ROYAL GOVERNMENT OF BHUTAN
MINISTRY OF AGRICULTURE AND FOREST
DEPARTMENT OF FORESTS AND PARK SERVICES
WANGDUE FOREST DIVISION

"Walking the extra mile"

DRAFT LOCAL FOREST MANAGEMENT PLAN

FOR

FOREST AREAS OUTSIDE FMUS AND PROTECTED AREAS

DANGCHU GEOG

WANGDUE DZONGKHAG

Period of the Plan: 01 JULY 2021 TO 30 JUNE 2031

Prepared by:
Tshering Choden,
Forestry Officer,
Wangdue Forest Division

1 AUTHORITY FOR PREPARATION, REVISION AND APPROVAL PERIOD OF THE PLAN

This Local Forest Management Plan for Dangchu Gewog is valid for the period of 10 years from 01 July 2021 to 30th June 2031.

AUTHORITY FOR PREPARATION, REVIEW AND APPROVAL

The authority for preparation of this plan was given to the Wangdue Forest Division, Department of Forest, Ministry of Agriculture, Royal Government of Bhutan.

APPROVAL

This plan was reviewed and recommended for implementation by Forest Resources Development Division, Department of Forests and Park Services (DoFPS) and approved by the Honourable Secretary, Ministry of Agriculture, Royal Government of Bhutan.

Prepared by approval:

Tshering Choden, FO
Wangdue Forest Division

Checked and recommended for

Chief Forestry Officer
Wangdue Forest Division

Technically reviewed and recommended for approval:

Chief Forestry Officer
Forest Resources Management Division
Department of Forests and Park Services
Date: .....

Recommended for approval:

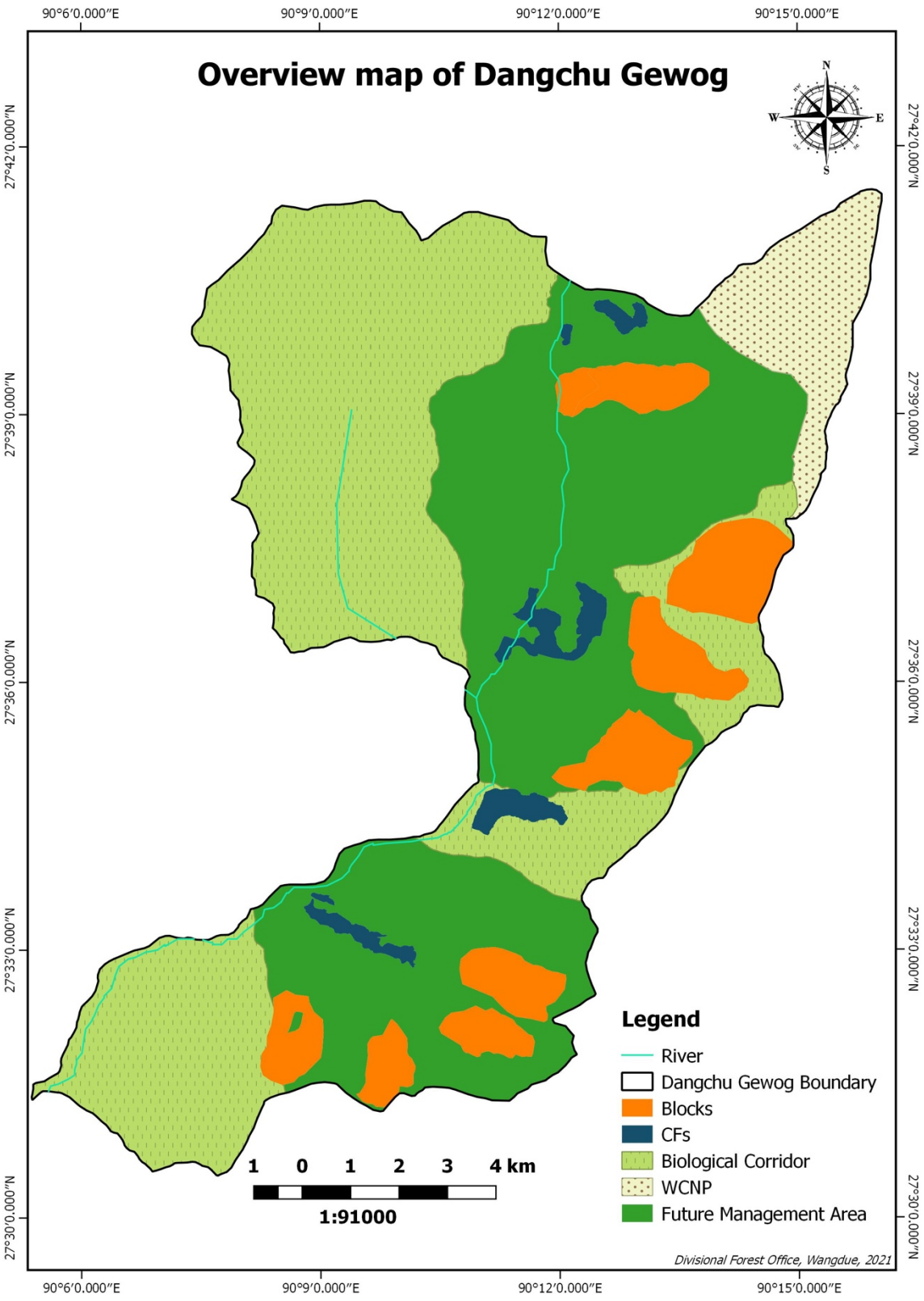
Director
Department of Forests and Park Services

Date: .....

APPROVED

Secretary
Ministry of Agriculture
Date: .....

Overview Map



Summary Results for Forest Management Area: Dangchu

Unit	Area Distribution			
	Non Production	Protection	Production	Total
ha	15.0	273.7	1569.8	1858.5
%	1%	15%	84%	100%

Average basal area (m2/ha)	Aver. Stand Volume (m3/ha)	No of Operable sample plots
27.4	203	184

Unit	Forest Type Distribution								
	Hemlock	Fir	Spruce	Mix. Con.	Bluepine	Chirpine	Hardwood	Mixed HC	Total
%	16%	26%	0%	4%	0%	0%	5%	50%	**100%**
Unit	**Age distribution**					**Stand type distribution**			
	young	immature	mature	Overmature	Total	plantation	natural	coppice	Total
%	15%	22%	63%	0%	**100%**	0%	100%	0%	**100%**
Unit	**Canopy closure**					**Condition**			
	dense	closed	open	unstocked	Total	good	average	poor	Total
%	9%	68%	23%	0%	**100%**	39%	54%	7%	**100%**

Unit	Site Condition								
	Slope			Erosiveness			Soil Cover		
	gentle	moderate	steep	stable	moderate	unstable	high	moderate	low
%	50%	30%	20%	74%	22%	4%	36%	46%	18%

Unit	Forest Use					
	Intensive Side Uses			Extensive Side Uses		
	grazing	sokshing	lopping	grazing	sokshing	lopping
ha	473.7	0.0	0.0	735.3	0.0	0.0
%	25%	0%	0%	40%	0%	0%

Unit	NWFP Occurence and Firewood							
	NWFP abundant				NWFP sparse			
	Firewood	Bamboo	Cane	Daphne	Firewood	Bamboo	Cane	Daphne
ha	622.5	716.5	0.0	406.5	544.1	270.6	0.0	306.2
%	33%	39%	0%	22%	29%	15%	0%	16%

Unit	Potential Production				
	Timber				
	Drashing	Cham	Tsim	Poles,posts	Total
Ntot	16811	17936	6362	13748	**54857**
N/ha	11	11	4	9	**35**
m3	54585	19135	1989	1081	**76790**
m3/ha	34.8	12.2	1.3	0.7	**48.9**
Unit	**Firewood**				
	> 49cm	30-49cm	20-29 cm	10-19 cm	Total
Ntot	10317	34258	42746	92697	**180018**
N/ha	7	22	27	59	**115**
m3	30008	28387	10602	6543	**75540**
m3/ha	19.1	18.1	6.8	4.2	**48.1**

Unit	Sivicultural Measures				
	Planting	Thinning	Felling (firewood)	Felling (timber)	No Activity
ha	0.0	37.0	695.0	875.2	249.5
%	0	2	37	47	13

Yield Regulation		
AAC	**2510**	m3
	1.6	m3/ha
Prod. Potential / AAC	**61**	years

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2 BACK GROUND

The goal of National Forest Policy of Bhutan 2011 is to *manage Bhutan's forest resources and biodiversity sustainably to produce wide range of social, economic and environmental goods and services for the equitable benefit of all the citizens and natural environment while still maintaining a minimum of 60% of the land under Forest Cover thereby contributing to Gross National Happiness and it emphasized on to bringing all State Forest Reserves land under management regimes focused on the sustainable supply of forest products and ecosystem services*.

Sustainable management of forests using scientific principles was confined to FMUs. Whereas, it is found that unmanaged forest areas in Bhutan are under tremendous pressure and major portion of the annual timber supply are from these areas. The resource allocation in the rural areas are demand driven rather than on its sustainability and resource capacity and a good monitoring is not in place too, to assess the demand and supply of timber.

Dangchu Gewog has CFs and Park areas which are managed scientifically for sustainable forest resource management. But apart from these areas, huge portion of the Gewog is not brought under any kinds of Management Regimes.

Therefore, in view of the goal and objectives of the National Forest Policy, it is felt imperative to manage these forest resources on a long term sustainable manner rather than on conventional ad-hoc demand driven basis.

3 OBJECTIVE

The main objective of this plan is:

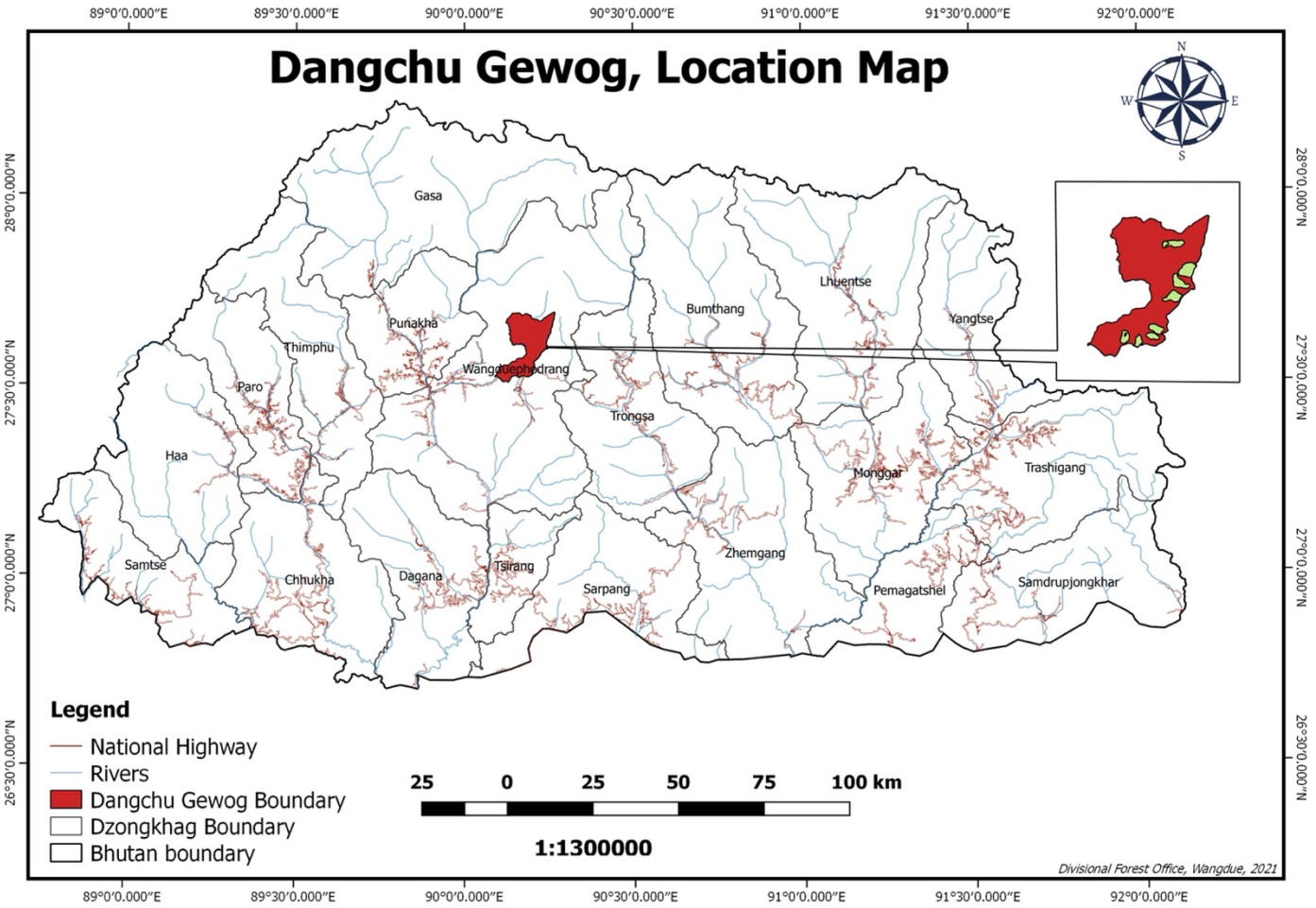
1. *To bring the forest resources of Dangchu Geog under sustainable management regime (management and utilization).*
2. *To supply rural timber to the rural communities on sustainable basis.*
3. *To place management intervention for the improvement of natural resources within the Gewog through carrying out plantation with appropriate species and encouragement of natural regeneration.*

This Forest Management Plan has been prepared by Tshering Choden, Forestry Officer, Wangdue Forest Division. Forest resource assessment has been carried out by field staff under the direct supervision of the Chief Forestry Officer, Wangdue Forest Division, in April 2021.

4 GENERAL DESCRIPTION AND CURRENT SITUATION

4.1 Location, Area and current status

4.1.1 LOCATION



Dangchu gewog is located in the northern part of Wangdue Phodrang Dzongkhag falls between 27°41'29.97"N, 90°15'59.63"E to 27°30'31.15"N, 90° 6'53.47"E and 27°35'45.08"N, 90°14'46.07"Eto 27°36'42.46"N, 90° 8'27.24"E with an altitude range of 1540 to 4120 masl. The total area of 17152 hectares or 172 sq.km. It is bordered by the Kazhi in and Sephu Gewog in Northern and eastern parts, Gangtey and Bjenag gewog in the south, Nyisho gewog in the west. Dangchu Gewog in Wangduephodrang dzongkhag was considered one of the remotest Gewogs until it was electrified and feeder road was built from Nobding in recent times. The Gewog Center of Dangchu sited at the center of Danghu, which is 18.5 km away from the Wangue-Trongsa Highway. Nahi Gewog consists of five chiwogs namely Tashidingkha Zimi, Godraang Taagsar, Tokaling Tomla, Doongdoongnyelsa and Yusagang with an estimated population of 1700 people and 240 households.

All the villages are connected with farm roads which immensely assist in improving the living standard of the people. Almost all the households have access to mobile services which has increased the pace disseminating the information. The sanitation facilities such as access to clean drinking water and flush toilets are still underway. There are two schools; Dangchu Primary school and Norbding Lower secondary school, one ECR and one Grade II BHU under Dangchu Gewog.

4.1.2 HISTORICAL BACKGROUND

The name of the place (Dangchu) holds miraculous historic and symbolic meaning from the time immemorial. The historic place is sacredly blessed by many divine personalities in the past. It was first visited and blessed by our 8th century Buddhist master, Guru Rinphoche. Guru mediated for three long months and blessed all the elements (earth, water and environment). It was then visited by our revered Buddhist Masters; Longchen Rabjam, Terton Ugyen Dorji Lingpa, Zhabdrung Ngawang Namgyel, Khenchen Sonam Yoedzer with crystal clear (Dang) devotion and blessed the running river (Chu) which undulates across the valley. Later during the 17th century, Zhabdrung officially approved the name the as Dangchupa (Dang- crystal clear, Chu-river, Pa- People) after having completed the construction of Wangdue Phodrang Dzong (Tshering, 2016, p. 78).

The Gewog abodes 16 Lhakhangs and many scared places (Nye) across the Gewog. Dangchu is popular for housing two holy rivers (Phochu and Mochu) to its neighboring districts; Bumthang, Trongsa, Punakha and Thimphu. Phochu/Wangchu has the spiritual power to heal eye sore and other diseases and it is believed to be the holy water of Guru Rinphoche. Mochu is said to be blessed by Guru Rinphoche and was further blessed by the Buddhist master Khenchen Sonam Yoedzer based on the prophecy. History reveals that having completed the renovation work of Chubar Stupa (which is located next to Gewog Center), an earthen pot filled with Mochu was placed as a brim inside the Stupa by the Khenchen. Surprisingly, the earthen pot filled with Mochu was discovered during the renovation work carried out by Agay Goleg sometimes in 1978. The divine river has the power to purify the internal and external defilements (Tshering, 2016, p. 78). Following are some of the important religious sites:

Chagkhey (Prakhey) Lhakhang

It is located on the south west direction of Godang Chiwog. It is a one hour up-hill walk from the nearest road point at the base of river Dangchu. There was no caretaker so visitors can't enter the Lhakhang. Further ahead is a sacred Guru site. Visitors are welcomed by an unending upward fissure through the base of the ridge, similar to a hydropower diversion tunnel. Guru Rinpoche is said to have meditated at this spot and subdued demons and other harmful demigods. A site where Guru in the form of a monkey is believed to have extracted holy water from the base of the cliff with the tail of a monkey can be seen towards the extreme left hand side.

It is scary and dark fissure where mammals like bats reside. Sharp and pointed rocks and some smooth objects resembling sacred artefacts are visible via torch light. A fragile ladder, made up of tree trunks is used as a scaffold to reach the next level. No one seems to have reached the exit point of this mystical fissure till date. But it is believed that a cat was sent through the tunnel exited from the other side of the ridge adjoining Boed Langdra Ney.

Zhabjee Lhakhang

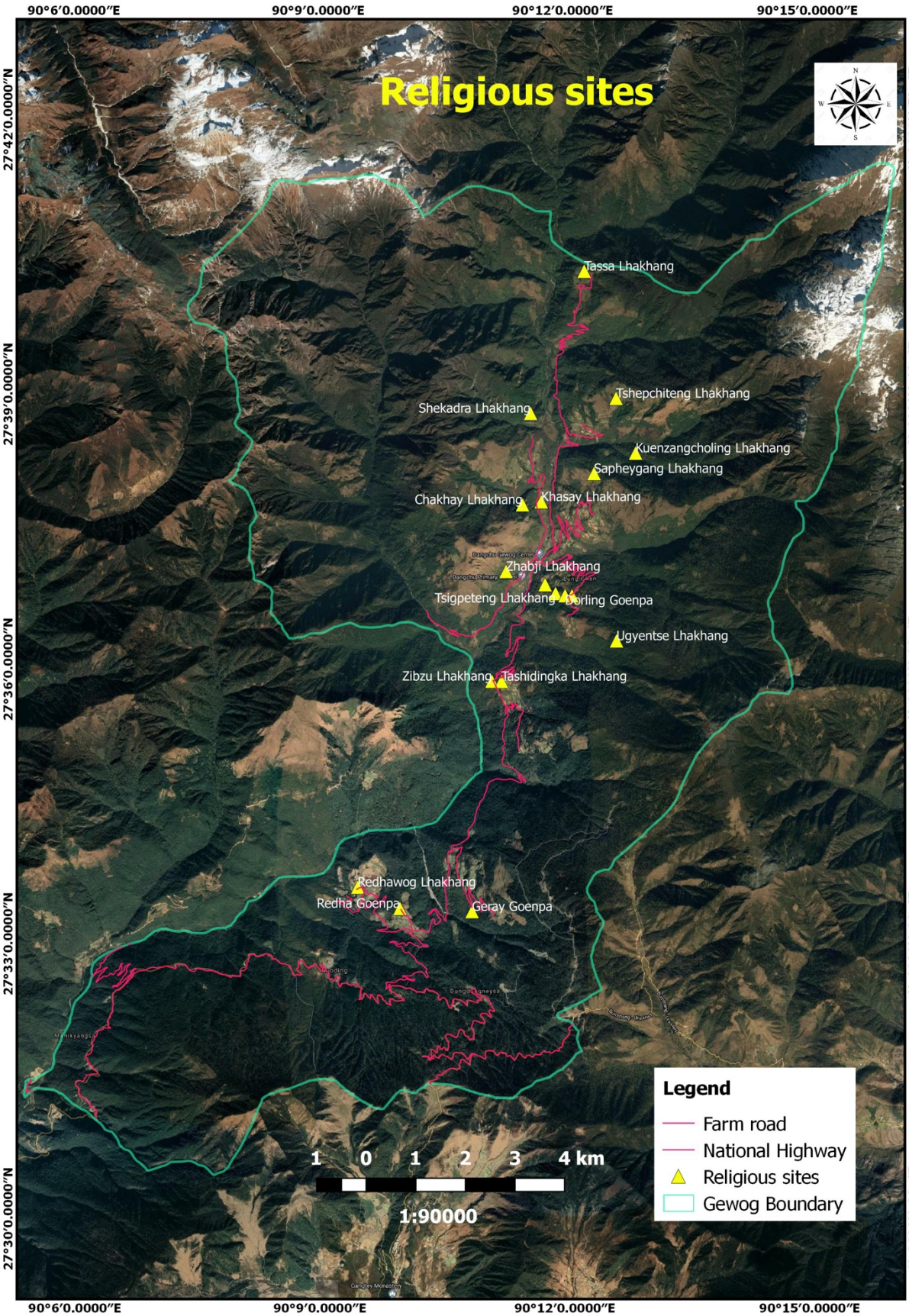
One can reach Zhabjee Lhakhang by crossing Dangchu river via Dangchu Primary School and doing a one hour and 30 minutes uphill walk. Ahead of the Lhakhang, after a 15 minute walk, is a cave where Khandro Yeshi Tshogyel is said to have meditated. It is one of the most scared Lhakhangs in the region. However the surrounding area is currently filled with cow dung. It seems the place is used as a grazing land by the people nearby. The lhakhang is a single storey structure with a single room. A square shape rock surrounded by bushes and shrubs, on the right hand side of the Lhakhang has numerous footprints of Khandro Yeshi Tshogyel. For about 5 meters away from the door, stands a towering cypress tree that welcomes visitors with its great aroma. A small Chorten with an inscription of Terton Dorji Lingpa stands at its immediate distance. It is popularly known as Zhabjee Lhakhang as it has footprint of Guru Rinpoche as its sacred remnant.

It is believed that Guru Rinpoche with his religious dagger extracted a stream from the ridge, north ward of Lhakhang. The stream is said to have flown from the ridge downward to Dangchu river. When the stream reached the site where the Lhakhang is located today, it is said that a demoness crossed the stream. Thus, the stream could not continue to gush down and join Dangchu river. Then it is said that Guru subdued the demoness and so the robust footprint of Guru which is said to have been stamped on the back of demoness can be seen today inside the Lhakhang in the form of rock that resembles the demoness' back. The demoness' internal organs are said to have been splashed and it can still be seen on the exteriors of the Lhakhang wall. The Guru is said to have done this to benefit the nearby people for cultivating paddy in the vicinity. The gentle slope covered by high altitude shrubs and grasses, like paddy fields can be seen today as well. As it is believed that the demoness crossed the stream and the stream could not join Dangchu river the people of Dangchu gewog do not grow rice except wheat and other crops.

Guru Tsokhorsum is the central vestige of the Lhakhang. Though small in size yet its walls are beautiful with paintings of great figures. Amongst many others, figures such as, Lord Buddha, Zhabdrung Rinpoche, Drupchoen Thangthong Gyalpo, Doedjom Rinpoche, Jamyang Khentse Choki Loedroe, Meinling Khen Rinpoche, Drupjoed Rinpoche, Balay Trulku, Terton Dorji Lingpa, Bayru Tsana, etc, all seem to have been beautifully painted but have become faded over the time. There are few Thangkas hung which are worn out too. Few boxes, pots and other utensils are stored untidily.

Dangchu Wangchu

Dangchu Wangchu Menchu is located at an elevation of 2335 masl under the Dangchu gewog in Wangduephodrang Dzongkhag. It is about 18km drive from Nobding. The people workship and consider the spring as holy water (duetsi) and drinks for health benefits. This Menchu is believed to heal 13 different diseases.


Religious sites
90°6'0.0000"E
90°9'0.0000"E
90°12'0.0000"E
90°15'0.0000"E
27°42'0.0000"N
27°39'0.0000"N
27°36'0.0000"N
27°33'0.0000"N
27°30'0.0000"N
Tassa Lhakhang
Tshepchiteng Lhakhang
Shekadra Lhakhang
Kuenzangcholing Lhakhang
Sapheygang Lhakhang
Chakhay Lhakhang
Khasay Lhakhang
Zhabji Lhakhang
Tsigpeteng Lhakhang
Dorling Goenpa
Ugyentse Lhakhang
Zibzu Lhakhang
Tashidingka Lhakhang
Redhawog Lhakhang
Redha Goenpa
Geray Goenpa
Legend
Farm road
National Highway
Religious sites
Gewog Boundary
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4.1.3 AREA STATEMENT

Land use and land cover map.

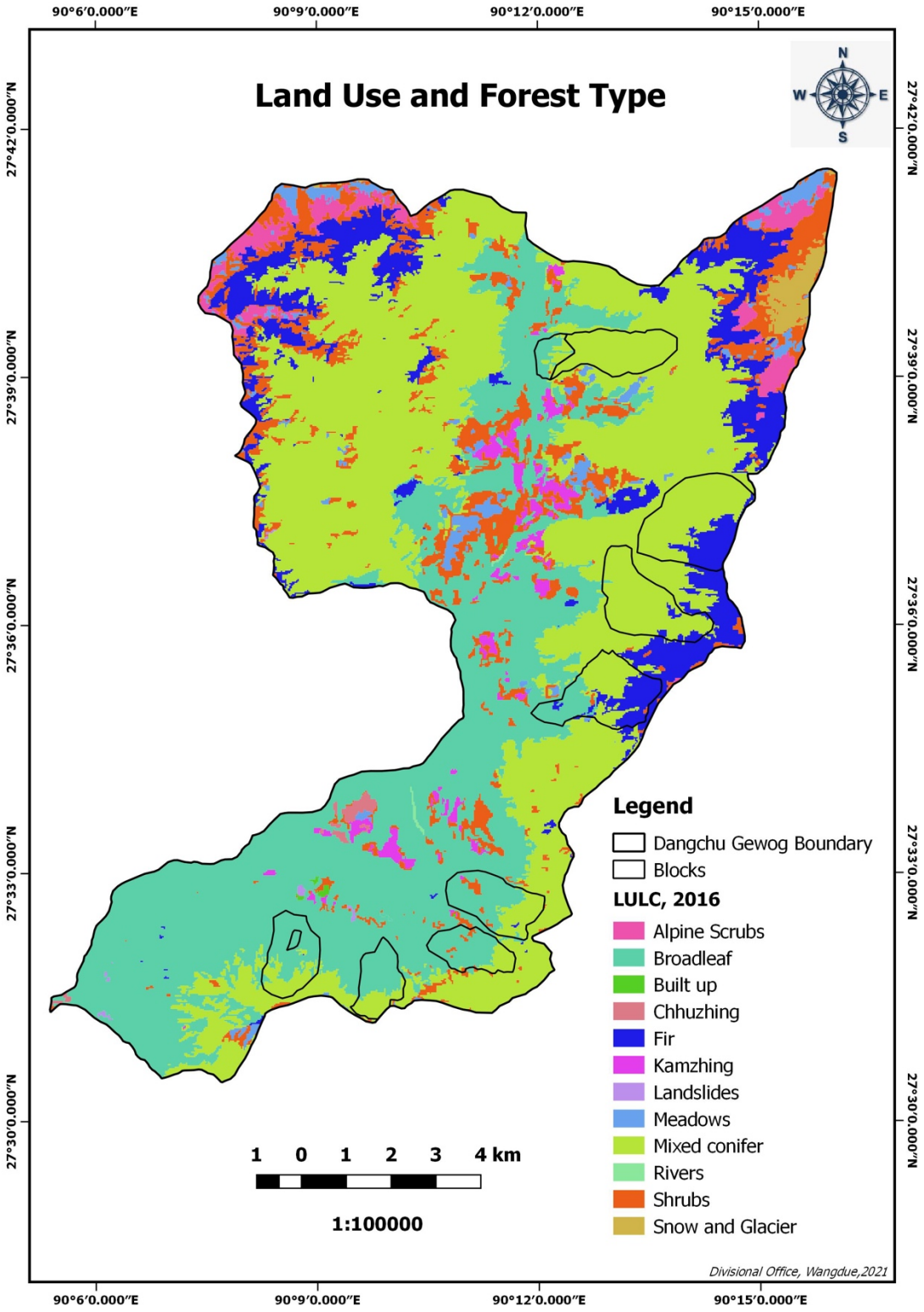


Table 1: Area statement.

Land Use Type	Area (Ha)	Area Percentage (%)
Alpine scrubs	342.25	2.00
Broadleaf	5639.28	32.93
Built_up	10.96	0.06
Chhuzhing	43.54	0.25
Fir	1589.88	9.29
Kamzhing	269.54	1.57
Landslide	12.10	0.07
Meadows	353.19	2.06
Mixed Conifer	7068.19	41.28
Rivers	8.13	0.05
Shrubs	1640.20	9.58
Snow and Glaciers	145.69	0.85
TOTAL	**17122.96469**	**100.00**

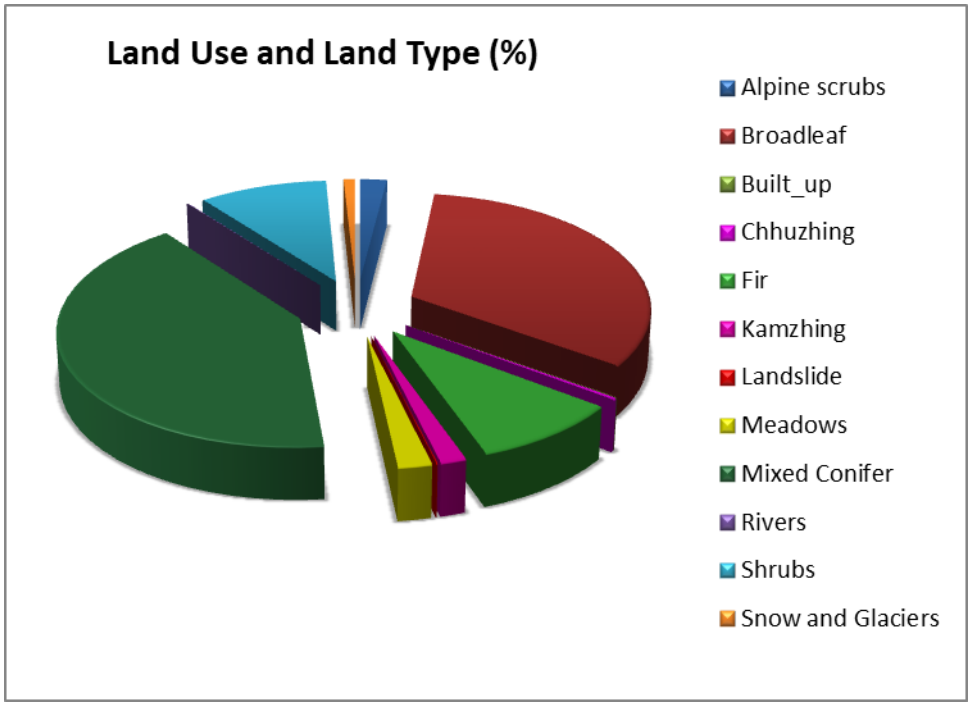


Fig 1: Land Use and Land Type

4.1.4 TOPOGRAPHY AND SLOPE

The average site condition is shown in the table below, the site condition for individual Blocks and compartments can be derived from Annex 1.

Table 2: Average site condition

Slope	%	Erosiveness	%	Stability	%
Gentle	50	Stable	74	High	36
Moderate	30	Moderate	22	Moderate	46
Steep	20	Unstable	4	Low	18

The forest management area generally comprises of gentle to moderate slopes. The areas with slopes greater than 45 degree (100 % slope) were exempted from timber allocation and designated as protection zone using QGIS. Drainage is towards the Dangchu River in the south. A buffer of 150 meters on either side of national highways and 20 meters on either side of farm roads is also maintained. Rivers and streams were given a buffer of 30m, within which no harvesting was allowed to prevent soil erosion and to protect the riparian zones. Within a circle of 100m radius around the monasteries no trees shall be marked for felling.

4.1.5 ACCESSIBILITY

Dangchu gewog is connected to the Wangdue-Trongsa National highway by a 18.5 km farm road from Nobding. The farm road extends to all the Chiwog under the Gewog. Areas that are far from the settlement/farm roads are designated as inaccessible areas. Owing to the distance the local residents have not explored these areas for timber extraction as it will require more time, energy and expenditure. Most of the inaccessible areas in the Northern parts of the gewog have very steep terrain (slope greater than 45 degree), where timber extraction is not feasible. The people usually opt for timber/firewood/poles from the community forest and the rural house building timber for the Gewog is mostly allotted from Phobji Gewog as the areas with desired sized and species of timber has already been harvested over the past years.

4.1.6 FOREST USE AND NWFP

The occurrence of NWFP in the forest management area is shown in the table below, for the distribution by Block and compartment refer to Annex 1 and 2.

Table 3: Occurrence of NWFP and important forest uses

NWFP	Abundant (%)	Sparse (%)	Forest Uses	Intensive (%)	Extensive (%)
Bamboo	39	15	Grazing	25	40
Cane	0	0	Shoksing	0	0
Daphne	22	16	Lopping	0	0

Mushrooms and medicinal plants like *Paris polyphylla* and *Picorrhiza spp.* are also collected for self-consumption. Bamboos are collected for fencing and for making bamboo products. People of Dangchu Gewog are issued permits for collecting cordyceps (*Ophio cordyceps sinensis*). Cordyceps is collected in the months of May-July. It is the main source of income for the households under Tassa Chiwog.

4.1.7 Past and current Forest Management History

Fir, Bluepine and Spruce are the tree species that are used as RHBT in Dangchu Gewog. Quercus spps., and Alunus spp. are allotted as firewood and fencing post. In the past years, Dangchu Gewog had rich timber resources and not only the local residents, people from other Gewogs and Dzongkhags also opted for timber from Dangchu Gewog. There was rampant illegal logging in the Gewog in the year 2005-2006. Therefore, presently the Gewog has very scarce timber resources and the local residents opt for RHBT mostly from Phobji Gewog and other neighbouring Gewogs. The local residents collect firewood and fencing posts from the CFs and areas which are at close proximity to settlements.

4.1.8 Population and Demography

The following villages and settlements are located in the forest management area:

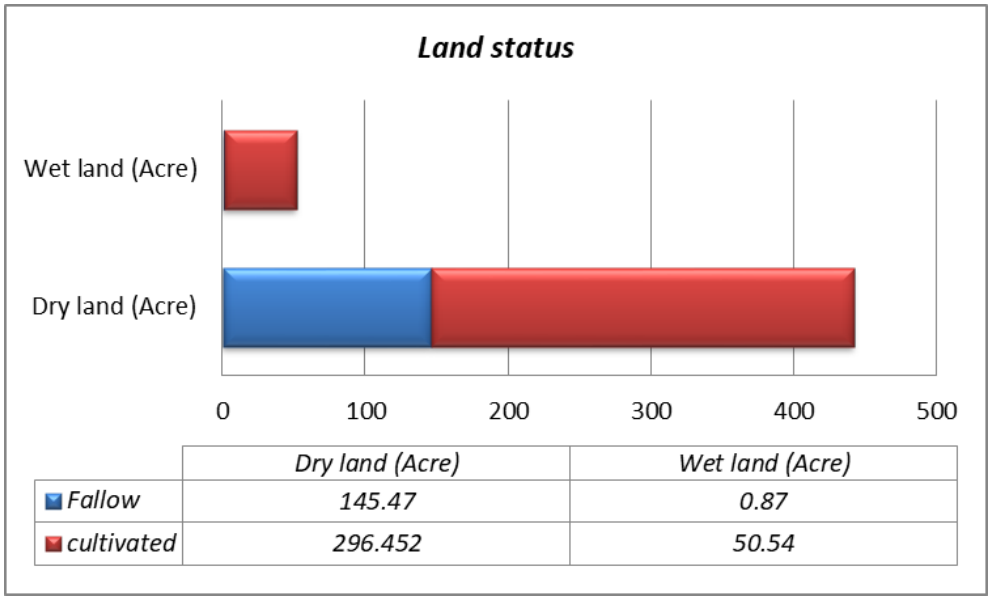
Table 4: Population and demography

Village Name	No. of Households	No. of Persons
Doongdoongnyelsa	90	550
Yusagang	20	110
Tashidingkha Zimi	48	334
Godraang Taagsar	45	519
Tokaling Tomla	37	230
Total	**240**	**1743**

Dangchu Gewog consists of Tashidingkha Zimi, Godraang Taagsar, Tokaling Tomla, Doongdoongnyelsa and Yusagang with an estimated population of 1743 people and 240 households.

4.1.9 Farming and Agriculture

Potato and Chilli cultivation dominates among other agriculture farming activities. Other vegetables such garlic, mustard, spinach, radish, etc are also cultivated and marketed. The people also raise livestock and sells the excess livestock products like eggs, cheese,butter, milk, etc., after self-consumption.



	Dry land (Acre)	Wet land (Acre)
Fallow	145.47	0.87
cultivated	296.452	50.54

Fig 2: Land Use

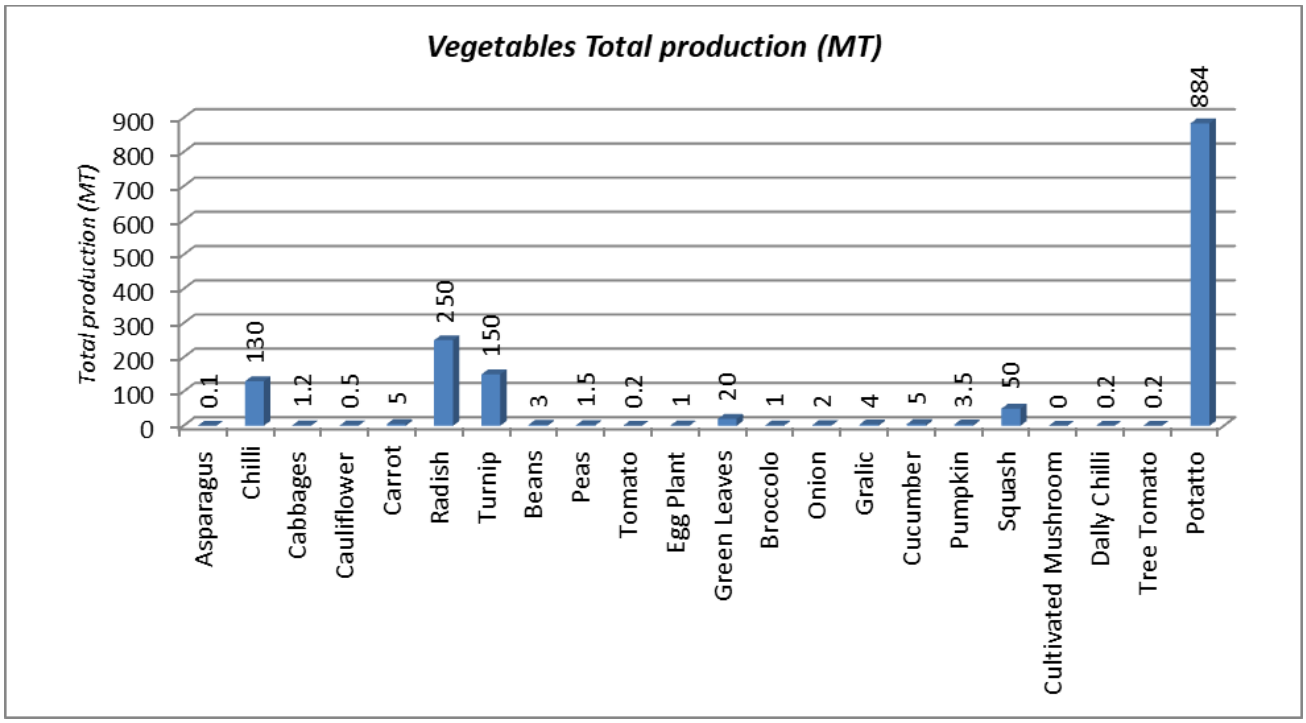


Fig: Vegetable Total Production

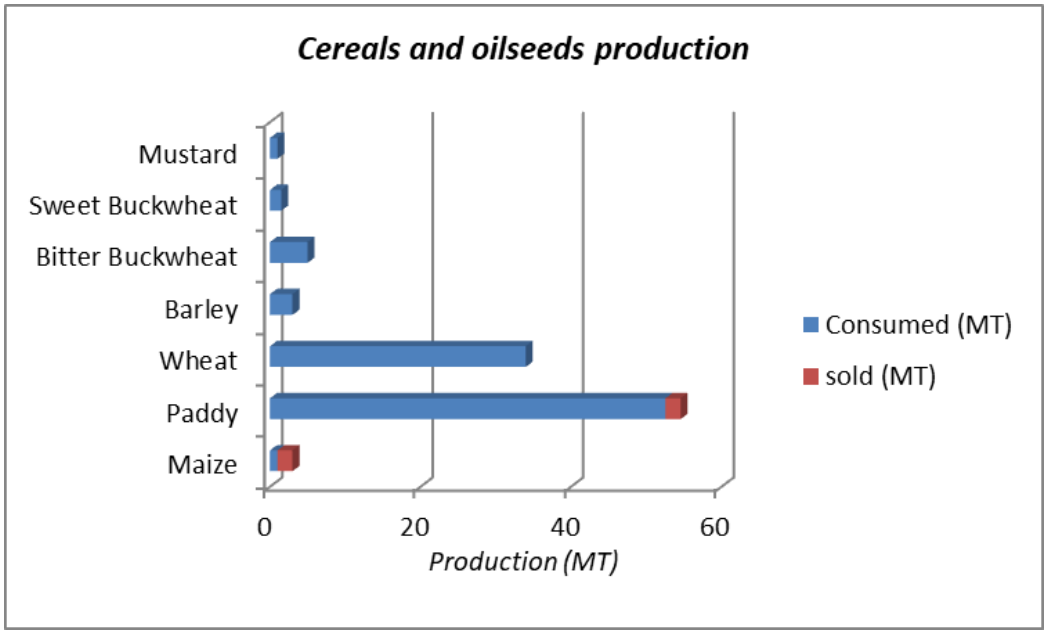


Fig 3: Cereals and oilseeds production

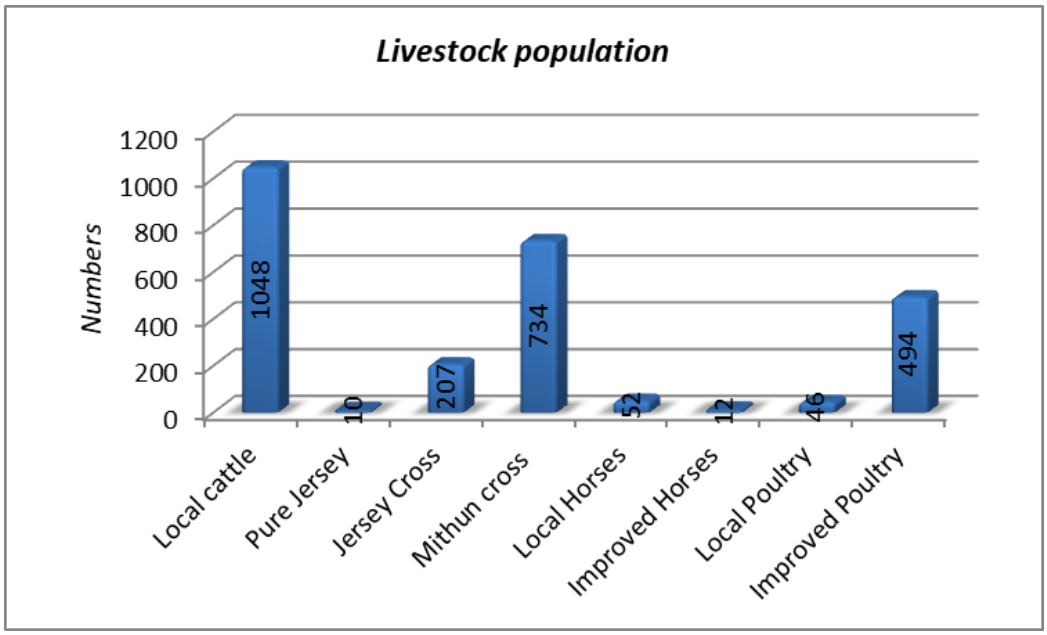


Fig 4: Livestock population

Table 5: Livestock Products

Products	Unit	Total Production
Butter	Kg	10967
Cheese	Kg	19727
Egg	Nos.	101600
Pork	Kg	200
Fresh milk	Liters	219042

Source: Gewog Level Data 2018-2019

4.2 Ecology

4.2.1 Forest Types and Condition

The major part of the Forest Management Area lies in the Mixed conifer zone (58%) followed by Broadleaf (30%) and Fir (12%). The distribution of the forest types is shown in the graph below. The general condition of the forest is good to average. Close to villages, the forest condition is poorer due to intensive use. Forest type distribution as well as forest condition and canopy closure per compartment can be derived from the respective compartment sheet in Annex 1.

The average standing volume is 203 m^3/ha and the average basal area is 27.4 m^2/ha. The forests are immature (22%) to mature (63%).

The Forest Management Area Comprises of the following forest types:

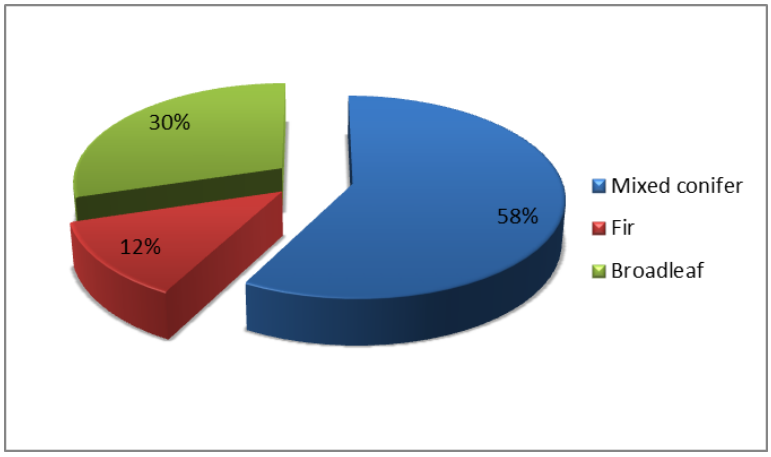


Fig 5: Forest Types and Condition

4.2.2 Floral Species Composition

Mixed conifer forest is the dominating forest type in the management area. Mixed conifer forest comprises of Hemlock and Fir stands with Rhododendron as associate species at the higher altitudes. Dunddungneysa and Eusagang blocks are mainly composed of Broadleaf forest with scattered patches of conifer species. The Broadleaf forests mainly consists of *Quercus spps., Acer spps., Betula spps*. and *Alnus nepalensis*.

4.2.3 Faunal Species Composition

During field enumeration evidences on presence of endangered species such as Red panda (*Ailurus fulgens*) and Musk deer *(Moschus chrysogaster*) were also found in higher elevations of

Tashidingkha and Dungdungneysa blocks. It is said that the population of Musk deer has decreased drastically over the years due to illegal poaching. Numerous traps were encountered during the field enumeration. The management area is also a habitat for the Bengal Tiger (*Panthera tigris tigris*). Himalayan Black bear, wild boar, Sambar, barking deer, Kalij pheasant were found in abundance and are a menace to the famers.

4.3 Socio Economics

4.3.1 COMMON SOURCES OF INCOME

The 5 chiwogs under Dangchu Gewog consists of population who are dependent of farming and livestock as a source of their livelihood with few employed in government service and some in monk and army. The local communities are farmers having individual landholdings. People of Dangchu are well-off for having access to cordyceps collection as their major source of income. Cash crops such as chillies, potatoes, garlic, wheat and barley are grown and livestock products are sold to supplement their income for living. All the villages are connected with farm roads which immensely assist in improving the living standard of the people. Most of the household income is used for food, religious ceremonies and clothing followed by expenditure on their children's education.

5 FOREST MANAGEMENT

5.1 Areas excluded from the Management Plan

The total area of Dangchu Gewog is ***17122.96*** ha comprising mainly of Mixed conifer forest, followed by Broadleaf and Fir forest. Biological Corridor-08 falling within the Gewog area has been included in the current management area. The areas, which are already managed for another purpose, are excluded from this plan. Therefore the total area excluded from this plan constitutes the total area of CFs within the Gewog and a part of WCNP, which adds up to 1419.436 ha.

Areas excluded from the management plan are:

Table 6: Areas excluded from the management plan

Community Forest		**Park**	
Name	**(ha)**	**Name**	**(ha)**
Tassar Pelgi Dorji CF	50.56	Wangchuck Centennial National Park	1025.311
Rida CF	80.45		
Yuesargang CF	103.0040191		
Chubar CF	160.1107		
Total	**394.1247**		**1025.311**

5.2 Local Forest Management Area

The total Local Forest Management Area for this plan period is 6388.699 ha which comprises of *"**Future Management Area**"* and ***"Current Management Area"*** the details of which are given in the following section.

5.2.1 FUTURE MANAGEMENT AREA

A total of 13845 ha of Gewog area are demarcated as "Future Management Area" as these areas are not accessible due to its distance from the nearest road head. People don't opt for timber from these areas as timber extraction from these areas will require more time, energy and expenses. These areas may be harvested in future with road construction.

5.2.2 CURRENT FOREST MANAGEMENT AREA

A total of 1858.24 ha of Forest area within the Gewog shall be managed in this current plan period. It comprises of following categories.

Table 7: Current Forest Management Area

Area (ha)	Type
14.970	Non Production Area[1]
273.665	Protection Zones
1569.605	Production Areas
1858.24	**Total**

5.3 Siviculture measures

Most of the timber demand is fulfilled from Phobji and other neighbouring Gewogs. People collect firewood from the areas adjacent to the settlements and cattle are allowed to graze freely in the forest nearby. The dominating Silviculture measure is timber use (47%), followed by firewood use (37%). Most of the accessible areas with good timber stocks have already been harvested in the past years. The areas with no activity are the areas that are either inoperable due to its terrain or accessibility. The distribution of silviculture measures throughout the forest management area is shown in the graph below. The silviculture measures for each individual compartment can be derived from the compartment register and from the forest management map.

[1] This comprises of areas which are excluded from timber production which are located within forest management area.

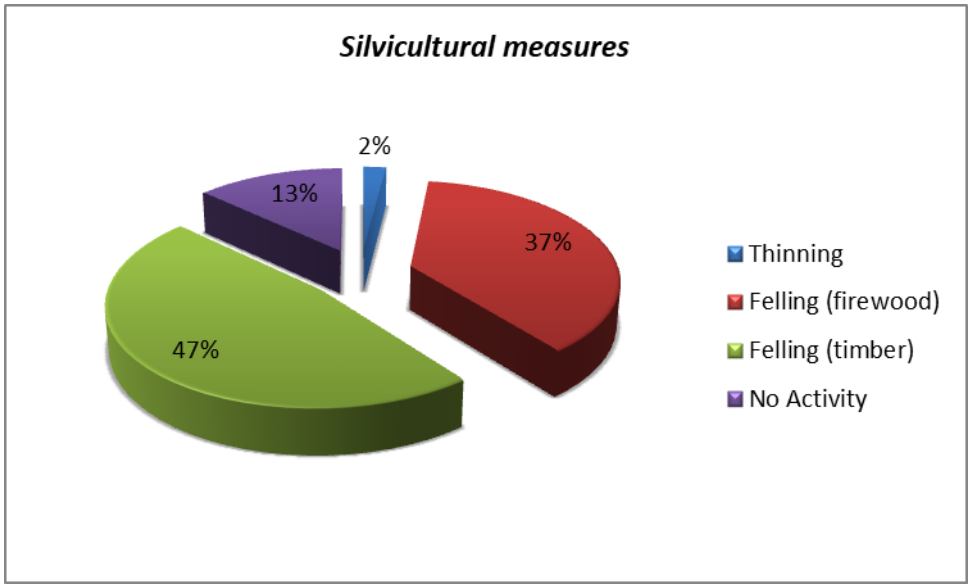


Fig 6:Silvicultural measures

5.4 Yield Regulation

The sustainable annual allowable cut $AAC_{sust.}$ for the management area is calculated as follows:

$$AAC_{sust} = \frac{\text{Production area (ha)} \times \text{Avg.Standing volume } (m^3/ha)}{\text{Avg Rotation Age}}$$

$AAC_{sust.}$= 2510 m^3/year

The Annual Allowable Cut for the Dangchu forest management area is fixed at 2510 m^3.

The AAC per ha is 1.6 m^3 and the Potential Production Period is 61 years.

5.5 Demand/Supply Assessment

The rural timber demand of the geog has been calculated as the average of the actual wood allotment from 2011 to 2020. The data were derived from the "geog register" of the Divisional Forest Office.

The annual timber supply potential is calculated by dividing the total production potential (in number of trees) by the Potential Production Period.

Potential Production Period is the number of years it will take to use up the production potential with the fixed AAC.

Table 8: Timber demand/supply scenario in number of trees

Product	*Total Production Potential*	*Sustainable Annual Supply Potential**	*Annual Demand*	*Demand -Supply*
Drashing/shingleps	*16811*	*275*	*28*	*+247*
Chams	*17936*	*294*	*52*	*+241*
Tsims	*6362*	*104*	*52*	*+52*
Poles	*13748*	*225*	*315*	*-90*

*Remark: the total production potential is divided by the Potential Production Period which is 61 years.

Where,

1. ***Total Production Potential for individual products in terms of numbers*** *can be derived from the summary sheet.*
2. ***Sustainable Annual Supply potential*** = $\frac{\text{Total Production Potential}}{\text{Potential production period}}$
3. **Annual Demand**: annual demand of the product assessed from the past allotment trend in the Gewog. Can be derived from the Gewog Register.
4. **Demand- Supply** = Difference of Demand and sustainable annual supply potential which gives an idea about whether there surplus supply or shortage of the products.

Drashing, chams and tsims can be supplied from the forest management area. Shortage is for poles which however can be compensated by the surplus of the larger trees (yield is controlled in terms of volume).

Firewood demand is calculated in truckloads. To compare it with the supply potential it has to be converted into standing volume equivalent. The conversion factor applied is:

1 truckload is equivalent to 8 m^3 standing volume.

Table 9: Firewood Demand/Supply Scenario in m^3

Total Production Potential ($Volume_{tot}$)	***Annual Supply Potential****	***Annual Demand***	***Demand -Supply***
75540	*1238*	*31*	*+1207*

**Remark: the total production potential is divided by the Potential Production Period which is 61 years

1. ***Total Production Potential ($Volume_{tot}$)*** *can be derived from the summary sheet.*

2. ***Sustainable Annual Supply potential*** = $\frac{\text{Total Production Potential}}{\text{Potential production period}}$
3. **Annual Demand**: annual demand of the product assessed from the past allotment trend in the Gewog. Can be derived from the Gewog Register.
4. **Demand- Supply** = Difference of Demand and sustainable annual supply potential which gives an idea about whether there surplus supply or shortage of the products.

The annual supply potential is considerably higher than the average annual demand of firewood of the last 10 years.

Whenever possible the wood demand of one village should be allotted from the corresponding village intervention zone (compartment).

6 IMPLEMENTATION OF THE PLAN

6.1 Plan Implementation

The Department of Forests and Park Services is vested with the responsibility of protection and management of forest resources in Bhutan. In the field, the territorial division is mandated by the Department to discharge the responsibility of implementing and monitoring all the activities mentioned in the plan. The Chief Forestry Officer of Wangdue Division will be responsible for implementation of this Management Plan. The Chief Forestry Officer, Wangdue will be assisted by the Forest Range Officer, Nobding and other staffs of the Range for effective implementation of this plan.

Adequate records will be maintained by the Nobding Range Office in the form of Tree Marking Book and Gewog Register as per the guidelines under Local Forest Area Management of Forest Management Code of Bhutan 2020.

The annual allotment of timber from the Geowg will not exceed the AAC prescribed in this plan under any circumstances. Any allotment over and above the AAC shall be made only upon due approval of the CFO, Wangdue. The surplus volume allotted over and above the AAC shall be adjusted in the AAC of the subsequent year without fail.

6.2 Tree Marking and Silviculture

Tree marking is done in accordance with the “Tree Marking Guidelines” and the “Silvicultural Guidelines” prescribed by the Department of Forests.

The silvicultural system applied is single tree selection system. The principle of negative selection is applied in all tending and thinning operations. Marking of mature trees for felling is permitted only, when the immediate vicinity is sufficiently regenerated and the regeneration can grow up (low grazing pressure).

Grazing shall be controlled in all over-mature forests which are in the stage of natural regeneration.

Un-stocked and sparsely stocked parts shall be re-planted with principal local species (species selection according to prevalent forest type).

6.3 Monitoring

Monitoring is the continuous/periodic review undertaken by management at every level of implementation of an activity to ensure that input deliveries, work schedules, targeted output and other required actions are proceeding according to the plan. It also ensures important control of the AAC. The CFO, Wangdue will ensure that monitoring is carried out on an annual basis according to Vol III, Chapter III (Local Forest Management Planning), Section 3.11(Monitoring).of the Forest Management Code of Bhutan 2020.

Further the Chief Forestry Officer will ensure to submit annual monitoring reports latest by 28th of February every year as per the provision of Forest Management Code of Bhutan 2020

Annex 1

Compiled Results by Compartments

Area Distribution, Basal Area and No. of Sample Plots for Forest Management Area: Gakidling

Comp	Sub-Compartment		Area Distribution (ha)					BA	No. of Plots
No.	No.	Name	Non Forest	Protection	Inoperable	Production	Total	(m2/ha)	
1	a	Relangthang 1		12.5	10.2	46	68.7	18	9
1	b	Relangthang 2		12.5	15.4	72.1	100	15.9	14
1	c	Relangthang 3		18.8	11.7	19.5	50	12	5
2	a	Muga		6.3	5.9	106.6	118.8	5.1	18
2	b	Deoralidara		12.5	10.7	64.3	87.5	11.3	12
2	c	Dungdungy				78	78	16.2	12
2	d	Sheer		43.8	29.2	58.3	131.3	7.3	14
2	e	Below Gatwal 1		6.3	5.9	87.9	100.1	13.5	15
2	f	Below Gatwal 2		18.8	15	60	93.8	14.3	12
2	g	Ganghatry		6.3	5.7	63	75	9.8	11
2	h	Kagaty		31.3	22.1	52.9	106.3	13.5	12
2	j	Muga Village		25	21	110.3	156.3	13	21
2	i	Bemberidara		18.8	15.6	78.1	112.5	15	15
3	a	Changay area 1		12.5	10.8	70.4	93.7	9.1	13
3	b	Changay area 2				106.3	106.3	11.9	17
3	c	Changay area 3		6.3	5.6	44.4	56.3	21	8
3	d	Changay area 4		12.5	8.9	22.3	43.7	8.4	5
3	e	Pahkheybari		18.8	15.2	66	100	10.5	13
3	f	Above Char 1		18.8	14.7	54	87.5	23.5	11
3	g	Above Char 2		56.3	17.3	7.7	81.3	16.5	4
4	a	Muga 1		18.8	14.7	54	87.5	21.3	11
4	b	Gangatay area		50	30	45	125	15.2	12
4	c	Muga area		75	15	3.8	93.8	8.7	3
4	d	Kagatay area		18.8	12.5	25	56.3	12.5	6
5	a	Hilley area 1		37.5	17	14.2	68.7	8	5
5	b	Hilley area 2		12.5	8.9	22.3	43.7	14.4	5
5	c	Hilley area 3		25	15.9	27.8	68.7	15.4	7
5	d	Hilley area 4		25	13.9	17.4	56.3	108	5
5	e	Hilley area 5		37.5	15	10	62.5	10	4
5	f	Hilley area 6		37.5	20.2	23.6	81.3	8	7
5	g	Hilley area 7		31.3	11.7	7	50	8.7	3
6	a	Bisty 1		25	17.9	44.6	87.5	12.6	10
6	b	Bisty 2		18.8	13.6	36.4	68.8	10.8	8
6	c	Laring top				62.5	62.5	6.6	10
6	d	Kamidara		18.8	15.8	84.2	118.8	10.4	16
6	e	Sixty 1		25	19.7	74	118.7	11.1	15
6	f	Sixty 2		12.5	10.8	70.4	93.7	8.3	13
6	g	Below Bisty 1		68.8	26.7	17	112.5	13.7	
6	h	Below bisty 2		12.5	34	9.7	56.2	12	2
7	a	Relangthang I		6.3	5.4	32.1	43.8	24	6
7	b	Relangthang II		18.8	14.7	54	87.5	13.8	11
7	c	Relangthang III		31.3	23	64.5	118.8	11.6	14
7	d	Relangthang IV		18.8	14.4	48.1	81.3	24.8	10
7	e	Above Bisty 1				68.8	68.8	10.5	11
7	f	Above Bisty 2				31.3	31.3	30	5
7	g	Above Bisty 3		6.3	5.8	81.7	93.8	6.3	14

Comp	Sub-Compartment		Area Distribution (ha)					BA	No. of Plots
No.	No.	Name	Non Forest Area	Protection	Inoperable	Production	Total	(m2/ha)	
1	Relangthang A			43.8	37.3	137.6	218.7	16.0	28
2	Muga A			169.1	131.1	759.4	1059.6	11.8	142
3	Changay			125.2	72.5	371.1	568.8	13.8	71
4	Muga B			162.6	72.2	127.8	362.6	17.1	32
5	Hilley			206.3	102.6	122.3	431.2	25.3	36
6	Bisty			181.4	138.5	398.8	718.7	10.0	74
7	Relangthang B			81.5	63.3	380.5	525.3	14.8	71
Total per Gewog				**969.9**	**617.5**	**2297.5**	**3884.9**	**13.6**	**454**

Explanations of abbreviations used in the compartment records

All information and data indicated in the sub-compartment record are related to the operable production area only.

A	abundant occurrence of NWFP
Bas. Area (m^2/ha)	basal area per ha of the sub-compartment
Dbh	diameter breast height
E	extensive forest use
Height 0,3<1.3m	number of trees of this height class
I	intensive forest use
m^3	total standing volume in m3
N/ha	number of trees per ha
Ntotal	total number of trees of the sub-compartment
S	sparse occurrence of NWFP
Volume (m3/ha)	standing volume per ha of the sub-compartment
Volume conifer %	percentage of conifers in relation to the standing volume

Annex 2
Compartment Register

Compartment Record

Geog	Dangchu	Block	Dundungneysa	Block No	1	Comp. No	I

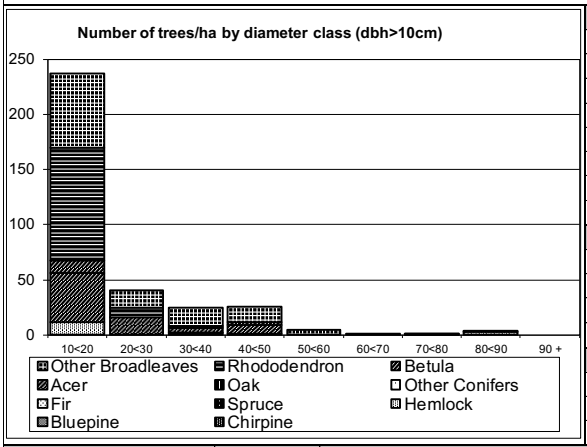
Areas in ha

Non production		Protection	95.5	Production	11.5

Forest Composition and Description

Mixed HC with hemlock forest and young rhodo stands. Closed to open canopy with good to average condition.

Stand data	
Bas. Area (m2/ha)	16.2
Volume (m3/ha)	114.3
Volume conifer %	17%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	40	Plantation		Type	%	%
Fir		Natural	100	Firewood	60	30
Spruce		Coppice		Bamboo	70	
Mixed Conifer		Canopy	%	Cane		
Blue Pine		Dense		Daphne	30	20
Chir Pine		Closed	70			
Hardwood		Open	30			
Mixed H/C	60	Unstocked		Forest Use	I	E
Age Class	%	Condition	%	Type	%	%
Young	40	Good	30	Grazing	90	10
Immature	30	Average	50	Shokshing		
Mature	30	Poor	20	Lopping		
Overmature		Site Characteristics				
Slope	%	Erosiveness	%	Soil Cover	%	
Gentle	50	Stable	40	High	10	
Moderate	50	Moderate	50	Moderate	30	
Steep		Unstable	10	Low	60	

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock	71	71	11		2	1				2		**17**	5
Spruce													
Fir													
Other Conifers													
Oak	106												
Acer	141	106	45	16	4	8			0			**74**	22
Betula			11			3						**14**	4
Rhododendron	460	1733	102	8	2							**112**	33
Other Broadleaves			68	16	17	14	4	1	1	0		**121**	36
Total	**778**	**1910**	**238**	**41**	**25**	**25**	**4**	**1**	**1**	**3**		**338**	100

Future Management & Monitoring of Activities

Felling of the matured stands of both hemlock and mixed HC is recommended .Intensive grazing needs to be reduced.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	20	2	49	123												
	Firewood	34	3		77												
30-49	Cham	14	1	49	18												
	Firewood	154	13		185												
20-29	Tsim																
	Firewood																
10-19	Poles, etc.			2													
	Firewood	130	11		9												

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning														
Felling (Firewood)	32.1	30												
Felling (Timber)	53.5	50												
No activity	21.4	20												

Assessment carried out by	Tshering choden	Year:	2021

Compartment Record

Geog	Dangchu	Block	Dungdungneysa	Block No	1	Comp. No	II

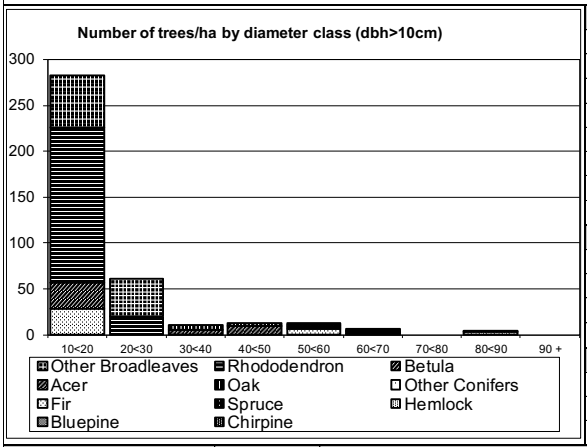
Areas in ha

Non production		Protection	24.4	Production	9.9

Forest Composition and Description

Mixed conifer forest with young rhodo and mixed H/C stands, closed to open canopy and good to average condition. Natural regeneration dominated by young Rhodo stands.

Stand data	
Bas. Area (m2/ha)	18.5
Volume (m3/ha)	133.4
Volume conifer %	37%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock		Plantation		Type	%	%
Fir	75	Natural	100	Firewood	75	25
Spruce		Coppice		Bamboo	100	
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne		75
Chir Pine		Closed	50			
Hardwood		Open	25			
Mixed H/C	25	Unstocked	25	**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young	25	Good	25	Grazing	100	
Immature		Average	50	Shokshing		
Mature	75	Poor	25	Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	25	Stable	25	High		
Moderate	75	Moderate	75	Moderate	75	
Steep		Unstable		Low	25	

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock	265									4		**4**	1
Spruce													
Fir			28				6	2		1		**37**	9
Other Conifers													
Oak													
Acer	177				5		2					**7**	2
Betula			28			9		2				**39**	10
Rhododendron	177	88	170	20			2	2				**194**	50
Other Broadleaves	354		57	41	5	3	2	2				**109**	28
Total	**973**	**88**	**283**	**61**	**10**	**13**	**13**	**6**		**4**		**390**	100

Future Management & Monitoring of Activities

The area has alresdy been exploited in the past years so, the remaining stands are recommended to be retained as mother trees. The intensive grassing activities needs to be reduced.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)		1	2	3	4	5	6	7	8	9		
>50	Drashing	53	5	87	202												
	Firewood	80	8		225												
30-49	Cham	31	3	9	43												
	Firewood																
20-29	Tsim																
	Firewood																
10-19	Poles, etc.			4													
	Firewood	279	28		19												

Silvicultural Measures			Area in ha to be implemented per year									Total	%
Measure	Area (ha)	in %		1	2	3	4	5	6	7	8	9		
Planting														
Thinning														
Felling (Firewood)	8.6	25												
Felling (Timber)	17.1	50												
No activity	8.6	25												

Assessment carried out by	Kinley Dorji	Year:	

Compartment Record

Geog	Dangchu	Block	Dungdungneysa	Block No	1	Comp. No	III

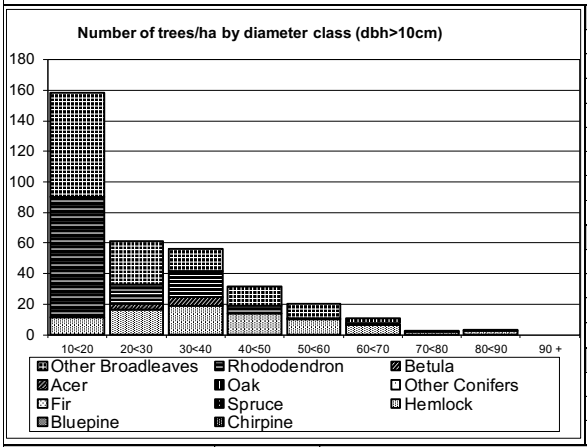
Areas in ha

Non production		Protection	17.5	Production	69.7

Forest Composition and Description

Mixed H/C stands with hemlock stands. closed to opencanopy with good to average stand condition. Natural regeneration dominated by Rhodo speices.

Stand data	
Bas. Area (m2/ha)	27.8
Volume (m3/ha)	215.9
Volume conifer %	50%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	50	Plantation		Type	%	%
Fir		Natural	100	Firewood	20	40
Spruce		Coppice		Bamboo	50	50
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense	20	Daphne	20	40
Chir Pine		Closed	40			
Hardwood		Open	40			
Mixed H/C	50	Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young	10	Good	30	Grazing	10	30
Immature		Average	50	Shokshing		
Mature	90	Poor	20	Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	40	Stable	70	High	50	
Moderate	30	Moderate	30	Moderate	50	
Steep	30	Unstable		Low		

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock	1592	566	11	16	19	14	10	7	2	2		**81**	24
Spruce													
Fir													
Other Conifers													
Oak													
Acer													
Betula	106	177		4	6							**10**	3
Rhododendron	1096	601	79	12	17	5	1	1				**115**	33
Other Broadleaves	212	248	68	29	15	13	9	3	1	1		**138**	40
Total	**3006**	**1592**	**158**	**61**	**56**	**31**	**20**	**11**	**3**	**4**		**344**	100

Future Management & Monitoring of Activities

The matured stands of hemlock and mixed H/C are recommended for felling on selection basis.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	1190	17	54	3502												
	Firewood	669	10		1694												
30-49	Cham	2236	32	37	2053												
	Firewood	1772	25		1446												
20-29	Tsim	284	4	7	97												
	Firewood	2270	33		602												
10-19	Poles, etc.	2365	34	2	161												
	Firewood																

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning	17.4	20												
Felling (Firewood)	26.1	30												
Felling (Timber)	34.9	40												
No activity	8.7	10												

Assessment carried out by	Tshering Tobgy	**Year:**	2021

Compartment Record

Geog	Dangchu	Block	Dungdungneysa	Block No	1	Comp. No	IV

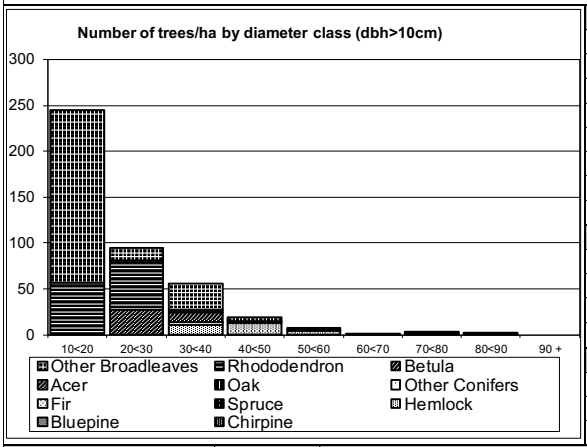
Areas in ha

Non production	0.0	Protection	2.3	Production	43.1

Forest Composition and Description

Mixed conifer with mixed HC stands and good to average condition with open canopy.Natural regeneration dominated by young rhodo species.

Stand data	
Bas. Area (m2/ha)	21.7
Volume (m3/ha)	149.8
Volume conifer %	46%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	33	Plantation		Type	%	%
Fir	67	Natural	100	Firewood	83	17
Spruce		Coppice		Bamboo	67	33
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne		
Chir Pine		Closed				
Hardwood		Open	100			
Mixed H/C		Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young	67	Good	17	Grazing	17	33.33
Immature		Average	50	Shokshing		
Mature	33	Poor	33	Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	67	Stable	83	High	50	
Moderate	33	Moderate	17	Moderate	33	
Steep		Unstable		Low	17	

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock		707			10	13	4	1	1			**29**	7
Spruce													
Fir	1238				3		1		2	2		**9**	2
Other Conifers													
Oak													
Acer				27								**27**	6
Betula					10	2						**12**	3
Rhododendron	177	59	57	54	3							**114**	27
Other Broadleaves		118	189	14	28	4	1					**236**	55
Total	**1415**	**884**	**245**	**95**	**55**	**19**	**7**	**1**	**3**	**2**		**427**	100

Future Management & Monitoring of Activities

The mature stands of Hemlock and fir stand needs to be harvested on selection basis.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	222	5	33	716												
	Firewood	25	1		151												
30-49	Cham	479	11	46	472												
	Firewood	927	22		726												
20-29	Tsim	293	7	12	94												
	Firewood	878	20		207												
10-19	Poles, etc.			9													
	Firewood	3250	75		231												

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning														
Felling (Firewood)	15.1	33												
Felling (Timber)	22.7	50												
No activity	7.6	17												

Assessment carried out by	Tashi Phuntsho	Year:	2021

Compartment Record

Geog	Dangchu	Block	Dungdungneysa	Block No	1	Comp. No	V

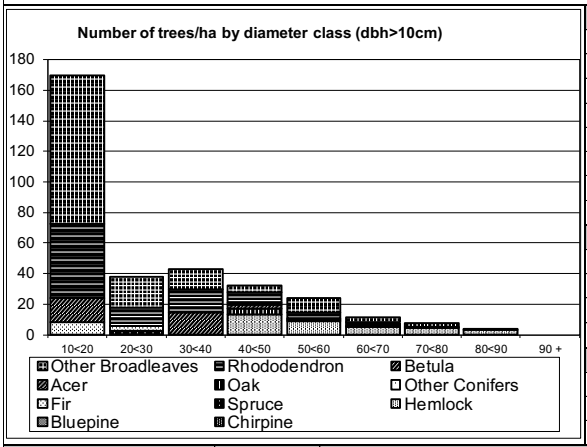
Areas in ha

Non production		Protection	6.8	Production	98.9

Forest Composition and Description

Mixed H/C stands with hemlock, closed to open canopy and good to average condition,natural regeneration of homlock and Rhodo species.

Stand data	
Bas. Area (m2/ha)	28.9
Volume (m3/ha)	230.3
Volume conifer %	45%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	36	Plantation		Type	%	%
Fir	14	Natural	100	Firewood	57	43
Spruce		Coppice		Bamboo	57	7
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense	7	Daphne	14	36
Chir Pine		Closed	86			
Hardwood	7	Open	7			
Mixed H/C	43	Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young	14	Good	14	Grazing		85.71
Immature	7	Average	79	Shokshing		
Mature	79	Poor	7	Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	50	Stable	79	High	71	
Moderate	21	Moderate	21	Moderate	29	
Steep	29	Unstable		Low		

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock	909	1945				13	9	5	4	3		**35**	11
Spruce				3								**3**	1
Fir		25	8	3			1	0	1			**13**	4
Other Conifers	51						1					**1**	0
Oak	51	101				4						**4**	1
Acer			16		15	3	1					**34**	10
Betula						1						**1**	0
Rhododendron	606	278	49	12	15	7	4	3				**88**	27
Other Broadleaves	253	328	97	20	13	4	10	3	3	0		**151**	46
Total	**1869**	**2678**	**170**	**38**	**43**	**32**	**24**	**12**	**7**	**3**		**329**	100

Future Management & Monitoring of Activities

The matured stands of hemlock can be felled as timber and mixed H/C as firewood on selection basis.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	1984	20	64	6166												
	Firewood	447	5		1170												
30-49	Cham	796	8	30	765												
	Firewood	2742	28		2677												
20-29	Tsim	575	6	1	158												
	Firewood																
10-19	Poles, etc.	3996	40	4	284												
	Firewood	2398	24		160												

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning														
Felling (Firewood)	45.3	43												
Felling (Timber)	45.3	43												
No activity	15.1	14												

Assessment carried out by	Tshewang Rinzin	**Year:**	2021

Compartment Record

Geog	Dangchu	Block	Dundungneysa	Block No	1	Comp. No	VI

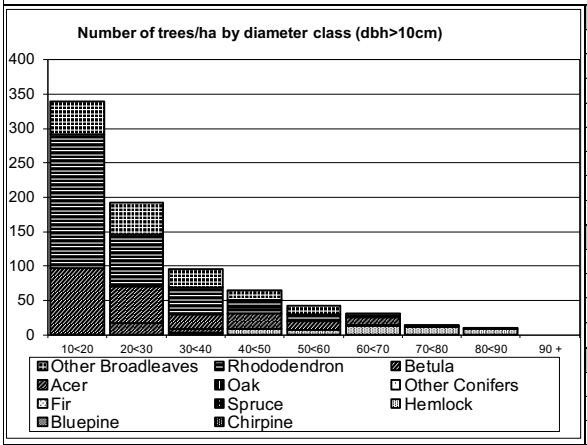
Areas in ha

Non production		Protection	1.5	Production	67.0

Forest Composition and Description

Hemlock forest with mixed H/C stand.Closed to open canopy,good to average condition.Natural regeneration of Hemlock and Rhodo species.

Stand data	
Bas. Area (m2/ha)	67.1
Volume (m3/ha)	529.2
Volume conifer %	36%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	57	Plantation		Type	%	%
Fir	43	Natural	100	Firewood	57	43
Spruce		Coppice		Bamboo	43	14
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne		14
Chir Pine		Closed	57			
Hardwood		Open	43			
Mixed H/C		Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young	29	Good	29	Grazing		85.71
Immature	71	Average	71	Shokshing		
Mature		Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	43	Stable	86	High	57	
Moderate		Moderate	14	Moderate	29	
Steep	57	Unstable		Low	14	

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock	2173	505				9	7	13	12	8		**49**	6
Spruce													
Fir	202	101			3			1				**4**	0
Other Conifers									1	2		**2**	0
Oak													
Acer				17	6							**23**	3
Betula	152	455	97	52	21	22	12	11	3			**218**	28
Rhododendron	1162	2678	194	76	39	20	11	6				**345**	44
Other Broadleaves	202	354	49	47	27	14	12					**148**	19
Total	**3890**	**4093**	**340**	**192**	**95**	**65**	**42**	**31**	**15**	**10**		**789**	100

Future Management & Monitoring of Activities

The mature stand of both mixed HC and Hemlock are recommended to be alloted as firewood and timber.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	2815	42	63	9030												
	Firewood	1730	26		4978												
30-49	Cham	2283	34	23	2691												
	Firewood	3310	49		2342												
20-29	Tsim	1950	29	10	661												
	Firewood	5851	87		1537												
10-19	Poles, etc.	3251	49	4	299												
	Firewood	8668	129		615												

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning														
Felling (Firewood)	19.6	29												
Felling (Timber)	48.9	71												
No activity														

Assessment carried out by	Karma Rinchen	**Year:**	2021

Compartment Record

Geog	Dangchu	Block	Eusagang	Block No	2	Comp. No	I

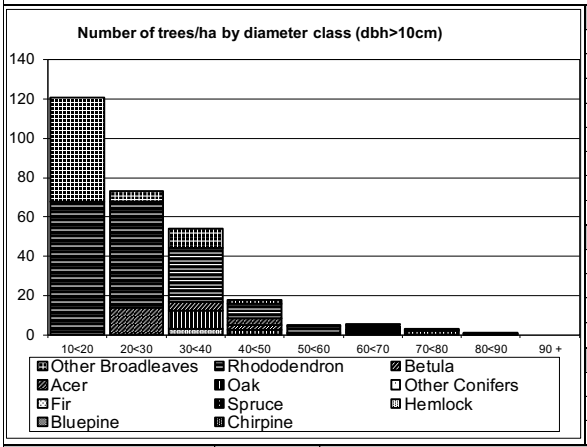
Areas in ha

Non production	10.8	Protection	28.1	Production	97.7

Forest Composition and Description

Mixed HC with hardwood stands. closed to open canopy with good to average stand condition. Natural regeneration of mixed HC stand.

Stand data	
Bas. Area (m2/ha)	18.5
Volume (m3/ha)	127.2
Volume conifer %	6%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock		Plantation		Type	%	%
Fir		Natural	100	Firewood	20	27
Spruce		Coppice		Bamboo		13
Mixed Conifer		Canopy	%	Cane		
Blue Pine		Dense		Daphne	47	20
Chir Pine		Closed	73			
Hardwood	33	Open	27			
Mixed H/C	67	Unstocked		Forest Use	I	E
Age Class	%	Condition	%	Type	%	%
Young	20	Good	20	Grazing	87	13.33
Immature	13	Average	60	Shokshing		
Mature	67	Poor	20	Lopping		
Overmature		Site Characteristics				
Slope	%	Erosiveness	%	Soil Cover	%	
Gentle	33	Stable	60	High		
Moderate	40	Moderate	27	Moderate	67	
Steep	27	Unstable	13	Low	33	

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock	354	94			3			1		0		**4**	2
Spruce													
Fir													
Other Conifers													
Oak		24			10	3	1	0	2	0		**15**	5
Acer				14	4	3	1	1				**22**	8
Betula						3						**3**	1
Rhododendron	189	71	68	54	28	8	3	2	1	0		**164**	59
Other Broadleaves	2664	589	53	5	10	2	1	1	1			**72**	26
Total	**3207**	**778**	**121**	**73**	**54**	**18**	**5**	**6**	**3**	**1**		**280**	100

Future Management & Monitoring of Activities

The Rhodo stands can be allotted as firewood and the matured mixed HC stands as timber in order to enhance the growth of the remainng stands.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	117	1	52	391												
	Firewood	673	7		1784												
30-49	Cham	434	4	43	426												
	Firewood	1738	18		1368												
20-29	Tsim			5													
	Firewood	796	8		188												
10-19	Poles, etc.																
	Firewood																

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning														
Felling (Firewood)	72.9	53												
Felling (Timber)	18.2	13												
No activity	45.5	33												

Assessment carried out by	Karpola	Year:	2021

Compartment Record

Geog	Dangchu	Block	Eusagang	Block No	2	Comp. No	II

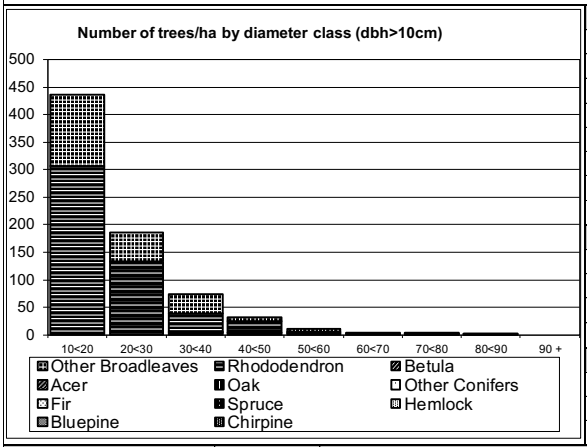
Areas in ha

Non production	0.1	Protection	6.9	Production	65.9

Forest Composition and Description

Young Rhodo stands with B/L forest. Closed to open canopy with average stand condition.

Stand data	
Bas. Area (m2/ha)	34.0
Volume (m3/ha)	202.1
Volume conifer %	5%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	14	Plantation		Type	%	%
Fir		Natural	100	Firewood	29	43
Spruce		Coppice		Bamboo		57
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense	14	Daphne	86	14
Chir Pine		Closed	86			
Hardwood		Open				
Mixed H/C	86	Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young		Good	29	Grazing	57	14.29
Immature		Average	71	Shokshing		
Mature	100	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	57	Stable	86	High	14	
Moderate	14	Moderate	14	Moderate	86	
Steep	29	Unstable		Low		

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock							1		1	1		**2**	0
Spruce													
Fir													
Other Conifers					3							**3**	0
Oak													
Acer						4						**4**	0
Betula					3		2	2				**7**	1
Rhododendron	1566	2072	307	134	33	22	1		1			**497**	67
Other Broadleaves			129	52	36	7	6	1	1	1		**233**	31
Total	**1566**	**2072**	**437**	**186**	**74**	**32**	**11**	**3**	**2**	**1**		**746**	100

Future Management & Monitoring of Activities

The young Rhodo stands can be removed and allotted as firewood in order to enhance the regeneration of valuable timber species.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	221	3	31	730												
	Firewood	472	7		1189												
30-49	Cham	432	7	41	414												
	Firewood	2707	41		2140												
20-29	Tsim			18													
	Firewood	4600	70		1099												
10-19	Poles, etc.	2130	32	10	152												
	Firewood	6389	97		445												

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning														
Felling (Firewood)	41.6	57												
Felling (Timber)	20.8	29												
No activity	10.4	14												

Assessment carried out by	Lekjay	Year:	2021

Compartment Record

Geog	Dangchu	Block	Tashidingkha	Block No	3	Comp. No	I

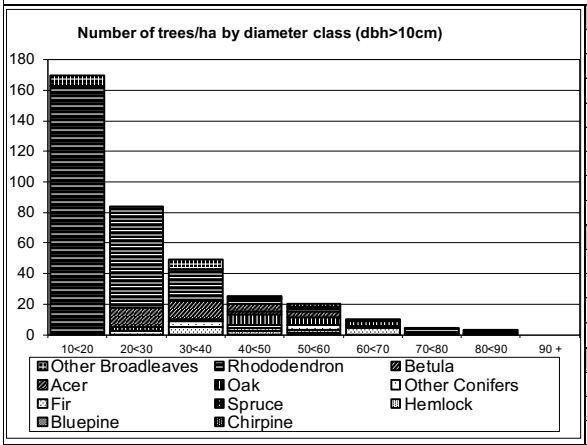
Areas in ha

Non production		Protection	13.5	Production	266.3

Forest Composition and Description

Mixed conifer forest with mixed H/C stands. Closed to open canopy with good to average stand condition. Natural regeneration of hemlock and Rhodo species.

Stand data	
Bas. Area (m2/ha)	27.6
Volume (m3/ha)	208.3
Volume conifer %	38%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	6	Plantation		Type	%	%
Fir	25	Natural	100	Firewood	6	31
Spruce		Coppice		Bamboo	6	13
Mixed Conifer	13	**Canopy**	**%**	Cane		
Blue Pine		Dense	6	Daphne	31	13
Chir Pine		Closed	81			
Hardwood		Open	13			
Mixed H/C	56	Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young	6	Good	44	Grazing	13	62.5
Immature	6	Average	56	Shokshing		
Mature	88	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	50	Stable	94	High	31	
Moderate	44	Moderate		Moderate	50	
Steep	6	Unstable	6	Low	19	

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock	199	309				2	1	0	1	1		**5**	1
Spruce													
Fir	752	177			5	2	2	4	2	0		**16**	4
Other Conifers	44	66		3	4	2	3	2	1	2		**16**	4
Oak				3		7	5	3		0		**18**	5
Acer				13	1	2						**16**	4
Betula					12	6	4	1				**22**	6
Rhododendron	1260	508	163	66	21	4	3	0				**257**	70
Other Broadleaves		22	7		6	1	2		1			**17**	5
Total	**2255**	**1083**	**170**	**84**	**49**	**25**	**20**	**10**	**5**	**3**		**366**	100

Future Management & Monitoring of Activities

Felling of the matured stands of both fir and hemlock is recommended to be harvested as timber and the Rhodo stands can be alloted as firewood, if the area can be accessed by road in the next ten years.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	3465	13	52	10993												
	Firewood	1532	6		3876												
30-49	Cham	3686	14	34	4277												
	Firewood	6936	26		5553												
20-29	Tsim	678	3	9	160												
	Firewood	10170	38		2396												
10-19	Poles, etc.			5													
	Firewood	20717	78		1379												

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning														
Felling (Firewood)	122.4	44												
Felling (Timber)	122.4	44												
No activity	35.0	13												

Assessment carried out by	Tshewang Namgay	**Year:**	2021

Compartment Record

Geog	Dangchu	Block	Tashidingkha	Block No	3	Comp. No	II

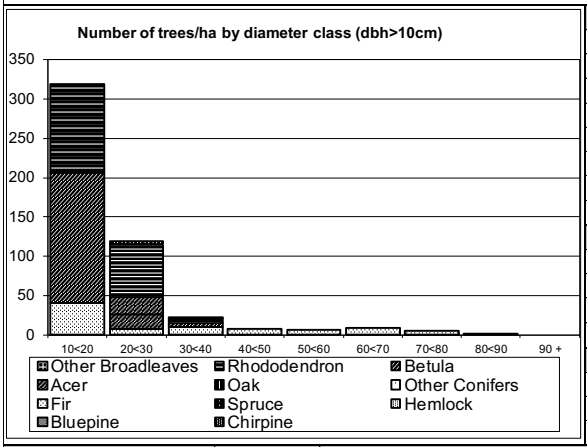
Areas in ha

Non production		Protection	1.4	Production	97.5

Forest Composition and Description

Fir forest with young Rhodo stands. Closed to dense canopy, good to average stand condition with profuse Fir regeneration.

Stand data	
Bas. Area (m2/ha)	22.5
Volume (m3/ha)	167.3
Volume conifer %	63%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock		Plantation		Type	%	%
Fir	91	Natural	100	Firewood	18	18
Spruce		Coppice		Bamboo		
Mixed Conifer	9	**Canopy**	**%**	Cane		
Blue Pine		Dense	9	Daphne		
Chir Pine		Closed	82			
Hardwood		Open	9			
Mixed H/C		Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young	9	Good	73	Grazing	36	36.36
Immature	9	Average	27	Shokshing		
Mature	82	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	82	Stable	100	High	36	
Moderate	18	Moderate		Moderate	55	
Steep		Unstable		Low	9	

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock													
Spruce								1	0			**1**	0
Fir	4212	1157	41	7	9	8	6	9	4	2		**87**	18
Other Conifers													
Oak													
Acer				19								**19**	4
Betula			165	22	6							**193**	39
Rhododendron	1608	1415	113	67	6							**186**	38
Other Broadleaves				4	2							**6**	1
Total	**5820**	**2572**	**319**	**119**	**23**	**8**	**6**	**9**	**5**	**2**		**490**	100

Future Management & Monitoring of Activities

The matured Fir stands are recommended to be alloted as timber if the are is accessible by road in the next ten years.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	898	9	50	3420												
	Firewood	31	0		187												
30-49	Cham	1183	12	21	1303												
	Firewood	368	4		226												
20-29	Tsim	722	7	16	231												
	Firewood	3250	33		892												
10-19	Poles, etc.	2006	21	13	185												
	Firewood	9027	93		780												

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning														
Felling (Firewood)	27.0	27												
Felling (Timber)	62.9	64												
No activity	9.0	9												

Assessment carried out by	Tshewang Namgyel	Year:	2021

Compartment Record

Geog	Dangchu	Block	Tashidingkha	Block No	3	Comp. No	III

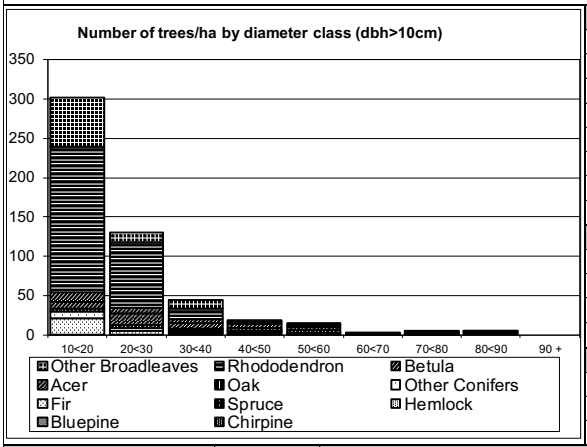
Areas in ha

Non production		Protection	23.0	Production	255.2

Forest Composition and Description

Mixed conifer stands with mixed H/C forest, closed to open canopy and good to average condition. Natural regeneration of Rhodo species and mixed conifer.

Stand data	
Bas. Area (m2/ha)	27.4
Volume (m3/ha)	198.1
Volume conifer %	27%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	22	Plantation		Type	%	%
Fir	26	Natural	100	Firewood	52	30
Spruce		Coppice		Bamboo	37	15
Mixed Conifer	4	**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne	30	15
Chir Pine		Closed	85			
Hardwood		Open	15			
Mixed H/C	48	Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young	11	Good	48	Grazing	3.7	74.07
Immature	22	Average	52	Shokshing		
Mature	67	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	59	Stable	70	High	33	
Moderate	30	Moderate	30	Moderate	48	
Steep	11	Unstable		Low	19	

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock						1	0	1	1	1		**4**	1
Spruce													
Fir	144	249	21	5	3	3	2	1	1	2		**37**	7
Other Conifers			8	5	2	1	0	0				**16**	3
Oak	13	13	4	3	2	1	3	1	1	1		**17**	3
Acer	26	13	8	15	8	4	4		1	0		**41**	8
Betula			13	8	4	4	2					**31**	6
Rhododendron	3589	982	184	83	15	2	1		0			**286**	55
Other Broadleaves	105	26	63	12	10	2	1			0		**88**	17
Total	**3877**	**1284**	**302**	**130**	**44**	**18**	**14**	**3**	**4**	**4**		**519**	100

Future Management & Monitoring of Activities

The mixed conifer and mixed H/C stand are recommended for felling as timber on selection basis and Rhodo stands can be allotted as firewood.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	1864	7	59	6894												
	Firewood	1966	8		6784												
30-49	Cham	1737	7	23	1858												
	Firewood	4333	17		3528												
20-29	Tsim	770	3	11	182												
	Firewood	9629	38		2371												
10-19	Poles, etc.			7													
	Firewood	22468	88		1506												

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning														
Felling (Firewood)	82.5	30												
Felling (Timber)	164.9	59												
No activity	30.9	11												

Assessment carried out by	Tshering Choden	**Year:**	2021

Compartment Record

Geog	Dangchu	Block	Tashidingkha	Block No	3	Comp. No	IV

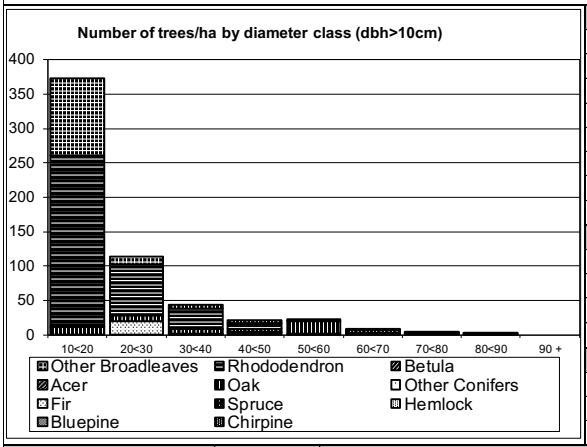
Areas in ha

Non production	1.6	Protection	5.5	Production	71.8

Forest Composition and Description

Mixed HC stand with young rhodo and scattered patches of Fir stands.Good to average condition with closed canopy.

Stand data	
Bas. Area (m2/ha)	30.2
Volume (m3/ha)	217.2
Volume conifer %	18%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock		Plantation		Type	%	%
Fir		Natural	100	Firewood	40	20
Spruce		Coppice		Bamboo	50	10
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne	20	10
Chir Pine		Closed	100			
Hardwood	30	Open				
Mixed H/C	70	Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young	20	Good	70	Grazing	10	50
Immature	20	Average	30	Shokshing		
Mature	60	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	50	Stable	80	High	20	
Moderate	20	Moderate	20	Moderate	60	
Steep	30	Unstable		Low	20	

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock													
Spruce													
Fir	71	212		20	2	3	2	3	1	0		**31**	5
Other Conifers		35				1		1	0			**2**	0
Oak	35		11	8	6	5	18	3	1	2		**55**	9
Acer													
Betula													
Rhododendron	212	990	249	73	29	8	2					**361**	61
Other Broadleaves	106	248	113	12	6	5	1	1	0			**139**	24
Total	**424**	**1485**	**373**	**114**	**44**	**21**	**22**	**7**	**3**	**2**		**587**	100

Future Management & Monitoring of Activities

The matured stand of mixed HC needs to be harvested on selection basis.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	309	4	67	1002												
	Firewood	1142	16		3750												
30-49	Cham			20													
	Firewood	1677	23		1414												
20-29	Tsim			10													
	Firewood	2926	41		701												
10-19	Poles, etc.			2													
	Firewood	2439	34		174												

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning														
Felling (Firewood)	78.9	100												
Felling (Timber)														
No activity														

Assessment carried out by	Karma Rinchen	Year:	2021

Compartment Record

Geog	Dangchu	Block	Tashi Dingkha	Block No	3	Comp. No	V

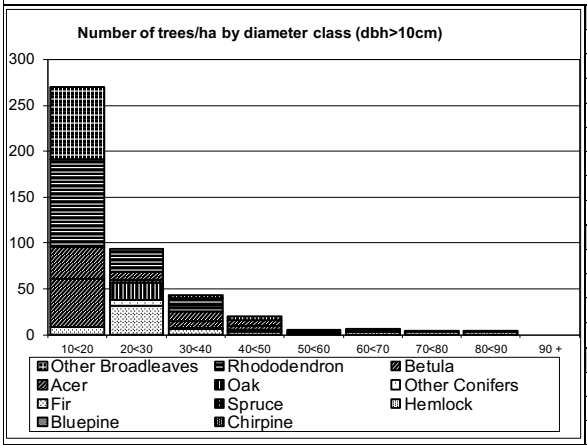
Areas in ha

Non production	1.0	Protection	7.0	Production	107.2

Forest Composition and Description

Fir forest with mixed H/C stands closed to open canopy, good to average condition. Natural regeneration of Fir and Rhodo stands.

Stand data	
Bas. Area (m2/ha)	23.8
Volume (m3/ha)	182.1
Volume conifer %	42%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock		Plantation		Type	%	%
Fir	69	Natural	100	Firewood		31
Spruce		Coppice		Bamboo	85	
Mixed Conifer	8	**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne		8
Chir Pine		Closed	54			
Hardwood		Open	46			
Mixed H/C	23	Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young	15	Good	38	Grazing	23	
Immature		Average	62	Shokshing		
Mature	85	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	54	Stable	77	High	46	
Moderate	31	Moderate	15	Moderate	31	
Steep	15	Unstable	8	Low	23	

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock													
Spruce													
Fir	571	381	9	31	6	3	1	3	3	4		**61**	14
Other Conifers				6		1						**7**	2
Oak				19	2	2	1	0				**24**	5
Acer	54		52	3	6	4		0				**66**	15
Betula		190	35	9	11	6	2	1		0		**64**	14
Rhododendron	871	816	96	25	14							**135**	30
Other Broadleaves	27	54	78		3	5	1	0	0			**88**	20
Total	**1524**	**1442**	**270**	**94**	**43**	**20**	**6**	**6**	**4**	**4**		**446**	100

Future Management & Monitoring of Activities

The mature Firand Betula stands should be harvested as timber and the Rhodo stands can be allotted as firewood.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	730	7	56	2822												
	Firewood	218	2		648												
30-49	Cham	996	9	31	970												
	Firewood	1168	11		917												
20-29	Tsim	672	6	4	272												
	Firewood																
10-19	Poles, etc.			8													
	Firewood	7463	70		518												

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning														
Felling (Firewood)														
Felling (Timber)	88.6	77												
No activity	26.6	23												

Assessment carried out by	Karpola	Year:	2021

Compartment Record

Geog	Dangchu	Block	Tashidingkha	Block No	3	Comp. No	VI

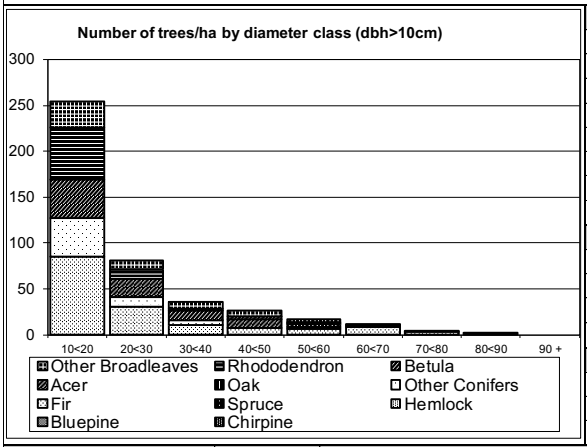
Areas in ha

Non production	1.1	Protection	4.6	Production	82.0

Forest Composition and Description

Fir forest with young Rhodo stand closed to open part,good to average condition with profuse regeneration of Fir and Rhodo species.

Stand data	
Bas. Area (m2/ha)	27.3
Volume (m3/ha)	220.3
Volume conifer %	59%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock	25	Plantation		Type	%	%
Fir	75	Natural	100	Firewood	25	38
Spruce		Coppice		Bamboo	38	13
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne		13
Chir Pine		Closed	75			
Hardwood		Open	25			
Mixed H/C		Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young	25	Good	50	Grazing		
Immature		Average	50	Shokshing		
Mature	75	Poor		Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	50	Stable	75	High	25	
Moderate	25	Moderate	25	Moderate	75	
Steep	25	Unstable		Low		

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock													
Spruce													
Fir	796	796	85	31	10	8	6	9	3	2		**155**	36
Other Conifers	88	133	42	10	5		2					**60**	14
Oak													
Acer			42	20	10	9	3	2				**87**	20
Betula						3	1					**4**	1
Rhododendron	398	1813	57	10	3		1	1				**71**	16
Other Broadleaves			28	10	8	6	3		1			**57**	13
Total	**1282**	**2741**	**255**	**81**	**36**	**27**	**17**	**11**	**5**	**2**		**434**	100

Future Management & Monitoring of Activities

The matured Fir stands are recommended for felling and the Rhodo stands can be allotted as firewood.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	1075	13	65	3431												
	Firewood	512	6		1516												
30-49	Cham	858	10	29	1081												
	Firewood	1071	13		1131												
20-29	Tsim	418	5	5	134												
	Firewood	835	10		232												
10-19	Poles, etc.			1													
	Firewood	1160	14		83												

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning														
Felling (Firewood)	11.0	13												
Felling (Timber)	65.8	75												
No activity	11.0	13												

Assessment carried out by	Kinley Dorji	**Year:**	2021

Compartment Record

Geog	Dangchu	Block	Tasa	Block No	4	Comp. No	I

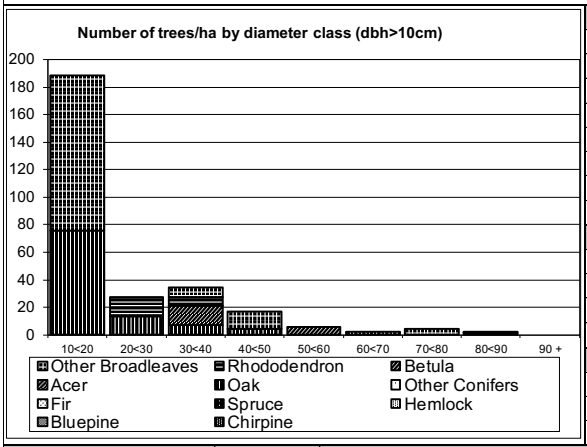
Areas in ha

Non production	0.4	Protection	20.8	Production	15.5

Forest Composition and Description

Mixed H/C stands with closed to open canopy and average stand condition.

Stand data	
Bas. Area (m2/ha)	16.0
Volume (m3/ha)	119.8
Volume conifer %	



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock		Plantation		Type	%	%
Fir		Natural	100	Firewood		67
Spruce		Coppice		Bamboo	67	
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne		33
Chir Pine		Closed	67			
Hardwood		Open	33			
Mixed H/C	100	Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young		Good		Grazing		
Immature		Average	67	Shokshing		
Mature	100	Poor	33	Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle		Stable		High	67	
Moderate		Moderate	100	Moderate	33	
Steep	100	Unstable		Low		

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock													
Spruce													
Fir													
Other Conifers													
Oak			75	14	7	4				1		**101**	36
Acer							6					**6**	2
Betula					14							**14**	5
Rhododendron				14	7							**21**	7
Other Broadleaves			113		7	13		2	5	1		**140**	50
Total			**189**	**27**	**35**	**17**	**6**	**2**	**5**	**2**		**282**	100

Future Management & Monitoring of Activities

Felling of matured stands of mixed H/C on single tree selection methodis recommended.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	55	4	44	185												
	Firewood	103	7		422												
30-49	Cham	173	11	31	178												
	Firewood	238	15		245												
20-29	Tsim			9													
	Firewood	422	27		119												
10-19	Poles, etc.			16													
	Firewood	2929	189		220												

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning														
Felling (Firewood)	24.5	67												
Felling (Timber)	12.2	33												
No activity														

Assessment carried out by	Tashi Phuntsho	**Year:**	2021

Compartment Record

Geog	Dangchu	Block	Tasa	Block No	4	Comp. No	II

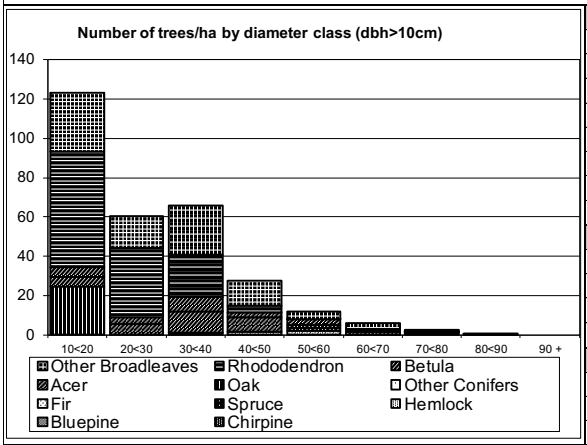
Areas in ha

Non production		Protection	14.9	Production	210.6

Forest Composition and Description

Mixed HC stand with Rhodo species closed to open canopy, good to average condition.Natural regeneration of both mixed HC and Rhodo spps. .

Stand data	
Bas. Area (m2/ha)	21.9
Volume (m3/ha)	160.3
Volume conifer %	8%



Forest Type	%	Stand Type	%	NWFP+firew.	A	S
Hemlock		Plantation		Type	%	%
Fir		Natural	100	Firewood	43	9
Spruce		Coppice		Bamboo	57	17
Mixed Conifer		**Canopy**	**%**	Cane		
Blue Pine		Dense		Daphne	13	9
Chir Pine		Closed	78			
Hardwood	9	Open	22			
Mixed H/C	91	Unstocked		**Forest Use**	**I**	**E**
Age Class	**%**	**Condition**	**%**	Type	%	%
Young	9	Good	43	Grazing	22	21.74
Immature	52	Average	48	Shokshing		
Mature	39	Poor	9	Lopping		
Overmature		**Site Characteristics**				
Slope	**%**	**Erosiveness**	**%**	**Soil Cover**	**%**	
Gentle	48	Stable	74	High	61	
Moderate	22	Moderate	17	Moderate	22	
Steep	30	Unstable	9	Low	17	

Species	Height	N/ha per diameter class										Total (> 10cm)	
	0.3<1.3 m	<10	10<20	20<30	30<40	40<50	50<60	60<70	70<80	80<90	90+	N/ha	%
Chirpine													
Bluepine													
Hemlock	46					2	2	0	1	0		**5**	2
Spruce													
Fir													
Other Conifers													
Oak	15		25		1		1		1			**28**	9
Acer	77	31	5	5	11	7	2	1		0		**31**	11
Betula			5	4	7	3	3	1	0			**22**	7
Rhododendron	231	277	59	35	22	3	0	0				**120**	40
Other Broadleaves	231	62	30	16	25	13	4	3	1			**91**	31
Total	**600**	**369**	**123**	**60**	**66**	**27**	**12**	**6**	**3**	**0**		**297**	100

Future Management & Monitoring of Activities

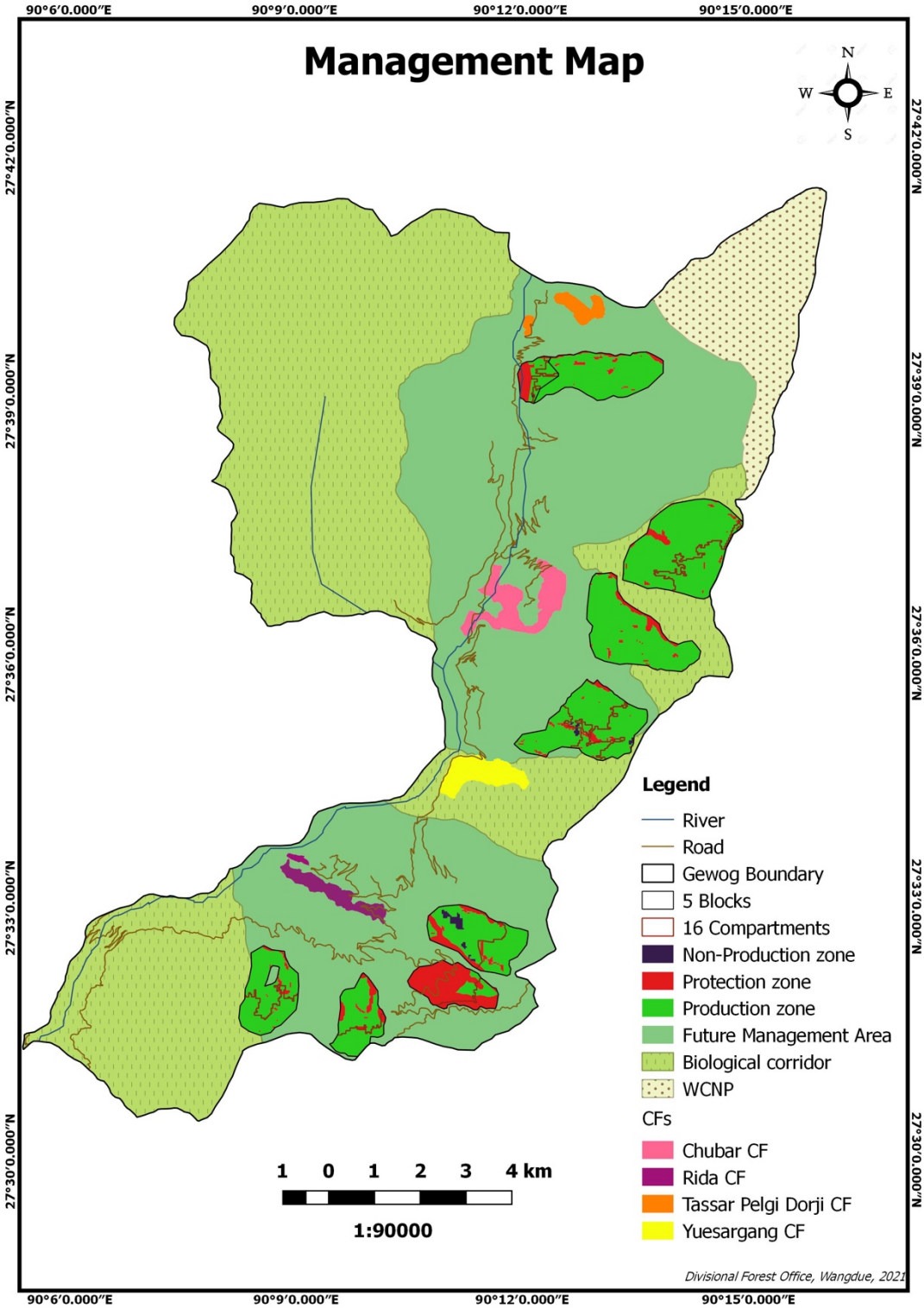
Felling of matured trees and thinning of ploes in mixed HC stands is recommended and Rhodo stands can be allotted as firewood.

Production Potential (N, Volume)						Volume of trees to be removed each year										Total	%
Product size		N total	N/ha	%	(m3)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
>50	Drashing	1793	9	46	5078												
	Firewood	683	3		1557												
30-49	Cham	2598	12	49	2586												
	Firewood	5117	24		4489												
20-29	Tsim			2													
	Firewood	1119	5		264												
10-19	Poles, etc.			3													
	Firewood	5180	25		404												

Silvicultural Measures			Area in ha to be implemented per year										Total	%
Measure	Area (ha)	in %	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Planting														
Thinning	19.6	9												
Felling (Firewood)	88.2	39												
Felling (Timber)	98.0	43												
No activity	19.6	9												

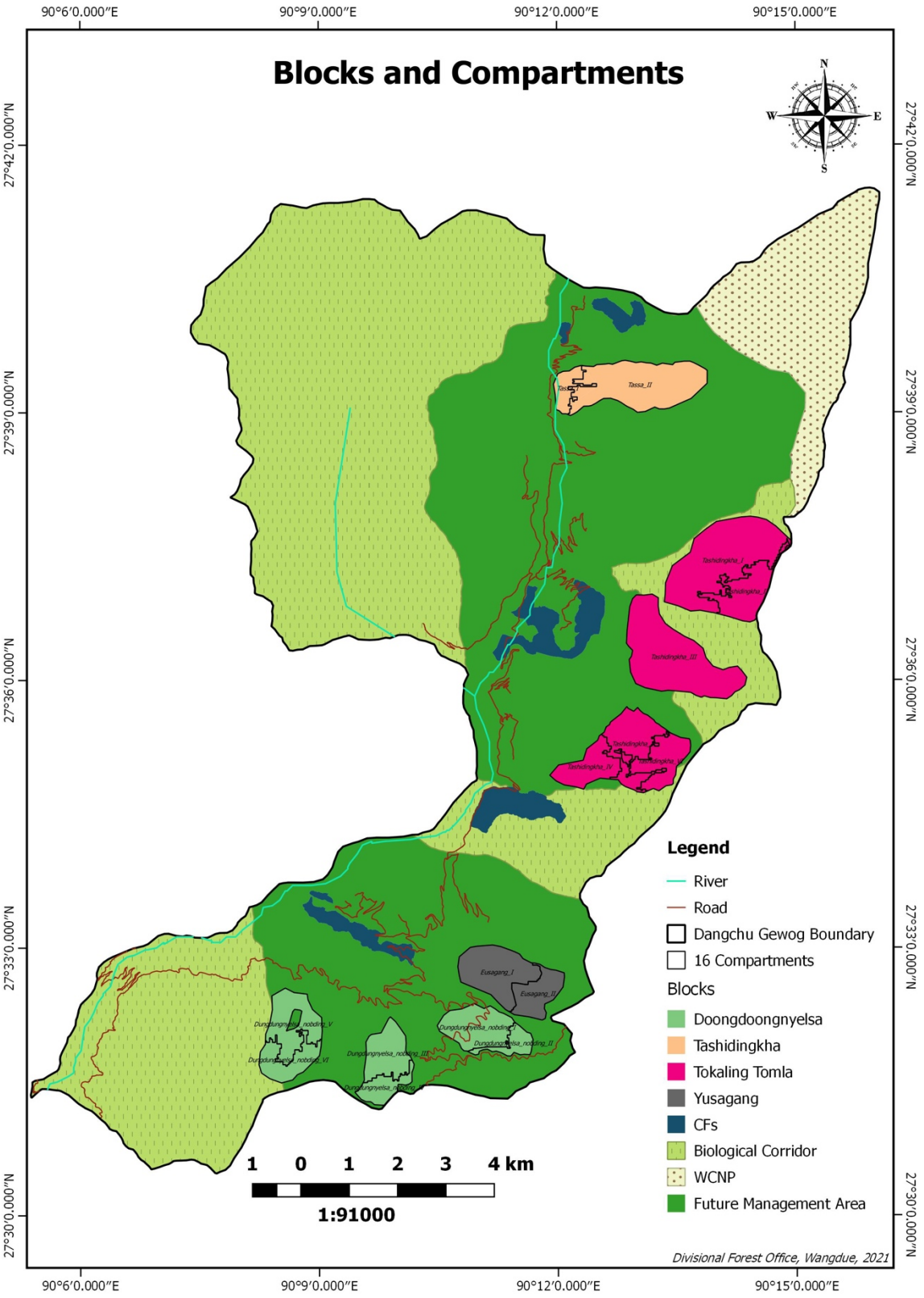
Assessment carried out by	Tshering Tobgay	Year:	2021

Annex 3
Forest Management Circle Map

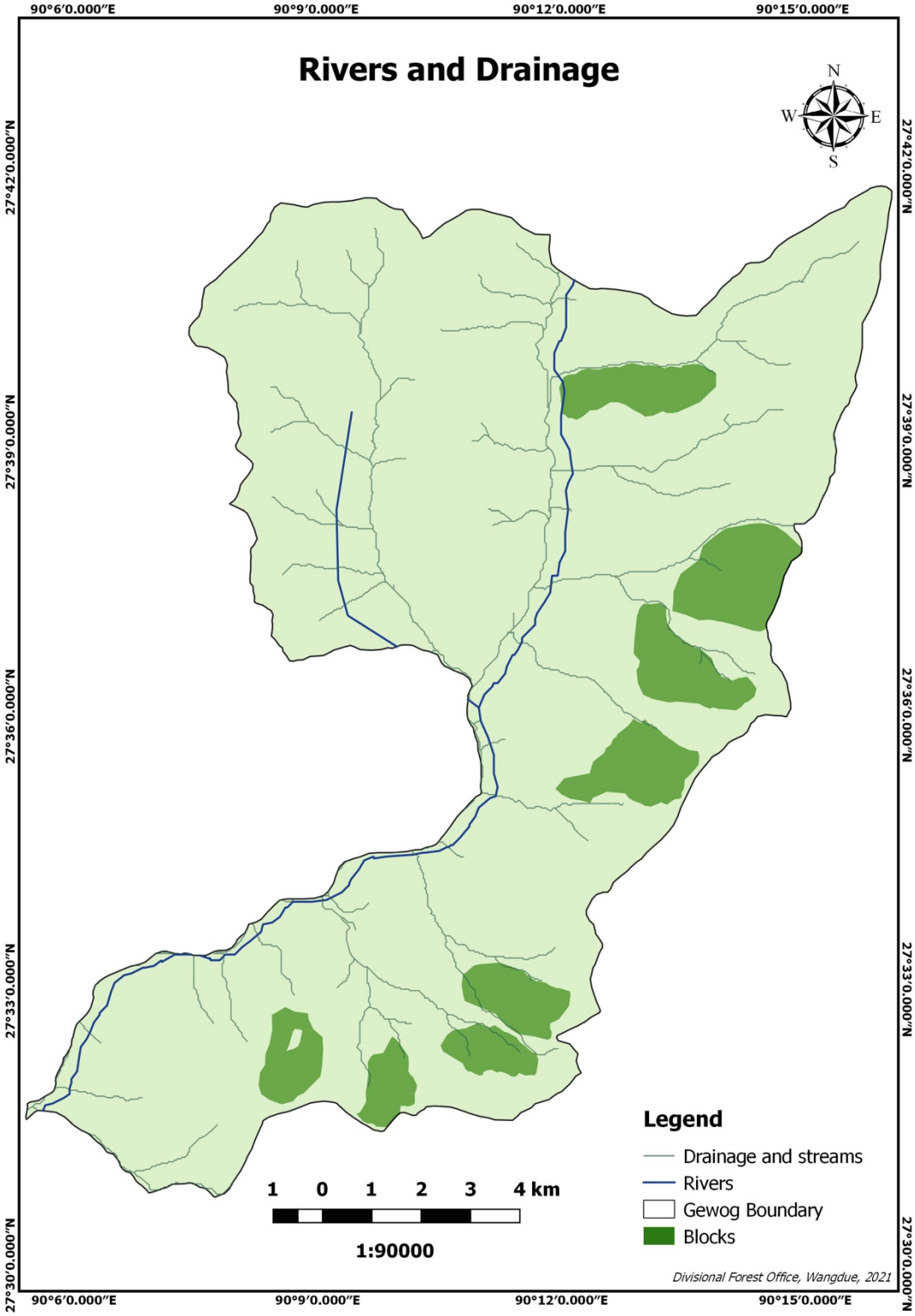


ANNEXURE 4

Spatial Organization Map of Blocks and Compartments



ANNEXURE 4
Rivers and Drainage



ANNEXURE 4
Roads