

CHANGRAY COMMUNITY FOREST MANAGEMENT PLAN

(Revised plan for second term management)



Plan Period: November 2022 – October 2032

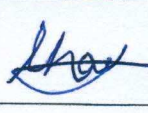
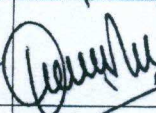
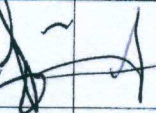
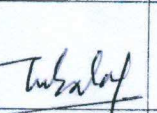

| | |
|-------------------|--------------|
| Village: | Changray |
| Chiwog: | Kuengarabten |
| Gewog: | Drakteng |
| Dzongkhag: | Trongsa |

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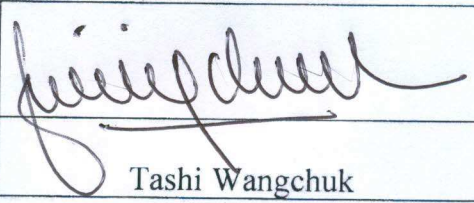
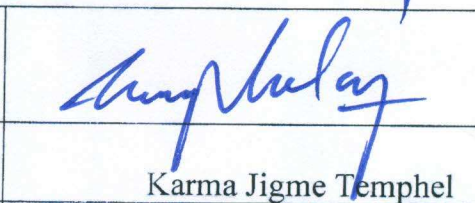
APPROVAL SHEET

| | |
|---------------------------------------|----------------|
| 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;

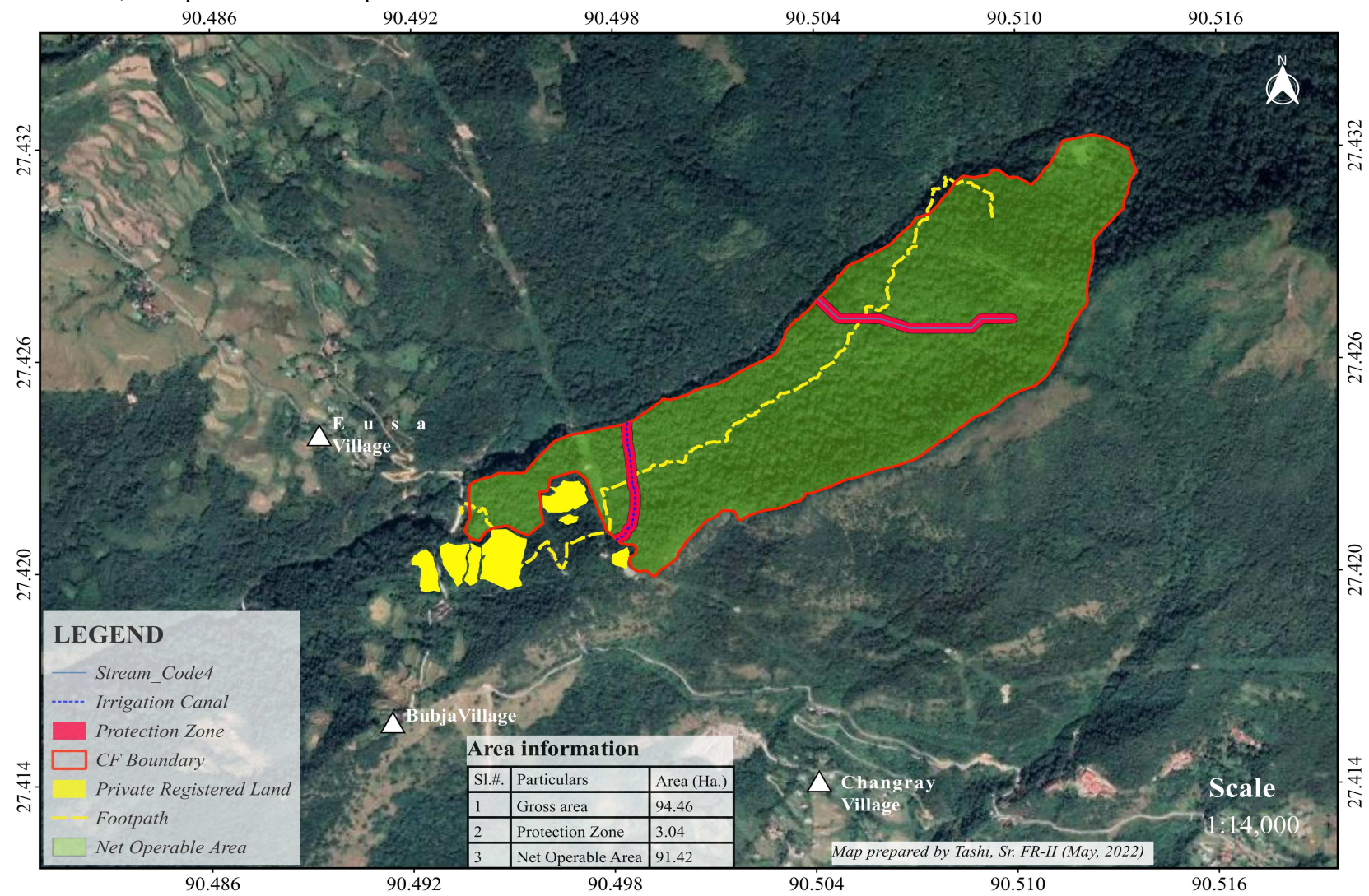
- To promote and improve existing forest conditions
- To harvest forestry resources on sustainable basis and share among the CFMG members on equitable basis.
- To generate income

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

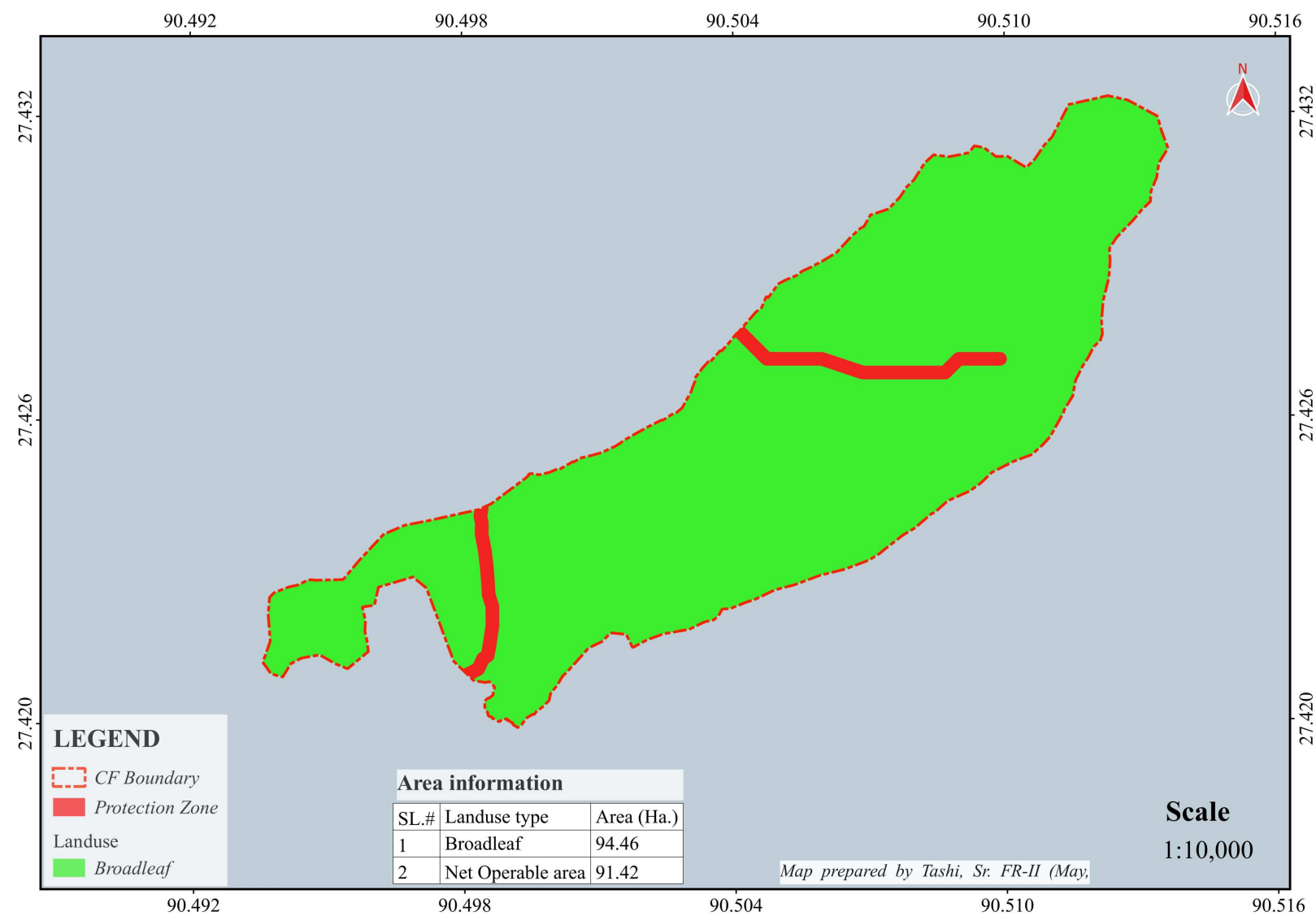
The resource assessment designs were made deploying QGIS (version 3.18.0) and assigned a total of 74 regular plots (circular plots with major and minor plots). Data was collected using forms in the field by Foresters of Trongsa Range and CFMG members.

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 |
|--|

| | | |
|-------------------------------|--|------------------------------|
| High <input type="checkbox"/> | Moderate <input checked="" type="checkbox"/> | Low <input type="checkbox"/> |
|-------------------------------|--|------------------------------|

| | | |
|---|---|--|
| 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"/> |
|--------------|------------------------------------|---|-------------------------------|

| | |
|--|---|
| 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 sparveroides</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. |

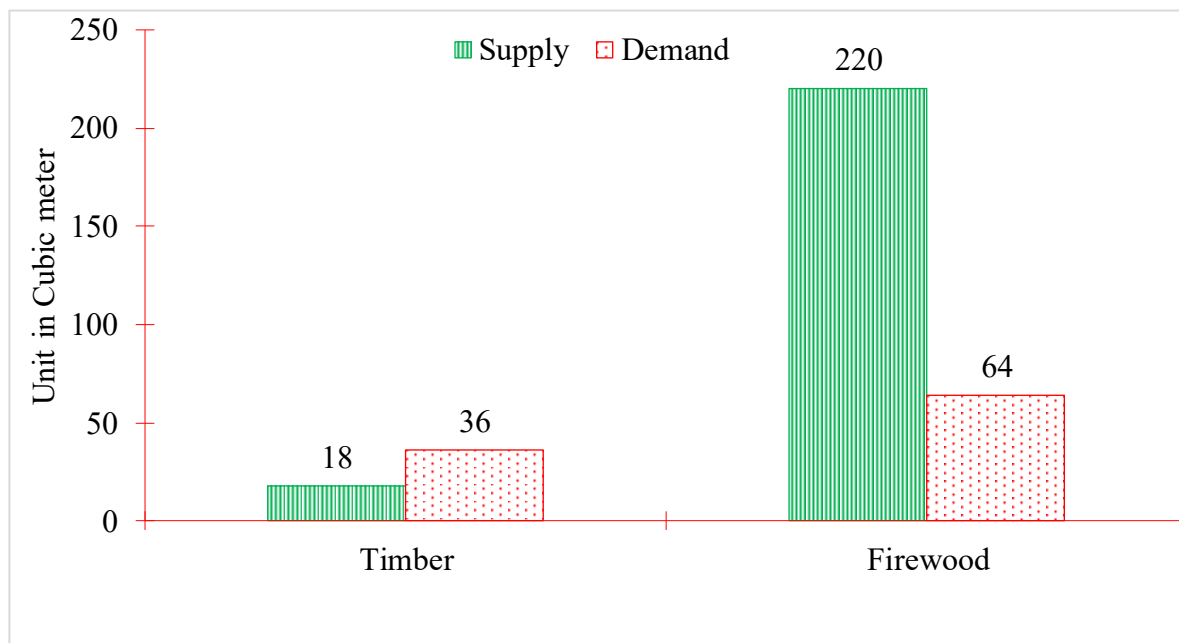
Demand Assessment for Forest Resources

| 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 |