

ZHEMGANG



Divisional Forest Office Management Plan

(January 2026 – December 2035)

Divisional Forest Office, Zhemgang

Department of Forests & Park Services
Ministry of Energy & Natural Resources
Royal Government of Bhutan



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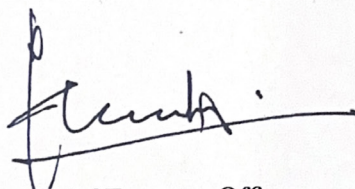
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Period of the Plan

This plan is valid for the period of 10 years from 2026 to 2035

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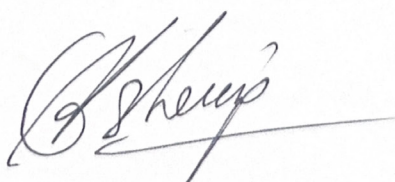
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Foreword



Forests have long been central to the livelihoods of the Bhutanese people and are deeply interwoven with the country's social, cultural, and traditional values. Beyond their contribution to socio-economic development, forests play a critical role in climate regulation and the provision of essential ecosystem services. Recognizing this importance, Bhutan is among the few countries to enshrine environmental conservation in its Constitution. Article 5 of the Constitution mandates that at least 60 percent of the country's land area be maintained under forest cover for all time. Bhutan has further reinforced its global environmental leadership by committing to remain

carbon neutral at the 15th Conference of Parties to the UNFCCC in 2009, a pledge reaffirmed through its Intended Nationally Determined Contribution submitted in 2015 under the Paris Agreement.

Currently, forests cover over 69.7 percent of Bhutan's total land area, making them an indispensable national asset. These forests sequester an estimated 8.5 million tonnes of carbon annually, sustain reliable water flows critical for hydropower generation, and provide essential resources such as timber and firewood to citizens. In light of Bhutan's national and international commitments, as well as the social, cultural, economic, and ecological benefits derived from forests, sustainable forest resource management remains imperative, particularly through targeted and effective interventions at the Divisional level.

Accordingly, this Divisional Forest Management Plan has been developed as a comprehensive framework for sustainable forest management within the Divisional Forest Office. The plan takes stock of existing management initiatives and presents the current status of forest area, biodiversity conservation, growing stock, resource allocation, local socio-economic conditions, and human-wildlife conflict. It prescribes strengthened conservation measures, sustainable resource utilization, climate change adaptation and mitigation actions, and human-wildlife conflict management, supported by a phased implementation plan, financing framework, and monitoring system. Developed through broad stakeholder consultation, the plan ensures shared ownership and institutional endorsement. The Division Forest Office is commended for this important milestone toward advancing sustainable forest management and biodiversity conservation.

A handwritten signature in blue ink, consisting of several loops and a long horizontal stroke extending to the right.

Director

Acknowledgement

The Divisional Forest Office Management Plan is the result of a collective and dedicated effort by the staff of the Divisional Forest Office, Zhemgang. The Division sincerely acknowledges the commitment, professionalism, and teamwork demonstrated by all officers and staff who contributed their time, experience, and technical inputs toward the successful formulation of this plan. Their sustained engagement throughout the planning process ensured that the document is comprehensive, practical, and grounded in field realities.

The formulation of this Management Plan was made possible through the unwavering support and guidance of the IKI Task Force Members under the IKI Project. The Division is deeply grateful for their strategic direction, technical advice, and continuous encouragement throughout the planning process. The Division further expresses its sincere gratitude to the IKI Project, “Living Landscapes: Securing High Conservation Values in South-Western Bhutan,” for its generous financial support, which enabled the conduct of comprehensive socio-economic and field surveys. The data generated through these assessments formed a critical foundation for evidence-based planning and significantly informed the management prescriptions contained in this plan. WWF–Bhutan, together with the Project Coordination Unit, played a pivotal role in facilitating the timely procurement of essential equipment and field gear, and in delivering capacity-building programs both within and outside the country. These interventions greatly strengthened the technical capacity of the field teams involved in the assessment.

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Abbreviations

AAC.....	Annual Allowable Cut
Ac.....	Acre
AGB.....	Above Ground Biomass
APA.....	Annual Performance Agreement
BC 4.....	Biological Corridor No.4
BGB.....	Below Ground Biomass
BO.....	Beat Office
CF.....	Community Forest
CFMG.....	Community Forest Management Group
CFNG.....	Community Forest Networking Group
Cft.....	Cubic feet
CR.....	Critically Endangered
CVCA.....	Climate Vulnerability and Capacity Assessment
CWD.....	Coarse Wood Debris
DFO.....	Divisional Forest Office
DoFPS.....	Department of Forests and Park Services
EN.....	Endangered
ESP.....	Elementary Service Personal
ESS.....	Environmental and Social Safeguard
EW.....	Extinct in Wild
FIRMS.....	Forest Information Reporting and Monitoring System
FMID.....	Forest Monitoring and Information Division
FMIS.....	Forest Monitoring and Information Section
FMU.....	Forest Management Unit
FNCA.....	Forest and Nature Conservation Act
FNCR.....	Forest and Nature Conservation Rules
FNCRR.....	Forest and Nature Conservation Rules and Regulations
FIRMS.....	Forest Information Reporting and Management System
FRPMS.....	Forest Resource Planning and Management Section
FSC.....	Forest Stewardship Council
FYP.....	Five Year Plan
G2C.....	Government to Citizen
GSB.....	Granular Sub Base
GTCT.....	Gewog Tiger Conservation Tshogpa
ha.....	Hectare
HCV.....	High Conservation Value
HCVA.....	High Conservation Value Area
IFL.....	Intact Forest Landscape

IKI.....	International Climate Initiative
IUCN.....	International Union for Conservation of Nature
IVI.....	Important Value Index
JSWNP	Jigme Singye Wangchuck National Park
KBA	Key Biodiversity Area
Kg.....	Kilogram
LFMA.....	Local Forest Management Area
LFMAP.....	Local Forest Management Area Plan
m3	Cubic meter
MW.....	Mega watt
NAP	National Adaptation Plan
NCS	Nature Conservation Section
NGO	Non-governmental Organization
No.	Number
NRDCL....	Natural Resources Development Corporation
NT.....	Near Threatened
NWFP.....	Non-woof Forest Products
OFS.....	Online Forestry Services
PA	Protected Area
PF	Private Forest
PNP.....	Phrumsengla National Park
RBA	Rapid Biodiversity Assessment
RGoB	Royal Government of Bhutan
RMNP	Royal Manas National Park
SES.....	Socio-economic Survey
SMART	Spatial Monitoring and Reporting Tool
sq.km	Square Kilometer
SRFL.....	State Reserved Forest Land
TES.....	Timber Extraction Site
TL	Truck Load
URC.....	User Right Certificate
VU.....	Vulnerable
WFMU	Wangdigang Forest Management Unit

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Executive Summary

Article 5 of The Constitution of the Kingdom of Bhutan mandates that every Bhutanese is a steward of the country's natural resources and environment and commits to maintaining at least 60% forest cover for all time to come. Bhutan is globally recognized for its commitment to environmental conservation through sustainable forest management, guided by philosophy of Gross National Happiness and committed to remain carbon neutral, absorbing more carbon than it emits.

Established in 2003, the Divisional Forest Office (DFO) Zhemgang has adopted sustainable forest management practices, focusing on forest protection, conservation and community engagement. Zhemgang Dzongkhag, which boasts one of the highest forest cover in the country at 93.89%, is managed by the division across seven out of its eight gewogs, prioritizing biodiversity conservation, sustainable forest landscape restoration, and community participation. The division also aims to enhance biodiversity conservation and sustainable forest management while ensuring compliance with forestry laws and policies. Furthermore, it works to maintain ecological connectivity in the biological corridor and supports community well-being through active participation in forest conservation. The division has established various management regimes, including 11,913.02 ha. of Forest Management Units, 40,617.51 ha. of Local Forest Management Areas, 3,050.91 ha. of Community Forests, 1,665.18 ha. of Non-Wood Forest Products management areas, 8.30 ha. of Private Forests, 48,849 ha. of Biological Corridor, 25 ha. of Key Biodiversity Area and 15.83 ha of High Conservation Value Area. The division is home to several key wildlife species, including the Tiger, Bengal Slow Loris, Golden Langur, Asian Elephant, Musk Deer, Red Panda, White-bellied Heron, Steppe Eagle, *Aquilaria malaccensis*, *Paphiopedilum fairrieanum*, *Paphiopedilum venustum* and *Sapria himalayana*.

The DFO management plan is developed to consolidate the various existing management regimes into a unified and integrated approach. The objectives of the plan are providing effective and efficient public services, ensuring sustainable forest management and utilization for optimizing economic and environmental goods and services, and improving community well-being by actively involving local communities in forest conservation and management activities. Additionally, the objectives include conserving biodiversity and ecosystem services through effective management of natural habitats, and addressing and reducing the adverse impacts of climate change through appropriate mitigation and adaptation interventions.

The DFO Zhemgang manages a total area of 151,800 hectares, with 136,475.61 hectares (89.90%) under forest cover, containing 52,125,021.22 trees, a basal area of 2,740,430.21 m², and a growing stock volume of 37,480,625.64m³. The total biomass across all forest types includes 27007936.49 tonnes of aboveground biomass (AGB), 7,061,924.52 tonnes of belowground biomass (BGB), 804,540.72 tonnes of coarse woody debris (CWD), and 1,905,669.78 tonnes of litter. The total carbon stock amounts to 12,693,823.27 tonnes of AGB, 3,319,042.58 tonnes of BGB, 378,134.78 tonnes of CWD, and 895,929.18 tonnes of litter. The total biomass increment across all forest types is 332,820.16 and carbon increment is 156,255.25. The carbon sequestration potential of the forest is estimated 573,560.07 tonnes of CO₂.



Zhemgang Dzongkhag has a total population of 17,126 across eight gewogs, with 15,997 people residing within the division's jurisdiction. The primary source of income for the communities is wage labor, followed by agricultural activities. *Kamzhing* is the most common landholding category, with cereals, maize, and rice being the main crops, while livestock farming, including local cattle and poultry, is also widespread. Zhemgang recorded its highest average maximum temperature of 25.95°C in 2022 and its lowest minimum temperature of 12.03°C in 2020, based on a decade of data (2014-2023) maintained with the National Centre of Hydrology and Meteorology. Among the seven gewogs under DFO Zhemgang, Trong gewog is the most vulnerable to climate change, with a low vulnerability index of -1.106, while Bjoka gewog has the highest index at -0.388 (DFO Zhemgang, 2024).

The HCV area under DFO Zhemgang, classified as HCV Category 6 (Cultural Values), is located at Buli Tsho in Nangkor Gewog, covering 39.12 acres nationally significant for its religious and cultural values while also supporting important wetland-associated biodiversity within surrounding warm broadleaved forests. The Key Biodiversity Area (KBA) is located in Kaktong in Ngangla Gewog. It is designated for protection and conservation of threatened and rare orchid species which includes critically endangered *Paphiopedilum fairrieanum*, endangered *Paphiopedilum venustum*, *Paphiopedilum insigne*, and newly discovered *Paphiopedilum x pradhanii* and *Spathoglottis jetsuniae*. These orchids are currently thriving together only in proposed site and protection of such critical habitat is desired to maintain viable population

The division faces numerous threats and challenges in conserving and sustainably managing natural resources, including human-wildlife conflict, wildlife poaching, retaliatory killings, illegal collection of forest resources, infrastructure development, improper waste management, climate change impacts, drying water sources, forest fires, and wildlife diseases. Additional challenges include high illiteracy rates, mobility and accessibility issues, inadequate infrastructure, and insufficient funding. To address these threats and challenges and to achieve its vision, mission, purpose, and objectives, the plan outlines 16 strategies and 50 actions with total budget outlay of Nu. 157.54 million over the next ten years period.



Key Facts of DFO Zhemgang

Sl.No.	Forest statistics		
1	Total Forest Area	ha	151800
2	Forest Cover Percent	%	89.90
3	Broadleaved forest	%	91.09
		ha	124311.88
4	Conifer forest	%	8.91
		Ha	12163.73
5	Basal area per hectare	m2/ha	20.08
6	Growing stock per hectare	m3	274.63
7	Biomass stock per hectare (AGB, BGB, DoM)	t/ha	269.49
Protected Areas			
1	Biological Corridors	ha	48849
		No.	1
2	Bey Biodiversity Areas	ha	25
		No.	1
3	High Conservation Value Area	ha	15.83
		No.	1
4	Botanical Garden	ha	21.32
		No.	1
Sustainable Forest Management Regimes			
1	Forest Management Unit Areas	ha	11913.02
		No.	1
2	Total area of Community Forest	ha	3050.91
	Total Community Forest	No.	20
	Total household involved in CF	No.	763
3	Local Forest Management Area	ha	40,617.51
		No.	7
4	NWFP Groups	ha	1665.62
		No.	9
Wood-based industries			
1	Wood-based industries	No.	2
Field Division and field offices			
1	Divisional Forest Office	No.	1
2	Divisional Range Office	No.	3
3	Divisional Beat Office	No.	5
4	Divisional Check Post	No.	1
5	Biodiversity Information Center	No.	1

CHAPTER 1: BACKGROUND

1.1 Rationale

Bhutan though a small country, is widely recognized across the world for its environmental conservation initiatives and as a carbon negative country in 21st century. The intact natural resources that we have today is a testimony to the farsighted conservative visions of our successive monarchs and the sound environment conservation policies of the country. However, over the years, the forest management policies have undergone significant changes from that of more conservation focused to sustainable utilization of forest resources. Though scientific management of our forest resources based on the principles of sustainability had long been practiced, it has become even more imperative than ever before in light of the changing climate and its impacts. Today climate change and its impacts has widely affected many countries. Bhutan by virtue of being located in a most fragile mountainous ecosystem is even more poised to the impacts of climate change. Thus, Bhutan is one of the few countries in the world that enshrines forest and environmental conservation aspects in its Constitution. Article 5 of The Constitution of the Kingdom of Bhutan reflects commitment to ensure that, in order to conserve the country's natural resources and to prevent degradation of the ecosystem, a minimum of sixty percent of Bhutan's total land shall be maintained under forest cover for all time.

Division Forest Office, as the custodian of our forest resources in Zhemgang Dzongkhag, plays an integral role in conserving and protecting our natural forest resources besides catering forestry services to the people of the country. It is one of the main players in implementing our sound environmental conservation policies and ensuring our commitment to remain carbon neutral and maintain 60% forest cover for all times to come. Though management of forest resources within the division's jurisdiction is guided by the noble principles of sustainability, it is even more important to be scientific along with long term goals and objectives. It is also equally important to review and evaluate such goals and objectives on a periodic basis. Therefore, in order to do so, a comprehensive and holistic Division Forest Management Plan with time bound vision, mission, objectives and goals is imperative. It shall serve as an overarching scientific Forest Management Plan in scientifically managing the forest resources within the jurisdiction of Divisional Forest Office, Zhemgang.

1.2 History and Significance

1.2.1 Importance of Forests

The Article 5 of the Constitution of the Kingdom of Bhutan states that: “Every Bhutanese is a trustee of the kingdom’s natural resources and environment”. The Royal Government is enjoined in the Constitution to conserve and improve the environment and safeguard the country’s biodiversity. It is further directed to secure sustainable development while promoting economic and social development. The Constitution has enshrined the Government to ensure that a minimum of 60% of the country’s land should be maintained under forest cover for all times to come. Bhutan is the only carbon neutral country in the world, absorbing carbon more than it emits. The RGoB has made an international commitment to remain carbon neutral for all times to come. Zhemgang Dzongkhag, with 93.89% of its area under forest cover, ranks among the highest in the country and plays a crucial role in the maintaining the constitution mandate and conservation of rich biodiversity.

1.2.2 Overview of the sustainable forest management

Bhutan is globally recognized for its dedication to environmental conservation and sustainable development, driven by a national philosophy centered on Gross National Happiness (GNH). A key component of Bhutan’s environmental strategy is sustainable forest management, which seeks to balance the ecological, economic, and social benefits derived from forest resources. The legislative framework for forest conservation, management and utilization is established by the Forest and Nature Conservation Act of Bhutan and the Forest and Nature Conservation Rules and Regulations of Bhutan 2023.

The Divisional Forest Office Zhemgang (DFO Zhemgang), founded in 2003, plays a crucial role in forest management and public service provision in Zhemgang. Initially, its focus was on protecting forest resources and regulating timber extraction. Over time, the division has adopted more holistic and sustainable practices, driven by advancements in forest inventory techniques, community engagement, and the application of contemporary sustainable forest management principles. DFO Zhemgang is vital in managing and conserving the forest resources of Zhemgang Dzongkhag, which boasts the highest forest cover among the twenty Dzongkhags in Bhutan, with 93.89% forest cover measuring (223,067.45 hectares of land) forested. The division encompasses diverse forest types, including Subtropical, Warm Broadleaved, and Cool Broadleaved forests. According to the National Forest Inventory Report (2023), this area features diverse structural characteristics, with an average tree density of 384 trees per ha. and a sapling density of 176 saplings per ha., highlighting its ecological richness and the necessity for careful management to preserve biodiversity.

DFO Zhemgang’s achievements demonstrate its dedication to sustainable forest management. Notable milestones include the establishment and successful management of 11,913.02 ha. of Forest Management Units (FMU), and Timber extraction sites; seven Local Forest Management Areas (LFMAs) covering 40,617.51 ha.; twenty Community Forests spanning 3,050.91 ha.; nine Non-Wood Forest Products (NWFP) management groups managing 1665.18 ha.; and Private Forests covering 4.34 ha, 48,849 ha. of

Biological Corridor and 25 ha. of Key Biodiversity Area. Some of these management regimes involve community participation, playing a vital role in empowering local communities, improving their livelihoods, and fostering sustainable forest stewardship. The establishment of Community Forest Networking Group (CFNG) has further strengthened the good governance practices in community forests. The division excels in providing essential services such as Government to Citizen (G2C) services, Online Forestry Services (OFS), technical backstopping to the community groups and other regulatory services. Its efforts in community engagement and capacity building are noteworthy, ensuring local populations are well-equipped to manage forest resources sustainably. Traditional forest management systems, like sacred groves and community-based resource management practices, are integrated with modern sustainable management practices. This integration ensures the conservation of culturally significant landscapes and the sustainable use of forest resources.

1.3 Policies and legislations

1.3.1 National Forest Policy 2011

The National Forest Policy 2011, was formulated to keep up with changing times and the evolution of forest management concept of the State Reserve Forest Land (SRFL). Since 1957, Forest governance has transitioned from providing “free access” to “almost no access” to “managed access”.

The National Forest Policy 2011 broadly stipulates to apply scientific management approaches to all of Bhutan’s forest and biodiversity resources for the benefit of people without compromising the conservation values and the constitutional mandate of maintaining a minimum of 60 % forest cover for all time.

The Policy, while stating about different management regimes, also has provisions on the forest-based industries and need of proper utilization and marketing in developing private sector and rural communities. Some of the main features of the policy includes a science-based participatory approach to forest governance and sustainable forest management with emphasis on efficient and environment friendly technologies for value-addition and waste minimization.

1.3.2 Forest and Nature Conservation Act of Bhutan (1969, 1995, 2023)

The Bhutan Forest Act 1969 is one of the first Acts passed by the RGoB. The Act nationalized “all land under which no person has acquired a permanent heritable and transferable right of use and occupancy” as forests. It further identified and provided directives regarding the forest rights, uses, royalties and penalties. The Act stipulated that at least 60% of the country should remain forested at all times.

The Bhutan Forest Act 1969 was repealed and ratified in 1995. The Forest and Nature Conservation Act of Bhutan 1995 identified and outlined the requirement of management plan for production and protection of forest and wildlife. Emphasis was given to community and social forestry and, encouraged the participation of community and

private individuals. The Act also provided the legal basis for defining management restrictions in the process of forest planning and function mapping.

The FNCA 1995 was revised in the year 2023 to address the emerging conservation issues without compromising development need of the country and the people. Besides, harmonizing obsolete sections and subsections the FNCA 2023 formulated mechanism for payment for ecosystem services.

1.3.3 Forest and Nature Conservation Rules and Regulations of Bhutan (2000, 2003, 2006, 2017, 2020, 2023, 2024)

The Forest and Nature Conservation Rules (FNCR) 2000 was revised in 2003 and again in 2006 to mainly accommodate a broader scope of the power and duties vested by the FNCA 1995 which were not covered by earlier FNCR. The FNCA 1995 mandated the Department to manage SRF including Community Forests (CF), protect and conserve wildlife, soil & water and related natural resources of Bhutan. The FNCR 2006 issued authority and provisions for the preparation of management plans for Protected Area (PA), Forest Management Units (FMU), CF, NWFP (Non-Wood Forest Produce Management Area), Soil & Water Conservation. Various amendments to the FNCR 2006 have been done over the years due to changing times but keeping in line with the provisions of the NFP 2011. Further, a separate amendment to the FNCR 2006 was carried out due to the adoption of the revised rules for the rural timber allotment as part of the implementation of the Government to Citizen Services programme. The FNCR 2006 was again revised in 2017 which was an amalgam of all the different amendments made to the FNCR 2006 and the provision on the Rules on Biological Corridors (BC) 2007, which defined the protection status and prescription of the BC plan.

The FNCRR was revised in the year 2023 to align all the requirement vested in FNCA 2023. Major changes in the FNCRR are deletion of Chapter on Surface Collection of Sand and Stone as the mandate is transfer to the Department of Geology and Mines. In addition to finetuning provisions of the FNCRR 2017 the FNCRR 2023 underscore expediting public services delivery through online platform. The amended FNCRR 2024 introduced targeted refinements to the FNCRR 2023 to address implementation challenges, clarify procedures, and simplify processes, enhancing practicality and efficiency without altering the core conservation objectives.

1.3.4 Land Lease Rules and Regulations of Bhutan 2018

The Land Lease Rules and Regulations of Bhutan 2018 implements the provision of the Land Act of Bhutan 2007 and necessitates the requirement of forestry clearance for issuance of lease of SRF Land. Further, it strongly discourages and forbids lease of land registered under Government institutions and areas which are under different management namely designated Parks, Nature Reserve, PA, BC, Buffer Zones, CF, Critical Watershed, Wetland, High Risk Zones, Nyes, religious sites & important monuments and Restricted Zones. However, the Secretariat can make exemptions for only those critical infrastructures of national importance and public need under only special circumstances as deemed relevant by it.

1.3.5 Biodiversity Act of Bhutan 2003

The Biodiversity Act of Bhutan 2003 provides for the conservation and sustainable utilization of biological resources & associated traditional knowledge and ensures Sui Generis protection of plant varieties. It also authorizes the implementation of the Access and Benefit-sharing regime to derive additional benefits in a fair and equitable manner.

1.3.6 Land Act of Bhutan 2007

The Land Act of Bhutan 2007 provides for the leasing of state land for economic and various other activities. All *Tsamdro* (grazing land) and *Sokshing* (forest land for collection of leaf litter) rights shall revert back to the State and convert to leasehold uses with management plans giving preference to previous rights holders.

1.3.7 National Environment Protection Act 2007

The National Environment Protection Act 2007 provides for the establishment of an effective system to conserve and protect the environment through the National Environment Commission or its successors, designation of competent authorities and constitution of other advisory committees, so as to independently regulate and promote sustainable development in an equitable manner. The Act also calls for conservation and protection of wetlands, alpine regions, watersheds, and other vulnerable ecosystems in addition to the existing protected areas.

1.3.8 Waste Prevention and Management Act of Bhutan 2009

The Waste Prevention and Management Act of Bhutan 2009 promotes minimization and sound management of waste in the country through the 3 Rs (Reduce, Reuse and Recycle). The Act further identifies different agencies for regulation of waste in the country wherein it empowers the Ministry of Agriculture and Forests to ensure prevention and management of waste with respect to the agricultural sector, including live-stock and forestry.

1.3.9 Climate Change Policy of the Kingdom Bhutan, 2020

Bhutan, a landlocked country in the Eastern Himalayas, is highly vulnerable to the impacts of climate change due to its fragile mountain ecosystems, dependence on climate-sensitive sectors (like agriculture, hydropower, and forestry), and limited adaptive capacity. Despite being a net carbon sink—absorbing more greenhouse gases than it emits—Bhutan faces increasing risks from climate-induced disasters such as glacial lake outburst floods (GLOFs), erratic rainfall, landslides, and droughts.

To address these challenges and align with its international commitments under the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, Bhutan adopted the Climate Change Policy of Bhutan 2020. This policy provides a strategic framework for coordinated action on climate change mitigation and adaptation, while ensuring that development remains sustainable and resilient. It also provides strategic guidance to ensure that Bhutan remains carbon neutral and protects the well being of the people by adapting to climate change efficiently and effectively. Additionally, the policy also aims to address challenges and opportunities such as in-

ternational support in the form of finance, technology, capacity building, research and awareness arising from recent developments in the national and international arena of climate change, which will be critical in implementing climate actions. This policy also ensures meaningful participation of all relevant stakeholders in climate change actions in a co-ordinated and coherent manner with clear roles and responsibilities.

1.3.10 Nationally Determined Contribution, 2021

Bhutan's 2nd NDC was officially launched on June 5, 2021, coinciding with World Environment Day and ahead of COP26. It reaffirms Bhutan's pledge to remain carbon neutral, and outlines enhanced mitigation measures via sector-specific Low Emission Development Strategies (LEDS) and updates to the National REDD+ Strategy and Action Plan. Bhutan's 2nd NDC advances LEDS across multiple sectors to decouple development from emissions. It also highlights key sector specific adaptation and mitigation measures and initiatives that will be taken by Bhutan. In presenting the second NDC, Bhutan maintains the commitment to remain carbon-neutral where emission of greenhouse gases will not exceed carbon sequestration by our forests and sinks as first pledged in 2009 and reaffirmed in the first NDC. At the same time, Bhutan calls on the international community to continue and enhance the support for Bhutan's efforts to mitigate and adapt to climate change. While Bhutan's first NDC covered broad priority action areas, the second NDC further enhanced our actions by elaborating priority mitigation actions in the form of LEDS, roadmaps and strategies.

1.3.11 National Adaption Plan of the Kingdom of Bhutan, 2023

The National Adaptation Plan (NAP) process was initiated by Bhutan in line with the UNFCCC Cancun Adaptation Framework (2010), which called on countries to formulate medium- and long-term strategies to address climate change impacts. While Bhutan had earlier prepared two National Adaptation Programmes of Action (NAPAs) focused on urgent and immediate needs, the NAP aims to provide a comprehensive, long-term framework for integrating climate change adaptation into national planning and development.

Bhutan began developing its NAP with support from the Green Climate Fund (GCF), the UNDP, and other partners around 2019. The objective is to identify, prioritize, and mainstream adaptation needs across key sectors such as agriculture, forestry, water resources, health, energy, and infrastructure, ensuring that climate resilience is embedded within the country's socio-economic development guided by the philosophy of Gross National Happiness (GNH). The NAP process also emphasizes strengthening institutional coordination, scientific data and climate information systems, and financing mechanisms to support sectoral adaptation. Importantly, it helps Bhutan align national adaptation planning with its Climate Change Policy (2020) and the Second Nationally Determined Contribution (2021).

1.3.12 Water Act of Bhutan, 2011

The Water Act of Bhutan, 2011 provides the legal framework for the protection, conservation, development, and sustainable management of water resources in Bhutan. The Act recognizes water as a public trust and a vital national resource, ensuring its equitable and sustainable use for present and future generations. The Act establishes principles for

integrated water resources management, regulates water abstraction and pollution, and sets out institutional roles for water governance at national and local levels. It also provides for the protection of watersheds, water sources, and water quality, while promoting efficient water use, conflict resolution, and environmental sustainability in line with Bhutan's development and conservation priorities.

1.3.13 Mines and Mineral Act of Bhutan 1995 and Regulation

The Mines and Minerals Act of 1995 provides the legal framework for the exploration, extraction, management, and conservation of mineral resources in Bhutan. It recognizes minerals as a state-owned resource and aims to ensure their sustainable utilization while safeguarding the environment and supporting national development. The Act establishes licensing and permit systems for prospecting, mining, and processing of minerals, defines the roles and responsibilities of regulatory authorities, and sets out procedures for revenue collection, royalty payments, and enforcement of compliance. The Mines and Minerals Regulations operationalize the Act by detailing application procedures, safety and environmental standards, reporting requirements, and penalties for violations. Together, the Act and its Regulations aim to balance economic development, environmental protection, and responsible resource management in Bhutan.

1.3.14 Economic Development Policy of Bhutan 2016

The Economic Development Policy of Bhutan outlines the nation's strategy to achieve sustainable, inclusive, and equitable economic growth while maintaining the country's unique cultural heritage and environmental conservation priorities. Rooted in the philosophy of Gross National Happiness (GNH), the policy emphasizes that economic development must contribute not only to income generation but also to social well-being and ecological balance. Key objectives include diversifying the economy, promoting private sector development and entrepreneurship, fostering rural development, enhancing human capital and skills, and ensuring sustainable use of natural resources. The policy also encourages investment in infrastructure, innovation, and trade, while prioritizing environmental stewardship and social equity. Overall, it provides a roadmap for Bhutan to achieve balanced economic growth that aligns with its development philosophy and long-term national goals.

1.3.15 National Biodiversity Strategy and Action Plan of Bhutan, 2025

The National Biodiversity Strategy and Action Plan (NBSAP) of Bhutan is a strategic framework aimed at conserving biodiversity, promoting sustainable use of biological resources, and ensuring equitable benefit-sharing. Aligned with the Convention on Biological Diversity (CBD), the NBSAP integrates Bhutan's development priorities, traditional knowledge, and conservation commitments into a coherent national plan.

The strategy focuses on ecosystem and species conservation, habitat restoration, and protection of genetic resources, while emphasizing community participation and mainstreaming biodiversity into sectoral policies such as agriculture, forestry, and tourism. The Action Plan outlines priority activities, targets, and institutional responsibilities to achieve these goals, ensuring that biodiversity contributes to both environmental sustainability and socio-economic development in Bhutan.

1.4 Purpose and Objectives

1.4.1 Vision

Contribute to a Sustainable Forest Ecosystems for the People, Nature and Economy

1.4.2 Mission

Contribute to conserve and manage Bhutan's natural resources through the adoption of innovative technologies to ensure socio-economic and environmental wellbeing, while maintaining a minimum 60% of the land under forest cover for all times to come

1.4.3 Purpose

To sustainably conserve and manage Zhemgang Dzongkhag's forest resources and biodiversity to ensure social, economic, and environmental well-being for present and future generations thereby contributing in maintaining at least 60% of the country's land under forest cover for all times to come

1.4.4 Objectives

The objectives of this Management Plan are:

- To provide effective and efficient public service delivery.
- To ensure sustainable forest management and utilization to optimize the production of economic and environmental goods and services.
- To improve community well-being by actively engaging local communities in forest conservation and management activities.
- To conserve biodiversity and ecosystem services through effective management of natural habitats.
- To effectively address and reduce the adverse impacts of climate change through appropriate mitigation and adaptation interventions.

CHAPTER 2: CURRENT STATUS

2.1 Boundary and Area

The jurisdiction of DFO Zhemgang, is situated geographically in a central part of the country encompassing an area of 1624.27 sq km. including Biological Corridor Number Four (BC4) which has an area of 594.56 sq km. Some part of BC4 with an area of 106.16 sq km. falls under the jurisdiction of DFO Bumthang. DFO Zhemgang covers seven *Gewog* out of eight *gewogs* under Zhemgang district. The DFO Zhemgang covers an area of 1518.11 sq.km excluding the BC4 area falls under DFO Bumthang. Geographically delimited, the area occupies a position between coordinates of latitude 26°50'.00"N & 27°20'.00"N and longitude 90°40'.00"E & 91°10'.00"E and altitude ranging from 110 masl - 4489 masl. It neighbors the eastern territories of Mongar and Pemagatshel districts, while its southern periphery interfaces with the boundaries of the Royal Manas National Park (RMNP). To the west, its adjacent is demarcated by the Jigme Singye Wangchuck National Park (JSWNP) and Trongsa, whereas its northern and northeastern border is DFO Bumthang and the Phrumshengla National Park (PNP). Despite its central location, the district harbors a sparse human population, facilitating the flourishing of its undisturbed natural environment.

The convergence of mountains, springs, rivers, grasslands, and forests establishes an ethereal habitation fostering the harmonious coexistence of indigenous flora and fauna. The region thus emerges as a pivotal source, disbursing elusive wildlife to adjacent locales. The dense vegetation, abundant flora, fauna and avifaunal diversity enclose the heavenly realm for the communities and species occupying the area. The characteristics of forest vary with a wide variety of composition, structures and associated vegetation in the area. The prominent feature of this landscape is its dominance by primary forest cover, a promising sign for the conservation of charismatic mammalian, reptilian, avian, entomological, and lepidopteran species. The area also encompasses Key Biodiversity Area (KBA) which protects some of the endangered orchid species like *Paphiopedilum fairrieanum* (CR), *Paphiopedilum venustum* (EN), *Gastrodia elata* (VU), *Paphiopedilum x pradhanii* amongst others. Numerous species remain to be undiscovered, and recent times have witnessed the identification of important taxa from the landscape.

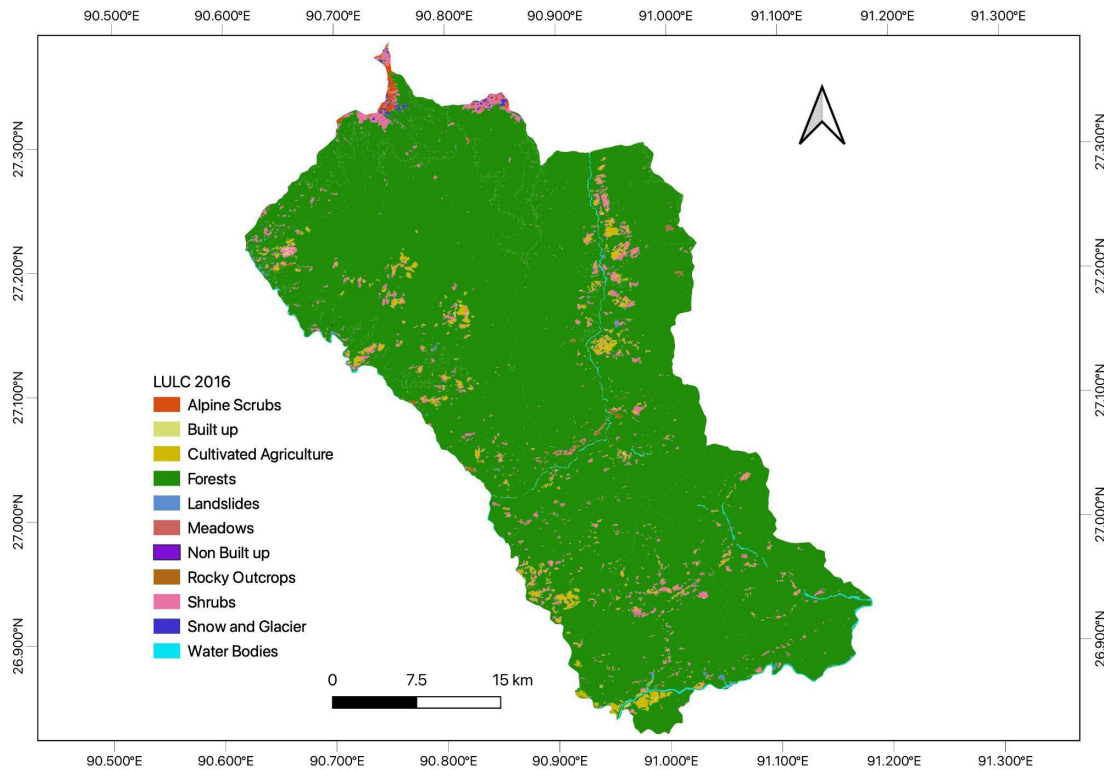


Figure 1. Land use map

The map areas of the LULC 2016 and the Forest Type Map 2022 were intersect to see the differences in non-forest areas. The analysis revealed a difference of 815.413 ha, with a ratio of 1.086, which was proportionately applied to the non-forest areas in the LULC 2016 map.

2.2 Administration

2.2.1 Administrative Set up

The administrative jurisdiction of DFO Zhemgang covers seven *gewogs* out of eight under Zhemgang Dzongkhag. Amongst the five *chiwogs* under Trong *gewog*, DFO Zhemgang covers only one *chiwog* (Dangkhar-Trong *chiwog*) where other *chiwogs* fall under the administrative jurisdiction of Royal Manas National Park (RMNP) and Jigme Singye Wangchuck National Park (JSWNP). Part of Shingkhar *gewog* falls under Phrumsengla National Park (PNP).

The division is headed by a Chief Forestry Officer. There are three Range Offices, six Beat Offices, one Forest Management Unit, one Forest Check Post and a Botanical Garden under the division. Zhemgang Range jurisdiction covers Trong and Nangkor *Gewogs* with three Beat Office viz. Mangdechu, Tali and Buli and Check post at Ting-tibi. Khomshar Range jurisdiction covers Bardo and Shingkhar *Gewogs* with one Beat office at Shingkhar. Similarly, Panbang Range covers three *gewogs* of lower Kheng viz. Ngangla, Goshing and Bjoka *gewogs* with two Beat offices at Bjoka and Goshing. Wangdigang Forest Management Unit (WFMU) caters allotment of commercial timbers. It also manages Malaya and Kikhar Timber extraction sites. Bermoo Botanical Garden provides recreational and educational facilities.

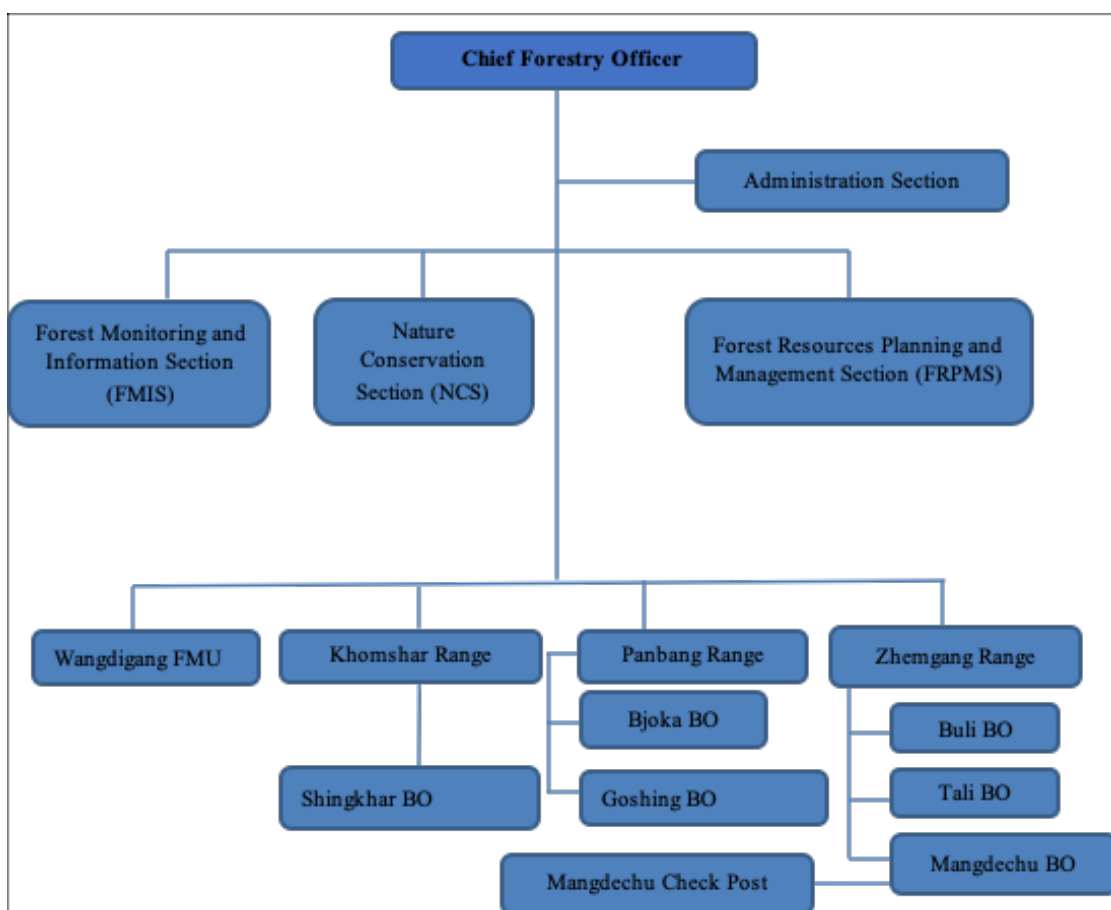


Figure 2. Organizational structure of DFO Zhemgang

2.2.2 Mandates

The Divisional Forest Office, Zhemgang is entrusted the following mandates;

- Manage and utilize Zhemgang's forests for sustainable production of economic and environmental goods and services to meet the needs of the people of Zhemgang.
- Enhance long term sustainability of Zhemgang's biodiversity and ecosystem services through management of natural habitats.
- Sustainable forest management through effective application of science and technology including participation of communities for socio-economic benefits.
- Forest landscape restoration for social, ecological and economic benefits.
- Generate forestry/biodiversity data to develop scientific knowledge to enhance forest and biodiversity management to support implementation and contribute in providing ecologically sound policies.
- Periodic monitoring and evaluation of different forest management regimes to ensure sustainable management and information dissemination.
- Delivering effective and efficient forestry services to the people as per the Act and Rules.

- Ensuring that the implementation and enforcement of forestry rules, regulations and programs are in line with the plans and policies of the department and the ministry.
- Maintain and enhance ecological connectivity through the protection and conservation of biodiversity in the biological corridor four (BC-4).
- Facilitate and support community well-being through community participation in conservation and management of the forest and its resources.

In order to fulfill the above mandates, the division has created different sections with specific terms of references as outlined below;

2.2.2.1 Administration Section

- Initiates and coordinates the procurement, and disposal of materials, based on the long-term plan of the organization.
- Initiates effective management of the general administration of the organization, including personnel administration, property management/maintenance, budget requirements, and procurement of office equipment and materials.
- Liaison and communicate regarding administrative matters with other relevant organizations.
- Facilitate staff welfare and capacity building initiatives.
- Attends miscellaneous tasks of the organization.

2.2.2.2 Nature Conservation Section (NCS)

- Coordinate and implement wild flora and fauna surveys, assessments and management including their habitats.
- Review and provide technical support in preparation of conservation management plans including those of KBAs and HCVs
- Coordinate management, implementation and monitoring of conservation activities inside Biological Corridor 4
- Coordinate and implement wildlife habitat enrichment and improvement activities
- Protection and conservation of watershed & wetlands as natural habitats of fauna and flora
- Conduct and coordinate environmental education and conservation awareness outreach programs
- Coordinate and conduct biodiversity and socio-economic survey
- Coordinate and implement Integrated Conservation and Development activities
- Coordinate and lead programs related to human-wildlife conflict
- Develop and promote ecotourism products and facilities
- Maintain a biodiversity database of the division and come up with publications/scientific reports.

2.2.2.3 Forest Resources Planning and Management Section (FRPMS)

- Scientific forest management planning and implementation for CF and NWFP
- Community based forest resource management through planning and implementation of activities in Community Forestry and Non-wood Forest Product management area.
- Provide technical support for preparation/revision of Community Forests Management Plan.
- Provide technical support for formation of NWFP Management and Marketing Group and formulation of its management plan.
- Facilitate and support the establishment of Private Forests.
- Compilation and submission of Annual monitoring and evaluation reports of CF and NWFP groups
- Plantation and agroforestry programs
- Monitoring of Community Forest Networking Group and provide technical support
- Coordinate and lead the programs of Bermo Botanical Garden
- Forest Fire Management, technical backstopping and awareness program
- Forest Pest and Diseases management and control

2.2.2.4 Forest Monitoring and Information Section (FMIS)

- Coordinate and facilitate Online Forestry Services (OFS).
- Coordinate and facilitate online Government to Citizen Services (G2C)
- Management of Forest Information Reporting and Monitoring System (FIRMS)
- Coordination of Spatial Monitoring and Reporting Tool (SMART)
- Facilitation of APA and Policy Works (Strategies, FYP, progress reporting, etc.)
- Facilitate, coordinate and collaborate for effective and efficient utilization of forest resources.
- Facilitate Timber Allocation and Utilization including facilitation activities with Wood-based Industries, natural resources pricing, timber disposal and utilization.
- Facilitate Non-Wood Forest Produce allocation and utilization
- Compilation and submission of annual monitoring and evaluation reports of FMU, LFMA and working schemes.
- Provide legal advice in compounding and settlement of forest offense cases and follow-up on forest protection and legal issues.

2.2.3 Human Resource

The following are the approved technical staff for DFO, Zhemgang as per the approved structure and staffing of the Ministry of Energy and Natural Resources;

Table 1. Approved Human Resources for DFO

Sl. No.	Position Title	Entry Position level	Approved
1	Chief Forestry Officer	P1A	1
2	Forestry Officer	P4A	3
3	Asst. Forester	S5A	39
4	Admin Asst.	S5A	1
Total			44

The division has 44 staff in total including Elementary Service Personal (ESP) and a Driver. Currently, the division has 37 technical staff against the approved staff strength of 44 with a shortage of 7 technical staff (Asst. Forester/SS level).

Table 2. Staff placed in different offices under DFO

Sl. No.	Office Name	No. of staff	Remarks
1	DFO HQ	8	Including 1 Admin Asst., 1 Driver, 1 ESP
2	Zhemgang Range	5	Including 1 ESP
3	Mangdechu Beat Office	2	
4	Tali Beat Office	1	
5	Buli Beat Office	3	
6	Khomshar Range	5	Including 1 ESP
7	Shingkhar Beat Office	2	
8	Panbang Range	6	Including 1 ESP
9	Goshing Beat Office	1	
10	Bjoka Beat Office	2	
11	Bermoo Botanical Garden	4	Including 2 ESP
12	Wangdigang FMU	3	
Total		42	

2.2.4 Infrastructure

Infrastructure and mobility facilities are vital to facilitate the faster service delivery to the public. To this, the division and field offices have established independent office space except Goshing and Shingkhar Beat Office, where the office space is currently provided from the erstwhile Gewog Forest Extension Office. The division has one Botanical Garden at Bermoo and it has one biodiversity information centre, three unit staff quarters, two unit common toilets, one watch tower, forest nursery, orchidarium, animal rescue enclosure, camping ground and picnic spot. The division has one Hilux and four Royal Enfield Bikes to facilitate the mobility of staff to enhance the service delivery.

2.2.5 Budget and Revenue

Over the past five years (2021-2025), the highest revenue was generated from commercial timber allotment (2.33m) followed by illegal timber cases (0.868m) and NWFP(0.52 m) respectively as indicated in table 3.

Table 3. Revenue generated (Nu. in million) (2021-2025)

Year	Revenue Head										
	Illegal Timber	Timber Misuse	Fishing & Aquatic Life	Poaching & Wildlife Crime	Non Wood Offence	Land Related Offence	Forest Fire	Rural Timber Allotment	Commercial Timber Allotment	Non Wood Forest Product	Fishing Fee
2021	0.267	0.031	0.123		0.118	0.152		0.016	0.110	0.184	
2022	0.344		0.099	0.012	0.068	0.038	0.015	0.023	0.165	0.138	0.008
2023	0.137		0.036		0.169	0.243		0.023	0.198	0.143	0.023
2024	0.050		0.060				0.001	0.020	0.270	0.006	0.062
2025	0.070				0.004			0.022	1.590	0.053	0.045
Total	0.868	0.031	0.318	0.012	0.358	0.433	0.015	0.105	2.333	0.524	0.139

The mandate of surface collection change to the Department of Geology and Mines from the Department of Forests and Park Services, the revenue for Non-wood Forest Product for next five years is expected to decrease by 50% since the major chunk of its revenue in the past was from surface collection. However, the revenue generation from other revenue heads is expected to increase by 10% due to initiation and implementation of nation wide scientific thinning activities shown in table 4.

Table 4. Revenue projection (Nu. in million) for the next 5 years (2026-2030)

Revenue Head		Illegal Timber	Timber Misuse	Fish- ing & Aquat- ic Life	Poach- ing & Wildlife Crime	Non Wood Of- fence	Land Re- lated Of- fence	For- est Fire	Rural Tim- ber Allot- ment	Com- mercial Timber Allot- ment	NWFP	Fish- ing Fee
Year	2026	0.17	0.05	0.09	0.01	0.08	0.11	0.02	0.06	0.16	0.07	0.02
	2027	0.19	0.06	0.10	0.01	0.09	0.12	0.02	0.07	0.18	0.08	0.02
	2028	0.21	0.07	0.11	0.01	0.10	0.13	0.02	0.08	0.20	0.09	0.02
	2029	0.23	0.08	0.12	0.01	0.11	0.14	0.02	0.09	0.22	0.10	0.02
	2030	0.25	0.09	0.13	0.01	0.12	0.15	0.02	0.10	0.24	0.11	0.02
Total		1.05	0.33	0.55	0.05	0.50	0.66	0.11	0.39	1.00	0.44	0.11

The DFO has utilized substantial amount of budget with support from various projects and RGoB for the sustainable management of forests and improvement of livelihood of the communities. The detail budget utilization is as shown in table 5.

Table 5. Budget utilization (Nu. in millions) from FY 2020–2021 to FY 2024–2025

Activity	Year				
	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Personnel Emoluments	22.701	21.619	23.278	27.061	26.248
Operation & Managements Services	3.408	2.305	1.014	0.867	0
Re-electrification works at Division Office	0.263	0	0	0	0
Monitoring and mobility of staffs	0	0	1.518	1.700	1.336
COVID 19 Prevention and control activities	0	0.525	0	0	0
Construction of 2 unit toilet and waste segregation shed at Bermo Botanical Garden	0.145	0	0	0	0
Revision of Community Forest and Management plans (BFL)	0	0.12	0.060	0	0
Operating cost (Travel & subsistence) for implementing SMART patrolling (BFL) & GEF	0	0.396	0.432	0	0
Conduct biodiversity survey in 6 assigned biodiversity monitoring grid (BFL)	0	0	0.06	0	0
Monitoring of Biodiversity Monitoring Grid (BFL)	0	0	0	0.06	0
Monitoring & response to forest fire (BFL)	0	0.05	0	0	0
Operational and Management Services (BFL)	0.241	0	0	0	0
Communication material posters radio programs PSAS brochures ETC for conservation awareness and education program (BFL)	0.113	0	0	0	0
Hectares of resilient grasslands supporting healthy wildlife population and local livelihood implement restoration to enhance quality and resilience of lowland grasslands (BFL)	0.212	0.5	0	0	0
Improvement of Salts licks signages, waterhole and wetlands (BFL)	0.335	0.075	0	0	0
Improvement of grassland habitat by plantation and database management through camera traps (BFL)	0	0	0	0.15	0
Resource assessment and stakeholder consultation for drafting the operational plan (BFL)	0	0	0	0.02	0

National Forestry inventory (enumeration of NFI cluster plots inside BC4 (BFL))	0	1.56	0	0	0
Development of Golden Mahseer high end recreational fishing along with Drangmechu (BFL)	0	0.65	0	0	0
ESS mitigation measure consultation for Golden Mahseer program (BFL)	0	0.03	0	0	0
Construction of Biological corridor office at Shingkar, Zhemgang (BFL)	3.949	0.8	3.112	0	0
Awareness and waste management program (BFL)	0.088	0	0	0	0
Train CFMG members on natural resource management (BFL)	0.075	0	0	0	0
Training staff on legal prosecution of law (BFL)	0.096	0	0	0	0
SMART patrolling inside BC4 (BFL)	0.099	0	0	0	0
Roofing of existing building of RMNP at Tingtibi (BFL)	1.6	0.722	0	0	0
Establish basic infrastructure eg. Signage patrol. Camping sites, boundary pillars and provide equipments essential for management of the BC4 in accordance with their conservation management plans (BFL)	0.4	0	0	0	0
Mid-term Evaluation of CFMP of Yoesel Pelri CF and revision of CFMP of Tshaidang CF	0	0	0.06	0	0
Integration of HWC and Wildlife rescue and formation of community based quick response team in line with <i>Dzongkhag</i> QRT SOP (GEF LDCF NAPA III)	0	0	0.35	0	0
Development of visitors information centre management and awareness enhancement at Buli tsho (GEF LDCF NAPA III)	0	0	0.5	0	0
Development of visitors information centre management and awareness enhancement at Praling (GEF LDCF NAPA III)	0	0	0.6	0	0
Identify high biodiversity habitat for targeted biological monitoring as potential key biodiversity area (GEF LDCF NAPA III)	0	0.25	0	0	0
Review and revalidation of BC4 boundaries and access its ecosystem and CCA functionality for preparing its conservation management plan (GEF LDCF NAPA III)	0	0.45	0	0	0

Strengthen patrolling in BC4 to reduce threat to wildlife from Poaching (GEF LDCF NAPA III)	0	0.218	0	0	0
Development of BC4 conservation management plan (GEF LDCF NAPA III)	0	1.6	0	0	0
Implementation of watershed interventions in Wangdigang Dechugang (GEF LDCF NAPA III)	0	0.4	1.5	0	0
Mapping of Wangdigang Dechugang watershed (Hydrogeological mapping of recharge area)- (GEF LDCF NAPA III)	0	0.4	0	0	0
Formation of QRT to address HWC and provide wildlife rescue refresher training (GEF LDCF NAPA III)	0	0	0.045	0	0
Construction of Human Wildlife Conflict (HWC) centre (GEF LDCF NAPA III)	0	0.5	0	0	0
Conduct awareness to the BC4 PA concept goals regulations and socioeconomic benefits (GEF LDCF NAPA III)	0	0.1	0	0	0
REDD+ Readiness Project Support (GEF LDCF NAPA III)	0	1.04	0	0	0
Improvement of resource management regimes in CFs and reduce their dependency on the resources from fringes forest area (UNDP GEF small grants)	1.478	0	0	0	0
Community based measures for Human Wildlife Conflict through upscaling of tea plantations in Zhemgang (UNDP GEF small grants)	0	0	1.45	0.971	0
Development of ecotourism facility at Bermo (WWF CATS)	1.3	1.084	0	0	0
Construction of predator proof livestock corrals (WWF CATS)	0	0.8	0	0	0
Community based habitat management and creation of water holes (WWF CATS)	0	0.4	0	0	0
Community based grassland management and fodder plantation (WWF CATS)	0	0.2	0	0	0
Creation of Tiger trails (WWF CATS)	0	0.25	0	0	0
Community based conservation of Tigers and its habitat outside the PA in Zhemgang (WWF CATS)	0	0.376	0	0	0
(Procurement of SMART equipments WWF CATS)	0.239	0	0	0	0

Advocacy on waste management and digitize online booking of the hot spring (GEF LDCF NAPA III)	0	0	0	0.5	0
Construction of kitchen, bridge & trail; Consultation meeting with stakeholder; Training drafting of SOP for business (GEF Ecotourism)	0	0	0	2.664	0
Construction of amenities improving trails and maintenance of other facilities (GEF Ecotourism)	0	0	0	3.197	0
Advocacy program for Tiger Conservation with public drafting by laws capacity building and develop SOPs (GEF Ecotourism)	0	0	0	1.5	0
SMART patrolling to manage database analysis interpretation and report (BFL & GEF Ecotourism)	0	0	0	0.78	0
Annual Monitoring of Tigers and prey using camera traps and non invasive genetics (IUCN)	0	0	0	0.505	0
Build corrals for livestock protection including electrical fencing and chain link fencing (IUCN)	0	0	0	0.497	0
IUCN Project activities (Professional services, coral fencing, cattle supply, tiger boot camp, awareness to migratory herders, eco trail)	0	0	0	0	4.305
GEF Project-Mainstreaming biodiversity conservation into the Tourism Sector in Bhutan (Establish BIC, awareness on biodiversity conservation, grassland development,	0	0	0	0	5.456
BFL Project (SMART patrolling, awareness on FNCRR, BMG monitoring, ESMP & ESS training, grassland improvement, FMU OP preparation,	0	0	0	0	0.571
WWF Project-Managing Human Tiger co-existence for long term in central Bhutan (Community exchange program, improve drinking water supply, sound bio acoustic, solar fencing, wildlife rescue training, cardamom rhizome, breeding bull, native poultry and extension, camera trapping, RRT formation, improve waterholes, nursery improvement, signages, CCTV installation, patrolling equipment)	0	0	0	0	8.211
Total Budget (Million)	36.742	37.42	33.979	40.472	46.127

2.3 Biodiversity Conservation

Zhemgang District is recognized as one of Bhutan's most important biodiversity hotspots, largely owing to its extensive and well-preserved forest cover and relatively undisturbed landscapes. The district occupies a strategically significant ecological position, sharing boundaries with three major protected areas- Jigme Singye Wangchuck National Park (JSWNP), Royal Manas National Park (RMNP), and Phrumsengla National Park (PNP). These protected areas are ecologically linked through Biological Corridor No. 4 (BC-4), the largest of Bhutan's nine biological corridors, which plays a critical role in maintaining landscape connectivity and facilitating wildlife movement across central and southern Bhutan.

The diverse altitudinal range and varied forest types within Zhemgang support a rich assemblage of flora and fauna, including numerous species of high conservation significance. The district provides important habitat for several globally and nationally threatened wildlife species, while also sustaining diverse plant communities that contribute to ecosystem stability and resilience. This ecological connectivity not only enhances genetic exchange among wildlife populations but also strengthens the overall integrity of Bhutan's protected area network. As such, Zhemgang holds exceptional importance for biodiversity conservation, climate regulation, and the long-term sustainability of ecosystem services at both local and national levels.

2.3.1 Forest Ecosystem

2.3.1.1 Floral composition

The BC4 area was excluded from the 2023 rapid biodiversity assessment as it is covered under a separate report and conservation management plan. A systematic random sampling design was adopted, applying a 30% sampling intensity across 64 BMG grids, which resulted in 19 sample grids comprising 76 plots. For interpretation of the assessment results, forests were classified into three types: subtropical, warm broadleaf, and cool broadleaf. Among these, warm broadleaf forests recorded the highest species diversity ($H = 4.09$), followed by subtropical forests ($H = 3.89$) and cool broadleaf forests ($H = 3.19$). The 2023 assessment further indicates that DFO Zhemgang is floristically dominated by *Lithocarpus elegans* (IVI = 10.08), followed by *Quercus glauca* (IVI = 6.52) and *Prunus nepalensis* (IVI = 6.06).

Cluster analysis using PC-ORD 5 software at 25% similarity index based on the species observation count resulted in seven clusters. Cluster I is dominated by *Symplocos ramosissima*, *Persea clarkeana*, *Quercus oxyodon*, *Rhododendron grande*, *Persea bootanica*, and *Persea odoratissima*, Cluster II is dominated by *Ficus auriculata*, *Macaranga denticulata*, *Mitrephora harai*, *Casearia glomerata* and *Pterospermum acerifolium*, Cluster III is dominated by *Bischofia javanica*, *Ailanthus integrifolia*, *Ficus hispida*, *Brassaiopsis glomerulata* and *Toona ciliata*, Cluster IV is dominated by *Daphne bhoula* and *Viburnum erubescens* Cluster V is dominated by *Quercus glauca*, *Ficus roxburghii* and *Lagerstroemia parviflora*, Cluster VI is dominated by *Lithocarpus elegans*, *Cinnamomum glaucescens*, *Ostodes paniculata*, *Castanopsis tribuloides*, *Persea duthiei* and *Callicarpa arborea* and Cluster VII is dominated by *Castanopsis hystrix*, *Castanopsis indica*, *Schima wallichii*, *Litsea monopetala* and *Lithocarpus fenestratus* as shown in figure 3.

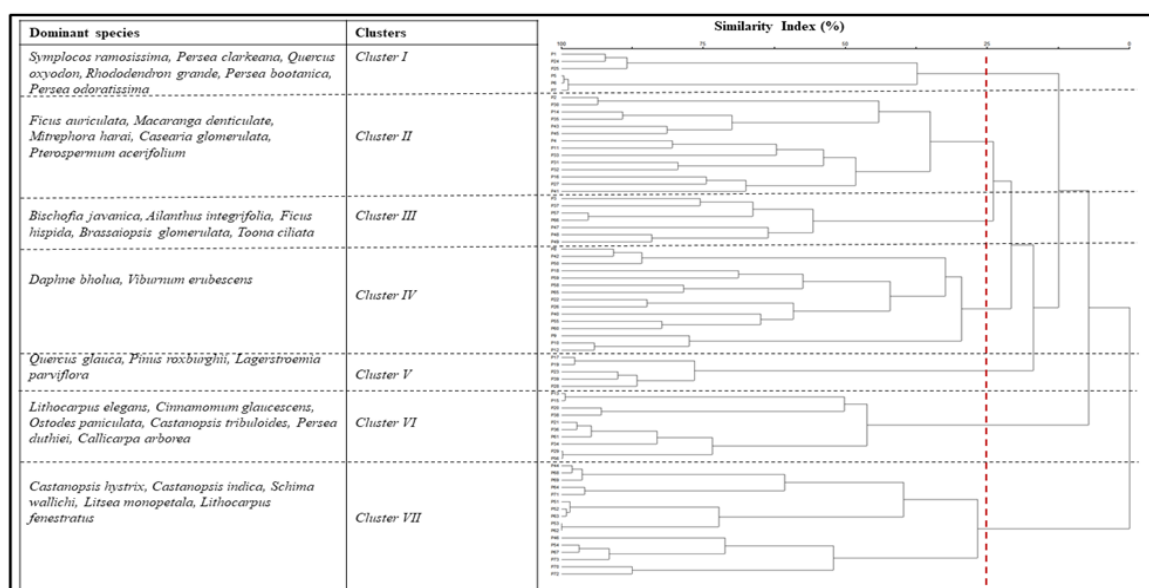


Figure 3. Cluster dendrogram of forest-type zones based on species observation count

The division has recorded a total of 1070 species of flora under 178 families (DFO Zhemgang, 2024). Out of 1070 species of flora recorded, 13 species are recorded as conservation significant in the IUCN Red List of threatened species in table 6.

Table 6. Record of IUCN red list plant species

IUCN Status	Species
Critically Endangered (CR)	<i>Aquilaria malaccensis</i> , <i>Paphiopedilum fairrieanum</i>
Endangered (EN)	<i>Sapria himalayana</i> , <i>Trillium tschonoskii</i> , <i>Tectona grandis</i>
Extinct in Wild (EW)	<i>Brugmansia suaveolens</i>
Near Threatened (NT)	<i>Phoenix rupicola</i> , <i>Quercus lamellosa</i> , <i>Aglaia edulis</i>
Vulnerable (VU)	<i>Paris polyphylla</i> , <i>Macaranga grandifolia</i> , <i>Rhododendron dalhousiae</i> , <i>Piper pedicellatum</i>

2.3.1.2 Faunal composition

The division also provides safe refuge to many faunal species. DFO Zhemgang along with protected areas like JSWNP and RMNP have a high tiger density of more than 2 tigers per 100 sq.km. During 2021-2022, 14 tiger individuals were captured through camera traps from the jurisdiction of DFO Zhemgang (DoFPS: & Bhutan, 2002). Furthermore, the camera traps capturing female tigers with three cubs each within the jurisdiction of DFO Zhemgang shows that the area is a prime habitat for the breeding and dispersal of the top predator. There are also other charismatic animals like the Clouded Leopard, Red Panda, Asiatic Golden Cat, and Spotted Linsang recorded from the area. There are 39 mammalian species under 17 families recorded from the jurisdiction of DFO, Zhemgang. The area also hosts 21 conservation-significant mammalian species as per the IUCN Red List of threatened species. The DFO Zhemgang has met all of the requirements of the Conservation Assured Tiger Standards (CA/TS) and was awarded the CA/TS approved certificate by CA/TS International Executive Committee on 20th February, 2025.

Table 7. Record of IUCN red list mammals

IUCN status	Common name
Endangered (EN)	Asian Elephant, Bengal Slow Loris, Bengal Tiger, Golden Langur, Himalayan Musk Deer, Red Panda, Wild Dog
Near Threatened (NT)	Asiatic Golden Cat, Assamese Macaque, Common Otter, Himalayan Goral, Malayan Giant Squirrel, Marbled Cat
Vulnerable (VU)	Asiatic Black Bear, Capped Langur, Clouded Leopard, Common Leopard, Gaur, Himalayan Serow, Sambar, Smooth-coated Otter

2.3.1.3 Avifaunal diversity

Including the cumulative species list from the Biodiversity Report (2019), BC4 RBA (2022), RBA (2023) for the DFO management plan conducted by the division, and personal checklist maintained by field staff, 364 species of birds belonging to 73 families are recorded within the jurisdiction of DFO Zhemgang. The area has recorded 15 conservation significant bird species.

Table 8. Record of IUCN red list birds

IUCN status	Common name
Critically Endangered (CR)	White-bellied Heron
Endangered (EN)	Steppe Eagle
Near Threatened (NT)	Great Hornbill, River Lapwing, Satyr Tragopan, Rufous-bellied Eagle, Yellow-rumped Honeyguide, Ward's Trogon, Himalayan Vulture, Black-necked Crane, Green Imperial Pigeon, Red-breasted Parakeet, Mountain Hawk Eagle
Vulnerable (VU)	Beautiful Nuthatch, Rufous-necked Hornbill, Wreathed Hornbill

2.3.1.4 Other taxa inventory

The DFO Zhemgang with varying altitudes, climatic zones and habitats is also home to other taxa which are hardly explored. They play significant ecological roles such as pest control, nutrient cycling and as indicators of environmental health. Although no systematic inventory was conducted, DFO Zhemgang has been able to record many such species through opportunistic observations and cumulative listings from earlier surveys.

The inventory listings include 27 species of snakes belonging to 5 families, 16 amphibian species under 5 families, 8 species of Agamids under 4 families, 186 species of orchids, 294 species of butterflies under 5 families, and 112 moth species under 19 families. Further, 44 fungi species under 23 families are also recorded.

2.3.2 Aquatic Ecosystem

The DFO Zhemgang oversees an area intersected by three major rivers: the Drangmechu, Mangdechu, and Chamkharchu. These rivers are essential to the region's ecosystem, nurturing diverse aquatic life and providing vital water resources for local communities and wildlife. Apart from these rivers, DFO Zhemgang has conducted assessments and mappings of water sources within its jurisdiction. These water sources play a critical role in maintaining ecological balance and supporting the area's biodiversity.

Overall, DFO Zhemgang's jurisdiction is characterized by significant water bodies and abundant biodiversity, making it a crucial focus for conservation efforts and ecological research. The natural wetlands managed by DFO Zhemgang include key features such as the sacred Buli Tsho, covering approximately 1.4 hectares, and marshy land totaling 11.7 hectares. These wetlands are vital components of the local ecosystem, providing essential habitats for a diverse array of plant and animal species.

Though not exhaustive, the report records 21 odonate species (dragonflies and damselflies) from 7 families, 19 fish species, and 2 species of testudines (turtles). One notable discovery within the DFO Zhemgang area is the presence of the Duck Mussel (*Anodonta anatina*), a freshwater mussel from the Unionidae family, recorded in a pond at Zarkabla. This finding underscores the existence of unique and specialized aquatic fauna in the region.



Figure 4. Duck mussel and its habitat at Zarkabla

2.3.3 Agricultural Ecosystem

Landholding patterns across seven gewogs under DFO Zhemgang are categorized into four types: Agriculture wetland (Chhuzhing), Dryland (Kamzhing), Kitchen garden (Tshoesa), and Orchard (Ngultho Dumra). The sampling households communities combined own a total of 2,225 acres of privately registered land. Examining the land distribution among the gewogs, Bardo Gewog emerges as the largest landholding, encompassing 528 acres. Nangkor Gewog follows, with a total of 405 acres.

Table 9. Types of land holdings

Types of land	Area (Acres)	Percent
Agriculture Wetland	393	18
Dryland	1521	68
Kitchen Garden	62	3
Orchard	250	11
Total	2225	100

The communities across the landscape cultivate eight different types of cereals. Among the cereals, maize and rice are identified as the major and most commonly grown crops by the farmers, highlighting their importance in local agriculture and diet. Thirteen types of cash crops and vegetables are also cultivated in the area. Bardo and Shingkar Gewogs are notable for their agricultural diversity, as they grow the widest variety of cash crops among the seven gewogs.

2.4 Existing Management Regimes

DFO Zhemgang manages a diverse array of forest resources through 32 area-based management regimes and 14 cross-cutting management regimes. These regimes include a Biological Corridor (BC-4), Forest Management Unit (FMU), Local Forest Management Areas (LFMAs), Community Forest (CF), Key Biodiversity Area (KBA), High Conservation Value (HCV) area, Scientific thinning area, plantations, and Non-Wood Forest Product (NWFP) management groups. The biological corridor, while designated as a protected area, allows resource allocation to local communities based on a conservation management plan and BC 4 has approved management plans for ten years. LFMAs are established in each gewog to address the resource needs of the communities. To promote the participation of the community in sustainable forest management, 20 community forest management groups have been formed. These groups are granted the right to allocate the forest resources based on approved management plans. The registration and certification of private forests encourage individuals to grow trees and other forest resources on their land, contributing to carbon sequestration and sustainable land management. Wangdigang-Dechugang watershed management plan is approved to ensure the sustainable flow of water to Zhemgang town and nearby communities for both drinking and irrigation purposes. The endangered growing area of *Paphiopedilum* spp. in Kaktong in Ngangla gewog is designated as KBA to ensure effective management and conservation. Buli Tsho in Nangkor gewog has been designated as HCV areas for its significance in cultural and spiritual values. NWFP management groups have been formed to facilitate the sustainable utilization of resources and to generate income for the group members through sale of NWFPs.

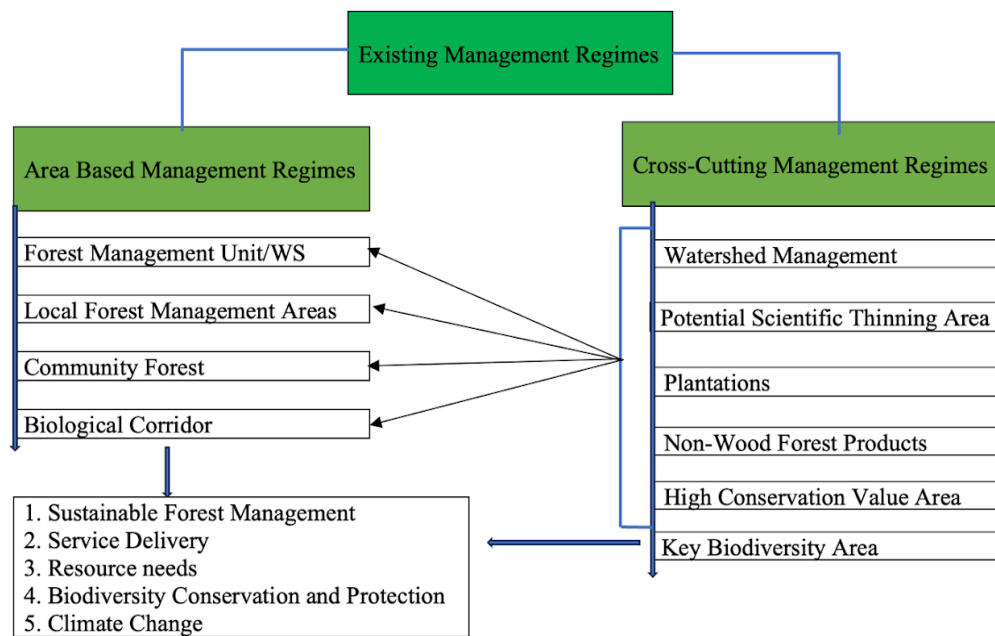


Figure 5. Thematic representation of existing management regimes

2.4.1 Area Based Management Regimes

The area-based management regimes include the Biological Corridor (BC), Forest Management Unit (FMU), Local Forest Management Areas (LFMA), Community Forests (CF), and Private Forests (PF). The location of area-based management regimes under DFO Zhemgang can be seen at glance in figure 6.

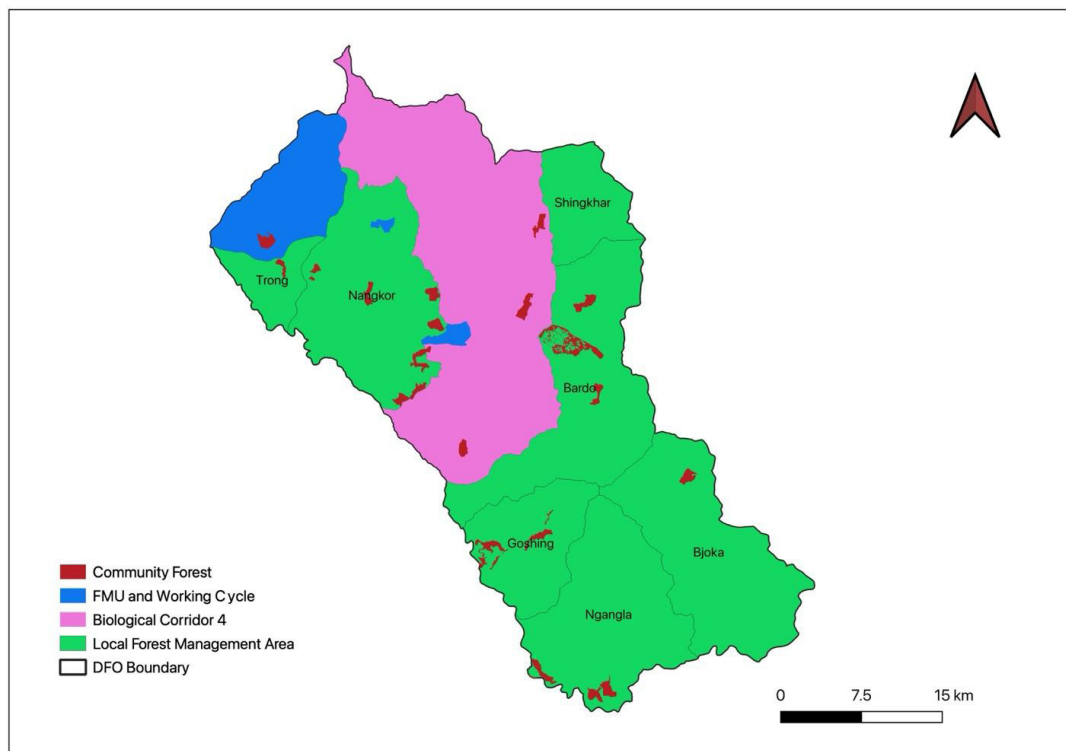


Figure 6. Area-based management regimes

2.4.1.1 Forest Management Unit and Timber Extraction Site

Forest Management Unit means an area of State Reserved Forest Land designated for production forest area for timber harvesting (FNCRR, 2023). DFO Zhemgang has one FMU (Wangdigang), two working schemes (Kikhar and Malaya Timber Extraction Site). Before the establishment of Wangdigang FMU, the area was used mostly as a grazing land by the local communities of Dangkhari, Dungbey, Pugling, Baling and migratory cattle from Trongsa and Bumthang Dzongkhags during winter season. The area was also managed with single tree selection with coupes allocated to Gedu Wood Manufacturing Corporation in 1984. In 1987–88, a coupe of 30 ha. was opened for supplying Champ (*Michelia* sp.) timber for National Assembly Hall construction in Thimphu. The major forest types that comprise the FMU and Timber Extraction Sites are Broadleaved forests.

Table 10. List of FMU and TES

Name of units	Dzong-khag	Gewog falling within the FMU	Year of establishment	Total area (ha)	Forest-ed area (ha)	Annual Allowable Cut (ACC)-m3				Plan Cycle
						Commercial	Rural	Total	Plan Period	
Wangdigang FMU	Zhemgang	Trong	2017	8,759.00	7,128.91	-	2,100.00	2,100.00	2017-2026	3
Kikhar TES	Zhemgang	Nangkor	2013	2,460.95	2,275.95	1,602.83	-	1,602.83	2012-2014	2
Kikhar TES1	Zhemgang	Nangkor	2018	176.47	175.33	509.44	-	509.44	2019-2020	1
Malaya TES	Zhemgang	Nangkor	2012	516.60		2,092.38		2,092.38	2012-2013	2
Total				11913.02						

2.4.1.2 Local Forest Management Area

The Local Forest Management Area (LFMA) was created to implement sustainable management practices for forest resources of DFO Zhemgang, situated outside PA, FMUs, BCs and CFs. The LFMA initiative was officially launched in 2012 in Nangkor Gewog. Presently, the DFO Zhemgang has extended LFMA management plans to seven gewogs covering an area of 51,051.61 ha from a total area of 151,842 ha under the division. While the management plan has significantly aided in ensuring sustainable harvesting of the forest resources.

Table 11. List of Local Forest Management Area

Local Forest Management Area								
Name of LFMA	Dzong-khag	Gewog	Year of estab-lish-ment	Total Ge-wog Area (ha)	Area covered by plan (ha)	Annual allowa-ble cut (AAC)-m3	Plan pe-riod	Plan cycle
Trong	Zhemgang	Trong	2016	35,574.24	3,386.208	1,095.00	2016-2026	1
Nangkor		Nangkor	2012	49,255.80	13,900.40	10,762.00	2012-2022	2
Shingkhar		Shingkhar	2015	29,848.31	2,956.00	1,416.00	2015-2025	1
Bardo		Bardo	2018	21,048.49	11,793.8	17,737.00	2018-2027	1
Goshing		Goshing	2019	9,911.00	2,179.00	3,210.00	2019-2028	1
Ngangla		Ngangla	2019	21,433	3,862.00	5,155.00	2019-2028	1
Bjoka		Bjoka	2020	19,297.55	2,540.10	1,323.00	2020-2029	
Total				186,368.39	40,617.51	40,698.00		

2.4.1.3 Community Forest

The relationships between the local people and an environment are inherited within the culture since time immemorial. In order to manage the existing forests in a sustainable way and to provide continuous forest produce supply to the citizens, the concept of social forestry was started in 1979 under a Royal Decree. Local communities are seen as important partners in the protection and management of natural resources. The policy implementation was initiated with the establishment of the first Community Forest Management Group (CFMG) in 1997 at Dozam, Mongar. The DFO Zhemgang has also initiated the establishment of CFs since 2004 and currently there are 20 CFs with 763 members managing 3050.91 hectares of State Reserved Forest Land as Community Forests. In line with the Forest Act and Rules, to ensure sustainable management of Community Forest through good governance practices, Zhemgang Dzongkhag has formed the first Community Forest Networking Group (CFNG) in 2020.

Table 12. List of Community Forests

Name of CF	Year of Estb.	Gewog	Members		Total Area (Ha)	AAC (m3)	Plan Period	Plan Cycle
			Male	Female				
Dangkhar	2010	Trong	40	12	156.00	387.21	2020-2030	2
Thuenpa Puenzhi	2011	Trong	5	17	66.34	337.45	2021-2031	2
Phuensum Pelri	2009	Nangkor	1	15	59.30	251.4	2019-2029	2
Yoesel Pelri	2004	Nangkor	2	19	111.74	302.4	2018-2027	3
Phendhey Norbuling	2009	Nangkor	2	35	115.09	436.3	2020-2030	2
Rinchen Norbuling	2009	Nangkor	1	32	119.60	377.49	2020-2030	2
Nyakhar Dung	2020	Nangkor	4	31	160.00	541.17	2020-2030	1
Tshaidang	2012	Nangkor	6	21	177.20	541.17	2023-2033	2

Tashicholing	2009	Nangkor	6	13	102.19	66.31	2019-2029	2
Khomshar	2011	Bardo	37	58	479.54	2,097.00	2022-2032	2
Phendheychoing	2011	Bardo	16	28	155.64	226.60	2021-2031	2
Tashi Yangcha	2011	Bardo	6	13	95.00	181.58	2021-2031	2
Radhi	2012	Shin-gkhar	14	12	148.30	134.7	2022-2032	2
Thuktenchoing	2011	Shin-gkhar	12	29	174.00	614.47	2021-2031	2
Budhashi	2012	Goshing	56	6	223.00	457.1	2022-2032	2
Mewangang	2020	Goshing	26	2	141.20	329.88	2020-2030	1
Galing	2009	Ngangla	33	3	162.33	428.68	2019-2029	2
Dali	2022	Bjoka	21	6	129.00	288.00	2022-2032	1
Norzincholing	2004	Ngangla	64	13	108.44	71.11	2019-2028	2
Thinleygang	2022	Ngangla	35	4	167.00	230.00	2022-2032	2
Total			387	369	3,050.91	8,300.02		

2.4.1.4 Private Forest

There are four registered Private Forests (PF) under DFO Zhemgang and the PFs have not formulated management plans and not determined the Annual Allowable Cut (AAC). The details of PF are as provided in table 13.

Table 13. List of Registered Private Forests

Name of the owner	CID No.	Name of the Private Forest	Dzong-khag	Gewog	Thram No.	Year of Estb.	Total area (ha)	Area under Forest (ha)	Plan period
Bum Tashi	12008002533	Bum Tashi PF	Zhemgang	Trong	298	2020	0.74	0.74	1
Yeshi Choden	12004000493	Yeshi Choden PF	Zhemgang	Nangkor	24	2020	2.86	2.86	1
Phurpamo	12004003051	Phurpamo PF	Zhemgang	Nangkor	236	2020	1.21	1.21	1
Yeshey Lhamo	12008000217	Yeshey Lhamo PF	Zhemgang	Trong	265	2024	3.96	3.96	1
Total							8.30	8.30	

2.4.1.5 Biological Corridor (BC 4)

Biological Corridor (BC4) covers an area of 594.65 sq. km and 40 km in length. It is located between the longitudes 90°35'22.14"E and 90°56'49.83"E and latitudes 27°23'5.66"N and 27°1'2.15"N. The corridor connects Royal Manas National Park (RMNP) in the south, Phrumsengla National Park (PNP) in the north, and Jigme Singye Wangchuck

National Park (JSWNP) in the west. The biological corridor covers three gewogs under Zhemgang Dzongkhag and a gewog under Trongsa Dzongkhag. The majority of the BC4 area falls under Divisional Forest Office, Zhemgang with 17.85% (106.16 sq. km) within Divisional Forest Office, Bumthang. Human settlements inside the corridor are scattered in the corridor's eastern, southern, and north-western parts. Trongsa-Zhemgang primary national highway passes through BC4 from Dangdung bridge to Wangdigang bridge. The road connecting the middle and upper Kheng passes at the middle of the corridor.

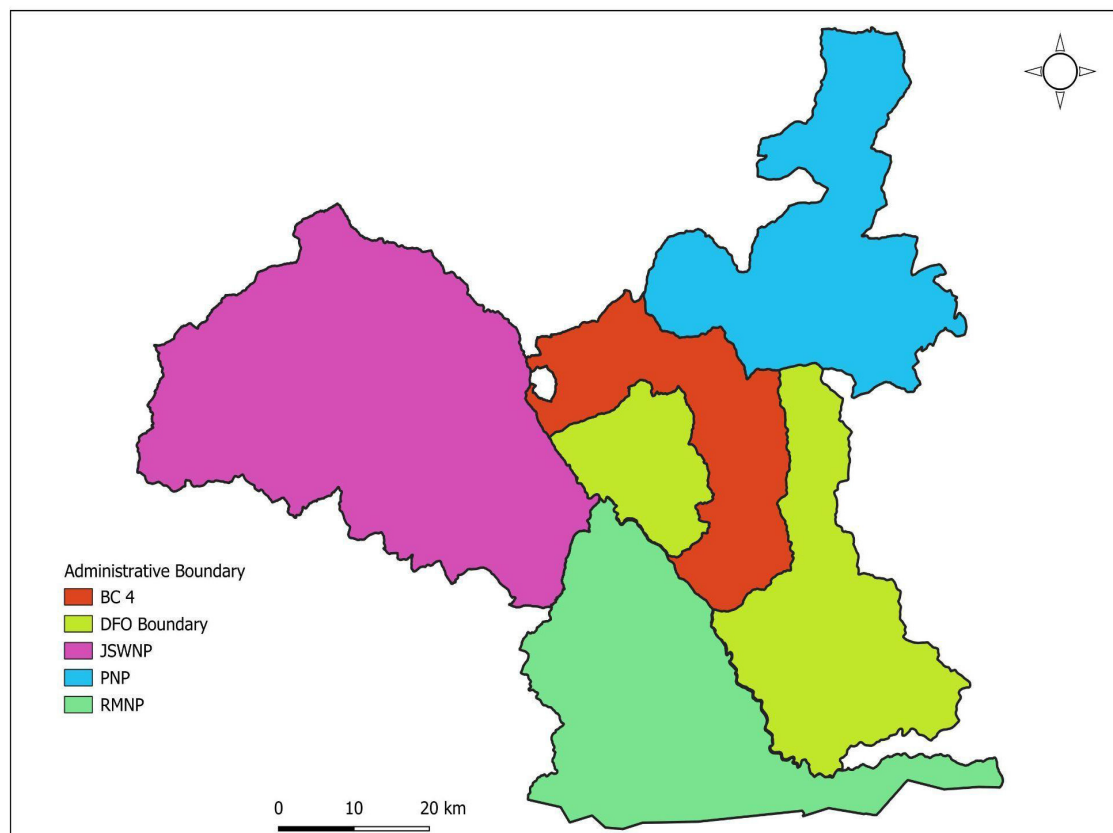


Figure 7. Map of BC4 connecting three PAs

2.4.2 Cross Cutting Management Regimes

The cross cutting management regimes include Non-wood forest product management areas, watershed management, plantations, high conservation value areas, key biodiversity areas, and potential scientific thinning areas.

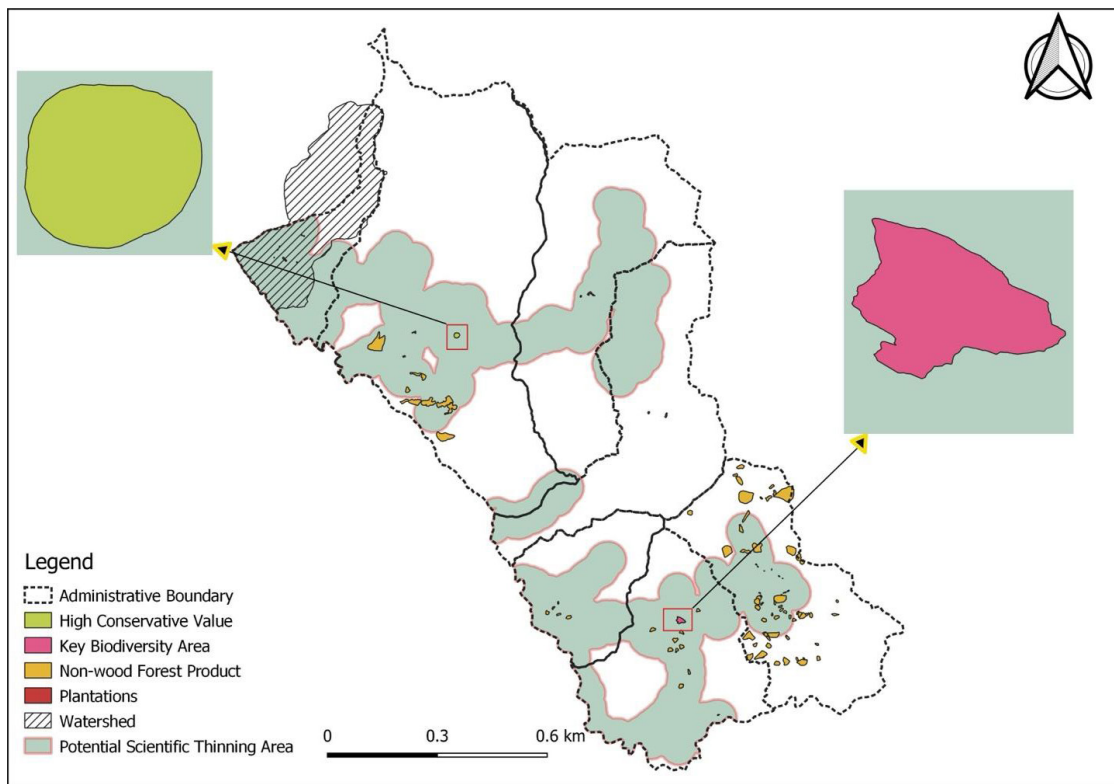


Figure 8. Map of Cross Cutting Management Regimes

The details of these cross cutting management regimes are provided in table 14.

Table 14. List of cross cutting management regimes

Sl #	Cross Cutting Management Regimes/ Interventions	Name of the area based management regimes/Location	Dzongkhag	Gewog	Year of operationalization of the cross cutting regime	Total area under management intervention (ha)	Area covered by the area based plan (ha)	Key Management Interventions	Plan period
1	Goling Jampel Thuenkhung Tshogpa	Nangkor LFMA	Zhemgang	Nangkor	2019	121.16	13,900.40	Collection and marketing of Pipla	2
2	Zhopbleng Shingmen Tshogpa	Nangkor LFMA	Zhemgang	Nangkor	2019	39.36	13,900.40	Pipla	2
3	Tshaidang Shingmen Tshogpa	Nangkor LFMA	Zhemgang	Nangkor	2019	264.26	13,900.40	Pipla, Rubia cordifolia, Dendrocalamus hamiltonii	2
4	Lamtang NWFP	Goshing LFMS	Zhemgang	Goshing	2019	42	2,179	Neomicrocalamus andropogonifolius, Dendrocalamus hamiltonii, Diplazium esculentum, Knema tenuinervia, Bornida grossa, Piper betleoides, Oroxylum indicum, Thysonolaena latifolia, Cinnamomum tamala, Tupistra nutans, Emblica officinalis	2
5	Marangduth NWFP	Ngangla LFMA	Zhemgang	Ngangla	2019	35	3,862	Neomicrocalamus andropogonifolius, Dendrocalamus hamiltonii, Diplazium esculentum, Knema tenuinervia, Bornida grossa, Piper betleoides, Oroxylum indicum, Thysonolaena latifolia, Cinnamomum tamala, Tupistra nutans, Emblica officinalis, Plectocomia himalayana	2
6	Ngangla-Trong Shingmen Tshogpa	Ngangla LFMA	Zhemgang	Ngangla	2019	32	3,862	Neomicrocalamus andropogonifolius, Dendrocalamus hamiltonii, Diplazium esculentum, Knema tenuinervia, Bornida grossa, Piper betleoides, Oroxylum indicum, Thysonolaena latifolia, Cinnamomum tamala, Tupistra nutans, Emblica officinalis, Plectocomia himalayana and Wild Yam	2

7	Bjoka Tsharzo Gong- phel Tshogpa	Bjoka LFMA	Zhemgang	Bjoka	2007	1007	2,540.10	Cane and Bamboo (Yula)	2
8	Dali Shingmen Tshogpa	Bjoka LFMA	Zhemgang	Bjoka	2020	119	2,540.10	Pipla and Rubia cordifolia	2
9	Kamati Pipla Man- agement Group	Bjoka LFMA	Zhemgang	Bjoka	2015	5,40	2,540.10	Pipla	2
10	Wangdigang-De- chugnag Watershed management	Trong LFMA/ WFMU	Zhemgang	Trong	2018	10,192.75	12,145.208	Watershed management	1
11	Kaktong KBA	Ngnagla LFMA	Zhemgang	Ngangla	2023	25	3,862	Paphiopedilum fairieanum, endangered Paphiopedilum venustum, Paphiopedilum insigne, and newly discovered Paphiope- dilum x pradhanii and Spathoglottis jetsuniae.	1
12	Buli Tsho (HCVA)	Nangkor LFMA	Zhemgang	Nangkor	2024	17.23	13,900.40	HCV-Cultural Values	1
13	Plantations	Plantations	Zhemgang	Ngangla, Goshing, Bardo, Nangkor	2023,2024,2025	10.60	NA	Afforestation, Reforestation, Enrichment plantation	1
14	Potential scientific thinning area	LFMA of Nang- kor, Trong, Bardo, Shingkhaz, Goshing, Ngangla, Bjoka	Zhemgang	Nangkor, Trong, Bardo, Shin- gkhar, Goshing, Ngangla, Bjoka	2025	38,276.27	129,770.39	Thinning	1

2.5 Forest Resources and Utilization

2.5.1 Forest Resources

As per National Forest Inventory, Volume I (2023), 93.89% of the total forest area of Zhemgang Dzongkhag is under forest cover making it the highest Dzongkhag with forest cover. The forest area spans to 223,067.45 ha (2,230.674 sq. km) with a stem count of 384 trees per hectare. The DFO Zhemgang covers seven gewogs (only Dangkhar chiwog under Trong gewog) amongst eight gewogs in the Dzongkhag covering an area of 151,800 ha (1518 sq.km).

2.5.1.1 Forest Cover by Forest Type

The Forest Type Map 2022 shapefile was used to determine the forest types under DFO Zhemgang. The Dzongkhag level information from the National Forestry Inventory, Volume I, State of Forest Report, 2023 was used to determine the forest cover by forest type for the DFO Zhemgang. The division has a forest cover area of 136475.608 (ha) which accounts for 89.90%. as shown in table 15.

Table 15. Forest cover by forest type

Forest Types	Forest Cover (ha)	Forest Cover (%)
Subtropical Forest	14,259.86	10.45%
Chir Pine Forest	1,827.86	1.34%
Warm Broadleaved Forest	66,411.35	48.66%
Evergreen Oak Forests	12,383.40	9.07%
Cool Broadleaved Forest	30,622.05	22.44%
Blue Pine Forest	2,774.68	2.03%
Spruce Forest	325.59	0.24%
Hemlock Forest	2,624.51	1.92%
Fir Forest	4,611.09	3.38%
Juniper Rhododendron Forest	635.22	0.47%

Warm Broadleaved Forest dominates the forests in DFO Zhemgang accounting 48.66% of the total forest. Warm Broadleaved Forest and Cool Broadleaved Forest accounts for 71.10% of the total forest area in DFO Zhemgang. Juniper Rhododendron Forest and Spruce Forest has the smallest area coverage constituting 0.47% and 0.24% of the total Forest respectively.

2.5.1.2 Stem density by forest type

The Dzongkhag level information from the National Forestry Inventory, Volume I, State of Forest Report, 2023 was used to determine the tree count by forest type for the DFO Zhemgang.

Table 16. Stem density by forest type

Average tree count/ha	382		
Stem density by Forest types	Forest Area (Ha)	Tree count/ha	Total tree count
Subtropical Forest	14259.86	310	4,420,556.60
Chir Pine Forest	1827.86	254	464,275.17
Warm Broadleaved Forest	66411.35	375	24,904,255.88
Evergreen Oak Forests	12383.40	417	5,163,877.38
Cool Broadleaved Forest	30622.05	417	12,769,395.68
Blue Pine Forest	2774.68	426	1,182,014.96
Spruce Forest	325.59	401	130,561.59
Hemlock Forest	2624.51	406	1,065,552.28
Fir Forest	4611.09	402	1,853,658.58
Juniper Rhododendron Forest	635.22	269	170,873.10
Total	136475.608		52,125,021.22

The table 16 shows that a total forest area is 136,475.61 hectares, containing 52,125,021 trees with an average density of 382 trees per hectare. Warm Broadleaved Forests contribute the most with 66,411.35 hectares and 24,904,256 trees, while Cool Broadleaved Forests follow with 30,622.05 hectares and 12,769,396 trees. In contrast, Juniper and Rhododendron Forests have the smallest area (635.22 hectares) and tree count (170,873).

2.5.1.3 Basal Area by Forest Type

The Dzongkhag level information from the National Forestry Inventory, Volume I, State of Forest Report, 2003 was used to determine the Basal area per hectare by forest type for the DFO Zhemgang.

Table 17. Basal area by forest type

Average basal area/ha	20.08		
Total basal area	2740430.209		
Basal Area by Forest types	Forest area(ha)	Basal area per ha (m2)	Total basal area
Subtropical Forest	14259.86	20.08	286,337.99
Chir Pine Forest	1827.86	15.14	36,703.33
Warm Broadleaved Forest	66411.35	27.67	1,333,539.89
Evergreen Oak Forests	12383.40	38.07	248,658.65
Cool Broadleaved Forest	30622.05	42.89	614,890.80
Blue Pine Forest	2774.68	23.14	55,715.63
Spruce Forest	325.59	36.95	6,537.85
Hemlock Forest	2624.51	46.51	52,700.22
Fir Forest	4611.09	44.47	92,590.71
Juniper Rhododendron Forest	635.22	15.34	12,755.14
Total	136475.608		2,740,430.21

The total basal area of DFO Zhemgang is 2,740,430.21 m² is estimated using the basal area density of the different forest types derived from NFI report volume II. Warm Broadleaved Forests contribute the largest share, covering 1,333,539.89 hectares followed by Cool Broadleaved Forests with 614,890.80 hectares and Subtropical Forest with 286,337.99m². In contrast, Spruce Forests have the smallest basal area of 6,537.85 m² across 325.59 hectares.

2.5.1.4 Growing stock by Forest Type

The Dzongkhag level information from the National Forestry Inventory, Volume I, State of Forest Report, 2003 was used to determine the volume per hectare by forest type for the DFO Zhemgang.

Table 18. Volume by forest type

Average growing stock/ha	274.63		
Total growing stock	40,549,195.30		
Growing stock by Forest types	Forest area(ha)	Volume (m ³ per ha)	Total growing stock (Volume m ³)
Subtropical Forest	14,259.86	160.90	2,294,411.47
Chir Pine Forest	1,827.86	116.93	213,731.09
Warm Broadleaved Forest	66,411.35	228.03	15,143,779.91
Evergreen Oak Forests	12,383.40	341.01	4,222,862.89
Cool Broadleaved Forest	30,622.05	379.15	11,610,351.02
Blue Pine Forest	2,774.68	290.17	805,129.77
Spruce Forest	325.59	384.84	125,300.06
Hemlock Forest	2,624.51	442.70	1,161,871.91
Fir Forest	4,611.09	398.82	1,838,995.31
Juniper Rhododendron Forest	635.22	101.04	64,182.22
Total	136,475.61		37,480,615.64

The total growing stock of DFO across all forest types is 37,480,615.64 m³. Warm Broadleaved Forests (66,411.35 ha) and Cool Broadleaved Forests (30,622.05 ha) have the highest total growing stock volumes with 15,143,779.91 m³ and 11,610,351.02 m³ respectively. In contrast, Spruce Forests have the smallest total growing stock volume of 125,300.06 m³ over 384.84 hectares.

2.5.1.5 Biomass Stock by Forest Type

The total biomass is estimated using the biomass density across all carbon pools and by forest type (as per National Forest Inventory, Volume II (2023)) under the areas of the DFO. Accordingly, the total carbon stock in Zhemgang Dzongkhag is 36.78 million tonnes across the different carbon pools.

Table 19. Biomass stock by forest type

Biomass by Forest types	Forest area(ha)	AGB	BGB	CWD	Litter	Total
Subtropical Forest	14,259.86	1555893.12	439623.21	32797.68	165699.57	2194013.59
Chir Pine Forest	1,827.86	179396.96	51197.99	6397.51	30177.97	267170.43
Warm Broadleaved Forest	66,411.35	11855963.29	3089120.62	349987.81	808890.24	16103961.97
Evergreen Oak Forests	12,383.40	3112797.48	804630.36	36159.53	149715.31	4103302.67
Cool Broadleaved Forest	30,622.05	8020610.32	2077603.20	260287.43	517512.65	10876013.59
Blue Pine Forest	2,774.68	343467.79	94290.17	18423.88	81103.90	537285.73
Spruce Forest	325.59	80020.93	20520.02	2054.47	1491.20	104086.63
Hemlock Forest	2,624.51	684301.63	177270.11	44957.86	45613.98	952143.59
Fir Forest	4,611.09	1126513.68	293839.59	52381.98	100198.99	1572934.23
Juniper Rhododendron Forest	635.22	48971.29	13829.23	1092.58	5265.97	69159.07
Total	136475.61	27007936.49	7061924.52	804540.72	1905669.78	36780071.51

Table 19 also shows the total biomass stock over the different carbon pools in the DFO with a high biomass of 27 million tonnes. Similarly, comparison of the biomass in the different forest type shows warm Broadleaved Forests contributing 16.1 million tonnes followed closely by Cool Broadleaved Forests with 10.88 million tonnes. In contrast, Juniper and Rhododendron Forests have the lowest contributions, with 0.07 million tonnes.

2.5.1.6 Carbon Stock by Forest Type

Similarly, the total biomass carbon is estimated using the carbon density across all carbon pools and by forest type (as per National Forest Inventory, Volume II (2023)) under the areas of the DFO. Accordingly, the total carbon stock for forest areas under DFO Zhemgang is 25.99 million tonnes across the different carbon pools.

Table 20. Carbon stock by forest type

Carbon stock by Forest types	Forest area(ha)	AGB	BGB	CWD	Litter
Subtropical Forest	14,259.86	731245.62	206625.37	15400.65	77858.84
Chir Pine Forest	1,827.86	84319.18	24054.64	2997.69	14184.19
Warm Broadleaved Forest	66,411.35	5572576.38	1451752.11	164700.15	380537.04
Evergreen Oak Forests	12,383.40	1462974.88	378189.04	16965.26	70337.71
Cool Broadleaved Forest	30,622.05	3769574.36	976537.17	122181.98	243139.08
Blue Pine Forest	2,774.68	161430.88	44311.64	8657.00	38124.10
Spruce Forest	325.59	37608.90	9643.98	967.00	703.27

Hemlock Forest	2,624.51	321633.70	83328.19	21127.31	21442.25
Fir Forest	4,611.09	529445.35	138102.15	24623.22	47125.34
Juniper Rhododendron Forest	635.22	23014.02	6498.30	514.53	2477.36
Total	136475.61	12693823.27	3319042.58	378134.78	895929.18

Table 20 shows the total carbon stock over the different carbon pools in the DFO. The total carbon stock within the DFO Zhemgang is 25.99 million tonnes. Warm Broadleaved Forests have the highest carbon stock of 11.23 million tonnes followed closely by Cool Broadleaved Forests with 7.68 million tonnes. In contrast, Spruce Forests have the lowest contributions, with 0.07 million tonnes..

2.5.1.7 Biomass Increment by Forest Type

The Biomass increment is calculated and presented in table 21.

Table 21. Biomass increment by forest type

Forest types	Forest area (Ha)	Biomass Increment (tonnes/ha/yr)	Total increment
Subtropical Forest	14,259.86	2.94	41,923.99
Chir Pine Forest	1,827.86	1.84	3,363.25
Warm Broadleaved Forest	66,411.35	2.79	185,287.66
Evergreen Oak Forests	12,383.40	0.77	9,535.22
Cool Broadleaved Forest	30,622.05	2.13	65,224.97
Blue Pine Forest	2,774.68	3.45	9,572.66
Spruce Forest	325.59	3.20	1,041.89
Hemlock Forest	2,624.51	2.44	6,403.81
Fir Forest	4,611.09	2.19	10,098.29
Juniper Rhododendron Forest	635.22	0.58	368.43
Total	136,475.61		332,820.16

The total biomass increment across all forest types is 332,820.16 tonnes per year. Warm Broadleaved Forests contribute the highest increment of 185,287.66 tonnes, followed by Subtropical Forests with 41,923.99 tonnes and Cool Broadleaved Forests with 65,224.97 tonnes. Blue Pine Forests have a significant increment of 9,572.66 tonnes, while Fir Forests contribute 10,098.29 tonnes. Spruce Forests and Hemlock Forests provide 1,041.89 tonnes and 6,403.81 tonnes, respectively. Juniper Rhododendron Forests have the smallest increment, contributing just 368.43 tonnes annually.

2.5.1.8 Carbon increment by forest types

The carbon increment is calculated based on forest types as presented in table 22.

Table 22. Carbon increment by forest type

Carbon Increment by Forest types	Forest area (Ha)	Carbon Increment (tonnes/ha/yr)	Total increment
Subtropical Forest	14,259.86	1.38	19,678.61
Chir Pine Forest	1,827.86	0.86	1,571.96
Warm Broadleaved Forest	66,411.35	1.31	86,998.87
Evergreen Oak Forests	12,383.40	0.36	4,458.02
Cool Broadleaved Forest	30,622.05	1.00	30,622.05
Blue Pine Forest	2,774.68	1.62	4,494.99
Spruce Forest	325.59	1.51	491.64
Hemlock Forest	2,624.51	1.15	3,018.19
Fir Forest	4,611.09	1.03	4,749.42
Juniper Rhododendron Forest	635.22	0.27	171.51
Total	136,475.61		156,255.25

The total carbon increment across all forest types is 156,255.25 tonnes per year. Warm Broadleaved Forests lead with the highest carbon increment of 86,998.87 tonnes, followed by Subtropical Forests with 19,678.61 tonnes and Cool Broadleaved Forests with 30,622.05 tonnes. Blue Pine Forests contribute 4,494.99 tonnes, while Fir Forests provide 4,749.42 tonnes. Spruce Forests and Hemlock Forests contribute 491.64 tonnes and 3,018.19 tonnes, respectively. Juniper and Rhododendron Forests have the smallest carbon increment at just 171.51 tonnes annually.

2.5.1.9 Carbon Sequestration

Carbon sequestration is the process of the removal of carbon dioxide from the atmosphere and storing it in the form of biomass/carbon in plants, soils, geologic formations, and the ocean. Forests play an important role in climate change mitigation through sequestration of atmospheric carbon and storing in the form of biomass.

The total carbon sequestration rate of Zhemgang dzongkhag is 6.67 tonnes CO₂ ha⁻¹ yr⁻¹ sequestering 1,487,986.65 tonnes CO₂ annually as reported in the NFI II. However, the carbon sequestration capacity for forests under the DFO Zhemgang is estimated 573,560.07 tonnes CO₂ per year as presented in table 23.

Table 23. Carbon sequestration

Area	Biomass Growth (tonnes)	Carbon Fraction	CO ₂ fraction/ equivalent	Total Carbon sequestration (tonnes CO ₂)
DFO Zhemgang	332,820.15	0.47	3.67	573,560.07

2.5.2 Function Mapping

Forest function mapping is crucial for biodiversity conservation, sustainable resource management, and maintaining essential ecosystem services like water regulation, soil

stabilization, and carbon sequestration. It identifies critical habitats, supports sustainable resource extraction, and aids in climate change mitigation by locating high carbon storage areas.

All areas under DFO Zhemgang covers by the existing area-based and cross-cutting management regimes leaving no area outside these established management regimes. The functional classifications such as production, protection, and non-production areas are already addressed under existing management regimes and are therefore not reflected in this plan. The figure 9 presents the overall existing management regimes under the DFO Zhemgang.

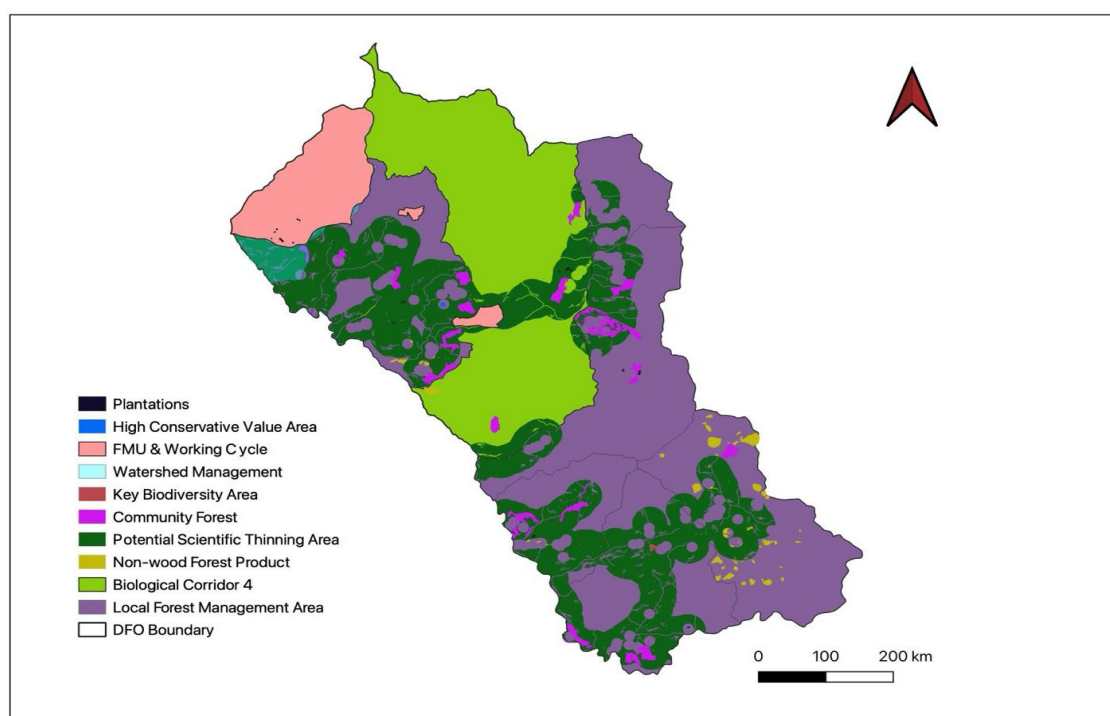


Figure 9. Overall existing management regimes

2.5.3 Forest Resource Utilization

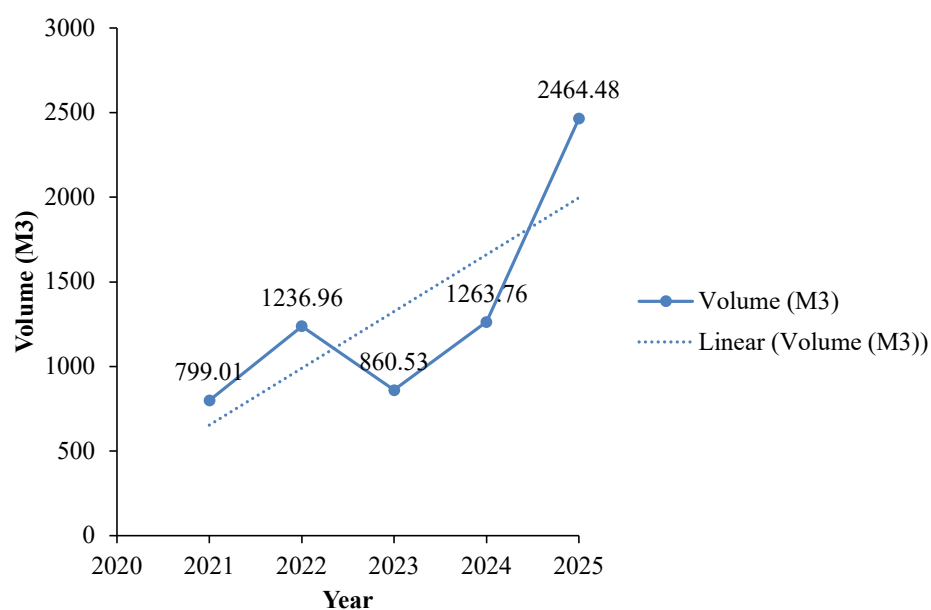
The forest resource utilization record has been generated from the Forest Information Reporting and Monitoring System (FIRMS) for the DFO Zhemgang as presented below;

2.5.3.1 Rural Timber Allotment in five years (2021-2025)

The division has allotted a significant quantity of timber to rural areas over the last five years. The record reveals that a total of 6624.74 m³ of timber were allotted for rural purposes from 2021-2025. In 2025, 2464.48 m³ of timber were allotted for rural purposes at subsidized rate. Of which, the major quantity has been allotted for New house construction (1610.94 m³) followed by Domestic use by rural dwellers (468.6 m³) and Rural construction (175.1 m³) respectively. The least quantity of timber has been allotted for General Hoisting purposes (0.48 m³). The rural timber allotment has been highest in the year 2025 (2464.48 m³) followed by 2024 (1263.76 m³) and 2022 (1236.96 m³) respectively.

Table 24. Volume of Rural Timber Allotted (2021–2025)

Purpose	Year				
	2021	2022	2023	2024	2025
Domestic use by rural dwellers	-	-	255.91	422.88	468.6
Fencing farm land	-	-	16.72	2	56.55
Fencing posts	-	6.95	-	-	-
Firewood allotted to NRDCL	-	-	-	-	8
Firewood for Funeral purpose	-	16.03	-	-	-
Firewood for Monk body	40.03	24	-	-	-
Firewood for rural purpose	140.45	191.3	-	-	-
Flag poles	2.69	11.71	-	-	-
Funeral	-	-	16.38	8	-
General Hoisting	-	-	-	-	0.48
Hoisting for dead case	-	-	-	3	-
House Renovation or Extension	48.74	155.99	-	-	-
Lhakhang renovation	-	-	-	8.26	-
New house construction	489.09	741.22	517.74	657.55	1610.94
Other rural construction: livestock shed	-	-	-	11.32	13.16
Other Institutions	3.2	-	-	-	-
Other rural construction: kitchen	-	-	-	-	15.54
Other rural construction: toilet	-	-	-	-	2.13
Others	29.24	77	-	-	-
Rural construction	-	-	-	8.39	175.1
Rural house renovation	-	-	53.78	142.36	113.98
Wall construction	45.57	12.76	-	-	-
Total Volume (M3)	799.01	1236.96	860.53	1263.76	2464.48

**Figure 10. Rural timber allotment and utilization (2021–2025)**

2.5.3.2 Commercial Timber Allotment in five years (2021-2025).

The division has allotted a total of 6987.64 m³ of timber for commercial purposes from 2021-2025. In 2025, 3329.92 m³ of timber were allotted for commercial purposes at commercial royalty rate. Of which, the major quantity has been allotted for domestic use by urban dwellers (1304.32 m³) followed by Commercial-sold to others apart from WBI (1121.58 m³) and Firewood allotted to BBPL (256.61 m³) respectively. The least quantity of timber has been allotted for Flag poles allotted to NRDCL purposes (0.42 m³). The commercial timber allotment has been highest in the year 2025 (3329.92 m³) followed by 2024 (1828.12 m³) and 2023 (677.7 m³) respectively.

Table 25. Volume of Commercial Timber Allotted (2021-2025)

Purpose	Year				
	2021	2022	2023	2024	2025
Chadri	-	-	-	81.54	-
commercial building in rural area	-	-	-	71.45	9.12
Commercial-sold to others apart from WBI	-	-	-	115.68	1121.58
Dapa and phob manufacture	-	-	-	-	6.05
Domestic use by rural dwellers	-	-	316	64	8.42
Domestic use by urban dwellers	-	-	23.31	23.91	1304.32
DoR	-	-	-	-	7.84
Dzongs/monasteries	-	-	-	16	-
Extension of Dzong	-	0.77	-	-	-
Extension of Lhakhang	-	62.73	-	-	-
Fencing farm land	-	-	-	2.2	-
Fencing house	-	-	-	12.27	-
Fencing institutional offices	-	-	-	21.72	6.22
Fencing posts	6.6	6.13	-	-	-
Firewood	-	8	-	-	-
Firewood allotted to NRDCL	-	-	96	623.37	166.5
Firewood allotted to BBPL	-	-	-	-	256.61
Firewood for Funeral purpose	-	16	-	-	-
Firewood for Monk body	80.03	16.09	-	-	-
Firewood for rural purpose	16.07	8.01	-	-	-
Firewood for Schools	1.9	293.21	-	-	-
Firewood for urban purpose	24	24	-	-	-
Flag poles	4.59	45.96	-	-	-
Flag poles allotted to NRDCL	-	-	-	-	0.42
Funeral	-	-	-	3.96	-
Furniture	1.39	-	-	-	-
Furniture	-	-	0.87	4.48	16.76
Handicraft	1.88	-	-	-	-
Hoisting for dead case	-	-	-	0.42	-

House Renovation or Extension	37.21	6.52	-	-	-
Industrial use	-	-	-	-	27.28
Lhakhang renovation	-	-	-	-	155.82
Livestock shed construction (Cattle/Pig-gery/Poultry)	7.4	8.54	-	-	-
Mushroom cultivation	-	-	-	246.96	-
New construction of Lhakhang	3.28	-	-	-	-
New house construction	22.53	5.45	171.79	102.25	10.42
New lhakhang construction	-	-	5.52	-	133.96
Nursery	-	2.7	-	-	-
other rural construction: livestock shed	-	-	-	8.4	-
Other Institutions	1.42	-	-	-	-
Others	255.96	120.52	-	-	-
Project in rural area	-	-	-	16.8	-
Religious purpose	-	-	-	8	44.11
Renovation of Lhakhang	0.09	-	-	-	-
Road construction	8.51	5.27	-	-	-
Rural house renovation	-	-	-	0.33	-
Schools	-	-	-	-	8
Timber allotment for WBI	-	-	64.21	15.73	43.09
Timber allotted to NRDCL	-	-	-	360.33	3.4
Timber for institutional use	-	-	-	28.32	-
Toilet construction	2.71	2.64	-	-	-
Wall construction	38.3	5.49	-	-	-
Total Volume (M3)	513.87	638.03	677.7	1828.12	3329.92

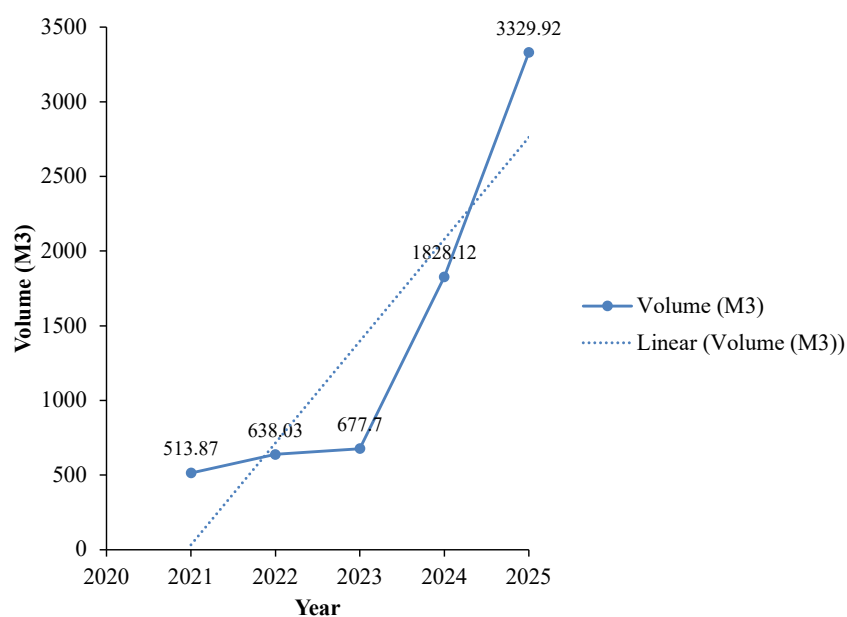


Figure 11. Commercial timber allotment and utilization (2021-2025)

2.5.3.3 Non-Wood Forest Product Allotment in five years (2021-2025)

The division has allotted a huge quantity of NWFPs for various purposes from 2021-2025. In 2025, the major NWFP allotted was *Rubia cordifolia* (3000 Kgs) followed by *Bambusa* spp. (400 Nos), *Bambusa nutans* subsp. *cupulata* (300 Nos) and *Phellinus linteus* (300 Kgs) respectively. Other common NWFPs allotted are *Fragesia* spp., *Piper longum* and *Plectocomia himalayana*.

Table 26. List of NWFP allotted (2021-2025)

Product Type	Year				
	2021	2022	2023	2024	2025
<i>Acacia catechu</i> (Khair)	-	-	20 nos.	-	-
<i>Acorus calamus</i> (Sweet-flag, bojho, chudar, chudarla, bartsa)	-	-	50 nos.	15 nos.	-
<i>Ampelocalamus</i> spp. (Nibha or ghopi bans)	-	-	-	1 head load	-
<i>Aquilaria malaccensis</i> (Agaroo)	-	-	-	5 kg	-
Bamboo mat	-	-	1245 nos.	-	-
Bamboo shoots	-	100 nos.	-	-	-
<i>Bambusa alamii</i>	-	-	150 nos.	-	-
<i>Bambusa balcooa</i>	-	-	-	80 nos.	-
<i>Bambusa nutans</i> subsp. <i>cupulata</i>	-	-	-	710 nos.	300 nos.
<i>Bambusa</i> spp. (Mugi bans, dhanu bans, chile bans, pagshing or pagshi, mal bans, jhushing, jushi or gren, taru bans, shingaray or bangay bans, katha or valka bans)	-	-	4170 nos.	150 nos.	400 nos.
<i>Calamus acanthospathus</i>	-	-	9 head load	32 head load	-
<i>Calamus</i> and <i>Daemonorops</i> spp. (Gauribet, tshim, minji, bet, tsar, tsha)	-	-	44 head load	-	-
<i>Calamus latifolius</i>	-	-	1 Bdl.	-	-
<i>Calamus</i> spp	2 nos.	-	-	-	-
Cane shoot	11 bdl	35 bdl	-	-	-
<i>Daphne</i> spp. (<i>Daphne</i> , dey-nap, kagatey, kagati)	1000 kg	1000 kg	4000 kg	700 kg	-
<i>Dendrocalamus hamiltonii</i> Munro var. <i>edulis</i>	-	-	-	100 nos.	-
<i>Dendrocalamus hamiltonii</i> var. <i>hamiltonii</i>	-	-	250 nos.	-	-
<i>Dendrocalamus</i> spp. (Pagshi, tama bans, choya or ban bans, leeshing or gugsho, soo, bhalu or kalo bans, zhang, dhungre bans, demtshar or dem chherring, zang, guliyo tama bans, su or -pagshi, rachhasi bans)	-	-	600 nos.	-	-
<i>Elastostema</i> (Dambru)	200 bdl.	-	-	-	-
<i>Fragesia</i> spp (Dragon Head Bamboo)	-	-	100 nos.	-	150 nos.

<i>Knema tenuinevia</i>	700 kg	-	-	-	-
Large bamboo	1644 nos.	401 nos.	-	-	-
<i>Neomicrocalamus andropogonifolus</i> (Ringshoo)	118 bdl.	50 bdl	-	-	-
<i>Pheellinus linteus</i> (Mulberry Mushroom)	-	-	-	650 kg	300 kg
<i>Pinus roxburghii</i> (Khotey salla, thangchuu) needle	-	-	-	8 m ³	-
<i>Piper longum</i> (Long pipla, chaitey-pipla, pipiling)	-	-	-	-	30 kg
<i>Plectocomia himalayana</i> (Patsba)	-	-	4 head load	30 head load	101 head load
<i>Rubia cordifolia</i> (Rubia, majito, tsoy)	-	-	1603 kg	-	3000 kg
Small bamboo	1243 nos.	843 nos.	-	-	-
<i>Thysanolaena spp.</i> (Tsakusha, kucho, amleso)	-	-	-	2 head load	-
<i>Tupistra nutans</i> (Ground orchid, wang pemo, wang pem, nakima, shan khuley)	-	-	115 nos.	130 nos.	-
Woodburr	240 nos.	-	-	-	-
<i>Yushania maling</i>	-	20 bdl.	75 bdl.	-	-

2.5.3.4 Surface Collection Allotment in five years (2021-2025)

From 2021-2025, a total of 85966 m³ were allotted for surface collection purposes. However, in 2025, a total of 144 m³ were allotted for surface collection. Of which, the major quantity has been allotted as Top soil (128 m³) followed by Clay soil (m³) and Leaf mould (8 m³) respectively. With taking over the mandate of surface collection by Department of Geology and Mining, no quantity has been allotted as Sand, Stone, Stone chips, Stone dust, Aggregates, GSB, Boulders and other Riverbed materials.

Table 27. Volume of Surface Collection Allotment (2021-2025)

Product Type	Unit	Year				
		2021	2022	2023	2024	2025
Aggregates	M3	-	-	1248	-	-
Boulder (rock fragment with size greater than 25.6 cm (10.1 in) in diameter.)	M3	3840	1709	568	-	-
Clay soil	M3	48	-	-	-	8
Granular Sub Base (GSB) material	M3	-	-	6256	-	-
Gravel	M3	8240	6170	7096	80	-
Leaf mould	M3	8	16	8	96	8
riverbed material	M3	-	-	8	-	-
Sand	M3	8836	7678	5555	104	-
Stone	M3	11160	5018	3984	80	-
Stone chips	M3	1496	5792	248	-	-
Stone dust	M3	32	56	160	-	-
Top soil	M3	152	32	48	-	128
Total Quantity (M3)		33812	26471	25179	360	144

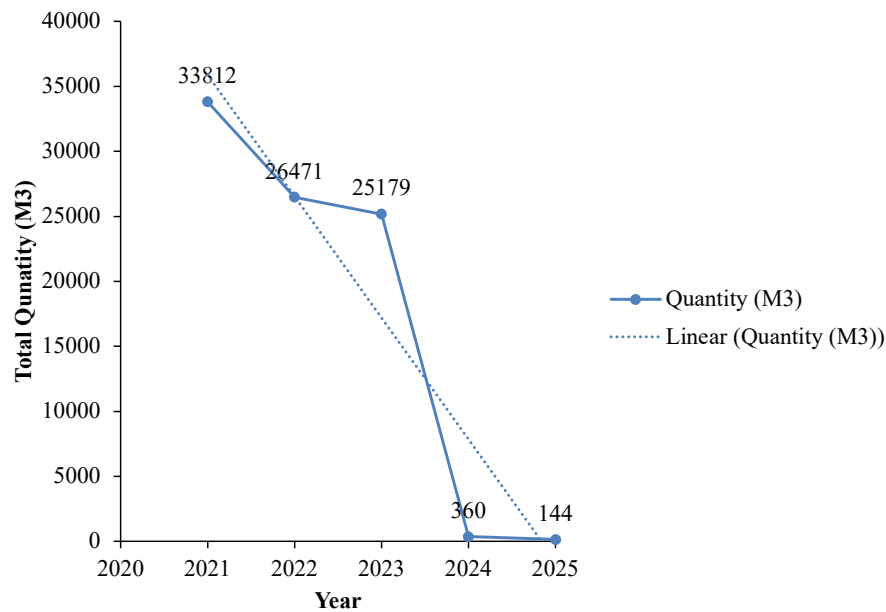


Figure 12. Surface collection allotment and utilization (2021-2025)

2.5.3.5 Total SRF land allotted for developmental activities in five years (2021-2025)

From 2021-2025, a total of 731.98 Ha of SRF land was allotted for developmental activities purposes. However, in 2025, a total of 226.368 Ha of SRF land was allotted for developmental activities. Of which, the major chunk of SRF land has been allotted for Construction of transmission line (83.938 Ha) followed by Acquiring land User Right Certificate (URC) (32.227 Ha) and Stone quarry (25.354 Ha) respectively. The least area of SRF land has been allotted for Removal of timber from SRFL (0.007 Ha). The land allotment has been highest in the year 2021 (392.15 Ha) followed by 2025 (226.368 Ha) and 2024 (67.775 Ha) respectively.

Table 28. SRF land allotted for developmental activities (2021-2025)

Land Allotment Purposes	Year				
	2021	2022	2023	2024	2025
Acquiring land User Right Certificate (URC)	-	-	0.02	-	32.227
Approach Road	0.8	-	-	-	-
Archery range	-	-	-	0.25	0.121
Bridge construction	0.06				
Clearing of transmission line ROW	-	-	0.3	0.049	-
Construction of access road to private land	-	-	-	-	0.25
Construction of government quarters	-	-	1.73	-	-
Construction of transmission line	-	-	-	7.82	83.938
Crushing plant installation	-	-	-	-	0.239
Development of Recreational Park	-	-	-	0.3	-
Dredging	-	-	-	0.51	-
Ecotourism infrastructure development	-	-	0.03	-	0.328
Ecotourism trail development	-	-	-	-	0.04
Extension of exiting farm road	-	-	0.67	-	1

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Extension of primary national highway	-	-	-	-	0.405
Extension of transmission line	-	-	-	0.1	16.936
Farm Road	375.71	6.73	-	-	-
Government land allocation for agricultural research	-	-	-	0.809	-
Irrigation channel	8.46	-	-	-	-
Land acquisition by Government Institution	-	-	2	3.347	-
land allotment	-	1.13	-	-	-
Land Exchange	-	-	-	0.15	-
Land lease	1.43	4.94	2.05	1.435	19.945
Land Substitute	-	-	-	1.203	6.517
Mobile Tower (Telecom)	-	0.26	-	-	-
Muck dumping	-	-	-	4.87	-
New farm road construction	-	-	0.25	4.275	9.163
New approach road construction	-	-	5.41	20.575	5.952
New Transmission line construction	-	-	-	0.25	-
Other purposes	2.46	2.32	-	-	-
Power substation	-	-	1.23	-	-
Realignment of farm road	-	-	-	0.19	21.506
Realignment of transmission line	-	-	2.98	-	-
Removal of NWFP (surface collection material) from SRFL		-			2.149
Removal of NWFP(plant) from private land	-	-	0.11	0.478	-
Removal of timber from private land	-	2.2	0.13	-	-
Removal of timber from registered institutional land	-	-	1	-	-
Removal of timber from SRFL	-	-	-	0.1	0.007
Road widening	0.18	-	-	-	-
Springshed management	-	-	-	10.01	0.081
Stone quarry	-	-	-	-	25.354
Substitute land /Exchange land	0.27	0.32	-	-	-
Surface collection	0.82	-	-	-	-
Surface Collection	-	2.72	-	-	-
Telecom tower	-	-	1.23	0.02	0.02
Temporary approach road for transportation of construction materials	-	-	1	-	-
Tower	0.04	-	-	-	-
Transmission line	0.8	4.61	-	-	-
Transmission Tower	-	-	0.32	-	-
Water pipeline	-	-	-	0.134	-
Water pipeline alignment	1.12	-	-	-	-
Widening of gewog centre road	-	-	-	10.9	0.13
Widening of secondary National Highway	-	-	-	-	0.06
Total Land Allotment Area (Ha)	392.15	25.23	20.46	67.775	226.368

2.5.3.6 Total Forest Area lost from SRF land allotment for developmental activities in five years (2021-2025)

From 2021-2025, a total Forest area of 504.149 Ha was lost from SRF land allotment for developmental activities. The highest forest area loss was in the year 2021 with 293.66 Ha followed by 2025 (137.948 Ha) and 2024 (45.503 Ha) respectively.

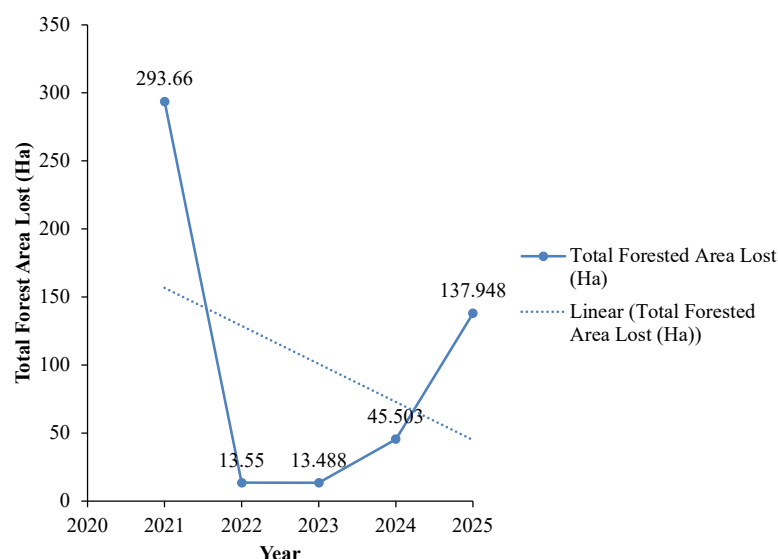


Figure 13. Forest area lost for developmental activities (2021-2025)

2.5.3.7 SRF land destroyed by Forest Fires in five years (2021-2025)

The division has experienced forest fire incidents with a total of 244.73 Ha of SRF land destroyed by forest fires from 2021-2025. The highest area burnt was in the year 2024 (110.57 Ha) with 3 different fire incidences followed by 2021 (85.37 Ha) and 2023 (48.77 Ha) respectively. No fire incidents were recorded in the year of 2022. The common cause of forest fires is anthropogenic activities.

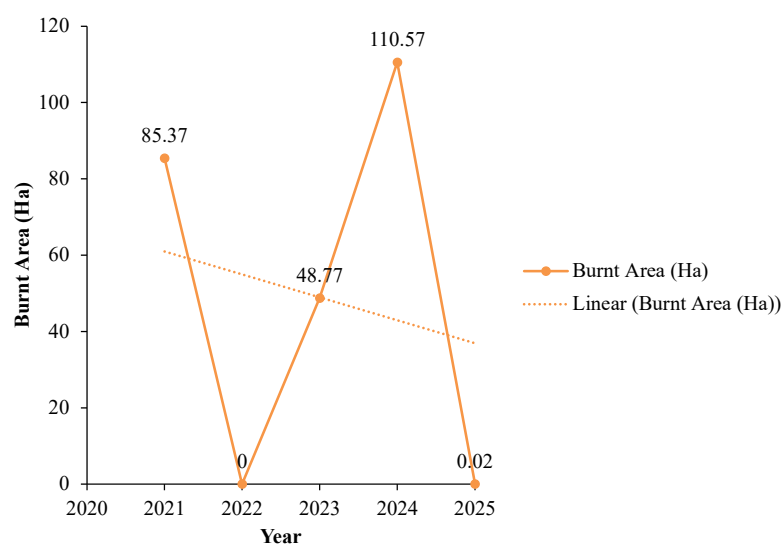


Figure 14. Forest fire incidences (2021-2025)

2.5.3.8 Wood Based Industries

Wood based industries are crucial for supply of sawn timber and finished product to meet the demand for the local people and other commercial activities. There are two registered Stationary Sawmills and fourteen Furniture units under DFO as detailed in table 29 and 30.

Table 29. List of registered sawmills

Sl. No.	Name	License No.	Location	Registration No.	Category	Type
1	Rinchen Yangdu Sawmill	5000256	Dechogang, Zhemgang	ZFD/WFMU/WBI/S-01	Primary	Stationary sawmill
2	Sonam Mebar Sawmill	5005810	Tamalaptsa, Zhemgang	ZFD/WFMU/WBI/S-02	Primary	Stationary sawmill

Table 30. List of registered furniture units

Sl. No	Name	License No.	Village	Registration No.	Category	Type
1	Ghalley Furniture House	CRC3859	Trong	ZFD/WFMU/WBI/FU-05	Secondary	Furniture Unit
2	K.Yoezer Nima Furniture House	CRC3453	Buli	ZFR/WBI/9-1/2-23-2024/03	Secondary	Furniture Unit
3	Kezang Furniture House	CRC1078	Tali	ZFR/WBI/PR/6-2/2018-2019/02	Secondary	Furniture Unit
4	Khomshar Furniture House	CRC1499	Khomshar	KR/WBI/14/2018-2019/01	Secondary	Furniture Unit
5	Kuenga Yangden Furniture	3015471	Rebati	PRO/For-28/FU(03)	Secondary	Furniture Unit
6	PD Furniture house	3014580	Khomshar	KR/22/2024-2025/225	Secondary	Furniture Unit
7	Phuntsho Samphel Furniture	3009367	Changarzam	PRO/For-28/FU(01)	Secondary	Furniture Unit
8	Pradhan Furniture House	5006634	Zhemgang Throm	ZFD/WFMU/WBI/F-04	Secondary	Furniture Unit
9	Rinchen Yangdu Furniture Unit	5002843	Trong	ZFD/WFMU/WBI/F-02	Secondary	Furniture Unit
10	Sangay Dema Furniture House	CRC2234	Trong	ZFD/WFMU/WBI/F-06	Secondary	Furniture Unit
11	Sangay Dorji Furniture House	CRC6631	Tama	ZFD/WFMU/WBI/F-06	Secondary	Furniture Unit
12	Sherub furniture house	CRC66012	Tali	ZFR/WBI/PR/6-2/2018-2019/03	Secondary	Furniture Unit
13	Taktsen Furniture House	CRC014917	Sonamthang	PRO/For-28/FU-03	Secondary	Furniture Unit
14	Tshering Lhamo furniture	CRC7138	Changarzam	PRO/For-28/FU(02)	Secondary	Furniture Unit

2.6 Local People and Livelihood

2.6.1 Demography

Zhemgang Dzongkhag has a total population of 17,126 across eight gewogs (NSB, 2018). The DFO Zhemgang covers seven gewogs out of eight with 15,997 people. Trong gewog, consisting of five chiwogs, is partly under DFO jurisdiction (only Dangkhar chiwog), with the other four chiwogs managed by Royal Manas National Park (RMNP) and Jigme Singye Wangchuck National Park (JSWNP). Subsequent results for Trong gewog represent only Dangkhar chiwog. Trong gewog, the most populous with 5,314 people, contrasts sharply with Bjoka gewog, the least populous with 840 residents.

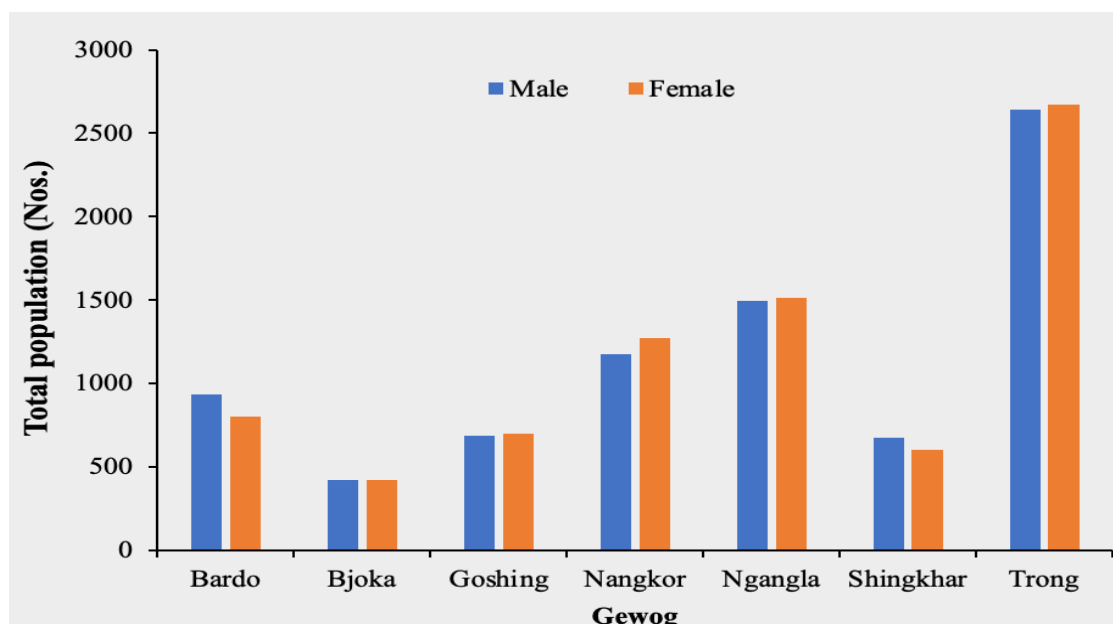


Figure 15. Gewog wise population based on gender

From the total population in the seven gewogs, there are 8,052 males and 7,945 females. This indicates a slight male predominance, with males constituting approximately 50.3% of the population and females making up about 49.7%. The gender distribution is fairly balanced, showing only a minor difference between the number of males and females. This near-equal distribution suggests that both genders are almost equally represented in the population across these gewogs as depicted in the figure 15.

2.6.2 Sources of Income

As per the climate vulnerability and social status report, 2024 found that overall highest annual income source was labor wage. Following labor wages, agriculture is the next highest income source, indicating that farming activities play a crucial role in the economic sustenance of these households. Livestock farming also contributes notably to household incomes, showcasing the importance of animal husbandry. Business ventures come after livestock in terms of income generation, reflecting a lesser but still significant role in the local economy.

Despite labor wages contributing the highest overall income, the maximum number of households rely on agriculture for their income generation. Specifically, 225 households depend on agriculture farming, highlighting its widespread practice and importance. Labor wage, while generating higher income, supports fewer households compared to agriculture. Horticulture is also a key source of income, but its impact is less widespread than agriculture and labor wages. Additionally, there is a unique case of a single household earning through beekeeping but valuable income source.

This information underscores the diversity of income sources in the gewogs and the critical role of agriculture, both in terms of the number of households it supports and its contribution to the overall economy. Labor wages provide higher income but are less common, while livestock and business also play important roles in the economic landscape of these communities.

Table 31. Source of income for the communities

Sl.No.	Source of Income	No. of households	Amount (Nu. in million)
1	Agriculture	225	9.56
2	Bee keeping	1	0.04
3	Business	51	7.86
4	Contract work	2	0.55
5	Horticulture	181	6.93
6	Labor wage	191	10.27
7	Livestock	160	8.43
8	Mushroom farming	3	0.09
9	Other source	37	3.27
10	Pension	7	0.77
11	Performing rituals	5	0.47
12	Relatives	32	3.08
13	Salary	15	4.06
14	Sale of NWFP	46	2.81
15	Tourism	2	0.34
Total		958	58.54

2.6.3 Landholding

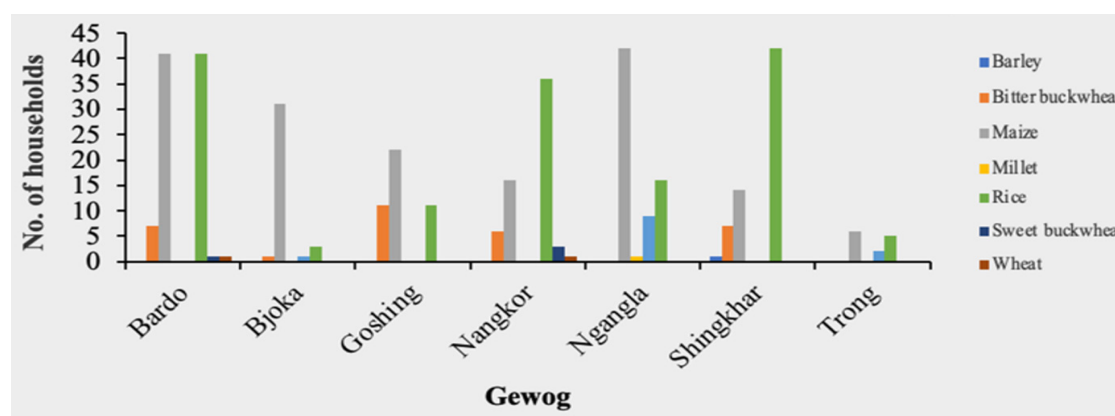
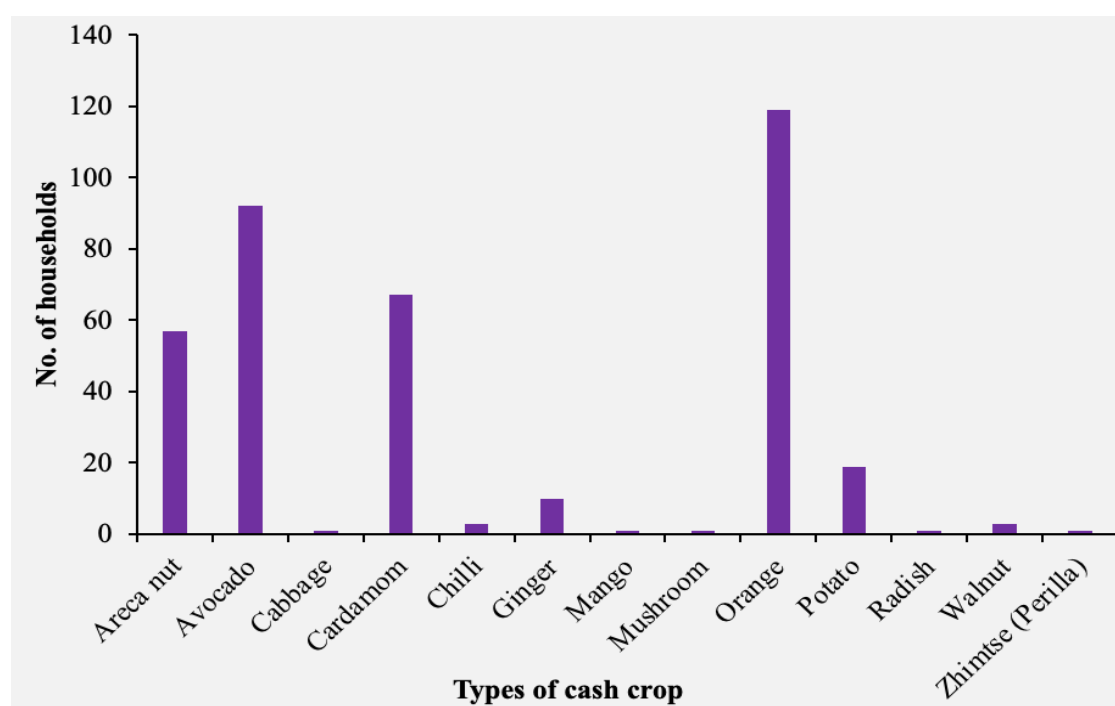
Landholding patterns across the gewogs are categorized into four types: Chhuzhing (agriculture wetland), Kamzhing (dry land), Tshoesa (kitchen garden), and Orchard (ngultho dumra). The combined data from the sampled households reveals that local communities own a total of 2,225 acres of land. Kamzhing is the predominant category, covering 1,525 acres, which constitutes 68% of the total landholdings. This is followed by Chhuzhing, which spans 393 acres or 18% of the total. Orchards, also known as Ngultho Dumra, account for 250 acres, making up 11% of the land. Lastly, Tshoesa, or kitchen gardens, comprise 62 acres, representing 3% of the total land area. Examining the land distribution among the gewogs, Bardo Gewog emerges as the one with the largest landholding, encompassing 528 acres. Nangkhor Gewog follows, with a total of 405 acres. On the other end, Trong Gewog has the smallest landholding, with only 102 acres.

Table 32. Types of land holdings

Types of land	Area (Acres)	Percent
Chhuzhing	393	18
Kamzhing	1521	68
Tshesa	62	3
Orchard	250	11
Total	2225	100

2.6.4 Agriculture and Livestock farming

In the context of the landholding patterns and agricultural practices, the community across seven gewogs cultivates eight different types of cereals. Among these cereals, maize and rice are identified as the major and most commonly grown crops by the farmers, highlighting their importance in local agriculture and diet.

**Figure 16. Types of cereal crops grown by the communities****Figure 17. Types of cash crops grown by the communities**

Local communities across the seven gewogs cultivate a diverse range of 13 cash crops to enhance their family income. Among these crops, oranges, cardamom, and avocados stand out as the most popular, with 278 households across all seven gewogs engaging in their cultivation. This widespread adoption highlights the significant role these three crops play in the local agricultural economy.

Ginger and potato are the most commonly cultivated vegetables among households across all gewogs, with ginger being grown by 204 households and potato by 71 households. Chilli follows closely behind, with 54 households cultivating it. Ngangla and Bar-do Gewogs boast the highest vegetable diversity, with nine and seven different types grown out of eleven respectively.

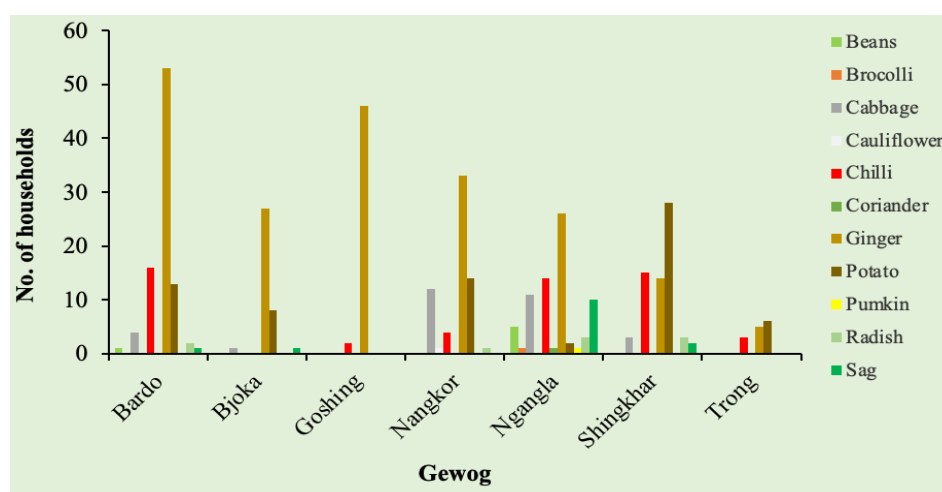


Figure 18. Types of vegetables grown by the communities

The communities engage in rearing various types of livestock for different purposes, reflecting a diverse agricultural practice. The livestock kept by the households include improved cattle breeds, local cattle breeds, cats, dogs, horses, pigs, and poultry. According to the data, the highest number of households rear local cattle, with a total of 185 households involved in this practice. Following this, 151 households rear cats, and 141 households rear poultry, indicating that these three types of livestock are the most commonly kept within the community.

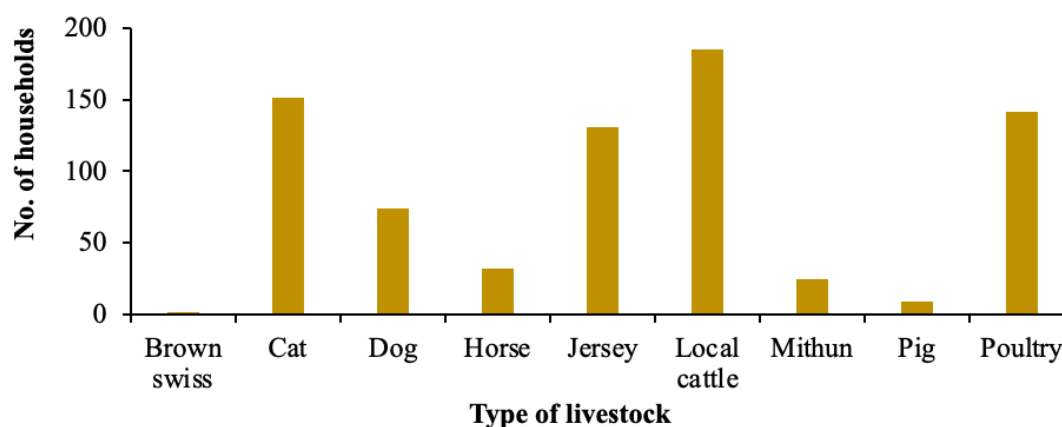


Figure 19. Types of livestock rear by the communities

2.6.5 Ecotourism

Zhemgang has the highest poverty rate in the country but it is rich in biodiversity which provides a huge potential for ecotourism and in recent years it is declared and recognized as “Eco-tourism Capital” by the Department of Tourism to capitalize on its biodiversity and nature. Eco-tourism development is expected to alleviate rural poverty by engaging the community in offering tourism services, including lodging, roadside amenities, bird-ing guides, the sale of local products, and camping services. Some of the key ecotourism sites besides famous birding in Zhemgang are Buli Tsho, Dungkhar Nye, Longay Nye, Bermoo Botanical Garden, Berti White-bellied Heron Ecolodge, Duenmang Tshachu, Dangkhar Khandroma Menchu, Bhutan Bird Festival, Twin Waterfall and White water rafting at Panbang, high end recreational fishing (Golden Mahseer) site and Duck Mus-sel Conservation area at Zarkabla.

2.7 Human Wildlife Conflict

2.7.1 Livestock depredation

The Climate Vulnerability and Socio-economic status of communities in Zhemgang (DFO Zhemgang 2024) revealed that over the past three years, the communities have experienced significant livestock losses, with 155 animals falling victim to predation by seven major wild animal species. Among these predators, the Dhole, Tiger, and Com-mon Leopard have emerged as the primary threats to livestock. An analysis of incidents from 2021 to 2023 shows that six types of livestock were affected by these predators, with local breed cattle suffering the highest losses. Poultry also faced considerable pre-dation, highlighting the vulnerability to wild predators in the region. The impact of these livestock losses is profound, affecting both the livelihoods and food security of the local communities.

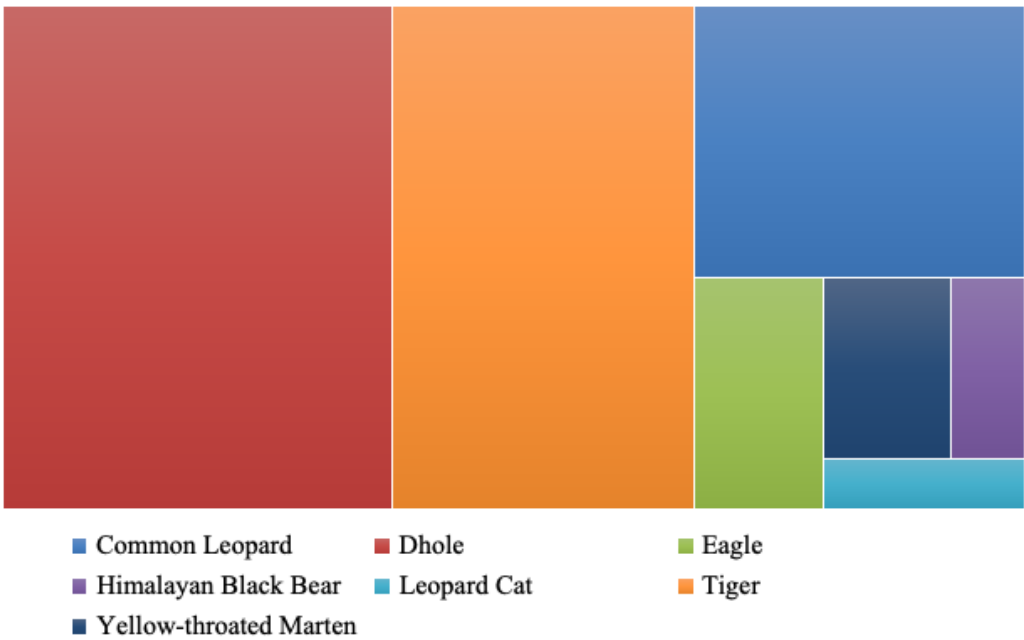


Figure 20. Predator type and their proportion of livestock depredation

Among the wild predators, Common Leopard and Tiger killed four types of livestock. Dhole killed three types of livestock and the maximum kill recorded were the local breed cattles followed by jersey and mithun respectively.

2.7.2 Crop damaged by wild animals

Wildlife-induced crop damage is a concern affecting agriculture practices in the community. Himalayan Black Bear, Wild Pig, Rodents, Sambar, Assamese Macaque, Langurs and birds are associated with crop damage. According to a recent socio-economic survey conducted by the division, cereals (n=634) are the most frequently affected crops followed by fruit trees (n=107) and vegetables (n=78). This crop depredation involves ten major wild animal species. Among these, wild pigs are the primary culprits, causing the most damage to crops. Porcupines and macaques are also significant contributors to crop damage. In contrast, langurs have caused minimal crop damage over the past three years.

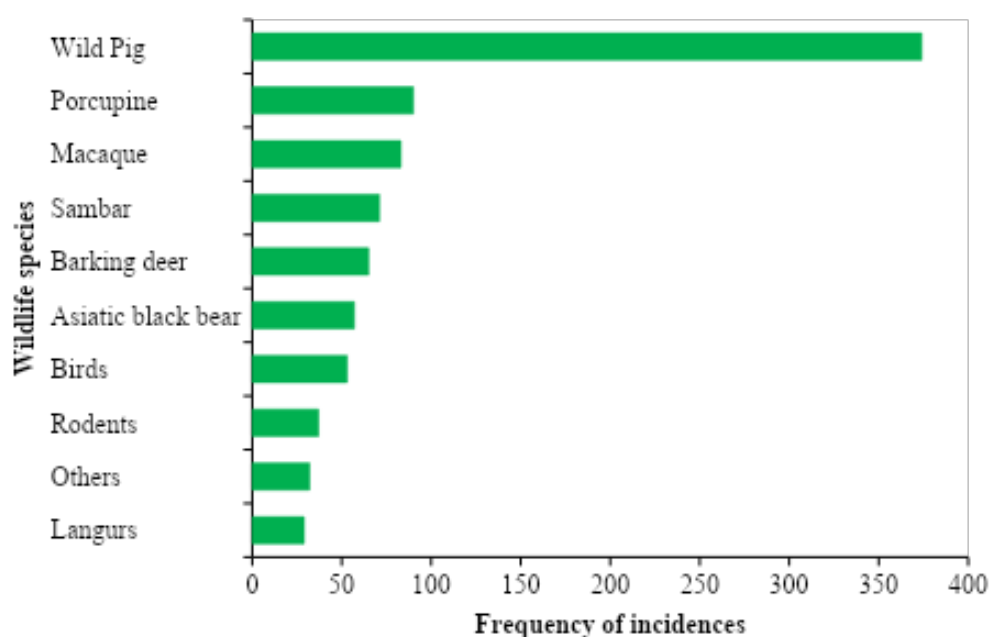


Figure 21. Crop damage by different wildlife species

Regarding property damage caused by wild animals, the landscape has very few records of such incidences with very minimal impact. In the year 2022 alone, DFO Zhemgang attended to 18 incidences of wildlife rescue operations and 16 individuals were safely released to their natural habitat. In the year 2021, a Common Leopard was killed in retaliation by a local from Nyakhar village when the predator entered the poultry coop. Retaliatory killings are least reported in the division since the local communities still do not openly declare such actions.

2.7.3 Human-wildlife Conflict Interventions

To mitigate the impact of human-wildlife conflict, DFO Zhemgang has implemented multiple interventions within its jurisdiction, such as;

- Periodic advocacy programs with local communities
- Establishment of Gewog Tiger Conservation Tshogpa (GTCT) in Nangkor and Shingkar gewogs.

- Formation of Citizen Science Group amongst migratory herders.
- Solar electric fencing and chain-link fencing are provided to the rural communities.
- Solar lighting and communication gadgets are provided to migratory herders.
- Habitat mapping for Golden Langur (*Trachypithecus geei*).
- Enrichment of wildlife habitats (Grasslands and Waterholes).
- Improvement of drinking water supply
- Improvement and extension of existing poultry farm
- Rapid Response Team (RRT) Formation of HWC incidences
- Community exchange program
- Supply of improved cardamom seedlings
- Installation of light and sound (Bio-acoustic) mechanism to deter wild animals
- Supply of Breeding bulls, native poultry species

Among the seven gewogs under DFO Zhemgang, Nangkor and Shingkhari have been identified as HWC hotspots, with 135 recorded incidents of human-wildlife conflict (DFO Zhemgang, 2025). A Human-Wildlife Conflict to Coexistence (C2C) Strategy has been developed for these two gewogs, and interventions will be implemented separately in line with the strategy. The assessment will be carried out to evaluate the effectiveness of the HWC interventions implemented in the two identified hotspot gewogs.

2.8 Climate Change and its impacts

2.8.1 Climatic conditions in the area

The data were retrieved from four weather station establishments of the National Centre for Hydrology and Meteorology (NCHM) under Zhemgang Dzongkhag. The weather stations are located at Zhemgang, Shingkhari, Panbang and Tingtibi. The climate data were collected over 10 years (2014 – 2023). Zhemgang has experienced the highest average maximum temperature of 25.95°C during the year 2022, and the lowest minimum temperature of 12.03°C in the year 2020 as per the data collected over ten years (2014–2023). It is observed that the intensity of rainfall increases with the increase of temperature because the average rainfall data collected over ten years (2014–2023) indicate that the precipitation rises during the monsoon season and drastically decreases during the fall (DFO Zhemgang, 2024).

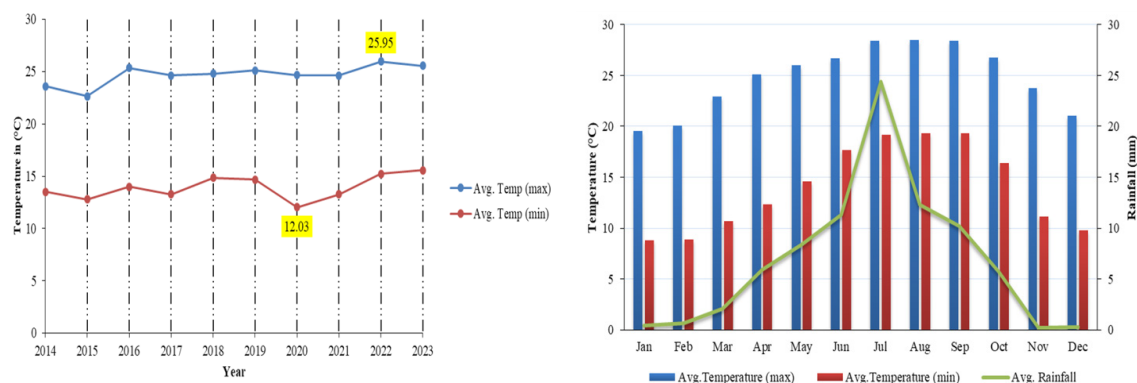


Figure 22. Average Max and Min temperatures (Left) and monthly average rainfall (Right) for the last ten years

2.8.2 Forest Fire

Forest fires are the most common and frequent threats to the forests. The forest fire incidents take a substantial toll on wildlife and biodiversity. The main causes of forest fires are sparks generated by electrical short circuits from power lines and old transformers; agriculture debris burning; cattle herders; roadside workers; picnickers and campfires.

It was mentioned in the assessment of climate risks on forests and biodiversity for National Adaptation Plan (NAP) formulation process in Bhutan (2021), that with the given size of broadleaved forests and the fuel models used, broadleaved forests below 2000 masl are projected to increase fire risk from now to 2050 with over 9000 km² of broadleaved forests at high fire risk under both RCP 4.5 and RCP 8.5. Zhemgang having the highest forest cover in Bhutan (FMID, 2023), has highest future risk from forest fire, similarly Pangkhar and Trong Gewog of Zhemgang were identified with most areas at risk from fires within broadleaved forests below 2000 masl during the assessment of climate change.

DFO Zhemgang has reported about 150.30 ha of forest land loss to forest fire, mostly concentrated in Chir pine forest as per the forest fire data of five years (2019-2023).

2.8.3 Drying of water sources

Water is a cross-cutting issue that affects all other sectors ranging from human to wildlife in terms of food production, energy, and ecosystems. The climate risk assessment indicates further increase in duration and frequency of dry spells can lead to risk of local water shortages and increase in drying of water sources. Factors causing the drying up of water sources are due to increase in developmental activities leading to deforestation, change in land use patterns, degradation of catchment areas and climate change.

During the water source mapping and discharge measurement of Zhemgang (2021), it was recorded that a total of 253 water sources were assessed and mapped with a finding of 194 in normal (no change) and 59 in the state of drying. Bardo gewog recorded the highest number of water sources in the state of drying followed by Bjoka gewog.

2.8.4 Climate Vulnerability

The overall vulnerability index facilitates inter gewog comparison. Higher value of the vulnerability index indicates lower vulnerability. Negative value of the index indicates the net effect of adaptive capacity, exposure and sensitivity was negative (Maiti et al., 2017). The people's perception based climate vulnerability assessment was conducted by the division in 2024. The climate vulnerability index amongst the seven gewogs under DFO Zhemgang, Trong gewog is the most vulnerable with low index of -1.106 and while Bjoka gewog has the highest index of -0.388 (DFO Zhemgang, 2024). The detail index on exposure, sensitivity, vulnerability and adaptive capacity are as shown in the table 33.

Table 33. Exposure, sensitivity, adaptive capacity and vulnerability index scores of seven gewogs

Geog	Adaptive capacity	Exposure	Sensitivity	Vulnerability index
Trong	0.398	0.687	0.825	-1.106
Nangkor	0.376	0.425	0.464	-0.513
Shingkhari	0.205	0.479	0.498	-0.772
Bardo	0.277	0.342	0.545	-0.610
Goshing	0.229	0.181	0.625	-0.577
Ngangla	0.372	0.26	0.512	-0.400
Bjoka	0.546	0.56	0.356	-0.388

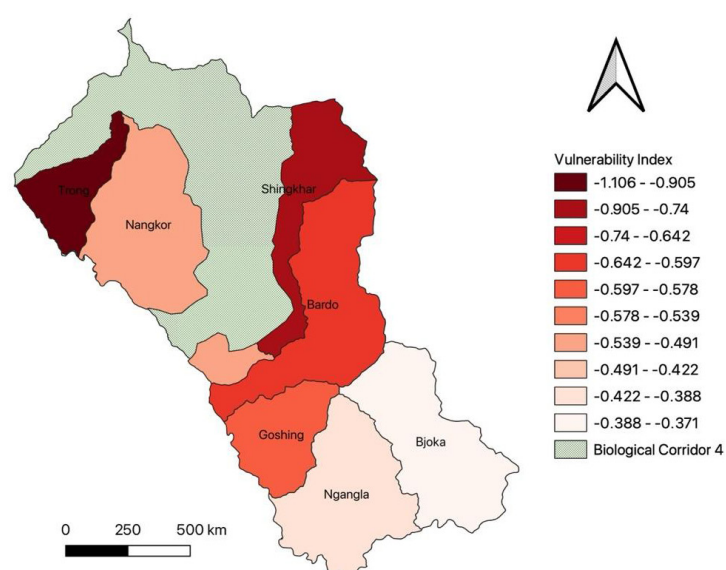


Figure 23. Vulnerability index map of seven gewogs

2.8.5 Impacts and Coping Mechanism

As per the report on climate vulnerability and socio-economic status of communities in Zhemgang (2024). The common impacts of climate change the community faces are, extreme temperature, shift in rainfall seasonality, flash floods, landslides, windstorm. The impact of these climate change and its coping mechanism are as shown in 2.8.5.1 and 2.8.5.2.

2.8.5.1 Impacts of climate change

Extreme Temperature: Causes heat stress on crops and livestock, increases pest and disease outbreaks, reduces soil moisture, and leads to water scarcity.

Shift in Rainfall Seasonality: Results in crop failure due to untimely rains, prolonged droughts or dry spells, and waterlogging or flooding during excess rainfall.

Flash Floods: Destroy crops and farmland, wash away topsoil, damage irrigation and drinking water sources, and cause loss of livestock and property.

Landslides: Lead to loss of agricultural land, destruction of homes, roads, and infrastructure, and displacement of communities.

Windstorms: Damage crops and fruit trees, destroy houses and farm structures, and disrupt livelihoods through infrastructure loss.

2.8.5.2 Coping mechanisms

Extreme Temperature: Adopt heat and drought tolerant crop varieties, practice mulching and shade management, improve irrigation methods such as drip and sprinkler systems, and provide adequate housing and water facilities for livestock.

Shift in Rainfall Seasonality: Use rainwater harvesting and storage systems, diversify crops with short duration and climate resilient varieties, and improve irrigation scheduling and water use efficiency.

Flash Floods: Construct flood protection walls and drainage channels, restore wetlands and floodplains for natural absorption, and strengthen community-based disaster preparedness and evacuation planning.

Landslides: Stabilize slopes through afforestation, terracing, and bioengineering, avoid settlements in high risk areas through proper land-use planning, and establish early warning systems with community training.

Windstorms: Plant windbreaks such as trees or bamboo, adopt resilient construction materials and roofing techniques, and stake or protect crops and orchards with support structures.

2.9 High Conservation Value (HCV) Area

2.9.1 HCV Concept Overview

The concept of high conservation value was globally introduced in 1998 by the Forest Stewardship Council (FSC), an international non-profit multi-stakeholder organization established in the year 1993. The organization promotes responsible management of the world's forest and global forest certification. A high conservation value (HCV) is defined as a natural habitat of a biological, ecological, social or cultural value of outstanding significance or critical importance, with six HCV categories and global definitions.

As per National Interpretation for the Identification of High Conservation Values in Bhutan, June 2022, the HCV approach promulgates six categories of conservation values; (1) Species diversity, (2) Landscape-level ecosystems, ecosystem mosaics and intact forest landscape (IFL), (3) Ecosystems and habitats, (4) Ecosystem services, (5) Community needs and (6) Cultural values as detail hereunder;

Category 1. *Species diversity*

Concentration of biological diversity including endemic species, and rare threatened or endangered species, that are significant at global, regional or national level.

Category 2. *Landscape-level ecosystems mosaics and IFL*

Large landscape-level ecosystems, ecosystem mosaics and Intact Forest Landscapes (IFL) that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.

Category 3. *Ecosystems and habitats*

Rare, threatened, or endangered ecosystems, habitats or refugia.

Category 4. *Ecosystem services*

Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.

Category 5. *Community needs*

Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous people (for livelihoods, health, nutrition, water, etc.), identified through engagement with these communities or indigenous peoples.

Category 6. *Cultural values*

Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples.

2.9.2 Screening and Identification of the HCV Area HCVs screening was conducted in 2023 to identify priority areas for HCV management and monitoring. This screening process, developed by the HCV Resource Network (HCVRN), involved desktop analysis using the National Interpretation in complementary to the HCV Screening Open Standards for the Practice of Conservation Standards (CS) to guide identification of HCV. The standards of the open-source Conservation Measures Partnership (CMP) has been provide a clear, systematic approach to managing, monitoring and planning to tackle complex and urgent environmental problems. The CS was used to design actions for effective management of high priority High Conservation Value Area (HCVA). A workshop held in Thimphu (24th - 28th April, 2023) documented appropriate monitoring and threat prevention to HCVA.



Figure 24. Steps of screening HCV

The HCVRN toolkit outlines six key steps figure 30 in the screening process, which are used to identify and prioritise areas with significant conservation value. This process aims to enhance biodiversity conservation, safeguard ecosystems and promote local community well-being. The screening process was supported by global HCVN specialists, in consultation with the DoFPS, participated by IKI Task Force members and field focal points.

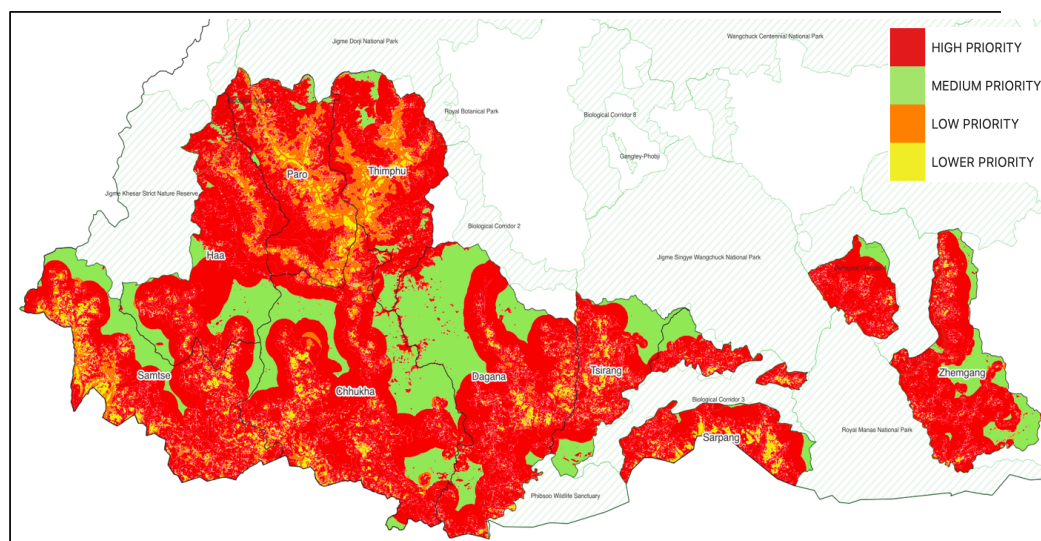


Figure 25. Combined Priority 1- 4 areas for the IKI landscape

Figure 25 shows that the majority of the division's area falls within high priority zones. These high priority areas are already managed under various area-based and cross-cutting management regimes, ensuring adequate management and protection. To enhance effective management and highlight local significance, Buli Tsho has been designated as an HCV area under Category 6: Cultural Values. In addition, other HCV categories such as HCV 1 (Species Diversity) and HCV 3 (Ecosystems and Habitats) are also present. Following this designation, the DFO Zhemgang conducted field verification and stakeholder consultations with the local communities and Nangkor Gewog administration.

2.9.3 HCV Area and Site Description

The HCV area under DFO Zhemgang falls under category 6. Cultural values. It is located in Buli Chiwog, Nangkor Gewog under Zhemgang Dzongkhag. Buli is located about 56 km from Zhemgang Dzongkhag Administration. The total area of HCV (Buli Tsho) is 39.12 acres including 150 meters buffer surrounded by forests. The altitude of the area is 1150 meters above sea level and is surrounded by State Forests Reserve Land managed by the DFO Zhemgang. The surrounding forest comprises warm broadleaved forests and presence of lake, wetland, stream and river flowing in the south. Buli Tsho is nationally known for its religious and cultural significance and also associated with local beliefs. Buli Tsho also serves an important habitat for waterbirds, mammals and other biodiversity.



Figure 26. Aerial view of Buli Tsho

2.9.4 Significance of HCV Area (Buli Tsho)

2.9.4.1 Historical Significance of Buli Tsho

A Sister's Promise to Reunite with Her Brother

According to local stories, Buli Tsho recounts the journey of a sister who made a promise to her brother and the efforts she undertook to fulfill it. This tale, believed by many locals, dates back to the late 17th century. Buli Ponpo, the chieftain of Buli village, agreed to follow a prophecy and travel south to Bhutan after winning several battles in Tibet. His sister, a mermaid, had been by his side throughout the wars but could not accompany him on his journey for unknown reasons. However, she promised her brother they would reunite in the land of the cypress tree, Bhutan. The sister's quest began in Dungkar, Lhuentse, and led her through Chumey in Bumthang before finally arriving at Buli, Zhemgang, where she sought her brother. It is believed that the lake settled in these places before finally establishing itself permanently in Kheng Buli.

Disguising herself as a woman, the sister sought refuge in a house in Trongmeth upon her arrival in Buli. An elderly lady welcomed her and allowed her to stay in the altar room. The mermaid revealed only part of her face and asked not to be disturbed. However, the old lady, wanting to show hospitality, offered tea and Ara (a local wine). Curious, she peered through a hole in the altar room and was shocked to see a large snake sleeping. The following morning, the mermaid left, but the old lady, upon entering the room, found a butter churner that had been left behind. According to legend, the household's cattle numbers increased for a year, only to dwindle after the churner mysteriously vanished a few years later.

The mermaid claimed certain areas beneath the main settlement and built her palace (Phodrang) in the form of a lake. However, the nearby village polluted the lake, so she relocated her Phodrang to the south, near the current lake. The new location, being at a tri-junction, also faced pollution due to human activity. Ultimately, the mermaid moved the lake to its current spot. In another legend, Buli Ponpo, believed to be the nephew of the lake's deity, Buli Moenmo, became wealthy after discovering several perfectly crafted pots near the newly formed lake. One pot was defective, while the rest disappeared. He kept the flawed pot and, as a result, gained great wealth. His descendants went on to become the local rulers of Buli.

The lake has received blessings from several prominent religious figures. Tertön Pema Lingpa (15th century) and Tertön Dorji Lingpa (12th century) visited the lake and blessed the Menmo. Many other religious leaders, including Ponlop Khen Rinpoche, His Holiness Tulku Jigme Choedra, His Eminence Namkhai Nyingpo Rinpoche, His Eminence Gangteng Tulku Rinpoche, Peling Sungtrul Rinpoche, Kyabji Thuksey Rinpoche, Kathok Situ Rinpoche, and Buli Tulku, have also bestowed blessings on the lake.

2.9.4.2 Traditional, Cultural and Social significance

Locally referred to as Buli Menmo, the mermaid is regarded as the primary protective deity of the chiwog. Rituals to appease Menmo are performed twice a year. According to the community, when these rituals are conducted on time, the village remains safe from calamities. If there's a delay in rainfall, offerings are made, and the issue is resolved,

they explain. However, they also warn that polluting or defiling the lake can have serious consequences. In the past, hailstorms, heavy rainfall, and thunderstorms occurred when the sanctity of the lake was violated. To preserve this sanctity, the community enforces a strict ban on visiting the lake for nearly two months each year. This period, known as Tsho-dam, starts on the first day of the 8th month and ends on the 15th day of the 10th month of the Bhutanese calendar. The women with menstrual period are restricted to visit the Tsho.

The lake is also known for revealing itself in different forms to certain visitors, depending on their luck. If fortunate, one may witness the mermaid's palace, complete with lhakhangs, burning butter-lamps, and prayer flags. Locals believe that faith plays a vital role in seeing these manifestations. Furthermore, the lake is renowned for its clarity, and if its water become murky or dark, it is considered a bad omen.

Over the years, the number of visitors to Buli Tsho has significantly increased, transforming the lake into one of the notable pilgrimage sites in Zhemgang. As part of the effective management of visitors, the visitors are required to pay an entry fee at the gate, managed by a caretaker. The revenue generated from these fees contributes directly to the local community's economy. In addition to the entry fee, many visitors choose to spend the night at homestays in Buli, which has provided locals with a valuable source of supplementary income. Beyond hosting guests, the community also benefits by selling their farm produce to these visitors, further boosting the local economy. This combination of tourism and agriculture has created a sustainable way for the people of Buli to thrive economically while maintaining their cultural heritage.

2.9.4.3 Ecological significance

In and around the Buli Tsho, the area is home to a wide range of wildlife species. Major mammals include Tiger, Barking Deer, Sambar, Himalayan Black Bear, Monkey, Porcupines and Wild Pigs. Additionally, other wildlife such as snakes, lizards, leeches, and frogs can also be found in the area. The area is also rich in bird diversity. Common bird species include Kalij Pheasant, Fowls, Nutcrackers, Common Crows, Yellow-billed Magpie, Emerald Dove, Red-Vented Bulbul, White-Throated Laughing Thrush, and Blue Whistling Thrush. The Ruddy Shelduck can be sighted on Buli Tsho, where local people believed where it cleans the Tsho. A study by the RSPN in 2015 recorded 90 bird species in the area, with the Sharp-tailed Sandpiper adding to Bhutan's bird list.

The Buli Tsho play a crucial role in supporting critical ecological services, such as biodiversity conservation, water catchment protection, carbon sequestration, and local climate regulation. These forests help ensure the continuous provision of essential services, including watershed protection, improved water quality, and the preservation of biodiversity.

2.9.5 Threats and Strategic Approach to Mitigate the Threat

As per the HCV screening summary of all priority areas and threats under the IKI Living Landscapes, DFO Zhemgang and HCVA (Buli Tsho) in particular falls under Priority 1 (High HCV probability and high threat) where active response is needed with sound management plan. The wildfire is identified as main threat for HCV 6 across the

IKI Living Landscapes of nine Divisional Forest Offices. However, wild fire is not an immediate threat in case of HCV (Buli Tsho) under DFO Zhemgang. The threats for the HCV (Buli Tsho) under DFO Zhemgang are detailed hereunder;

1. Littering (garbage) from visitors

The road from Nangkhor Gewog Center to the Buli Tsho entrance gate was blacktopped a few years ago. With improved road access, the number of visitors to Buli Tsho has risen considerably, turning the lake into a significant pilgrimage site in Zhemgang. However, as visitor numbers grow, littering along the trail and surrounding areas has become increasingly noticeable.

2. Disturbance of recharge area

Buli Tsho has no visible water inflow or outflow. Most of the agricultural fields in the Buli community are situated to the northeast of the lake, at a higher elevation. Agricultural practices, developmental activities, and forest resource extraction in the area could disrupt the lake's recharge process, potentially leading to its drying up in the future. To address this, conducting hydrogeological mapping of Buli Tsho and its surroundings is essential to understand the area's underlying geology and identify potential recharge zones, which will aid in implementing necessary mitigation measures.

3. Wildlife poaching

The rich forest cover in this High Conservation Value (HCV) area is essential for maintaining ecological balance and providing critical habitat for diverse wildlife. However, the presence of abundant wildlife also attracts poachers, posing a significant threat to the ecosystem. Poaching can disrupt the balance of species, leading to cascading effects throughout the food chain and degrading the environment.

4. Visits during Tsho-dam

The local community enforces a ban on visits to Buli Tsho during the agricultural harvest season, which spans from the first day of the 8th month to the 15th day of the 10th month in the Bhutanese calendar. This period, called Tsho-dam, is strictly observed, as it is believed that any visitors during this time may bring adverse weather conditions and cause damage to crops or other calamities in the area.

Table 34. Threats and strategic approach

Threats	Strategic approach to mitigate the threat
1. Littering (garbage) from visitors	Implement waste management through surveillance and awareness program
2. Disturbance of recharge area	Identify and ensure the protection of recharge area of Buli Tsho
3. Wildlife poaching	Strengthen surveillance and community awareness programs
4. Visits during <i>Tsho-dam</i> (Restricted period to visit to lake)	Raise awareness and regulate visitors

2.9.6 Management and Monitoring of HCVA

Effective management and monitoring of activity implementation are essential. Detailed guidelines on managing and monitoring the High Conservation Value Area (HCVA) are outlined in Chapter 5 and Chapter 6, respectively.

CHAPTER 3: THREAT AND CHALLENGES

3.1 Threats

Threats were identified through a socio-economic survey conducted in 2023 and field experiences shared by the field forestry staff of the division. Threat analysis was conducted using Miradi-4.5.0 in consultation with the field forestry staff. The division has identified and assessed 10 major threats that hamper the conservation and protection of nature and wildlife, and impact the livelihood of local communities. Threats were assessed to derive relevant strategies and intervention actions for better management of the landscape.

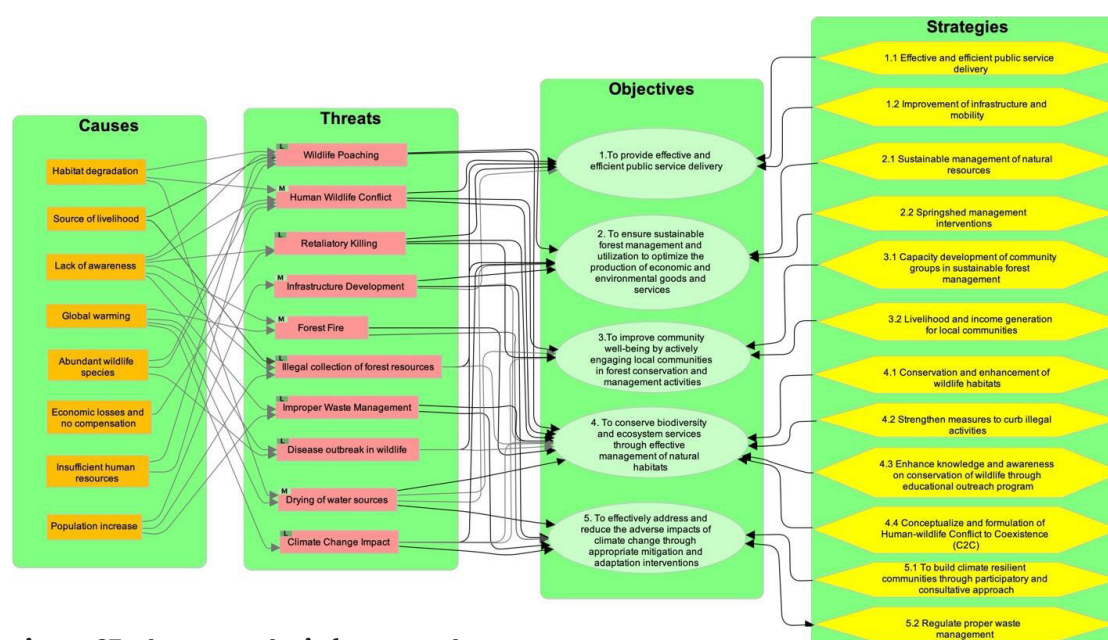


Figure 27. Threat analysis framework

3.1.1 Human Wildlife Conflict

Human-wildlife conflict is one of the major issues faced by the communities across the country. As per the report on Climate Vulnerability and Socio-economic Status of Communities in Zhemgang (CVSES, 2024), livestock depredation and crop damage by the wild animals has impacted the livelihood of the communities. Among these predators, the Dhole, Tiger, and Common Leopard have emerged as the primary threats to livestock. An analysis of incidents from 2021 to 2023 shows that six types of livestock were affected by these predators, with local breed cattle suffering the highest losses. Poultry also faced considerable predation, highlighting the vulnerability of these animals to wild predators in the region. The impact of these livestock losses is profound, affecting both the livelihoods and food security of the local communities.

The crop damage by wildlife is a serious threat affecting agriculture practice in the community. A total of 634 incidents of crop damage in cereal fields have been reported, making cereals the most frequently affected type of crop. This is followed by 107 reported incidents in fruit trees and 78 incidents in vegetable fields. Crop depredation involves ten major wild animal species. Among these, wild pigs are the primary culprits, causing the most damage to crops. Porcupines and macaques are also significant contributors to crop damage.

3.1.2 Wildlife Poaching

With high coverage of forest areas, abundant wildlife species present and exposure of local communities to technologies, poaching became one of the main threats. Evidence of poacher's camps were seen in high altitude areas (probably for musk deer). Foot traps suspected to be set for tigers were detected during a field survey. Asiatic Black Bear are the main target species for its high value and also other antelopes for meat, there are cases where poachers with poaching weapons and meat were appended. Illegal fishing is also a concern for the division as many cases of illegal fishing are caught from Golden Mahseer habitat river (Chamkharchu and Mangdechhu). Persistent presence of illegal fishing detected and apprehended during routine SMART patrolling.

3.1.3 Retaliatory killing

Retaliatory killing is triggered by intense livestock depredation by predators and crop damage by herbivores. The human-wildlife conflict is prevalent and retaliation against wildlife is inevitable. A common leopard was killed in retaliation by a community member when he lost many of his poultry to the leopard. In a suspected poisoning case by cattle herders, two carcasses of wild dogs were found from herder's pasture ground. Presence of wild meat in communities indicates that people are killing wild animals in retaliation. Most retaliatory killings are unnoticed, or it is not reported due to people's fear for fines and penalties despite having several advocacy meetings with communities and local governments. Due to people's belief and less knowledge on snakes, snakes are always killed.

3.1.4 Illegal collection of forest resources

With high coverage of forest, DFO Zhemgang is home to many valuable and edible NWFP's and there are increasing incidents of illegal collection of NWFP's. Peoples from both within Zhemgang and outside come for harvesting and collection of those valuable forest produce for self-consumption and sale. Cases of illegally harvesting and marketing of Paris polyphylla species were apprehended. Illegal collection of mulberry mushrooms was present as *Morus laevigata* were found abundant. There are cases whereby mushrooms were seized and auctioned. In addition, the collection of other resources like cane, bamboo, fern, wildflower and mushrooms is rampant. Beside NWFP, people were caught for illegal harvesting of timbers and collection of burrs.

3.1.5 Infrastructure development

Developmental activities are considered as one of the main threats to the environment and wildlife globally. DFO Zhemgang is also facing an escalating issue of development activities encroaching even into protected areas like the Biological Corridor. The primary

developmental activities that are causing threats to environment and wildlife are infrastructure such as Hydro Power Project, Road construction and transmission lines. The Construction of 54 MW Burigangchhu Hydro Power Project in Buli and transmission lines from the project sites have deforested significant areas and disturbed the habitat of wildlife. The construction of 18 km Wangdigang/Sershong integrated water supply road through Wangdigang Forest Management Unit has significantly disturbed the tiger's trail and lost many timbers of various species. Roads (Highways and Gewog Centre Roads) are also a significant threat to wildlife movement, and many reports of wildlife casualties (roadkill) especially golden langur and snakes. The Divisional office has been receiving applications and issuing Forestry Clearance for Satsab (land exchange/substitution) surface collection, land lease, government institutions, agriculture marketing products, water pipeline alignment, infrastructure, transmission line, livestock farm, farm road and approach road construction.

3.1.6 Improper waste management

With increased population and developmental activities more waste is disposed off into the forest area. The presence of more prominent community residents and national highways has increased the number of waste through improper disposal of plastic and bottles along the highway by the communities and commuters. The waste generation and pollution of forest lands by littering have been one of the main factors causing the degradation of wildlife habitats. Monthly cleaning campaigns are done as mandated by the Waste Prevention and Management Regulation, 2012, the division office also gives advocacies to the general public in consultation with the local government on waste management and regulations.

3.1.7 Climate change impact

It is estimated that by the end of the 21st century, 20%-30% of plants and animal species are at risk of extinction due to climate change. Further, climate change is a major detrimental factor in habitat alteration and fragmentation of large wildlife habitats and population. Zhemgang has experienced unexpected snowfall in 2022 causing unprecedented damages to the crops.

3.1.8 Drying up of water sources

The erratic rainfall and climate change leading to drying of water sources has increased the challenge to keep up to speed in supplying the growing water demand for drinking, hydropower generation and irrigation water. Less water availability for domestic and irrigation has been the major threat to the farmers of Zhemgang leaving their fields under used and indirectly affecting their food security.

3.1.9 Forest fire

Forest fires pose a serious threat to the environment, resulting in the destruction of vegetation, loss of wildlife habitat, soil degradation, damage to property, and risks to both human and wildlife safety. In DFO Zhemgang, forest fire incidents reported between 2019 and 2023 affected a total area of 150.30 ha of forest. These fires were mainly caused by agricultural debris burning and accidental ignitions by laborers while working in forest areas.

3.1.10 Disease outbreaks in wildlife

Outbreaks of diseases such as swine flu can create devastating impacts on populations' patterns in the wild especially particularly in areas where populations are already stressed or fragmented.

3.2 Threat Ranking

The conservation threat ranking was performed using the Miradi-4.5.0 software, considering three major criterias; Scope, Severity, and Irreversibility. Scope refers to the proportion of the threat that is likely to affect the target within 10 years under current circumstances. Severity is the level of damage to the biodiversity target expected within the scope, the level of damage to the target from the threat that can reasonably be expected given the continuation of current circumstances and trends. Irreversibility is the degree to which the effects of a given threat can be undone and the targets affected by the threat restored, if the threat is stopped. The nature of each threat ranking criteria are guided by four sub level criteria: **1: Low** (The threat is likely to be very narrow in its scope, affecting the target across a small proportion (1-10%) of its occurrence/population), **2: Medium** (The threat is likely to be restricted in its scope, affecting the target across some (11–30%) of its occurrence/population), **3: High**: The threat is likely to be widespread in its scope, affecting the target across much (31–70%) of its occurrence/population, **4: Very High** The threat is likely to be pervasive in its scope, affecting the target across all or most (71-100%) of its occurrence/population. The overall threat ranking for the targets of DFO Zhemgang is medium.

Threats/Targets	1.To provide effective and efficient public service delivery	2.To ensure sustainable forest management and utilization to optimize the production of economic and environmental goods and services	3.To improve community well-being by actively engaging local communities in forest conservation and management activities	4.To conserve biodiversity and ecosystem services through effective management of natural habitats	5.To effectively address the adverse impacts of climate change through appropriate mitigation and adaptation interventions	Summary Threat Ranking
Wildlife poaching		Low		Medium		Low
Retaliatory killing	Low		Low	Low		Low
Infrastructure development	Medium	Medium		Medium	Medium	Medium
Improper waste management				Low	Low	Low
Illegal collection of forest resources	Low	Medium		Low		Low
Human Wildlife Conflict	Low		Medium	Medium		Medium

Forest fire							Medium	Medium	Medium
Drying of water source							Low	Medium	Medium
Disease outbreak in wildlife							Low		Low
Climate Change Impact							Low	Low	Low
Summary Target Ratings:	Low		Medium	Medium	Medium	Medium	Medium	Overall Project Rating	Medium

Figure 28. Threat raking score and status

3.3 Challenges

3.3.1 Illiteracy

With the development of information technology, most of the government to citizen services are made online for faster service delivery to the public. The Department of Forest and Park Services has initiated and made online services such as Government to Citizen (G2C) services for allocation of rural timbers and Online Forest Services (OFS) to issue forestry clearances and other permits for availing other forest resources. In general such initiatives had greatly enhanced the faster service delivery to the public. However, most of the communities in Zhemgang are illiterate and this has faced challenges.

3.3.2 Mobility

The DFO Zhemgang has one Toyota Hilux (2015 model) and four Royal Enfield motor bikes each in Zhemgang Range, Khomshar Range, Panbang Range and Wangdigang FMU. Due to poor road conditions and far-flung remote areas, especially during the monsoon season it becomes very difficult to provide services on time and conduct routine SMART patrolling.

3.3.3 Accessibility

The topography of Bhutan, characterized by its rugged terrains with dense forest and towering mountains, presents significant challenges for traversal and ascent, particularly under adverse weather conditions. This terrain complexity poses a considerable obstacle for the staff of the DFO Zhemgang, hindering their ability to provide services and conduct regular consistent patrols. Most of the Gewogs and Chiwogs roads are in poor condition thus making it difficult to travel and provide services.

3.3.4 Inadequate infrastructure

Lack of adequate office space, housing facilities and field gears are incessant challenges. Currently the division office does not have a meeting room whereby during meetings and training, meeting rooms are arranged from other institutions. The Range and Beat Offices buildings are all old and maintenance required. Most of the field offices are located in remote areas without staff quarters and it is difficult to get decent housing. Without proper arrangement of such facilities, building of credible and effective institutions, and ensuring effective service delivery is challenging.

3.3.5 Funding constraints

Biodiversity conservation and management incur a lot of expenses for safeguarding resources, training of manpower, and establishment of facilities and structures. RGoB supports mostly recurrent expenditures and some capital works only and budget allocated for maintenance cost and fuel for pool vehicles are insufficient. Lack of consistent donor support to finance major conservation activities such as mitigating human-wildlife conflicts (compensating livestock killed by tiger, leopard and dholes) and research works and innovations in crop protection measures against wildlife. Due to meagre remuneration and allowances, the management encounters difficulties in adequately paying the field

staff and keeping them well motivated to carry out anti-poaching and wildlife surveys and monitoring in the highly dense forests. Most of the field offices are in dire need of maintenance but lack of budget made it impossible to do so. A committed fund is necessary to achieve the planned activities otherwise most of the planned activities in different management regimes are left unachieved.

CHAPTER 4:

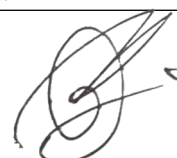
MANAGEMENT

PRESCRIPTION

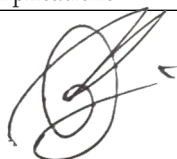
The management prescriptions are framed to achieve the objectives of the management plan. In order to achieve the broad five objectives, 12 strategies and 51 actions are identified where there will be numerous activities implemented under each action. The strategies and actions are identified based on analysis of threats, challenges, and opportunities and are expected to solve problems or overcome the barriers that prevent from achieving the objectives. The management prescriptions may be segregated but not limited to three broad areas as shown in table 35.

Table 35. Management prescription

Objective 1: To provide effective and efficient public service delivery
<i>Strategy 1.1 Effective and efficient public service delivery</i>
Action 1.1.1 Provide Online Forestry Services via G2C and OFS system within the stipulated time.
Action 1.1.2 Advocacy program to the public on Online Forestry Services, Acts and Rules.
Action 1.1.3 Enhance professional capacity of staff for effective service delivery.
<i>Strategy 1.2 Improvement of Infrastructure and Mobility</i>
Action 1.2.1 Construction of Shingkhar Beat Office
Action 1.2.2 Maintenance of offices
Action 1.2.3 Procurement of pool bikes and vehicles
Action 1.2.4 Maintenance of vehicle and fuel
Objective 2: To ensure sustainable forest management and utilization to optimize the production of economic and environmental goods and services.
<i>Strategy 2.1 Sustainable management of natural resources</i>
Action 2.1.1 Revision of CF Management plans.
Action 2.1.2 Revision of LFMA Management plans.
Action 2.1.3 Revision of NWFP Management plans.
Action 2.1.4 Revision of Management plan for Wangdigang FMU.
Action 2.1.5 Facilitate establishment of Community Forests/NWFP groups for sustainable management and utilization of forest resources.
Action 2.1.6 Monitoring and evaluation of different forest management regimes.
Action 2.1.7 Operationalize the sustainable thinning plan.
Action 2.1.8 Sustainable Resource allocation from different forest management regimes
Action 2.1.9 Carry out forest inventory as a part of National Forest Inventory
<i>Strategy 2.2 Springshed Management Intervention</i>
Action 2.2.1 Conduct water discharge measurement of Dechugang and Chukhormani springshed
Action 2.2.2 Hydrogeological Mapping for springshed management.



Objective 3: To improve community well-being by actively engaging local communities in forest conservation and management activities.
Strategy 3.1 Capacity development of community groups in sustainable forest management
Action 3.1.1 Facilitate and provide technical support to the CFMG members in CF planning governance, gender mainstreaming, planning and management.
Action 3.1.2 Provide advocacy on sustainable management of forest resources.
Action 3.1.3 Provide training on CFMG on nursery management, plantation and tending operations based on gender needs.
Action 3.1.4 Provide training to CF and NWFP Group members on basic office management and record and bookkeeping.
Action 3.1.5 Training on resource inventory and management plan writing
Action 3.1.6 Conduct training on post-harvest management and production
Strategy 3.2 Livelihood and income generation for local communities
Action 3.2.1 Enhance establishment of forest-based enterprises
Action 3.2.2 Enhance income generation for the communities through sales of forest resources
Action 3.2.3 Enhance income generation through product diversification of cane and bamboo resources
Objective 4. To conserve biodiversity and ecosystem services through effective management of natural habitats.
Strategy 4.1 Conservation and enhancement of wildlife habitats
Action 4.1.1 Improve and manage grassland areas to safeguard critical habitats and species diversity.
Action 4.1.2 Conduct biodiversity assessments to track changes in habitat and ecosystem health.
Action 4.1.3 Engage local communities and stakeholders in conservation stewardship.
Action 4.1.4 Control and manage invasive species through appropriate preventive measures.
Action 4.1.5 Assessment of aquatic diversity under DFO Zhemgang
Action 4.1.6 Monitoring and implementation of activities in Key Biodiversity Area (KBA) as per the plan
Action 4.1.7 Assessment of Duck Mussel habitat at Zarkabla for conservation
Action 4.1.8 Carry out tiger population survey as a part of the nationwide tiger population revalidation surveys every five years
Action 4.1.9 Determine the population or abundance of Musk Deer as a part of the nationwide survey
Action 4.1.10 Conduct eDNA survey as part of the nationwide eDNA survey
Action 4.1.11 Carry out the assessment of Bhutan METT+
Action 4.1.12 Carry out assessment to determine the effectiveness HWC intervention in two hotspot gewogs
Strategy 4.2 Strengthen measures to curb the illegal activities
Action 4.2.1 Conduct SMART Patrolling
Action 4.2.2 Conduct Drone Patrolling
Action 4.2.3 Enhance the capacity of the forestry officials in planning and conducting SMART patrolling
Action 4.2.4 Train staff on use of advanced technologies like drones and camera traps for real-time monitoring.
Action 4.2.5 Capacity building of forestry officials on investigation and legal documentation procedures
Strategy 4.3 Enhance knowledge and awareness on conservation of wildlife through educational outreach program
Action 4.3.1 Conduct awareness campaign to the communities on the significance of wildlife to the ecosystem and the legal implications



<i>Strategy 4.4 Conceptualize and formulation of Human-wildlife Conflict to Coexistence (C2C)</i>
Action 4.4.1 Initiate interventions activities as per the C2C strategy in two HWC hotspots gewogs.
Objective 5. To effectively address and reduce the adverse impacts of climate change through appropriate mitigation and adaptation interventions.
<i>Strategy 5.1 To build climate-resilient communities through participatory and consultative approach</i>
Action 5.1.1 Strengthen the <i>Dzongkhag</i> level Interagency Forest Fire Coordination Group (IFFCG)
Action 5.1.2 Conduct forest fire awareness campaigns
Action 5.1.3 Encourage and support the communities in Agroforestry/Agro-silvo-pastoral activities
<i>Strategy 5.2 Regulate waste management</i>
Action 5.2.1 Waste management awareness and sensitization to local communities and other relevant stakeholders to reduce the disposal of waste into the forest
Action 5.2.2 Observe regular zero waste hours in the community

4.1 Management of HCVA

The management prescription and strategy of HCVA is as shown in table 36.

Table 36. HCVA management prescriptions and strategy

Strategy	Outcome	Output	Activity
1. Implement waste management through surveillance and awareness program	Integrated conservation and development	Pollution prevented at Buli Tsho	1.1 Conduct the awareness program on waste management
			1.2 Facilitate to conduct the regular cleaning campaign
			1.3 Installation of waste prevention and management signages
2. Identify and ensure the protection of recharge area of Buli Tsho	Forest protection and enforcement	Water level of the Buli Tsho maintained and recharge area protected	2.1 Capacity building of technical staff on hydrogeological survey to identify potential recharge area of the <i>Tsho</i>
			2.2 Conduct field survey and identification of potential recharge area through hydrogeological mapping
			2.3 Presentation of Hydrogeological mapping result to the community and gewog officials
3. Strengthen the regular surveillance and enforcement	Forest protection and enforcement	Awareness created and patrolling conducted	3.1 Conduct awareness program on designated HCVA and implication of wildlife crimes to nearby communities
			3.2 Conduct regular SMART Patrolling in and around the HCVA
			3.3 Monitoring of HCV area
4. Raise awareness and regulate visitors	Integrated conservation and development	Public are aware on Tsho dam and no natural calamities	4.1 Conduct advocacy on <i>Tsho-dam</i> through various media platforms
			4.2 Documentary video of HCVA and screening to visitors in the Information Center.



4.2 Gender Mainstreaming

Gender mainstreaming involves examining the roles and relationships between genders in various aspects of conservation, including policy-making, research, resource management, access to resources, division of labour, socio-cultural gender perception, and community engagement. All DFOs understand that this approach recognizes that gender dynamics influence how individuals interact with their environment, access resources, and participate in decision-making processes. As such, integrating gender considerations into conservation efforts is a fundamental step toward achieving equitable and sustainable outcomes of the DFO management plan.

The “Gender Analysis, Gender Mainstreaming Strategy and Gender Action Plan” 2019 has indicated that in order to mainstream gender into the DFO management plans, adequate budget allocation is needed (indicative budget in relation to gender mainstreaming is provided in the Gender Action Plan). The report recommends the need to involve women’s organization both at national and local level to enhance gender mainstreaming, building capacity of project team, enhancing skill development at local level for nature-based product diversification, identification of alternative livelihood and incentives for participation and support to CFMG. Integrating the above recommendations within the overall structure of the DFO management plan is supposed to ensure gender aspects are addressed.

In addition, the following are some important outcomes that are generally accepted if gender integration, specifically women are considered:

1. **Diverse Knowledge and Perspectives:** Women and men often possess distinct knowledge about local ecosystems, resources, and species. Incorporating this diverse knowledge can lead to more comprehensive and accurate conservation strategies. Therefore, women participation would be considered of outmost significance when planning and implementing biodiversity action plans.
2. **Resource Management:** Women frequently play key roles in natural resource management, including agriculture, water collection, and fuelwood collection. As a result, women involvement in the management of forest resources in the CF and SRF would be encouraged.
3. **Empowerment:** The Division shall empower women by providing them with opportunities to actively engage in decision-making processes related to conservation and land management.
4. **Equitable Benefits:** Ensure gender equity in conservation initiatives and promotes fair distribution of benefits and resources, preventing potential gender-based disparities.

4.3 Environmental and Social Safeguards (ESS)

The Environmental and Social Safeguards (ESS) system is designed to identify and manage potential negative environmental or social impacts associated with various actions. By screening these potential actions, the ESS allows for the early detection of issues that might adversely affect the environment or communities. This proactive approach facilitates the development of suitable measures to avoid, minimize, or compensate for these



negative impacts, ensuring that the actions taken are both environmentally and socially responsible.

A crucial aspect of the ESS is its role in monitoring the implementation and effectiveness of mitigation measures. This involves continuous oversight to ensure that the measures put in place are working as intended and addressing any unforeseen impacts that may arise during the execution of management prescriptions. This integration ensures that environmental and social considerations are not overlooked at any stage, leading to more comprehensive and effective management strategies.

The through ESS screening processes will be carried out for the activities which will have some environmental impact and subsequently the detail Environmental and Social Management Plan (ESMP) will be prepared and disclose to the public before the implementation of the activities. The ESMP will have all the possible risks outlined along with mitigation measures to ensure that the environment and society are not affected either during or after the implementation of the actions.



CHAPTER 5: IMPLEMENTATION PLAN AND FINAN- CIAL OUTLAY

The projected budget for the entire plan period of 10 years is estimated Nu. 157.34 million. The schedule and budget required for implementing the plan activities are outlined in table 37 and 38.



Table 37. Implementation plan and financial outlay

Objectives	Strategies	Action	Year (2026-2035) along with budget outlay (Nu. in million)										Remarks
			I	II	III	IV	V	VI	VII	VIII	IX	X	
Objective 1: To provide effective and efficient public service delivery	Strategy 1.1 Effective and efficient public service delivery	Action 1.1.1 Provide Online Forestry Services via G2C and OFS system within the stipulated time.	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	The services will be provided within TAT
		Action 1.1.2 Advocacy program to the public on Online Forestry Services, Acts and Rules.		0.7					0.7				As an when the services are upgraded
		Action 1.1.3 Enhance professional capacity of staff for effective service delivery.	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
		Action 1.2.1 Construction of Shingkhari Beat Office	5.0	3.0									Shingkhari BO
	Strategy 1.2 Improvement of Infrastructure and Mobility	Action 1.2.2 Maintenance of offices	1.0	—	1.0					1.0	1.0		Range Offices
		Action 1.2.3 Procurement of pool bikes and vehicles				5.0	1.0					1.0	One vehicle and bikes
		Action 1.2.4 Maintenance of vehicle and fuel	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
		Action 2.1.1 Revision of CF Management plans.		0.20	0.20	0.80	1.00		1.00	1.20	0.40		
Objective 2: To ensure sustainable forest management and utilization to optimize the production of economic and environmental goods and services	Strategy 2.1 Sustainable management of natural resources												

Objective 3: To improve community well-being by actively engaging local communities in forest conservation and management practices	Strategy 2.2 Springshed Management and Intervention	Action 2.1.9 Carry out forest inventory as a part of National Forest Inventory												4.55	0.08	0.08	0.08	0.08	0.08	Quarterly
		Action 2.2.1 Conduct water discharge measurement of Dechugang and Chukhormani springshed	0.08	0.08		0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08						
		Action 2.2.2 Hydrogeological Mapping for springshed management.	0.70	0.10																Year-2026: Burgangchu
	Strategy 3.1 Capacity development of community groups in sustainable forest management	Action 3.1.1 Facilitate and provide technical support to the CFMG members in CF planning governance, gender mainstreaming, planning and management.	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
		Action 3.1.2 Provide advocacy and awareness on sustainable management of forest resources.	0.30				0.30								0.30					0.30
		Action 3.1.3 Provide training to CFMG on nursery management, plantation and tending operations based on gender needs		0.30					0.30								0.50			
		Action 3.1.4 Provide training to CF and NWFP Group members on basic office management and record and bookkeeping.		0.50														0.50		

		Action 3.1.5 Training on resource inventory and management plan writing	0.50					0.50		0.50		
		Action 3.1.6 Conduct training on post-harvest management and production	0.30		0.30		0.30		0.30			
		Action 3.2.1 Facilitate establishment of forest-based enterprises	3.5				1.50		1.50			
		Action 3.2.2 Enhance income generation for the communities through sales of forest resources	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	Value addition, advertisement, marketing strategy
		Action 3.2.3 Enhance income generation through product diversification of cane and bamboo resources	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	Value addition, advertisement, marketing strategy
	Objective 4: To conserve biodiversity and ecosystem services through effective management of natural habitats	Strategy 4.1 Conservation and enhancement of wildlife habitat	0.45	0.15		0.15		0.15		0.15		BFL in 2026, BFL in 2027, 2029, 2031, 2033
		Action 4.1.1 Improve and manage grassland areas to safeguard critical habitats and species diversity.	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	Annual BMG by BFL Project
		Action 4.1.2 Conduct biodiversity assessments to track changes in habitat and ecosystem health.	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	Group formation, advocacy, meetings/workshops
		Action 4.1.3 Engage local communities and stakeholders in conservation stewardship										

		Action 4.1.12 Carry out assessment to determine the effectiveness HWC intervention in two hotspot gewogs	-	0.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Strategy 4.2 Strengthen measures to curb the illegal activities	Action 4.2.1 Conduct SMART Patrolling	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
		Action 4.2.2 Conduct Drone Patrolling	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
		Action 4.2.3 Enhance the capacity of the forestry officials in planning and conducting SMART patrolling		0.50															
		Action 4.2.4 Train staff on use of advanced technologies like drones and camera traps for real-time monitoring.	0.30	0.30															
	Strategy 4.3 Enhance knowledge and awareness on conservation of wildlife through educational outreach program	Action 4.2.5 Capacity building of forestry officials on investigation and legal documentation procedures		0.30															
		Action 4.3.1 Conduct awareness campaign to the communities on the significance of wildlife to the ecosystem and the legal implications	0.10	0.10															
		Action 4.3.2 Initiate interventions activities as per the C2C strategy in two HWC hotspots gewogs	6.4																
																			C2C for Trong, Nangkor and Shingkhari Gewog

Objective 5: To effectively address and reduce the adverse impacts of climate change through appropriate mitigation and adaptation interventions	Strategy 5.1 To build climate-resilient communities through participatory and consultative approach	Action 5.1.1 Strengthen the <i>Dzongkhag</i> level Interagency Forest Fire Coordination Group (IFFCG)	0.05						0.05									0.05		
		Action 5.1.2 Conduct forest fire awareness campaigns	0.10	0.10					0.10	0.10								0.10		
		Action 5.1.4 Encourage and support the communities in Agroforestry practices/ Agro-silvo-pastoral activities		0.30	0.30				0.30	0.30								0.30		
		Action 5.2.1 Waste management awareness and sensitization to local communities and other relevant stakeholders to reduce the disposal of waste into the forest	0.10	0.10					0.10	0.10								0.10		
		Action 5.2.2 Observe regular zero waste hours in the community																		
Total		29.23	18.79	11.74	16.94	12.64	12.69	13.99	12.59	12.74	13.14									



5.1 Implementation Plan and Financial Outlay (HCVA)

The estimated budget for implementation of HCVA activities is Nu. 4.15 million. The HCVA implementation plan and financial outlay are as shown in table 38.

Table 38. HCVA implementation plan and financial outlay

Strategy	Outcome	Output	Activity	Location	Timeframe (Year= Y1, Y2..... Y10)	Baseline	Target	Budget (Million Nu.)	Lead	Collabora- tor
1. Implement waste management through surveillance and awareness program	Integrated conservation and development	Pollution prevented at Buli <i>Tsho</i>	1.1 Conduct the awareness program on waste management	Buli, Nyakhar, Tshaidang	Y1, Y2	0	2	0.20	Buli BO	ZRO, DFO
			1.2 Facilitate to conduct the regular cleaning campaign	Buli	Y1---Y10	0	10	0.10	Buli BO	LG
			1.3 Installation of waste prevention and management signages	Buli	Y1	1	1	0.05	DFO	Buli BO
2. Identify and ensure the protection of recharge area of Buli <i>Tsho</i>	Forest protection and enforcement	Water level of the Buli <i>Tsho</i> maintained and recharge area protected	2.1 Capacity building of technical staff on hydrogeological survey to identify potential recharge area of the <i>Tsho</i>	Buli	Y1	0	1	0.20	ZRO	DFO
			2.2 Conduct field survey and identification of potential recharge area through hydrogeological mapping	Buli	Y1, Y2	0	1	0.50	ZRO	Buli BO, DFO
			2.3 Presentation of Hydrogeological mapping result to the community and gewog officials	Buli	Y2	0	1	0.10	ZRO	DFO

3. Strengthen the regular surveillance and enforcement	Forest protection and enforcement	Awareness created and patrolling conducted	3.1 Conduct awareness program on designated HCVA and implication of wildlife crimes to nearby communities	Buli, Nyakhar, Tshaidang	Y1, Y3,	0	4	0.2	Buli BO	ZRO, DFO
			3.2 Conduct regular SMART Patrolling in and around the HCVA	Buli, Nyakhar, Tshaidang	Y1.....Y10	0	20	0.50	Buli BO	DFO
			3.3 Monitoring of HCV area	HCVA	Y1.....Y10	0	10	0.60	DFO	Buli BO, ZRO
4. Raise awareness and regulate visitors	Integrated conservation and development	Public are aware on Tsho dam and no natural calamities	4.1 Conduct advocacy on Tsho-dam through various media platforms	Buli	Y1, Y2, Y5, Y8, Y9	1	5	0.10	LG	DFO, Buli BO
			4.2 Documentary video of HCVA and screening to visitors in the Information Center.	Buli	Y1-Y2	0	1	0.50	DFO	Buli BO, LG
Total								3.05		



CHAPTER 6: MONITORING AND EVALUATION

The monitoring and evaluation plan includes the indicators against which the performance of the management plan will be measured. The details of the M&E plan prepared to ensure synergy with the management prescription and implementation framework are outlined in table 39.

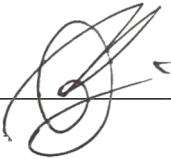


Table 39. Monitoring and Evaluation timeline

Objectives	Action	Output Indicator	Unit	Base-line	Yearly Target									
					I	II	III	IV	V	VI	VII	VIII	IX	X
Objective 1: To provide effective and efficient public service delivery	Action 1.1.1 Provide Online Forestry Services via G2C and OFS system within the stipulated time.	Service provided as per TAT	Days	5 days	-	-	-	-	-	-	-	-	-	-
	Action 1.1.2 Advocacy program to the public on Online Forestry Services, Acts and Rules.	No. of advocacy programs conducted	Nos.	One	-	7	-	-	-	7	-	-	-	-
	Action 1.1.3 Enhance professional capacity of staff for effective service delivery.	Professional capacity enhanced	Nos.	41	20	20	20	20	20	20	20	20	20	20
	Action 1.2.1 Construction of Shingkhari Beat Office	Completed the construction	No.	0	-	1	-	-	-	-	-	-	-	-
	Action 1.2.2 Maintenance of offices	Completed the maintenance	No.	0	1	-	1	-	-	-	-	1	1	-
	Action 1.2.3 Procurement of pool bikes and vehicles	Bikes and pool vehicle procured	No.	5	-	-	5	1	-	-	-	-	-	1
	Action 1.2.4 Maintenance of vehicle and fuel	Pool vehicles and bikes maintained	No.	5	5	5	5	5	5	5	5	5	5	5
	Action 2.1.1 Revision of CF Management plans.	Management plans revised	No.	0	-	1	1	4	5	-	1	2	6	-
	Action 2.1.2 Revision of LFMA Management plans.	LFMA Plan revised	No.	1	1	1	1	2	1	1	-	-	-	1
	Action 2.1.3 Revision of NWFP Management plans.	NWFP Plan revised	No.	6	1	1	-	-	1	-	-	-	-	6
Objective 2: To ensure sustainable forest management and utilization to optimize the production of economic and environmental goods and services	Action 2.1.4 Revision of Management plan for Wangdigang FMU.	FMU Plan revised	No.	1	-	1	-	-	-	-	-	-	-	-
	Action 2.1.5 Facilitate establishment of Community Forests for sustainable management and utilization of forest resources.	Facilitated the establishment of CFs	No.	0	1	-	-	-	-	-	-	-	-	-

	Action 2.1.6 Monitoring and evaluation of different forest management regimes.	Monitored and evaluated the management regimes	No.	32	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
	Action 2.1.7 Operationalize the sustainable thinning plan	Operational plan implemented	No.	0	1	1	1	1	-	-	-	-	-	-
	Action 2.1.8 Sustainable Resource allocation from different forest management regimes	Resources allocated	M ³	13061	26,500	26,500	26,500	2500	2500	2500	2500	2500	2500	2500
	Action 2.1.9 Carry out forest inventory as a part of National Forest Inventory	Inventory conducted	No. of plots	-	-	-	-	91	-	-	-	-	-	-
	Action 2.2.1 Conduct water discharge measurement of Dechugang and Chukhormani springshed	Water discharge measurement conducted	No.	4	4	4	4	4	4	4	4	4	4	4
	Action 2.2.2 Hydrogeological Mapping for springshed management.	Hydrogeological mapping conducted	No.	1	1	1	1	-	-	-	-	-	-	-
	Action 3.1.1 Facilitate and provide technical support to the CFMG members in CF governance, gender mainstreaming, planning and management.	Provided technical support to CFs	No.	1	1	1	1	1	1	1	1	1	1	1
	Action 3.1.2 Provide advocacy and awareness on sustainable management of forest resources.	Advocacy programs conducted	No.	1	3	-	-	-	3	-	-	3	-	3
	Action 3.1.3 Provide training to CFMG on nursery management, plantation and tending operations based on gender needs	Training provided to CFMG Members	No.	1	-	3	-	-	-	3	-	-	5	-
	Action 3.1.4 Provide training to CF and NWFP Group members on basic office management and record and bookkeeping.	Training provided to CF and NWFP Group members	No.	1	-	5	-	-	-	-	5	-	-	-
Objective 3: To improve community well-being by actively engaging local communities in forest conservation and management practices														

	Action 3.1.5 Training on resource inventory and management plan writing	No.	0	-	5	-	-	-	-	5	-	5
	Action 3.1.6 Conduct training on post-harvest management and production	No.	0	1	1	-	1	1	1	-	1	1
	Action 3.2.1 Facilitate establishment of forest-based enterprises	No.	1	1	-	-	-	1	-	-	1	-
	Action 3.2.2 Enhance income generation for the communities through sales of forest resources	No.	1	1	1	1	1	1	1	1	1	1
	Action 3.2.3 Enhance income generation through product diversification of cane and bamboo resources	No.	1	1	1	1	1	1	1	1	1	1
Objective 4: To conserve biodiversity and ecosystem services through effective management of natural habitats	Action 4.1.1 Improve and manage grassland areas to safeguard critical habitats and species diversity.	Ha.	4	10	-	4	-	4	-	4	-	-
	Action 4.1.2 Conduct biodiversity assessments to track changes in habitat and ecosystem health.	No.	2	2	2	2	2	2	2	2	2	2
	Action 4.1.3 Engage local communities and stakeholders in conservation stewardship	No.	0	20	20	20	20	20	20	20	20	20
	Action 4.1.4 Control and manage invasive species through appropriate preventive measures.	Ha	0	1	1	1	1	1	1	1	1	1
	Action 4.1.5 Assessment of aquatic diversity under DFO Zhemgang	No. of river/streams	0	-	1	1	-	-	-	-	-	-

	Action 4.1.6 Monitoring and implementation of activities in Key Biodiversity Area (KBA) as per the plan	Monitored the activities	No.	0	1	1	1	1	1	1	1	1	1	1	1	1	1
	Action 4.1.7 Assessment of Duck Mussel habitat at Zarkabla for conservation	Habitat assessed	No.	0	1	1	1	1	1	1	1	1	1	1	1	1	-
	Action 4.1.8 Carry out tiger population survey as a part of the nationwide tiger population re-validation surveys every five years	Survey conducted	No.	1	-	1	1	1	1	1	1	1	1	1	1	1	-
	Action 4.1.9 Determine the population or abundance of Musk Deer as a part of the nationwide survey	Survey conducted	No.	1	-	1	1	1	1	1	1	1	1	1	1	1	-
	Action 4.1.10 Conduct eDNA survey as part of the nationwide eDNA survey	Survey conducted	No.	1	-	1	1	1	1	1	1	1	1	1	1	1	-
	Action 4.1.11 Carry out the assessment of Bhutan METT+	Assessment completed	No.	1	1	1	1	1	1	1	1	1	1	1	1	1	-
	Action 4.1.12 Carry out assessment to determine the effectiveness HWC intervention in two hotspot gewogs	Assessment completed	No.	0	-	2	2	2	2	2	2	2	2	2	2	2	-
	Action 4.2.1 Conduct SMART Patrolling	Patrolling conducted	No.	2000	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
	Action 4.2.2 Conduct Drone Patrolling	Patrolling conducted	No.	4	24	24	24	24	24	24	24	24	24	24	24	24	24
	Action 4.2.3 Enhance the capacity of the forestry officials in planning and conducting SMART patrolling	Capacity of the forestry officials in planning and conducting SMART patrolling enhanced	No.	40	-	30	30	30	30	30	30	30	30	30	30	30	-

	Action 4.2.4 Train staff on use of advanced technologies like drones and camera traps for real-time monitoring.	Staff trained	No.	4	30	30	-	-	-	-	-	-	-	-	-	-	-
	Action 4.2.5 Capacity building of forestry officials on investigation and legal documentation procedures	Forestry officials trained in investigation and legal documentation procedures	No.	10	-	10	-	10	-	-	10	-	-	-	-	-	-
	Action 4.3.1 Conduct awareness campaign to the communities on the significance of wildlife to the ecosystem and the legal implications	Awareness campaign conducted	No.	1	1	1	-	-	1	1	1	-	-	-	1	1	1
	Action 4.4.2 Initiate interventions activities as per the C2C strategy in two HWC hotspots gewogs	Intervention activities implemented	No. of gewogs	0	1	-	-	-	-	-	-	-	-	-	-	-	-
Objective 5: To effectively address and reduce the adverse impacts of climate change through appropriate mitigation and adaptation interventions	Action 5.1.1 Strengthen the Dzongkhag level Interagency Forest Fire Coordination Group (IFFCG)	IFFCG strengthened	No.	1	1	-	-	1	-	-	-	1	-	-	-	1	1
	Action 5.1.2 Conduct forest fire awareness campaigns	Forest fire awareness conducted	No.	1	1	1	-	1	1	1	-	1	1	1	-	1	1
	Action 5.1.3 Encourage and support the communities in Agroforestry/Agro-silvo-pastoral activities	Supported the communities in Agroforestry	No.	0	-	2	2	2	2	2	2	2	2	2	2	2	2
	Action 5.2.2 Waste management awareness and sensitization to local communities and other relevant stakeholders to reduce the disposal of waste into the forest	Waste management awareness programs conducted	No.	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Action 5.2.3 Observe regular zero waste hours in the community	Zero waste hours observed monthly	No.	48	48	48	48	48	48	48	48	48	48	48	48	48	48



6.1 Monitoring and Evaluation (HCVA)

The monitoring and evaluation of HCVA will be as shown in table 40.

Table 40. HCVA monitoring and evaluation timeline

Strategy	Outcome	Output indicators	Measure- ment Unit (Nos.)	Activity	Lead	Collaborator	Baseline	Target
1. Implement waste management through surveillance and awareness program	Integrated conservation and development	No. of awareness program and cleaning campaigns coordinated	13	1.1 Conduct the awareness program on waste management	Buli BO	ZRO, DFO	0	2
				1.2 Facilitate to conduct the regular cleaning campaign	Buli BO	LG	0	10
				1.3 Installation of waste prevention and management signages	DFO	Buli BO	1	1
2. Identify and ensure the protection of recharge area of Buli Tsho	Forest protection and enforcement	No. of intervention implemented to maintain the water level and protect recharge area	5	2.1 Capacity building of technical staff on hydrogeological survey to identify potential recharge area of the Tsho	ZRO	DFO	0	1
				2.2 Conduct field survey and identification of potential recharge area through hydrogeological mapping	ZRO	Buli BO, DFO	0	1
				2.3 Presentation of Hydrogeological mapping result to the community and gewog officials	ZRO	DFO	0	1
3. Strengthen the regular surveillance and enforcement	Forest protection and enforcement	No. of awareness program and patrolling conducted	34	3.1 Conduct awareness program on designated HCVA and implication of wildlife crimes to nearby communities	Buli BO	ZRO, DFO	0	4
				3.2 Conduct regular SMART Patrolling in and around the HCVA	Buli BO	DFO	0	20
				3.3 Monitoring of HCV area	DFO	Buli BO, ZRO	0	10
4. Raise awareness and regulate visitors	Integrated conservation and development	No. of advocacy conducted on Tsho dam	7	4.1 Conduct advocacy on Tsho-dam through various media platforms	LG	DFO, Buli BO	1	5
				4.2 Documentary video of HCVA and screening to visitors in the Information Center.	DFO	Buli BO, LG	0	1

CHAPTER 7: STAKEHOLDER CONSULTATION AND ENDORSE- MENT OF DFO PLAN

7.1 Stakeholder consultation

The DFO convened a stakeholder consultation meeting with Local Government members and community representatives (Chiwog Tshogpas) from all seven gewogs on 24th November 2024. During the meeting, participants unanimously endorsed the management plans. The list of participants is provided in Annexure II.

7.2 Finalization and Endorsement of the DFO Management Plan

The DFO Management Plan was subsequently reviewed and proofread by the Chief Forestry Officer, Section Heads, and Range Officers of the division before being submitted to the Department of Forests and Park Services and subsequently reviewed and endorsed by the Technical Advisory Committee.

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Annexure I: Bhutan METT+ form (DFO Zhemgang)

Name, affiliation and contact details for the person responsible for completing the Bhutan METT + (email etc.)		Kezang Wangmo, Sr. FO, ZFD, kezangwangmo@moaf.gov.bt, 17823532		
Date assessment carried out		18th August 2021		
Name of Protected Area/Forest Division		Zhemgang FD		
WDPA site code (codes can be searched for on: www.protectedplanet.net/)				
Designation	National	IUCN Category National Category (to list based on site needs-CF, WFMU, LFMPs)	Internation (see below)	
Location of protected area (province and if possible map reference)		South-Central Bhutan		
Date of establishment (dd/mm/yyyy)		28-Jul-03		
Ownership details (please tick)	SRFL	Private	Community	Other
Management Authority		Divisional Forest Office		
Size of forest division (sq.km)		1518.42 sq.km		
Number of staff	Technical-49, Non-technical-3, (F-5, M-47)		Temporary (same): 7 (M-4, F-3)	
Annual budget (Nu) – excluding staff salary costs		Current budget (operational costs, e.g. staff costs): 1.235m		Capital budget (infrastructure development etc): 5.041m
What are the main values for which the area is designated				
List the two primary protected area management objectives				
Management objective 1		Protection, conservation and management of forests to maintain 60% of the country's area for all times to come		
Management objective 2		Delivering effective and efficient forestry services to the people unstingily as per forest acts and rules		
No. of people involved in completing assessment		20		
Including: (highlight where appropriate)	FD Manager 1 agency staff	FD staff 19	Other FD	NGO
	Local community	Donors	External expert	Other
Please note if assessment was carried out in association with a particular project, on behalf of an organisation or donor.				
Information on International Designations (where applicable)				
UNESCO World Heritage site				

Date listed	Site name	Site area
Criteria for designation (i.e. criteria i to x)		
Statement of Outstanding Universal Value		
Ramsar site		
Date listed	Site Name and number	Site area
Criteria for Designation & ecological character (see Ramsar Information Sheet)		
UNESCO Man and Biosphere Reserves		
Date listed	Site name	Site area
Total:		
Core:		
Buffer:		
Transition:		
Criteria for designation		
Fulfilment of three functions of MAB (conservation, development and logistic support)		
Please list other designations and any supporting information below		
Name:	Detail: 555576126 (WDPA code)	
Name:	Detail:	
Name:	Detail:	
Forest Division Threats: Assessment Sheet 1		
In the assessment below threats should be:		
Ranked as of high significance if they are seriously degrading values; medium if they are having some negative impact and low if they are present but not seriously impacting values. Not applicable (N/A) is selected when the threat is either not present or not applicable in the forest Division.		
<i>Note that threats ranked as of medium and high significance can be assessed in more detail using Assessment Sheet 2</i>		
Assessed at three levels:		
Current threat: in which case a 'C' is put in either the High, Medium or Low box		
Potential threat: in which case a 'P' is put in either the High, Medium or Low box		
Issues: In which case an 'I' is put in either the High, Medium or Low Box		
<i>Each threat identified could have both a current threat assessment (e.g. assessed as low) and potential threat (e.g. assessed as medium). The category of 'issues' has been added because some management issues may not be strictly regarded as threats but need constant management intervention to ensure they do not become a threat. For example, plants collected for medicinal use could be a management issue; or a current or potential threat if management activities are not effective in controlling the collection levels or processes.</i>		
Guidance in making the assessment		
Unlike many other countries in the region (and worldwide) the level of threats are fairly low at present in Bhutan and thus what might be considered of high threat here, may not be at anything like the same scale as in other countries. Guidance in what is meant by the categories high, medium and low threats in a Bhutanese context has thus been developed for threats marked ** (see Annexe 1). Threat categories with specific guidance are marked by a *.		
Specific guidance on assessing threats in the Bhutanese context are also given in boxes below each threat.		

1. Residential and commercial development within a protected area/ forest division				
<i>Threats from human settlements or other non-agricultural land uses with a substantial footprint</i>				
High	Medium	Low	N/A	
	p	c		1.1 Housing and settlement
	p	c		1.2 Commercial and industrial areas
	p	c		1.3 Tourism and recreation infrastructure

2. Agriculture and aquaculture within a protected area/ forest division				
<i>Threats from farming and grazing as a result of agricultural expansion and intensification, including silviculture, mariculture and aquaculture</i>				
High	Medium	Low	N/A	
		c		2.1 Annual and perennial non-timber crop cultivation
			na	2.1a Medicinal plant cultivation*
	p	c		2.2 Wood and pulp plantations
	p	c		2.2a Community forestry
		c		2.2b Private forestry (e.g. planting of exotic species)
	c	p		2.3 Livestock farming and grazing**
	p	c		2.3a Land encroachment for agriculture
p	c			2.3b Land lease of government reserve land for commercial farming
		c		2.4 Freshwater aquaculture
<i>Threat 2.1a Medicinal plant cultivation: Note that the collection of species from the wild is covered in threat 5.2</i>				

3. Energy production and mining within a protected area/ forest division				
<i>Threats from production of non-biological resources</i>				
High	Medium	Low	N/A	
			na	3.1 Oil and gas drilling
		p		3.2 Mining and quarrying**
	p	c		3.3 Energy generation, including from hydropower dams*
<i>3.3 Energy generation including HEP: This question looks specifically at threats within protected areas. Most of the hydropower developments in Bhutan are outside protected areas but distant HEP systems can still impact on the protected area, the impact of such threats is covered in threat 7.2.</i>				

4. Transportation and service corridors within a protected area/ forest division				
<i>Threats from long narrow transport corridors and the vehicles that use them including associated wildlife mortality</i>				
High	Medium	Low	N/A	
p	c, i			4.1 Roads and railroads (include road-killed animals)**
	c	p		4.2 Utility and service lines (e.g. electricity cable lines, telephone lines)*/**
			na	4.3 Flight paths*
<i>4.2 Utility and service lines: Given the pace of infrastructure development in Bhutan (e.g. high tension cables, service centres etc) it was felt this threat should consider both impacts in the protected area and in the buffer zones.</i>				

4.3 *Flight paths: It should be stressed that this threat is considering flight paths of aeroplanes, hot air balloons, gliders etc, not the flight paths of birds*

5. Biological resource use and harm within a protected area/ forest division				
<i>Threats from consumptive use of “wild” biological resources including both deliberate and unintentional harvesting effects; also persecution or control of specific species (note this includes hunting and killing of animals)</i>				
High	Medium	Low	N/A	
				5.1 Hunting, killing and collecting terrestrial animals (including killing of animals as a result of human/wildlife conflict)
	c, p			5.1a Human wildlife conflict**
	p	c		5.1b Wildlife Poaching**
				5.2 Gathering terrestrial plants or plant products (non-timber)
		c		5.2a Mushrooms**
	p	c		5.2b Plant species for medicinal use**
	p	c		5.2c Plant species for food**
	p	c		5.3 Illegal logging and timber harvesting**
	p	c		5.3a Legal logging and timber harvesting**
	p	c		5.4 Fishing and harvesting aquatic resources

6. Human intrusions and disturbance within a protected area/ forest division				
<i>Threats from human activities that alter, destroy or disturb habitats and species associated with non-consumptive uses of biological resources</i>				
High	Medium	Low	N/A	
				6.1 Recreational activities and tourism
		c		6.1a Unmanaged ecotourism**
			na	6.2 War, civil unrest and military exercises*
		c		6.3 Research, education and other work-related activities in forest divisions
		c		6.4 Activities of FD Managers (e.g. construction or vehicle use, artificial watering points and dams)
			na	6.5 Deliberate vandalism or destructive activities
<i>6.2 War, civil unrest and military exercises: in the case of Bhutan war and civil unrest should include intrusion of political insurgency from across the border</i>				

7. Natural system modifications				
<i>Threats from other actions that convert or degrade habitat or change the way the ecosystem functions</i>				
High	Medium	Low	N/A	
			NA	7.1 Fire and fire suppression (including arson)**
		c		7.2 Dams, hydrological modification and water management/use*/**
			N/A	7.3a Increased fragmentation within forest division
			NA	7.3b Isolation from other natural habitat (e.g. deforestation, dams without effective aquatic wildlife passages)

			NA	7.3c Other 'edge effects' on protected area values
		c		7.3d Loss of keystone species (e.g. top predators, pollinators etc)
<i>Whereas threat 3 looked at impacts of infrastructure development in protected areas, threat 7 looks at impacts which may occur from developments far away from the actually protected area. As noted above most of the hydropower developments in Bhutan are outside protected areas but distant HEP systems can still impact on the protected area. Threat 7.2 should record impacts on habitat or changes in the way the ecosystem functions, such as changing water flow patterns.</i>				

8. Invasive and other problematic species and genes

Threats from terrestrial and aquatic non-native and native plants, animals, pathogens/microbes or genetic materials that have or are predicted to have harmful effects on biodiversity following introduction, spread and/or increase

High	Medium	Low	N/A	
		c		8.1a Invasive non-native/alien plants (weeds)
			na	8.1b Invasive non-native/alien animals
			na	8.1c Invasive non-native/alien freshwater fish
			na	8.1d Pathogens (non-native or native but creating new/increased problems)
			na	8.2 Introduced genetic material (e.g. genetically modified organisms)

9. Pollution entering or generated within protected area/forest division

Threats from introduction of exotic and/or excess materials or energy from point and non-point sources

High	Medium	Low	N/A	
				9.1 Household sewage and urban waste water
		c, p		9.1a Sewage and waste water from protected area facilities (e.g. toilets, hotels etc)
		c, p		9.2 Industrial, mining and military effluents and discharges (e.g. poor water quality discharge from dams, e.g. unnatural temperatures, de-oxygenated, other pollution)
		c, p		9.3 Agricultural and forestry effluents (e.g. excess fertilizers or pesticides)
	p	c		9.4 Garbage and solid waste**
			na	9.5 Air-borne pollutants
			na	9.6 Excess energy (e.g. heat pollution, lights etc)

10. Geological events

Geological events may be part of natural disturbance regimes in many ecosystems. But they can be a threat if a species or habitat is damaged and has lost its resilience and is vulnerable to disturbance. Management capacity to respond to some of these changes may be limited.

High	Medium	Low	N/A	
			na	10.1 Volcanoes
	p			10.2 Earthquakes/Tsunamis
	p	c		10.3 Avalanches/ Landslides

	p	c		10.4 Erosion and siltation/ deposition (e.g. shoreline or river-bed changes)
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11. Climate change and severe weather				
<i>Threats from long-term climatic changes which may be linked to global warming and other severe climatic/ weather events outside of the natural range of variation</i>				
High	Medium	Low	N/A	
		p		11.1 Habitat shifting and alteration
			na	11.2 Droughts
			na	11.3 Temperature extremes
	p	c		11.4 Storms and flooding

12. Specific cultural and social threats				
High	Medium	Low	N/A	
	p	c		12.1 Loss of cultural links, traditional knowledge and/or management practices
	p	c		12.2 Natural deterioration of important cultural site values
		c		12.3 Destruction of cultural heritage buildings, gardens, sites etc

Protected Area Threats: Assessment Sheet 2

As the severity and impact of threats in Bhutan are expected to increase over the next few years, in part due to infrastructure development and the relative ease of access/communications that new roads and mobile phone coverage are allowing, the Bhutan METT + includes a more detailed assessment of major threats.

The assessment form allows a more detailed assessment of the current or potential threats identified as having medium or high significance in Assessment Sheet 2

1. Specify threat: Housing and settlement

Threat (specific if current or potential): p

Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Delivery of forestry services as per the forestry rules and regulations.
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

2. Specify threat: Commercial and industrial areas

Threat (specific if current or potential): p

Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat

A: Small section of the site (5-10%):	A: Minor impact:	The activities are implemented as per the DPR
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

3. Specify threat: Tourism and recreation infrastructure

Threat (specific if current or potential): p

Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Ecotourism management plan endorsed by Zhemgang Dzongkhag Administration, and activities are implemented as per the plan
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

4. Specify threat: Wood and pulp plantations

Threat (specific if current or potential): p

Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Any wood and pulp plantation are done based on the FNCRR 2017 & 2020
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

5. Specify threat: Community forestry

Threat (specific if current or potential): p

Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Implemented as per the CF management plans and FNCRR 2017,2020 (amendment)
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

6. Specify threat: Livestock farming and grazing		
Threat (specific if current or potential): p		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Reduction in the cattle migration and Tsamdru, introduction of improved breed, improved grass
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

7. Specify threat: Land encroachment for agriculture		
Threat (specific if current or potential): p		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Enforcement of Forest and Nature Conservation Rules and Regulation 2017 & 2020 (amendments)
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

8. Specify threat: Land lease of government reserve land for commercial farming		
Threat (specific if current or potential): C, P		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	As per FNCRR 2017&2020, Land Act
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

9. Specify threat: Energy generation, including from hydropower dams*		
Threat (specific if current or potential): p		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Feasibility assessment being conducted as per FN-CRR2-17&2020

B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

10. Specify threat: Roads and railroads (include road-killed animals)**		
Threat (specific if current or potential): c, p		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Proper monitoring of the site as per terms of FC and restoration of damaged sites, SMART patrolling
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

11. Specify threat: Utility and service lines (e.g. electricity cable lines, telephone lines)*/**		
Threat (specific if current or potential): p		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Proper monitoring of the site as per terms of FC and restoration of damaged sites.
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

12. Specify threat: Human Wildlife Conflict		
Threat (specific if current or potential): c, p		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Stringent data collection and project based incentives to farmers
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

13. Specify threat: Wildlife Poaching**		
Threat (specific if current or potential): p		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Strict compliance of SMART patrolling, regulated as per FNCRR 2017 & 2020 (amendment)
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

14. Specify threat: Plant species for medicinal use**		
Threat (specific if current or potential): p		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Collection of Piper is done as NWFP management, timing for collection of Paris polyphilla is done as per FNCRR 2017 & 2020
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

15. Specify threat: Plant species for food**		
Threat (specific if current or potential): p		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Sustainable collection of NW-FPs as per FNCRR 2017
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

16. Specify threat: Illegal logging and timber harvesting**		
Threat (specific if current or potential): P		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat

A: Small section of the site (5-10%):	A: Minor impact:	Implementation of SMART patrolling, laws & rules, impose fines and penalties
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

17. Specify threat: Legal logging and timber harvesting**
Threat (specific if current or potential): p

Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Scientific management of timber harvesting as per FNCRR 2017&2020 (amendment) and management plans for LFMPs, CF, Extraction Plan
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

18. Specify threat: Fishing and harvesting aquatic resources
Threat (specific if current or potential): P

Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Strick implementation of SMART Patrolling Fines and penalty as per FNCRR 2017&2020 and following the prescribe management plan.
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

19. Specify threat: Garbage and solid waste**
Threat (specific if current or potential): P

Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Implementation of waste management rules and regulations, involvement of public and students during the monthly waste program and zero waste hours
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

20. Specify threat: Earthquakes		
Threat (specific if current or potential): P		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	No management interventions
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

21. Specify threat: Landslides		
Threat (specific if current or potential): P		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Land management activities, climate smart restoration are being done
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

22. Specify threat: Erosion and siltation/ deposition (e.g. shoreline or riverbed changes)		
Threat (specific if current or potential): P		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Climate smart restoration, soil and land management interventions
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

23. Specify threat: Storms and flooding		
Threat (specific if current or potential): P		
Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat

A: Small section of the site (5-10%):	A: Minor impact:	River mitigation work in case of flooding
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

23. Specify threat: Loss of cultural links, traditional knowledge and/or management practices
Threat (specific if current or potential): p

Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Preservation of cultural sites, monuments and traditional architects for ecotourism, promote traditional and cultural practices
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

24. Specify threat: Natural deterioration of important cultural site values
Threat (specific if current or potential): P

Impact of threat		Management response
Extent: Describe the extent of the impact under one of the three descriptors given below	Severity: Describe how severe the impact under one of the three descriptors given below	Action: What actions are planned or have taken place to manage the threat
A: Small section of the site (5-10%):	A: Minor impact:	Renovation/restoration of religious and cultural sites
B: Several areas of the site (11-50%):	B: Major impact but not continuous:	
C: Most of the site (51-100%):	C: Major continuous impact:	

Protected Areas Management Activities: Assessment Sheet 3

Please tick the two critical management activities currently undertaken in the protected area	Comment/Explanation
☐ Law enforcement and surveillance	SMART patrolling, FNCA 1995, FN-CRR 2017 & 2020 (amendment)
☐ Promoting sustainable resource use	Scientific management of forest resources, as per FNCRR, Implementation of CF-MPs, NWFPs, LFMPs & FMU
☐ Working with local communities	
☐ Education and awareness	
☐ Demarcation and zoning	
☐ Monitoring	
☐ Research	
☐ Management planning	
☐ Ecotourism	
☐ Building institutional and governance capacity	
☐ Species management	
☐ Infrastructure development	
☐ Fundraising	
☐ Restoration	
☐ Fire management	
☐ Resolving tenure problems	
☐ Human-wildlife conflict management	
☐ Alien species control	
☐ External communication and publicity	
☐ Equipment and facilities	
☐ Improving habitat	
☐ Species (re)introduction / control / breeding	
☐ Working with regional authorities	
☐ Other	

Protected Area Management Effectiveness: Assessment

Issue	Criteria	Score: Tick only one box per question	Comment/Explanation	Next steps
1. Legal status Does the protected area/forest division have legal status (or in the case of private reserves is covered by a covenant or similar)?	The protected area/forest division is not gazetted/covenanted	0	Zhemgang Forest Division area covers 1518.42 sq.km of SRFL legally defined by FNCA 1995 and FNCRR 2017. The area comprises of BC4 (594.40 sq.km.)	The Division will come up with Division management plan approved by the MoAF
	There is agreement that the protected area should be gazetted/covenanted but the process has not yet begun	1		
	The protected area is in the process of being gazetted/covenanted but the process is still incomplete (includes sites designated under international conventions, such as Ramsar, or local/traditional law such as community conserved areas, which do not yet have national legal status or covenant)	2		
	The protected area has been formally gazetted/covenanted	3		
Context 2. Protected area/forest division regulations Are appropriate regulations in place to control land use and activities (e.g. hunting)?	There are no regulations for controlling land use and activities in the protected area /forest division	0	All the legal provisions of FNCA 1995, FNCRR 2017 & 2021(amendment) are enforced	
	Some regulations for controlling land use and activities in the protected area exist but there are major weaknesses	1		
	Regulations for controlling land use and activities in the protected area exist but there are some weaknesses or gaps	2		
	Regulations for controlling inappropriate land use and activities in the protected area exist and provide an excellent basis for management	3		
3. Law enforcement Can staff (i.e. those with responsibility for managing the site) enforce protected area rules well enough?	The staff have no effective capacity/resources to enforce protected/forest division area legislation and regulations	0	Lack of capacities, skills, budget and staffs for efficient law enforcement	Trainings on capacity development, improvement of staff skills should be conducted efficient law enforcement
	There are major deficiencies in staff capacity/resources to enforce protected area/forest division legislation and regulations (e.g. lack of skills, no patrol budget, lack of institutional support)	1		
	The staff have acceptable capacity/resources to enforce protected area legislation and regulations but some deficiencies remain	2		
	The staff have excellent capacity/resources to enforce protected area/forest division legislation and regulations	3		

4. Protected area/forest division objectives Is management undertaken according to agreed objectives? Planning	No firm objectives have been agreed for the protected area/forest division	0			The activities of the Division are done to fulfill the management objectives	
	The protected area/forest division has agreed objectives, but is not managed according to these objectives	1				
	The protected area/forest division has agreed objectives, but is only partially managed according to these objectives	2	2			
	The protected area/forest division has agreed objectives and is managed to meet these objectives	3				
5. Protected area/forest division design Is the protected area/forest division the right size and shape to meet the objectives (protect species, habitats, ecological processes and water catchments of key conservation concern, resource utilization) Planning	Inadequacies in protected area/forest division design mean achieving the major objectives of the protected area is very difficult	0			Stakeholders involvement for any developmental activities going on in Division	Awareness programme, advocacy and consultation meeting needs to be initiated
	Inadequacies in protected area/forest division design mean that achievement of major objectives is difficult but some mitigating actions are being taken (e.g. agreements with adjacent land owners for wildlife corridors or introduction of appropriate catchment management)	1				
	Protected area/forest division design is not significantly constraining achievement of objectives, but could be improved (e.g. with respect to larger scale ecological processes)	2	2			
	Protected area/forest division design helps achievement of objectives; it is appropriate for species and habitat conservation; and maintains ecological processes such as surface and groundwater flows at a catchment scale, natural disturbance patterns etc	3				
6. Protected/forest division area boundary demarcation Is the boundary known and demarcated? Process	The boundary of the protected area/forest division is not known by the management authority or local residents/neighbouring land users	0			The boundary is well demarcated and known to management authority office but not known by locals (presence of shapefile of Division boundary)	Need to provide awareness to local people on the boundary of Division Office
	The boundary of the protected area/forest division is known by the management authority but is not known by local residents/neighbouring land users	1				
	The boundary of the protected area/forest division is known by both the management authority and local residents/neighbouring land users but is not appropriately demarcated	2	2			
	The boundary of the protected area is known by the management authority and local residents/neighbouring land users and is appropriately demarcated	3				

7. Management plan Is there a management plan and is it being implemented? Planning	There is no management plan for the protected area/forest division	0	0	No holistic plan for the Division but management plan for various management regimes exists (CF, LF-MPs, WFMUWS)	All management plans will be incorporated in the DFO plan for better management of the Division
	A management plan is being prepared or has been prepared but is not being implemented	1			
	A management plan exists but it is only being partially implemented because of funding constraints or other problems	2			
	A management plan exists and is being implemented	3			
Bhutan METT+: If a management plan is just running out and there is a process underway to redo the plan this is equivalent to score 3: a management plan exists					
Additional points: Planning					
7a. Planning process	The planning process allows adequate opportunity for key stakeholders to influence the management plan	1	0	No overall DFO management plan	To be included for DFO mgt plan preparation
7b. Planning process	There is an established schedule and process for periodic review and updating of the management plan	1	0	No overall DFO management plan	To be included for DFO mgt plan preparation
7c. Planning process	The results of monitoring, research and evaluation are routinely incorporated into planning	1	0	No overall DFO management plan	To be included for DFO mgt plan preparation
8. Regular work plan Is there a regular work plan and is it being implemented? Planning/Outputs	No regular work plan exists	0		The activities are planned and implemented as the work plan-Annual Performance Agreement (APA), CF, LFMPs, NWFPs, FMU plan	
	A regular work plan exists but few of the activities are implemented	1			
	A regular work plan exists and many activities are implemented	2	2		
	A regular work plan exists and all activities are implemented	3			

9. Resource inventory Do you have enough information to manage the area? Input	There is little or no information available on the resource (critical habitats, species(flora & fauna), growing stocks and cultural values) of the protected area/forest division	0			Information on resources are sufficient (CF data, LFMA data, FMU data, BC data, NWFP data, NFI data, Tiger Survey data, SES data, species data, annual data) for planning and decision making, baseline assessment data on Biodiversity of ZFD (Wild Flowers, Mammals, birds, Reptiles, butterfly, moths), Orchids of Bermoo	The Division office will be frequent updating the new findings/new addition of species to the already existing biodiversity data base
	Information on the resource (critical habitats, species(flora & fauna), growing stocks and cultural values) of the protected area/forest division / not sufficient to support planning and decision making	1				
	Information on the resource (critical habitats, species(flora & fauna), growing stocks and cultural values) of the protected area/forest division / sufficient for most key areas of planning and decision making	2	2			
	Information on the resource (critical habitats, species(flora & fauna), growing stocks and cultural values) of the protected area/forest division / sufficient for all areas of planning and decision making	3				
10. Protection systems Are systems in place to control access/resource use in the protected area? Process/Outcome	Protection systems (patrols, permits etc) do not exist or are not effective in controlling access/resource use	0				Guided by FN-CRR2017&2020 (amendment)
	Protection systems are only partially effective in controlling access/resource use	1				SMART Patrolling, Implementation of Zero Poaching Strategy
	Protection systems are moderately effective in controlling access/resource use	2	2			
	Protection systems are largely or wholly effective in controlling access/ resource use	3				

11. Research	There is no survey or research work taking place in the protected area	0			NFI & NTS research, survey for CF, LF-MAS, FMUs, NWFPs, SES are conducted. But there is still need for other research	
Is there a programme of management-orientated survey and research work?	There is some survey and research work but it is not directed towards the needs of protected area management	1				
Process	There is some survey and research work which is at least partly directed towards the needs of protected area management	2	2			
	There is a comprehensive, integrated programme of survey and research work, which is relevant to management needs	3				
12. Resource management	Active resource management is not being undertaken	0			Done as per the management plans but issues such as insufficiency of resource allotments from CF, LF-MAs, increasing and adhoc timber demand for Dzong construction/renovations, insufficient resources required for making of religious items, insufficient/non-availability of RBM sites, etc.	Intervention such as private forestry, plantation of commercial timber species, identification of RBM sites
Is active resource management being undertaken?	Very few of the requirements for active management of critical habitats, species, ecological processes, cultural values and sustainable resource production are being implemented	1				
Process	Many of the requirements for active management of critical habitats, species, ecological processes, cultural values and sustainable resource production are being implemented but some key issues are not being addressed	2	2			
	Requirements for active management of critical habitats, species, ecological processes, cultural values and sustainable resource production are being substantially or fully implemented	3				
12a: Management of NTFPs	A management plan exists for the management of all major non timber forest products actively collected within the protected area	1	1		Plans for NTFPs (Pipla, bamboo & cane shoot, Yula, broom grass, mushroom) exists	
12b: Management of medicinal plants	A management plan exists for the management of all major medicinal plants actively collected within the protected area	1	1		Pipla is used as medicinal purposes	
12c: Management of Other conservation areas (OCAs)	A management plan exists for all Other conservation areas (OCAs) within the protected area/forest division	1	1		CF, FMU, LFMA, Watershed, Timber extraction action plan, NWFPs exists	
Bhutan METT+: consideration of this question includes issues relating to land leasing						

13. Staff numbers	There are no staff	0			As per the OD exercise, there is shortage of 4 staff to manage the forest division	The management had requested the Department for additional staff
Are there enough people employed to manage the protected area?	Staff numbers are inadequate for critical management activities	1				
Inputs	Staff numbers are below optimum level for critical management activities	2		2		
14. Staff training	Staff numbers are adequate for the management needs of the protected area	3				
Are staff adequately trained to fulfil management objectives?	Staff lack the skills needed for protected area management	0			All staff are trained but lack in IT knowledge, and other basic technical skills	Timely refresher courses/ trainings needed to be conducted to keep an update on the upgraded software
Inputs/Process	Staff training and skills are low relative to the needs of the protected area	1				
	Staff training and skills are adequate, but could be further improved to fully achieve the objectives of management	2		2		
	Staff training and skills are aligned with the management needs of the protected area	3				
15. Current budget	There is no budget for management of the protected area	0			Shortage of TA/DA, mileage for staff, budget constraints to conduct any kind of meetings and trainings	
Is the current budget sufficient?	The available budget is inadequate for basic management needs and presents a serious constraint to the capacity to manage	1				
	The available budget is acceptable but could be further improved to fully achieve effective management	2		2		
Inputs	The available budget is sufficient and meets the full management needs of the protected area	3				
Bhutan MEET+: Budgets in Bhutan are divided by capital budget (infrastructure development etc) and current budget (operational costs, e.g. staff costs). Consideration of both budgets should be made when answering question 15 (and 16 and 17). The comment/explanation column should be used to detail specific issues concerning budget allocations etc.						
16. Security of budget	There is no secure budget for the protected area/forest division and management is wholly reliant on outside or highly variable funding	0			Yearly budget received from RGoB and from outside sources (GEF, BFL, CA/TS, etc)	
Is the budget secure?	There is very little secure budget and the protected area/forest division could not function adequately without outside funding	1				
Inputs	There is a reasonably secure core budget for regular operation of the protected area/forest division but many innovations and initiatives are reliant on outside funding	2		2		
	There is a secure budget for the protected area/ forest division and its management needs	3				

17. Management of budget	Budget management is very poor and significantly undermines effectiveness (e.g. late release of budget in financial year)	0			Annual Budget meeting is conducted for effective management, activities are prioritised based on the available budget	Prioritization of activities/work plan based on approved budget
Is the budget managed to meet critical management needs?	Budget management is poor and constrains effectiveness	1				
Process	Budget management is good and actions are prioritised when funds are inadequate to meet management needs	2		2		
	Budget management is excellent and meets management needs	3				
18. Equipment	There are little or no equipment and facilities for management needs	0			Office equipments such as laptops, desktops and other forestry-based equipments are lacking. Due to budget constraints, office stationaries and equipments are not adequate for all staff	
Is equipment sufficient for management needs?	There are some equipment and facilities but these are inadequate for most management needs	1		1		
Input	There are equipment and facilities, but still some gaps that constrain management	2				
	There are adequate equipment and facilities	3				
Bhutan METT+: Most protected areas cover large areas, there are thus likely to be differences in equipment availability in park headquarters and guard posts around the park. Question 18 should consider equipment across the whole protected area and specific concerns regarding availability should be included in the comment/explanation and next steps column						
19. Maintenance of equipment	There is little or no maintenance of equipment and facilities	0			Due to shortage of budget, the maintenance of equipments are carried out once or never	
Is equipment adequately maintained?	There is some ad hoc maintenance of equipment and facilities	1		1		
Process	There is basic maintenance of equipment and facilities	2				
	Equipment and facilities are well maintained	3				

20. Education and awareness Is there a planned education programme linked to the objectives and needs? Process	There is no education and awareness programme	0			Awareness and education programs are being conducted for the school and public	More advocacy and education programs needs to be be conducted to provide right information on the objectives and needs of the office (eg. awareness programs on snake bites can be conducted to school students so that they in turn help/support forest division in protecting snakes)
	There is a limited and ad hoc education and awareness programme	1				
	There is an education and awareness programme but it only partly meets needs and could be improved	2	2			
	There is an appropriate and fully implemented education and awareness programme	3				
21. Planning for land and water use Does land and water use planning outside the protected area/forest division recognise the protected area/forest division and aid the achievement of objectives? Planning	Adjacent land and water use planning does not take into account the needs of the protected area/forest division and activities/policies are detrimental to the survival of the area	0			Land and water use planning are conducted as per the existing rules such as FNCRR2017&2020, Land Act, Water Act, etc. All stakeholders participate for planning of activities and discuss before the actual activities are implemented in the field. Also provide full support and commitment	
	Adjacent land and water use planning does not takes into account the long term needs of the protected area/forest division, but activities are not detrimental the area	1	1			
	Adjacent land and water use planning partially takes into account the long term needs of the protected area/forest division	2				
	Adjacent land and water use planning fully takes into account the long term needs of the protected area/forest division	3				

Bhutan METT +: This question is specific to activities outside of the protected area. EIAs are supposed to take place for any developments. Issues in Bhutan include hydropower, transmission lines and mining.						
Additional points: Land and water planning						
21a: Land and water planning for habitat conservation	Planning and management in the catchment or landscape containing the protected area/forest division incorporates provision for adequate environmental conditions (e.g. volume, quality and timing of water flow, air pollution levels etc) to sustain relevant habitats	1	0	Water source assessment for Zhemgang Forest Division conducted recently and report submitted Watershed Management Division, Thimphu .	Plans to conduct the Hydrogeological mapping Wangdi-gang-Dechugang Watershed in this financial year 2021-2022	
21b: Land and water planning for connectivity	Management of corridors linking the protected area/forest division provides for wildlife passage to key habitats outside the protected area (e.g. to allow migratory fish to travel between freshwater spawning sites and the sea, or to allow animal migration)	1	1	The forest office jurisdiction provides passage to wildlife and with presence of BC4, it connects three national parks (PNP, JSWNP and RMNP)		
21c: Land and water planning for ecosystem services and species conservation	Planning addresses ecosystem-specific needs and/or the needs of particular species of concern at an ecosystem scale (e.g. volume, quality and timing of freshwater flow to sustain particular species, fire management to maintain grassland habitats etc.)	1	1	Waterholes and management of grassland in BC4 are done recently		
22. State and commercial neighbours Is there co-operation with adjacent land and water users? Process	There is no contact between managers and neighbouring official or corporate land and water users	0		There is very little or no cooperation between the users and managers	More awareness and frequent meeting to be done to improve the cooperation between the stakeholders	
	There is contact between managers and neighbouring official or corporate land and water users but little or no cooperation	1	1			
	There is contact between managers and neighbouring official or corporate land and water users, but only some co-operation	2				
	There is regular contact between managers and neighbouring official or corporate land and water users, and substantial co-operation on management	3				
22a: State and commercial neighbours	There is regular contact and substantial cooperation with any hydropower developers and operators whose operations impact protected area management	1	1	Involvement of all relevant stakeholders		

22b: State and commercial neighbours	There is regular contact and substantial cooperation with any developers and operators of linear infrastructure (e.g. transmission lines and/or roads) whose operations impact protected area management	1	1	Involvement of all relevant stakeholders	
22c: State and commercial neighbours	Where the protected area/forest division provides important natural resources for commercial operations (e.g. municipal water companies or hydropower operators) payments for ecological services agreements are in place	1	1		
23. Local communities Do local communities resident or near the protected area/forest division have input to management decisions? Process	Local communities have no input into decisions relating to the management of the protected area/forest division	0		Local communities are involved in decision making process but lack support during implementation.	More of awareness program to be conducted
	Local communities have some input into discussions relating to management but no direct role in management	1	1		
	Local communities directly contribute to some relevant decisions relating to management but their involvement could be improved	2			
	Local communities directly participate in all relevant decisions relating to management, e.g. co-management	3			
Additional points Local communities					
23a: Impact on communities	There is open communication and trust between local people, stakeholders and protected area/forest division managers	1	1		
23b: Impact on communities	Programmes to enhance community welfare, while conserving protected area/forest division resources, are being implemented	1	1		
23c: Impact on communities	Local people actively support the protected area/forest division	1	0	Local people partially support FD	Awareness programs to be conducted
24. Economic benefit Is the protected area/forest division providing economic benefits to local communities, e.g. income, employment, payment for environmental services?	The protected area/forest division does not deliver any economic benefits to local communities	0		Direct benefit to the groups (KNC, Yula Group, Dakphel Women Association, CF & NWFP groups)	Capacity building/trainings needs to be conducted
	Potential economic benefits are recognised and plans to realise these are being developed	1			
	There is some flow of economic benefits to local communities	2	2		
	There is a major flow of economic benefits to local communities from activities associated with the protected area/forest division	3			
Outcomes					

25. Monitoring and evaluation	There is no monitoring and evaluation in the protected area/forest division	0			CF M&E, LFMP M&E, NWFP M&E, evaluation of WFMU are done annually	The result of M&E will be analysed on an annual basis and used for the improvement of management interventions
Are management activities monitored against performance?	There is some ad hoc monitoring and evaluation, but no overall strategy and/or no regular collection of results	1	1			
Planning/Process	There is an agreed and implemented monitoring and evaluation system but results do not feed back into management	2				
	A good monitoring and evaluation system exists, is well implemented and used in adaptive management	3				
26. Visitor facilities	There are no visitor facilities and services despite an identified need	0			Heritage village, homestay, Botanical garden, Duenmang Tshachu, Dangkhari Menchu, Buli Tsho, Tali ecotrail are available for visitors	
Are visitor facilities adequate?	Visitor facilities and services are inappropriate for current levels of visitation	1				
Outputs	Visitor facilities and services are adequate for current levels of visitation but could be improved	2	2			
	Visitor facilities and services are excellent for current levels of visitation	3				
27. Commercial tourism operators	There is little or no contact between managers and tourism operators using the protected area/forest division	0	0			
Do commercial tour operators contribute to protected area/forest division management?	There is contact between managers and tourism operators but this is largely confined to administrative or regulatory matters	1				
Process	There is limited co-operation between managers and tourism operators to enhance visitor experiences and maintain protected area values	2				
	There is good co-operation between managers and tourism operators to enhance visitor experiences, and maintain protected area/forest division values	3				
28. Fees	Although fees are theoretically applied, they are not collected	0	0			
If fees (e.g. entry fees) are applied, do they help protected area/forest division management?	Fees are collected, but make no contribution to the protected area/forest division or its environs	1				
	Fees are collected, and make some contribution to the protected area/forest division and its environs	2				
Inputs/Process	Fees are collected and make a substantial contribution to the protected area/forest division and its environs	3				

29. Fines	There are no fines, or fines are theoretically applied but are seldom or never collected	0		Fines (collection through imposed fines and penalties for illegal cases) are directly collected and desposited in RGoB revenue account	
If fines (e.g. poaching fines) are applied, do they help protected area management?	Fines are collected, but make no direct contribution to the protected area/forest division or its environs	1	1		
	Fines are collected, and make some contribution to the protected area/forest division and its environs	2			
	Fines are collected and make a substantial contribution to the protected area/forest division and its environs	3			
Inputs/Process					
Bhutan METT +: The term “protected area or its environs” can include incentive schemes such as payments to informers of poachers					
30. Condition of biodiversity and ecological values	Many biodiversity and ecological values are being severely degraded	0		Important biodiversity and ecological values are partially degraded due to upcoming development activities	
What is the condition of the important biodiversity values of the protected area as compared to when it was first designated?	Some biodiversity and ecological values are being severely degraded	1			
	Some biodiversity and ecological values are being partially degraded but the most important values have not been significantly impacted	2	2		
	Biodiversity and ecological values are predominantly intact	3			
Outcomes					
Additional Points: Condition of values					
30a: Condition of biodiversity values	The assessment of the condition of biodiversity and ecological values is based on research and/or monitoring	1	1	Camera trapping, NFI, SMART patrolling	
30b: Condition of biodiversity values	Specific management programmes are being implemented to address threats to biodiversity and ecological values	1	1	SMART patrolling, regular patrolling, M&E	
30c: Condition of biodiversity values	Activities to maintain key biodiversity and ecological values are a routine part of protected area/forest division management	1	1	BC-4 survey, Tiger Survey	
Bhutan METT + questions					

31. Condition of cultural values What is the condition of the important cultural values of the protected area/forest division as compared to when it was first designated? Outcomes	Many cultural values are being severely degraded	0			Religious sites and its cultural values are still intact and preserved but traditional management practice are degraded	Interventions such as video documentary or pictorial book on traditional knowledge/ management practices may be done
	Some cultural values are being severely degraded	1				
	Some cultural values are being partially degraded but the most important values have not been significantly impacted	2		2		
	Cultural values are predominantly intact	3				
32. Access How accessible is the protected area/forest division? Planning / Process	Staff are unable to move around the protected area/forest division and thus much of the protected area is inaccessible throughout the year	0			Few remote areas are cut off during the monsoon season	
	There are significant restrictions on the ability of staff to move around the protected area/forest division throughout the year (e.g. in the rainy season) and thus much of the protected area (e.g. over 50 % of the area) is inaccessible some or all of the year	1				
	Staff are able to move relatively easily around the protected area and thus most of the protected area/forest division is accessible, although some areas (e.g. less than 50 % of the area) remain inaccessible some or all of the year	2		2		
	Staff are able to move easily around the whole protected area/forest division and the majority of the protected area is fully accessible	3				
33. Neighbouring protected areas/forest division Is there co-operation with adjoining protected areas/forest division (national and international)? Process	There is no contact between managers of adjoining protected areas/forest division on issues which impact protected area/forest division management effectiveness	0			Full cooperation rendered by adjoining protected areas. forest divisions.	
	There is limited contact between managers of adjoining protected areas/forest division but little cooperation on issues which impact protected area management effectiveness	1				
	There is contact between managers of adjoining protected areas/forest division and some cooperation on protected area/forest division management effectiveness	2		2		
	There is regular contact between managers of adjoining protected areas/forest division and full cooperation on ensuring management effectiveness	3				

34. Is the protected area/forest division being consciously managed to adapt to climate change? Planning	There have been no efforts to consider adaptation to climate change in management	0				
	Some initial thought has taken place about likely impacts of climate change, but this has yet to be translated into management plans	1	1		Climate smart restoration are done (plantation)	
	Limited plans have been drawn up about how to adapt management to predicted climate change, which may or may not be being implemented	2				
	Detailed plans have been drawn up about how to adapt management to predicted climate change, and these are already being implemented	3				
	Carbon storage and carbon dioxide capture has not been considered in management of the protected area/forest division	0				
35. Is the protected area/forest division being consciously managed to prevent carbon loss and to encourage further carbon capture? Process	Carbon storage and carbon dioxide capture has been considered in general terms, but has not yet been significantly reflected in management	1	1		Done in 2 CFs-Buli, but no reflected in CF management plan	National Forest Inventory will be collecting soil samples for soil carbon assessment
	There are active measures in place to reduce carbon loss from the protected area/forest division, but no conscious measures to increase carbon dioxide capture	2				
	There are active measures in place both to reduce carbon loss from the protected area/forest division and to increase carbon dioxide capture	3				
		123	70			
			56.91%			

Annexure II: Stakeholder consultation participant list

Sl#	Name & Designation	Gender/Age	Gewog/Chiwog	Signature
1.	Narbu Gyeltshen	m/50	Trong/D/Khang	[Signature]
2.	Tashi Tobgye	14/39	Shingkhut	[Signature]
3	SINAYE WANUHTUT	34/1A	Gup; Nangkur	[Signature]
4	Sonam	43/m	Mangni	[Signature]
5	Sonam Tashi	m/40	maasni	[Signature]
6	Namgyel	m/56	Goshing	[Signature]
7	Dorji Tenzin	11/38	Tshagpa	[Signature]
8	Hagawang Kinga	M/42	'1	[Signature]
9	Tsheing Uandup	m 41	Brup, Shingpa	[Signature]
10	Zangpo	m/56	Goshing	[Signature]
11	Kinchen Gyatshen	m/34	Goshing	[Signature]
12	Puji Letso	m/38	Chensha	[Signature]
13	Phurpa Uamco	F/39	Bardo/Phutaki	[Signature]
14	Leki Nyimpo	M/35	Bjaka Chardong	[Signature]
15	Sangay Dorji	m 34	N/ktong	[Signature]
16	Sonam Zangpo	m/49	Goshing	[Signature]
17	Sangam Phuntsho	m/40	Deli Bjaka	[Signature]
18	Rinchen Dolan	m/35	Kameti, Bjaka	[Signature]
19	Sonam Tobgye	m -	Nagayla Trong	[Signature]
20	Wangyal	m/44	Bjaka	[Signature]
21	Wangyal	20/50	Bjaka	[Signature]

22	ཁྱེད་ཀྱི་མེས་པོ་	1/56	"	Dorji
23	ཁྱེད་ཀྱི་མེས་པོ་	1/46	"	Ku
24	ཁྱེད་ཀྱི་མེས་པོ་	1/39	"	Ala
25	Tashi Dorji	1/5	Goching	And
26	Tshering Norbu	m/38	Kikhov	22-g
27	Sangay Dorji	m/44	Goshing / Shogpa	30m
28	ཁྱེད་ཀྱི་མེས་པོ་	20/42	ཁྱེད་ཀྱི་མེས་པོ་	ཁྱེད་ཀྱི་མེས་པོ་
29	RINCHEN WANGDI	m/35	GOSHING	ཁྱེད་ཀྱི་མེས་པོ་
30	Pema Naeyel	m/39	Ngagla	ཁྱེད་ཀྱི་མེས་པོ་
31	Phurba Tashi	m/36	Ngagla	ཁྱེད་ཀྱི་མེས་པོ་
32	Sangay Dorji	m/40	"	ཁྱེད་ཀྱི་མེས་པོ་
33	Wangay / Gemp	m/46	Tong	ཁྱེད་ཀྱི་མེས་པོ་
35	ཁྱེད་ཀྱི་མེས་པོ་	20/48	ཁྱེད་ཀྱི་མེས་པོ་	ཁྱེད་ཀྱི་མེས་པོ་
36	ཁྱེད་ཀྱི་མེས་པོ་	20/45	ཁྱེད་ཀྱི་མེས་པོ་	ཁྱེད་ཀྱི་མེས་པོ་
36	Leki Wangdi	m/40	Ngagla	ཁྱེད་ཀྱི་མེས་པོ་
37	Souang Norbu	m/39	Shangkhari	ཁྱེད་ཀྱི་མེས་པོ་
38	Ugyen Nangay	m/38	Tray Driver	ཁྱེད་ཀྱི་མེས་པོ་
39	ཁྱེད་ཀྱི་མེས་པོ་	20/35	SARMA	ཁྱེད་ཀྱི་མེས་པོ་

