

Roles and Responsibilities of CFMG

- To participate in every activity carried out as per the approved plan.
- To provide equal labour contribution.
- To terminate or appoint committee members based on their performance.
- Inform committee members of any illegal activities being detected in the CF.

Fees for forest produces

Sl. No.	Forest products	Fees (Nu.)	Remarks
1	Drashing	100/-	Per standing tree
2	Cham	50/-	Per standing tree
3	Tsim	30/-	Per standing tree
4	Dangchung	30/-	Per standing tree
5	Flag poles	10/-	Per standing tree
6	Fencing post	5/-	Per fencing post to be converted from firewood
7	Firewood	100/-	Per standing tree. If sold, price shall be fixed by the management committee
8	Bamboo	5/-	Per pair
9	Sand/Stone	2/-	Per cft to CFMG members
10	Sand/Stone	20/-	Per cft if sold

Fines and Penalties

The CF Management Committee will be responsible to impose fines and penalties against all illegal activities in the CF as follows:

Sl. No.	Products	Fines (Nu.)	Compensation
1	Timber	- Walnut: 2000/- - Champ: 2000/- - <i>Betula & Persea</i> : 1500/- - <i>Quercus spp.</i> : 1000/-	As per prevailing NRPC rate.
2	Firewood	Nu. 100/- per cft and for subsequent offences it will applicable as per section 401 (1, 2 &3) of FNCRR, 2017. The fine for transportation will be applicable as per section 418 of the FNCRR, 2017.	As per prevailing NRPC rate.
3	Bamboos from CF	Nu. 15/- per pair	As per FNCRR
4	Illegal collection of sand and stones	Nu. 30/- per cft	As per FNCRR
5	Taking mushroom and fern from forest	Nu. 1000/- per occasion	As per FNCRR
6	Grazing cattle in the CF	Nu. 100/- per cattle per occasion and additional fine of Nu. 100/- for every repeated occasion	
7	Absent from CF developmental work	Nu. 800/- per day	
8	Absent from CF meetings	Nu. 600/- per day	
9	Damage to seedlings in plantations	Nu. 500/- per seedlings	
10	Destruction of fencing materials	Nu. 1500/- per occasion	The defaulter shall repair the fences including and replace fencing materials if required
11	Forest fire outbreak	Nu. 1000/- per acres and replant the burnt area. Seedlings shall be arranged by CFMG	
12	Poaching wildlife	As per FNCRR	

Managing CFMG Fund

Financial arrangements

CF Management Committee, Treasurer in particular will be responsible to properly manage the CF fund. The possible sources of fund for CFMG are;

- Membership fees
- Collection fees for CF resources
- Sale of surplus firewood
- Fines and compensations
- Any contributions made by the visitor/donor agencies.

CFMG shall utilize the CF fund for following purposes. If the area of expenditure has to be made beyond following listed purposes, approval from Department will be required.

- 25% for CF development activities (CF review, thinning, cleaning, salvage operations, boundary clearing and forest fire line creation)
- 50% for CFMG enhancement (loan, networking, meeting and capacity development, roofing CFMG office with CGI sheets)
- 5% as reserve fund in the bank
- 20% for others (*Zhingdrup*, *Semsoo*, water supply, road constructions)
- Any expenditure up to Nu. 10,000/- shall be decided by the CF Management Committee and beyond that amount the decision shall be made by the 2/3rd majority of the CFMG members.
- Loaning procedures will be followed as per section 8.4.4 of Forestry Field Manual for Bhutan, Community Forestry Manual, Third edition, 2018. However, CFMG shall disburse loan at 5% interest with penalty of 8% of total principal amount.

Benefit Sharing

- All CFMG members shall be entitled to get any CF produces on need basis.
- Timber, poles, flagpoles, and firewood shall be allotted on **standing volume basis**. However, 'number of trees' reflected in this CFMP shall be used for reference during annual allotment.
- After tree Marking, trees shall be felled by experienced chain saw operator and must be sawn at site within the validity period
- Benefits and CF resources shall be shared among the CFMG on equitable basis.
- The quantity of timber shall not be exceeding the AAC and shall be allotted based on genuineness and actual requirement.
- During the calamities such as earthquake, flood, pandemic or any disasters CFMG shall provide *Semsoo* in the form of timber or cash whichever is convenient. Such decisions should be made upon emergency meeting of CFMG.
- Loaning of CF fund within members shall be approved upon verification and review by CF Management Committee.
- The resource sharing (timber/firewood) shall not be allotted on '**quota system**' rather do so on equity basis.
- CFMG shall not share cash from the accumulated fund unless required under unavoidable circumstances. However, in such cases approval from CFO shall be required.
- Timber allotted to CFMG member shall not be allowed for commercial purposes.
- Contribution for the welfare of disadvantaged member of CFMG shall be made on situation of need and requirement.

Meetings

CFMG shall conduct two types of meetings for effective functioning of CF management as follows;

- General meeting
- CF Management Committee meeting

The general meetings shall be convened during **Daw Dangpa** (1st month of Bhutanese Calendar) whereas CFMC meetings shall be conducted during 3rd, 6th, 9th and 12th month of Bhutanese

Calendar. Any important meeting within the committee members shall be held based on urgency and need. During the meeting, following agenda will be discussed for decision making.

General Meeting	CF Management Committee meeting
<ul style="list-style-type: none"> • Discuss on the achievements of planned activities. • Present on the fund status • Fix time for execution of planned activities. • Discuss problems and solutions about CF development • Approval of loans 	<ul style="list-style-type: none"> • Monitor and evaluate planned activities. • Annual planning and annual reporting to higher authority. • Loan disbursement • Discuss issues related to CF. • Review the management plan and implementation of planned activities. • Annual timber and firewood allotment • Imposing fines and penalties to the offenders

Conflict Management

Any internal conflict among the CFMG members related to CF or CFMG shall be handled by the CF Management Committee chaired by the Chairperson to reach win-win situation. If the conflict remains unresolved, the case shall be forwarded to Gup for interventions and negotiations. If the case escalates, it shall be forwarded to Trongsa Range Office/Divisional Forest Office and unsettled case shall be forwarded finally to the District Court.

Amendment of CFM plan

The CFMG shall seek the approval with written application addressed to CFO, Bumthang Division or Director, DoFPS for the amendment of the CFM plan/by-laws. The proposed amendment of CFM plan/by-laws should be supported by minutes of general meeting of CFMG duly signed thereof.

Power of the Department

Department is fully empowered to take action with regard to both forestry and other developmental activities in part or whole of the Community Forests. In addition, the Department is specifically empowered to:

- i. Take action against violators of the Act, Rules or Management Plan, regardless of whether requested by the CFMG or not.
- ii. Inspect, monitor, review the records and otherwise supervise the activities of the CFMG, and take action (including cancellation/suspension of the CFMG's certificate, where warranted under these Rules) against the CFMG or any of its members who may be acting in violation of the provisions of the Management Plan or any provisions of the FNCRR, 2017.
- iii. Cancellation/suspension/reinstatement of CF Certificates shall be dealt as per the provisions of FNCRR, 2017 (Section 102, 103, 104, 105(1&2), 106 & 107 (1, 2 &3)).

Annex I: CF Member List

Sl.#.	Name	Gung no.	Thram no.
1	Phuntsho	TSA-1-147	950
2	Sumcho (Lhajay)	TSA-1-89	119
3	Dawa Penjor	TSA-1-101	06
4	Jurmi Dorji	TSA-1-165	118
5	Nakphela	TSA-1-370	733
6	Lham Tshering	TSA-1-Nill/	1210
7	Kuchumo	TSA-1-98	46
8	Kinzang	TSA-1-82	60
9	Phub Lhamo (Pema Lhamo)	TSA-1-83	672
10	Tandin Bidha	TSA-1-96	734
11	Tsumpi Mo	TSA-1-87	37
12	Dorji Wangmo	TSA-1-81	05
13	Tsagay Chungwa	TSA-1-97	57
14	Singye	TSA-1-153	136
15	Dechen	TSA-1-93	55
16	Leki Wangmo (Kezang)	TSA-1-88	38
17	Pema Zangmo	TSA-1-65	94
18	Tshering Yangden	TSA-1-91	85
19	Pema Wangchuk	TSA-1-343	07

Annex II: CF Boundary GPS Coordinates

	Name	Geocoordinates
East	Mechugang Guying	27.42536° N & 90.51072° E
West	Yeshigang	27.42620° N & 90.50282° E
North	Baktsana	27.43191° N & 90.51334° E
South	Barab Goenpa	27.42040° N & 90.49845° E

Annex III: Geo-coordinates of Sample Plots

Plot ID	Northing	Easting		Plot ID	Northing	Easting
1	27.43169	90.51126		45	27.42448	90.50428
2	27.43168	90.51242		46	27.42447	90.50544
3	27.43066	90.50894		47	27.42447	90.50659
4	27.43066	90.51010		48	27.42447	90.50775
5	27.43066	90.51126		49	27.42446	90.50891
6	27.43065	90.51241		50	27.42347	90.49616
7	27.42963	90.50778		51	27.42347	90.49732
8	27.42963	90.50893		52	27.42347	90.49848
9	27.42963	90.51009		53	27.42346	90.49964
10	27.42962	90.51125		54	27.42346	90.50080
11	27.42962	90.51241		55	27.42345	90.50196
12	27.42861	90.50545		56	27.42345	90.50311
13	27.42860	90.50661		57	27.42345	90.50427
14	27.42860	90.50777		58	27.42344	90.50543
15	27.42860	90.50893		59	27.42344	90.50659
16	27.42859	90.51009		60	27.42245	90.49384
17	27.42859	90.51125		61	27.42244	90.49500
18	27.42758	90.50429		62	27.42244	90.49732
19	27.42758	90.50545		63	27.42243	90.49848
20	27.42757	90.50661		64	27.42243	90.49963
21	27.42757	90.50777		65	27.42242	90.50079
22	27.42756	90.50892		66	27.42242	90.50195
23	27.42756	90.51008		67	27.42242	90.50311
24	27.42755	90.51124		68	27.42241	90.50427
25	27.42655	90.50313		69	27.42142	90.49384
26	27.42655	90.50429		70	27.42141	90.49500
27	27.42654	90.50545		71	27.42140	90.49847
28	27.42654	90.50660		72	27.42139	90.49963
29	27.42653	90.50776		73	27.42037	90.49847
30	27.42653	90.50892		74	27.42036	90.49963
31	27.42653	90.51008				
32	27.42652	90.51124				
33	27.42552	90.50197				
34	27.42552	90.50312				
35	27.42551	90.50428				
36	27.42551	90.50544				
37	27.42550	90.50660				
38	27.42550	90.50776				
39	27.42550	90.50892				
40	27.42549	90.51007				
41	27.42450	90.49964				
42	27.42449	90.50080				
43	27.42449	90.50196				
44	27.42448	90.50312				

Annex IV: Compilation Sheets (Timber trees)

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)								
1. CF Name		Changray			4. Block Area		94.46 Hectares	
2. Block Name		Barab			5. Compiling date		21/04/2022	
3. No of plots		74			6. Species group		Other BL (Central)	
<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)
10-19	0.017	0.078	0.050	0.270	74	20.00	0.34	1.56
20-29	0.047	0.287	0.050	0.270	32	8.65	0.41	2.48
30-39	0.093	0.687	0.050	0.270	1	0.27	0.03	0.19
40-49	0.156	1.323	0.050	0.270	0	0.00	0.00	0.00
50-59	0.233	2.236	0.050	0.270	4	1.08	0.25	2.42
60-69	0.327	3.462	0.050	0.270	1	0.27	0.09	0.94
70-79	0.436	5.037	0.050	0.270	1	0.27	0.12	1.36
80-89	0.561	6.993	0.050	0.270	2	0.54	0.30	3.78
90-99	0.701	9.361	0.050	0.270	0	0.00	0.00	0.00
100-109	0.857	12.171	0.050	0.270	0	0.00	0.00	0.00

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)

1. CF Name		Changray				4. Block Area		94.46	Hectares
2. Block Name		Barab				5. Compiling date		21/04/2022	
3. No of plots		74				6. Species group		<i>Acer spp.</i>	
<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)	
10-19	0.017	0.113	0.050	0.270	0	0.00	0.00	0.00	
20-29	0.047	0.334	0.050	0.270	0	0.00	0.00	0.00	
30-39	0.093	0.691	0.050	0.270	1	0.27	0.03	0.19	
40-49	0.156	1.190	0.050	0.270	2	0.54	0.08	0.64	
50-59	0.233	1.839	0.050	0.270	0	0.00	0.00	0.00	
60-69	0.327	2.642	0.050	0.270	0	0.00	0.00	0.00	
70-79	0.436	3.605	0.050	0.270	0	0.00	0.00	0.00	
80-89	0.561	4.733	0.050	0.270	0	0.00	0.00	0.00	
90-99	0.701	6.026	0.050	0.270	0	0.00	0.00	0.00	
100-109	0.857	7.491	0.050	0.270	0	0.00	0.00	0.00	

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)

1. CF Name		Changray			4. Block Area		94.46	Hectares
2. Block Name		Barab			5. Compiling date		21/04/2022	
3. No of plots		74			6. Species group		<i>Betula alnoides</i>	
<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)
10-19	0.017	0.096	0.050	0.270	2	0.54	0.01	0.05
20-29	0.047	0.335	0.050	0.270	4	1.08	0.05	0.36
30-39	0.093	0.773	0.050	0.270	2	0.54	0.05	0.42
40-49	0.156	1.449	0.050	0.270	1	0.27	0.04	0.39
50-59	0.233	2.396	0.050	0.270	1	0.27	0.06	0.65
60-69	0.327	3.643	0.050	0.270	0	0.00	0.00	0.00
70-79	0.436	5.218	0.050	0.270	0	0.00	0.00	0.00
80-89	0.561	7.145	0.050	0.270	0	0.00	0.00	0.00
90-99	0.701	9.448	0.050	0.270	0	0.00	0.00	0.00
100-109	0.857	12.150	0.050	0.270		0.00	0.00	0.00

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)

1. CF Name		Changray			4. Block Area		94.46	Hectares
2. Block Name		Barab			5. Compiling date		21/04/2022	
3. No of plots		74			6. Species group		<i>Cinnamomum spp.</i>	
<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)
10-19	0.017	0.066	0.050	0.270	0	0.00	0.00	0.00
20-29	0.047	0.264	0.050	0.270	0	0.00	0.00	0.00
30-39	0.093	0.670	0.050	0.270	0	0.00	0.00	0.00
40-49	0.156	1.352	0.050	0.270	0	0.00	0.00	0.00
50-59	0.233	2.372	0.050	0.270	2	0.54	0.13	1.28
60-69	0.327	3.789	0.050	0.270	0	0.00	0.00	0.00
70-79	0.436	5.662	0.050	0.270	0	0.00	0.00	0.00
80-89	0.561	8.045	0.050	0.270	0	0.00	0.00	0.00
90-99	0.701	10.996	0.050	0.270	0	0.00	0.00	0.00
100-109	0.857	14.670	0.050	0.270	0	0.00	0.00	0.00

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)

1. CF Name		Changray			4. Block Area		94.46	Hectares
2. Block Name		Barab			5. Compiling date		21/04/2022	
3. No of plots		74			6. Species group		<i>Persea spp.</i>	
<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)
10-19	0.017	0.086	0.050	0.270	0	0.00	0.00	0.00
20-29	0.047	0.295	0.050	0.270	0	0.00	0.00	0.00
30-39	0.093	0.673	0.050	0.270	1	0.27	0.03	0.18
40-49	0.156	1.250	0.050	0.270	1	0.27	0.04	0.34
50-59	0.233	2.051	0.050	0.270	0	0.00	0.00	0.00
60-69	0.327	3.099	0.050	0.270	3	0.81	0.27	2.51
70-79	0.436	4.414	0.050	0.270	1	0.27	0.12	1.19
80-89	0.561	6.016	0.050	0.270	0	0.00	0.00	0.00
90-99	0.701	7.921	0.050	0.270	0	0.00	0.00	0.00
100-109	0.857	10.147	0.050	0.270	0	0.00	0.00	0.00

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)

1. CF Name		Changray			4. Block Area		94.46	Hectares
2. Block Name		Barab			5. Compiling date		21/04/2022	
3. No of plots		74			6. Species group		<i>Michelia spp.</i>	
<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)
10-19	0.017	0.086	0.050	0.270	1	0.27	0.00	0.02
20-29	0.047	0.297	0.050	0.270	0	0.00	0.00	0.00
30-39	0.093	0.678	0.050	0.270	0	0.00	0.00	0.00
40-49	0.156	1.259	0.050	0.270	0	0.00	0.00	0.00
50-59	0.233	2.065	0.050	0.270	2	0.54	0.13	1.12
60-69	0.327	3.121	0.050	0.270	0	0.00	0.00	0.00
70-79	0.436	4.447	0.050	0.270	0	0.00	0.00	0.00
80-89	0.561	6.061	0.050	0.270	0	0.00	0.00	0.00
90-99	0.701	7.983	0.050	0.270	0	0.00	0.00	0.00
100-109	0.857	10.227	0.050	0.270	0	0.00	0.00	0.00

Annex V: Compilation Sheets (Non-timber trees)

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)								
1. CF Name		Changray			4. Block Area		94.46	Hectares
2. Block Name		Barab			5. Compiling date		21/04/2022	
3. No of plots		74			6. Species group		Other BL (Central)	
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)
10-19	0.017	0.078	0.050	0.270	204	55.14	0.94	4.30
20-29	0.047	0.287	0.050	0.270	118	31.89	1.50	9.15
30-39	0.093	0.687	0.050	0.270	37	10.00	0.93	6.87
40-49	0.156	1.323	0.050	0.270	17	4.59	0.72	6.08
50-59	0.233	2.236	0.050	0.270	12	3.24	0.76	7.25
60-69	0.327	3.462	0.050	0.270	6	1.62	0.53	5.61
70-79	0.436	5.037	0.050	0.270	7	1.89	0.82	9.53
80-89	0.561	6.993	0.050	0.270	1	0.27	0.15	1.89
90-99	0.701	9.361	0.050	0.270	4	1.08	0.76	10.12
100-109	0.857	12.171	0.050	0.270	8	2.16	1.85	26.32

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)

1. CF Name		Changray			4. Block Area		94.46	Hectares
2. Block Name		Barab			5. Compiling date		21/04/2022	
3. No of plots		74			6. Species group		Oak Spp. (Central)	
<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)
10-19	0.017	0.095	0.050	0.270	14	3.78	0.06	0.36
20-29	0.047	0.340	0.050	0.270	37	10.00	0.47	3.40
30-39	0.093	0.796	0.050	0.270	18	4.86	0.45	3.87
40-49	0.156	1.505	0.050	0.270	27	7.30	1.14	10.98
50-59	0.233	2.508	0.050	0.270	29	7.84	1.83	19.66
60-69	0.327	3.837	0.050	0.270	9	2.43	0.80	9.33
70-79	0.436	5.526	0.050	0.270	10	2.70	1.18	14.94
80-89	0.561	7.603	0.050	0.270	5	1.35	0.76	10.27
90-99	0.701	10.096	0.050	0.270	5	1.35	0.95	13.64
100-109	0.857	13.033	0.050	0.270	14	3.78	3.24	49.31

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)

1. CF Name		Changray			4. Block Area		94.46	Hectares
2. Block Name		Changray			5. Compiling date		21/04/2022	
3. No of plots		74			6. Species group		<i>Rhododendron spp.</i>	
<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)
10-19	0.017	0.074	0.050	0.270	17	4.59	0.08	0.34
20-29	0.047	0.255	0.050	0.270	15	4.05	0.19	1.03
30-39	0.093	0.579	0.050	0.270	2	0.54	0.05	0.31
40-49	0.156	1.072	0.050	0.270	2	0.54	0.08	0.58
50-59	0.233	1.755	0.050	0.270	0	0.00	0.00	0.00
60-69	0.327	2.646	0.050	0.270	0	0.00	0.00	0.00
70-79	0.436	3.762	0.050	0.270	0	0.00	0.00	0.00
80-89	0.561	5.119	0.050	0.270	0	0.00	0.00	0.00
90-99	0.701	6.731	0.050	0.270	0	0.00	0.00	0.00

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)

1. CF Name	Changray	4. Block Area	94.46	Hectares
2. Block Name	Changray	5. Compiling date	21/04/2022	
3. No of plots	74	6. Species group	<i>Acer spp.</i>	

<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)
10-19	0.017	0.113	0.050	0.270	5	1.35	0.02	0.15
20-29	0.047	0.334	0.050	0.270	1	0.27	0.01	0.09
30-39	0.093	0.691	0.050	0.270	3	0.81	0.08	0.56
40-49	0.156	1.190	0.050	0.270	1	0.27	0.04	0.32
50-59	0.233	1.839	0.050	0.270	2	0.54	0.13	0.99
60-69	0.327	2.642	0.050	0.270	0	0.00	0.00	0.00
70-79	0.436	3.605	0.050	0.270	2	0.54	0.24	1.95
80-89	0.561	4.733	0.050	0.270	0	0.00	0.00	0.00
90-99	0.701	6.026	0.050	0.270	2	0.54	0.38	3.26
100-109	0.857	7.491	0.050	0.270	5	1.35	1.16	10.12

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)

1. CF Name		Changray			4. Block Area		94.46	Hectares
2. Block Name		Changray			5. Compiling date		21/04/2022	
3. No of plots		74			6. Species group		<i>Betula spp.</i>	
<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)
10-19	0.017	0.096	0.050	0.270	0	0.00	0.00	0.00
20-29	0.047	0.335	0.050	0.270	4	1.08	0.05	0.36
30-39	0.093	0.773	0.050	0.270	1	0.27	0.03	0.21
40-49	0.156	1.449	0.050	0.270	3	0.81	0.13	1.17
50-59	0.233	2.396	0.050	0.270	0	0.00	0.00	0.00
60-69	0.327	3.643	0.050	0.270	0	0.00	0.00	0.00
70-79	0.436	5.218	0.050	0.270	0	0.00	0.00	0.00
80-89	0.561	7.145	0.050	0.270	0	0.00	0.00	0.00
90-99	0.701	9.448	0.050	0.270	0	0.00	0.00	0.00
100-109	0.857	12.150	0.050	0.270	0	0.00	0.00	0.00

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)

1. CF Name		Changray			4. Block Area		94.46	Hectares
2. Block Name		Changray			5. Compiling date		21/04/2022	
3. No of plots		74			6. Species group		<i>Cinnamomum spp.</i>	
<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)
10-19	0.017	0.066	0.050	0.270	3	0.81	0.01	0.05
20-29	0.047	0.264	0.050	0.270	0	0.00	0.00	0.00
30-39	0.093	0.670	0.050	0.270	1	0.27	0.03	0.18
40-49	0.156	1.352	0.050	0.270	0	0.00	0.00	0.00
50-59	0.233	2.372	0.050	0.270	1	0.27	0.06	0.64
60-69	0.327	3.789	0.050	0.270	0	0.00	0.00	0.00
70-79	0.436	5.662	0.050	0.270	0	0.00	0.00	0.00
80-89	0.561	8.045	0.050	0.270	0	0.00	0.00	0.00
90-99	0.701	10.996	0.050	0.270	0	0.00	0.00	0.00
100-109	0.857	14.670	0.050	0.270	0	0.00	0.00	0.00

OPERATIONAL INVENTORY: COMPILATION SHEET (FIXED-SIZE PLOT)

1. CF Name		Changray			4. Block Area		94.46	Hectares
2. Block Name		Changray			5. Compiling date		21/04/2022	
3. No of plots		74			6. Species group		<i>Persea spp.</i>	
<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)
10-19	0.017	0.086	0.050	0.270	1	0.27	0.00	0.02
20-29	0.047	0.295	0.050	0.270	6	1.62	0.08	0.48
30-39	0.093	0.673	0.050	0.270	6	1.62	0.15	1.09
40-49	0.156	1.250	0.050	0.270	15	4.05	0.63	5.07
50-59	0.233	2.051	0.050	0.270	4	1.08	0.25	2.22
60-69	0.327	3.099	0.050	0.270	4	1.08	0.35	3.35
70-79	0.436	4.414	0.050	0.270	2	0.54	0.24	2.39
80-89	0.561	6.016	0.050	0.270	2	0.54	0.30	3.25
90-99	0.701	7.921	0.050	0.270	0	0.00	0.00	0.00
100-109	0.857	10.147	0.050	0.270	1	0.27	0.23	2.74