WATERSHED MANAGEMENT PLAN

BULI CHIWOG, NANGKOR GEWOG, ZHEMGANG DZONGKHAG

(JULY 2018 - JUNE 2023)

WATERSHED MANAGEMENT DIVISION
DEPARTMENT OF FORESTS AND PARK SERVICES
MINISTRY OF AGRICULTURE AND FORESTS

AND

ROYAL SOCIETY FOR PROTECTION OF NATURE

Buli Watershed Management Plan

Nangkor Gewog, Zhemgang District

July 2018

Funded by GEF-UNDP Small Grants Programme in partnership with the Royal Government of Bhutan

PERIOD OF THE PLAN

This Plan is valid for the period of 5 years from July 2018 to June 2023

AUTHORITY FOR PREPARATION, REVIEW AND APPROVAL

The authority for preparation of this plan was given to the Watershed Management Division (WMD), Department of Forests and Park Services (DoFPS), Ministry of Agriculture and Forests, Royal Government of Bhutan. The Royal Society for Protection of Nature (RSPN) is the collaborating partner in developing the management plan.

PROVISION FOR REVISIONS AND CHANGES

This Plan may be revised during the period when it is in effect. If major changes occur in the watershed, or if new information becomes available, that may have significant bearing on the implementation of the Plan, the Head of Department, DoFPS, can authorise a revision of this plan.

APPROVAL

This plan has been examined by a wide section of user groups, clients and organisations. The plan was presented and endorsed by the Technical Advisory Committee (TAC) meeting held on 19th July, 2017. It has been further reviewed and recommended for implementation by the Director, DoFPS and approved by the Honourable Secretary, Ministry of Agriculture and Forests, Royal Government of Bhutan.

Submitted for approval:

Chief Forestry Officer,
Watershed Management Division

Executive Director,
Royal Society for Protection of Nature

Recommended for Approval:

Director,
Department of Forests & Park Services

APPROVED

Hon'ble Secretary
Ministry of Agriculture & Forests
Date: .....

FOREWORD

A healthy watershed is the lifeline for the mountain people and those living downstream in Bhutan. Water is often regarded as the engine of country's economic growth primarily to boost agriculture production and hydropower generation. Bhutan has strong policies, acts, and regulatory frameworks that seeks to safeguard water resources which contribute to maintaining a healthy river system that is pollution-free and accrues the benefit that transcends across the border. Under the wise and far-sighted leadership of our monarchs, environmental conservation in Bhutan is widely regarded as the bastion for conservation in the twenty-first century. Bhutan is one of the few countries in the world where the Constitution mandates 60 percent forest cover for all times. Bhutan is endowed with abundant water resources in the form of glaciers, snow, lakes, streams, and rivers. The per capita availability of water per annum is more than 100,000m³(Vision, 2008). Bhutan has one of the highest per capita water resource availability in the world with 94,500 m³/capita/annum (NEC, 2016). Sustainable management of an abundant resource that country has today is the shared responsibility of every individual in the country. The Government of Bhutan (RGoB) is enhancing its efforts to protect this scarce natural resource, which if not managed properly can have devastating repercussion for future generations. Increasingly, there are non-governmental organizations (NGO) that are playing proactive roles in environmental conservation and the government applauds and recognizes the important role they play in society.

In 1987, the Royal Society for Protection of Nature (RSPN) was established as a citizen-based NGO dedicated to the conservation of Bhutan's rich natural environment. Since then, the RSPN has evolved as a complementary partner to the Royal Government of Bhutan in the preservation of Bhutan's rich natural heritage. The RSPN has been a pioneer in conserving one of the largest alpine-wetlands and the Black-necked Cranes (*Grus nigricollis*) in Gangtey and Phobjikha in Wangduephodrang district. The wetland has successfully transitioned into a RAMSAR site with a global conservation status. Considering the successes and the significant role it plays in environmental conservation, it is timely for RSPN to replicate its successful programs across the country and continue to complement the efforts of the RGoB in its conservation efforts.

On this note, I would like to extend my sincere appreciation to RSPN and Watershed Management Division (WMD) team for yet another milestone achievement in collaborating to develop the Buli Watershed Management Plan, which will guide the overall protection of a healthy watershed in Buli. Lastly, let me also thank the project donor GEF/Small Grants Programme, UNDP, project partners and stakeholders in Zhemgang Dzongkhag, particularly the community of Buli and local government officials of Nangkhor Gewog for contributing to the development of the management plan.

Phento Tshering
Director
Department of Forest and Park Service

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ACKNOWLEDGEMENT

This management plan document is a result of the effort and support of various partners, stakeholders and individuals. The plan would not have materialized without the wholehearted support of the relevant organization and persons who were involved in the process of developing it.

The board, management, staff and members of the Royal Society for Protection of Nature (RSPN), humbly extend our appreciation to our partner, the Watershed Management Division (WMD) of the Department of Forest and Park Service (DoFPS) for rendering their technical support during the course of the project and especially for supporting in the development and finalization of the management plan. We want to also extend our appreciation and gratitude to the Dzongkhag administration of Zhemgang, Nangkor gewog administration, gewog RNR sector, Zhemgang Forest Territorial Division and the community for their participation and partnership.

Lastly, we extend our gratitude to GEF/Small Grants Program for the financial support and we would keep our pledge to continue working toward achieving the goal of environmental conservation in the country.

Thank you, Tashi Delek

ACRONYMS

BC	Biological Corridor
BDBL	Bhutan Development Bank Limited
BTFEC	Bhutan Trust Fund for Environmental Conservation
BEMC	Buli Environment Management Committee
CF	Community Forest
CSOA	Civil Society Organization Authority
CIC	Community Information Centre
DoFPS	Department of Forests and Park Services
ECCD	Early Childhood Care and Development
FMU	Forest Management Unit
FNCA	Forest And Nature Conservation Act
FP	Forest Policy 2011
JSWNP	Jigme Singye Wangchuck National Park
LA	Land Act
LFA	Logical Framework Analysis
MOAF	Ministry of Agriculture and Forests
NCD	Nature Conservation Division
NLC	National Land Commission
PNP	Phrumsengla National Park
RNR	Renewable Natural Resources
RMNP	Royal Manas National Park
RSPN	Royal Society for Protection of Nature
SGP	Small Grants Programme (UNDP)
WA	Water Act 2011
WMA	Waste Management Act 2009
WMD	Watershed Management Division
WP	Water Policy 2003
WR	Water Regulation 2014

Contents

EXECUTIVE SUMMARY

The Royal Society for Protection of Nature (RSPN) and the Watershed Management Division (WMD) jointly developed the Buli Watershed Management Plan funded by the GEF/Small Grants Programme, United Nation Development Program (UNDP). The purpose of the Buli watershed management plan is to provide a strategic direction to ensure conservation and protection of watersheds and sustain local livelihoods that are intricately linked to the watershed and its ecosystem services.

The Buli watershed area lies within the administrative boundary of Buli *chiwog* (village) under Nangkor *gewog* (administrative block) in Zhemgang *dzongkhag* (district). It covers an area of 1322.94 Ha. An important feature of the watershed besides its rich vegetation cover is a lake, the Buli Tsho measuring 1.4 Ha. The wetlands are the water reservoirs playing an important role in the hydrological processes in the ecosystem and the socio-economic and cultural lifestyle of the communities. The Buli watershed area is diverse with several primitive, endemic and native plant, animal and bird species owing to its rich biodiversity.

The watershed management plan of Buli in Zhemgang is developed to sustain its current pristine conditions and to minimize the potential threats that could compromise the ecological function and productivity of the watershed. Although, the watershed is in a pristine condition where no management prescription is required, with rapid developmental activities, increasing population and human settlement the demand for natural resources has adversely impacted the surrounding watershed area. Following are the core issues in the watershed area:

- Actual and potential pollution of streams, springs, and marshes
- Drying up of water sources and marshes
- Landslides and erosion from farm road and irrigation channels
- Invasive species in marshes and grazing area

Effective watershed management includes planning, implementation, and evaluation components. The plan characterizes the present watershed conditions, it identifies and prioritizes problems, defines management objectives, and strategies in partnership with stakeholders.

The plan implementing process involves various expertise and skills including technical, project management, monitoring and evaluation, and communication. RSPN, WMD, Dzongkhag administration and gewog officials deliberated and agreed on the current implementing strategies.

1 BACKGROUND

1.1 Context

The Royal Society for Protection of Nature (RSPN) and the Watershed Management Division (WMD) jointly developed the Buli Watershed Management Plan. Under the broad national framework for the protection of forests, wild animals and plants, and conservation of soil and water resources, the WMD of the Department of Forests and Park Services (DoFPS) under the Ministry of Agriculture and Forests (MoAF) is mandated to develop management plan(s) for degraded watersheds to conserve and protect Bhutan's rich natural resources. The RSPN is a pioneer non-governmental organization (NGO) established in 1987 to support environmental conservation in Bhutan. Since then, the RSPN has prioritized proactive conservation of pristine ecosystems to enhance conservation efforts of the Royal Government of Bhutan. Under the aegis of the partnership and a shared goal for the conservation of a significant wetland, RSPN initiated the conservation and livelihood program in Buli, Zhemgang with technical support from the WMD. GEF/Small Grants Programme, United Nation Development Program (UNDP) funded the project. The project covered the development of this management plan. Additionally, the project also supported the advocacy and public awareness activities in Buli on the importance of wetlands.

1.2 Rationale

In the context of climate change and potential anthropogenic disturbances to the water and forest resources, sustaining an adequate supply of freshwater to meet agricultural and domestic requirements of the communities rely on the effective management of the watershed. Rich forest coverage in Buli watershed plays an important role in enhancing the ecological functions, as well as social and economic lives of the communities, primarily supporting an agrarian livelihood. Wetlands such as lakes, streams, and marshes are productive environments and cradles of biological diversity indispensable for the “ecosystem services” that they provide within the watershed. Considering the local belief and historical narratives connected to Buli Tsho (lake) and other significant abodes of deities in the forests, the watershed also provides cultural and recreational values.

The watershed management plan in Buli in Zhemgang is developed so as to sustain its current pristine condition and deter the potential threats. This management plan encompasses the sustainable management of Buli watershed with a specific focus on wetlands conservation. This will also complement the Water and Wetlands program of the Department of Forest and Park Services, working on various strategies to preserve the wetland ecosystem in the country in collaboration with various domestic and international partners.

1.3 Purpose of the Buli Watershed Management Plan

Although the natural environment of Buli watershed remains relatively undisturbed, there are potential human dynamics and natural forces that may pose threats to its status. The Buli watershed does not entirely fall within the legally recognized conservation status of

the Royal Government of Bhutan. Thus, a proactive management plan will serve to deter any imminent threats in the future.

The specific purpose of the Buli watershed management plan is to:

3. Provide strategic direction for ensuring conservation and protection of watersheds, particularly wetlands and associated biodiversity, and
4. Support sustainable local livelihoods linked to conservation and protection of the watershed.

2 Description of Watershed Area

2.1 Location and Physical features

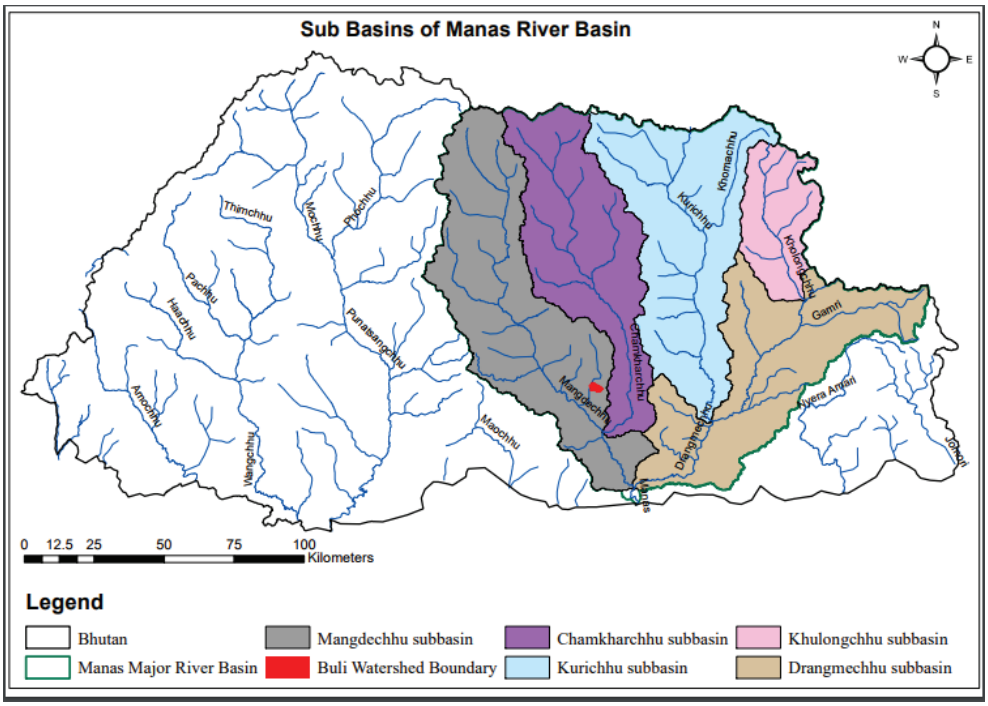


Figure 1. Map of Manas River basin showing Mangdechhu sub-basin and Buli watershed boundary (Source: WMD, 2016)

The Buli watershed area lies within the administrative boundary of Buli chiwog (village) under Nangkor gewog (administrative block) in Zhemgang dzongkhag (district). The upper part of the Nangkor gewog borders Jigme Singye Wangchuck National Park and a portion of the gewog falls in lower Kheng under the Royal Manas National Park. The watershed also falls under the Mangdechhu sub-basin, which in turn forms a part of the major river basin in Bhutan, namely the Manas River basin (Figure 1). Buli watershed

covers an area of 1322.94 Ha situated in the foothills of the Himalayan ranges. Endowed with rich broad-leaved forests, wetlands such as marshes, lake and streams, it stretches from 27°09'08.24" N to 27°09'30.57" N latitudes and 90°47'38.13" E to 90°50'46.16" E longitudes at an elevation ranging from 1370 to 2900 m.a.s.l.

Buli watershed area is characterized by rugged mountain with undulating landscape. The area weighted average slope gradient is about 20° (Figure 2). Only small patches of red soil are found in the settlement areas, whereas black and clay soil rich in humus dominates the forested and wetland areas. Gneiss with residual soil predominates Buli (World Bank, 1998).

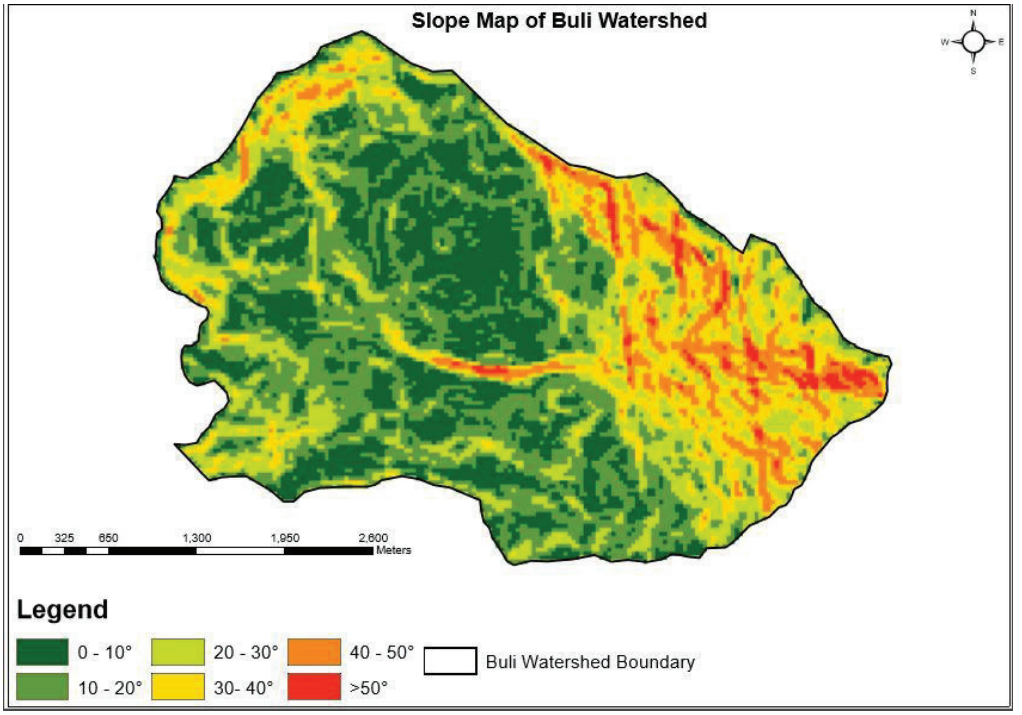


Figure 2. Slope map of Buli watershed

2.2 Climate

The climate in the watershed area is dominated by the south-western monsoons originating in the Bay of Bengal. Rainfall and temperature data compiled between 1985-1991 and 2003 and 2010 show an annual rainfall varying from 1100-2200 mm. The minimum average monthly temperature was recorded at 11.3 °Celsius in the month of January and a maximum temperature at 21.4° Celsius in August (Figure 3).

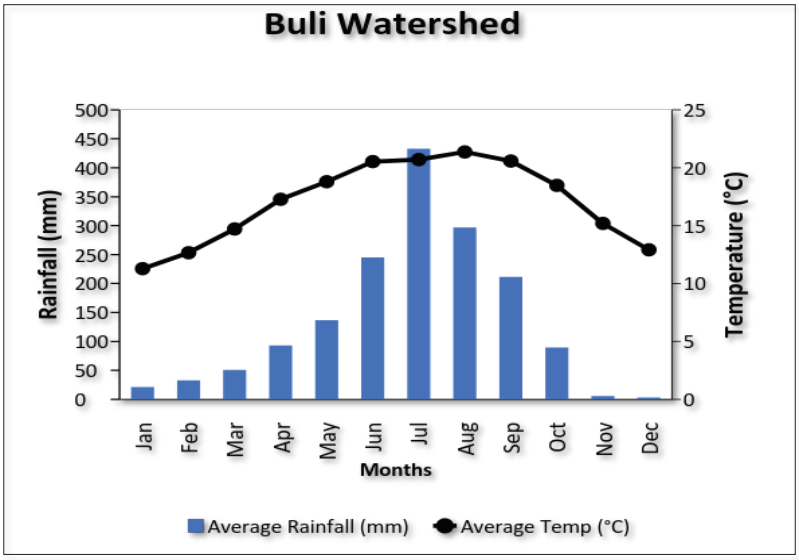


Figure 3. Rainfall and temperature pattern (weather station at Buli Centre School)

2.3 Land Use and Land Cover

Agricultural land covers over 7 percent with 4 percent Kamzhing (dryland) and 3 percent Chuzhing (paddy fields). The broadleaf forest dominates Buli with over 82 percent followed by shrubs (8%) (**Table 1 and Figure 4**).

Table 1. Land Use and Land Cover

Sl. No.	Land cover	Area (Ha)	Percent (%)
1	Chuzhing	44.91	3.39
2	Kamzhing	53.5	4.04
3	Built up Area	12.62	0.95
4	Broadleaf Forest	1097.95	82.98
5	Meadows	1.33	0.10
6	Shrubs	109.61	8.28
7	Lakes	1.48	0.11
8	Rivers	1.75	0.13

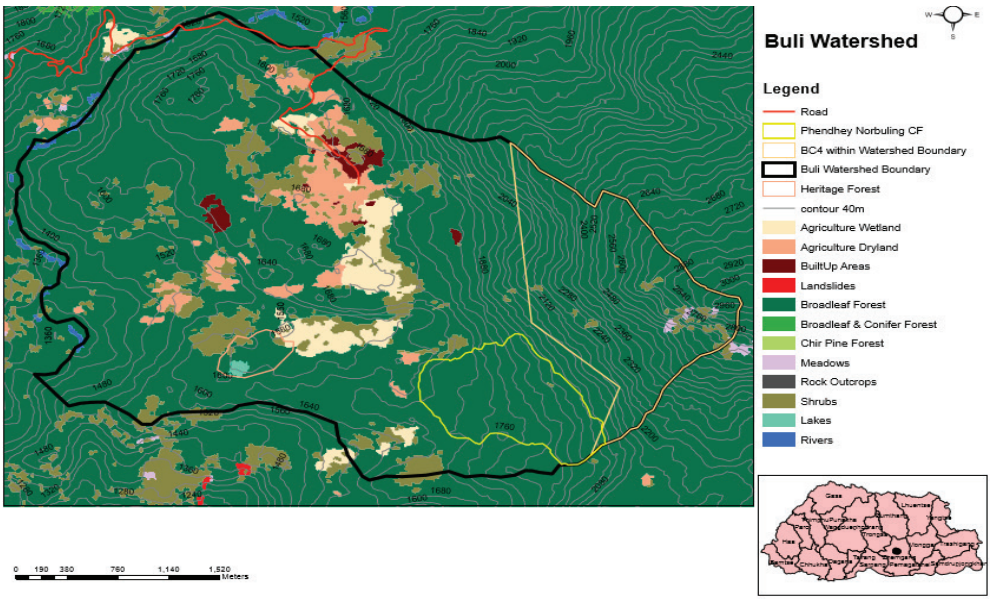


Figure 4. Buli watershed area showing streams, land use and settlements

2.4 Floristic Diversity

The Buli watershed area is diverse with several primitive, endemic and native plant species due to its large forest cover. A total of 51 tree species comprising of 33 families are found in the watershed area (RSPN & WMD, 2015). Evergreen broadleaf canopy species dominate the forest followed by deciduous broadleaf trees. The broadleaf forests comprise mostly of oak-laurel species such as *Beilschmiedia gammieana, Cinnamomum bejolghota, Cinnamomum impressinervium, Persea fructifera, Persea clarkeana, Cryptocarya bhutanica* (endemic to Bhutan), *Litsea sp*. and *Neolitsea foliosa.* Oak species such as *Castanopsis tribuloides, Lithocarpus fenestratus*, and *Quercus glauca* are also present. Other significant canopy tree species composed of *Altingia excelsa, Elaeocarpus lanceifolius, Michelia velutina, Helicia nilagirica, Schima wallichiana, Engelhardtia spicata, Toona ciliata,* and *Betula alnoides*. The understory species compositions are mainly dominated by *Microtropis discolor, Rapanea capitellata*, and *Myrsine semiserrata*. Other important species include *Symplocos, Maytenus, Sophora* (endemic), *Xantolis* (rare), *Myrica, Glochidion, Eurya, Daphne*, and *Maesa* (RSPN, 2015). The forests around the lake are dominated by *Taxus baccata* (RSPN & WMD, 2015).

2.5 Faunal Diversity

The Buli watershed and the adjacent area is home to a number of flagship mammalian species including the Golden Langur (*Trachypithecus geei*), an endemic species to Zhemgang District, the Himalayan black bear (*Selenarctos thibetanus*), leopard (*Panthera pardus*) and the Royal Bengal Tigers (*Panthera tigris).* The area is also home to diverse bird species (Annexure I) such as the endangered Rufous-necked Hornbill (*Aceros nipalensis),* Great hornbill (*Buceros bicornis*) and other avian species (Avian Assessment

Report, 2015).

Surrounded by evergreen broadleaf forest and with rich wetland ecosystem, the area is reported to be relatively undisturbed. The pocket of marshy area that lies near the gewog office is home to a few resident bird species such as Black-tailed Crake (*Amaurornis bicolor*) and White-breasted Waterhen (*Amaurornis phoenicurus*).

2.6 Watershed Hydrology

Within the single watershed boundary, there are several seasonal and perennial streams. A common watershed boundary has been delineated which represents all the streams within the watershed. As per the result of rapid watershed assessment report, Buli watershed is in pristine condition (RSPN & WMD, 2015) with three major streams, three prominent lakes and marshes. All the streams from the watershed area flow into Burgang Chhu, below the Buli village.

2.6.1 Water Quality

An assessment carried out by WMD and RSPN in 2015 classified the watershed as pristine and included a water quality report measuring five parameters such as temperature, pH, conductivity and salinity (Table 2).

Table 2. Physical Characteristics of the Streams in Buli

Sl. No.	Stream ID	TDS (ppm)	Temp (^{o}C)	pH	Conductivity (µS/cm)	Salinity (ppm)
1.	Chenrizi dupchhu	42.2	16.3	8.5	59.2	31.2
2.	Rumrangchhu	15.8	19.1	7.8	22.6	16.9
3.	Rongdegangchhu	28.1	20.8	7.2	39.4	24.2
4.	Berpangchhu	37	23.1	7.1	52	30.2
5.	Kharetangchhu	54.9	17	6.8	77.2	39
6.	Mephangchhu	29.9	21.5	7.9	41.5	25.6
7.	Yongbarichhu	15.2	22.5	7.6	21.8	11.2

2.6.2 Wetlands

The streams, marshes and lakes are the natural wetlands within Buli watershed playing a vital role in the hydrological processes and providing ecosystem services. The natural wetland includes a sacred lake called Buli Tsho measuring approximately 1.4 Ha and marshes with a total area of 11.7 Ha. The Buli Tsho is the largest lake at Buli. The artificial wetlands consist mostly of paddy fields drained by irrigated water or rain-fed.

2.7 Socio-Economic Status

2.7.1 Population and Settlement

The village of Buli has over 100 households and a population of over 800 ethnic *Khengpas* (RSPN, 2015). Buli is situated in an open valley surrounded by three settlements of Trong, Pang, and Langbi. Houses are clustered, built in traditional architecture and surrounded by small orchards and vegetable gardens (Figure 5). All households have access to proper drinking water supply although issues of water management and damage to water infrastructure have been reported leading to water scarcity. The village also hosts most of the government offices including the Gewog Administration office, Renewable Natural Resources Extension Centre, Community Centre, Agriculture Machinery Centre and the Basic Health Unit.

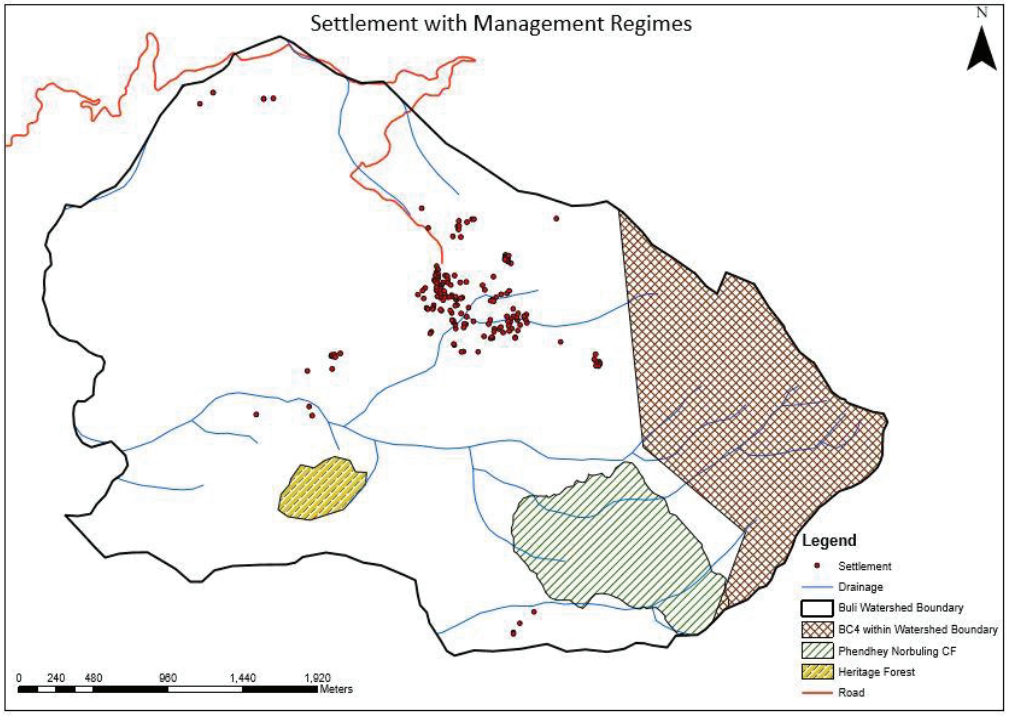


Figure 5. Village settlement pattern

2.7.2 Livelihood Practices

Agriculture forms the mainstay of the livelihood in Buli. Most farmers practice subsistence farming combined with the rearing of livestock. An average household owns more acreage of dryland than paddy fields (RSPN Socio-economic Survey Report, 2015). Dryland is mostly used for the cultivation of maize, vegetable, mustard, wheat, and potato. Chilli and potato form the major sources of the cash crop. Paddy is also cultivated by most of the farmers in the village. The socio-economic assessment conducted by RSPN in 2015 found that every household cultivates not less than 50 decimals of land for potato cultivation. Potato is sown in December and harvested in June. Pesticide, weedicide, and

fertilizers are used in a small quantity (with no more than 1 kilogram) for paddy cultivation, maize, and potato.

Rearing of dairy cattle is the most dominant livestock activity in the village although a few household rear poultry. Some households largely depend on income from the sale of dairy products. The open marshes and vast forestland provide an all-season grazing area for cattle in Buli. All households have proper farm shed for cattle and heap compost is practiced to produce manure for fertilizer. The livestock sector in Buli has initiated a dairy-processing unit that collects milk from farmers, making it a good income source for the farmers.

Communities in Buli watershed also depend on the forest ecosystem as a part of their livelihood. The rich forests provide provisioning services including fuelwood, timber, food, fodder, fibre, shelter, medicines, household implements, and handicrafts. Firewood, fiddleheads, cane, bamboo, and mushroom are most commonly and frequently collected for household consumption as well as to sell in the local markets (RSPN, 2105).

The watershed assessment report points out the commonly used firewood species as *Tshakoi* (Castanopsis sp.), *Meckham* and *Pising* (Oak). An average household uses a truckload of firewood annually (one truckload is equivalent to 8 cubic meter). With the community forest management practices, all firewood collection is monitored, as households are members of the two existing community forest groups.

Champ (local name) or *Magnolia champaca* is the dominant timber species used and preferred for house constructions owing to its resistance to rainwater and wood-eating worms.

2.7.3 Use of Water Resources

Rumrang stream is the only drinking water source for Buli community and also serves as the one of the water source for irrigation. In addition to Rumrang stream, Chhuzar stream is also used as the source for irrigation. The Krake Drubchhu/Chenrezi Drubchhu, a small brook believed to be a sacred water body is also an important source of irrigation for the communities. Though Buli Tsho doesn't have direct utility, it is considered a sacred site and is the source of pride for Buli community. The marshes in Buli serve not only as the source of irrigation for downstream settlers but as a water source for cattle. There are two prominent drup-chhu or sacred natural springs valued by the community as holy water that has medicinal properties.

2.7.4 Cultural and Historical Values

The picturesque village is dotted with traditional, mostly two-storied Bhutanese style structures. The historical sites are valued for educational interests and recreational purposes. Buli village has prominent Lhakhangs (temples) with linkages to historic and legendary leaders in contemporary Bhutan. The Bar Lhakhang in Trong village is dedicated to Terton Pema Lingpa and the Pang Lhakhang is dedicated to Terton Dorji Lingpa. The ruin of Sarphey dzong (fort of Buli Ponpo/Drongsep Singye Namgyal) is located on the Krongmen hillside covered in thick forests. The Krake Drubchhu/Chenrezi

Drubchhu, originates from the mountain revered as the abode of *Rongle Tsen* or *Buli Tsen* Lhatsen Karpo, worshipped for ages as their protective deity.

Buli is well known for its popular Buli Tsho (lake), located about thirty minutes' walking distance from the main village. The lake is particularly revered, for being the abode of Buli Monmo, a legendary mermaid worshiped as the protective deity of the community. The forests around the lakes are protected with traditional local conservation practices such as *La Dam* and *Ri dam* (restricted visitations to mountain and forest areas) during certain periods of the year - from the 8th to 10th Bhutanese (lunar) months - regarded as the harvest season for the communities. During this time, people are restricted from visiting the lake for fear of the lake-dwelling mermaid unleashing her wrath in the form of heavy rainfall, windstorm, and hailstorm. These belief systems and indigenous conservation practices are vital links to community-based management of resources.

The language, social organization, relationship, religious beliefs and rituals in the region are still largely intact. The local communities conduct the annual *Monmo* and *Tsen Soelkha* (ritual) or offerings to appease the local deities and seek their support for the good fortune in the form of good harvest, good health, peace and happiness. The culture and historical past of Buli form an integral component of the aesthetic diversity of the area.

2.7.5 Public Amenities

Buli enjoys all basic public amenities including a middle secondary school, grade II basic health unit, gewog renewable natural resources (RNR) centre, early childhood care and development (ECCD), Bank (BDBL) branch office, community information centre (CIC) and a Buddhist Shedra/school. Buli also serves as the national highway transit that has access to paved road, providing better economic opportunities compared to the neighbouring villages. In the absence of a proper town plan, there are temporary makeshift shops.

3 SITUATION ANALYSIS

3.1 Policies, Rules and Regulations

Protection and management of natural resources, water resources, river basins, and watersheds is crucial for long-term sustenance of natural resources, as enshrined in Article 5.1 of the Constitution of the Kingdom of Bhutan. The Water Act (2011) and Water Regulation (2014) largely set the framework for this watershed Planning.

Forest Policy (2011), Forest and Nature Conservation Act (1995), Land Act (2007) and Waste Management Act (2009) are among the most important policies and regulatory documents that influence the preparation of integrated watershed management plans in the country.

3.2 Other Management Regimes in the Watershed

3.2.1 Heritage Forest and Waste Management

Nature Conservation Division (NCD) under Department of Forest and Park Services contributed toward enhancing and preserving Buli Tsho by designating the forest around Buli Tsho as a Natural Heritage Forest in August 2016. This was initiated to enhance the conservation and preservation of natural heritage and the forest cover eliminating or minimizing human-made impacts inside the designated area.

The Bhutan Trust Fund for Environmental Conservation (BTFEC) funded an initiative for nature trails and fencing around the lake area. The fund also supported the community in waste management, while adding value to the community by building of a *chorten* (stupa). The dzongkhag and gewog are currently engaged in identifying a new disposal site to avoid water pollution from disposal of wastes and limiting wastes generated from the construction activities within the village.

3.2.2 Community Forest Management

Phendey Norbuling is the only prominent community forest management group established with the overall objectives of meeting timber demand and at the same time ensuring the sustainability of the forest area resources under the particular community forest group. While the community forest initiative, in general, has been effective benefiting multiple areas including access to sustainable timber, and economic and gender equality, it is noteworthy that the scope of the group does not include the entire forest area within Buli.

3.2.3 Decentralized Forest Management

Zhemgang Forest Territorial Division has a governing role in ensuring Bhutan's commitments to international and regional conventions, treaties and non-legally binding instruments through participation, facilitating and enactment of enabling policies, legislation, strategies, plans and programs. The department has appointed representatives in the gewog to monitor any illegal deforestation activity in the watershed area.

3.2.4 Biological Corridor

Biological corridor (BC) is defined as an area set aside to connect one or more Protected Area (PA) for movement and gene flow by plants and animals, providing connectivity and continuity for wildlife. Biological Corridor 4 (BC4) constitutes 20 % of the total area of BCs in Bhutan, forming the largest single corridor linking the three important national parks i.e. Phrumsengla National Park (PNP), Jigme Singye Wangchuck National Park (JSWNP) and the Royal Manas National Park (RMNP). BC4 (27°2'36" to 27°23'16"N and 90°35'24" to 90°55'52" E) covers an area of 50,000 Ha shared by 9 chiwogs of 3 gewogs in the Trongsa and Zhemgang Dzongkhags. About 0.4 % (201 Ha) of the total BC4 area falls within the Buli watershed area as shown in (Figure 5). The part of BC falling within the gewog is designated as a restricted area for harvesting operations for the local forest management planning (i.e Management of Forest Areas outside FMUs).

The Zhemgang Forest Territorial Division is in the process of developing a management plan for BC4 for the 2017-2022 period. The Buli Watershed Management Plan is expected to form a part of the BC4 management plan. Its territorial map of the BC is reflected in the watershed map (Figure 5).

4 WATERSHED MANAGEMENT PLANNING AND IMPLEMENTATION

4.1 Planning Process

4.1.1 Consultation at Dzongkhag, Gewog and Community Levels

The current management planning initiative is an outcome of RSPN's Wetland conservation program in Buli, following the decision of national stakeholders that suggested preparing a holistic watershed management plan. The planning process entailed adequate consultations all level of stakeholders including two at the level of the Dzongkhag Administration and four at the gewog level. The successive meetings discussed concerns related to watershed and wetland management, and opportunities to conserve the rich natural environment in Buli. The consultation processes also included discussions on holistic approaches to conservation that do not hinder the development needs of the community. Ensuing outcomes of the meetings served as the preliminary basis interventions for watershed management and wetland conservation along with plans and programs.

Awareness and public outreach programs were carried out targeting local stakeholders, students of Buli Central School and the community members. These educational and outreach activities were initiated to familiarize potential partners and stakeholders with the issues, the importance of management planning and how it addresses conservation while enlisting their participation. Educational tours and participatory assessments were used as approaches to engagement of stakeholders. Local leaders, extension officers, and other relevant stakeholders participated in the consultative meetings and awareness programs.

4.1.2 Consultation at the National Level

RSPN also consulted with national stakeholders comprising mostly of government and donor organizations on the development of management plan, before and after the plan completion. Relevant project stakeholders including stakeholders from national, district and gewog level officials were present during the consultation meetings. A draft plan was also presented for feedback and suggestions from all stakeholders. More importantly, the goals and objectives of the plans were deliberated at length.

4.1.3 Logical Framework Analysis (LFA)

The process of Logical Framework Analysis was divided into identifying stakeholders, formulating and analyzing problems and objective tree to design proper goals, objectives

and ensuing strategies. Issues related to the current condition of the watershed and potential threats in future that can lead to degradation of watershed health, its implications on the livelihoods of people and environment were identified. The problems identified were then triangulated with those raised at the community level consultations and field assessments reports to develop a common understanding of the main problems. Accordingly, core problems were identified and analyzed and suggested measures and approaches to address these issues were developed. Final stages of the LFA included an analysis of intended results with targeted goals, objectives, outputs and strategies designed for implementing the plan.

The Logical Framework Analysis Matrix is shown in Table 4.

4.1.4 Field Surveys and Assessment of Watershed

Between 2015 and 2016, RSPN and WMD carried out multiple field assessments including socio-economic study, rapid assessment of watershed, biodiversity assessment, ecosystem service assessment. The field studies were able to quantify stream flow, measure the quality of water and categorized Buli watershed as pristine.

5 THE PLAN

5.1 Issues

Initial assessment of Buli watershed categorized it as pristine with no management prescription required as per the classification guideline. However, with rapid developmental activities, increasing population and human settlement has increased the demand for natural resources, which would adversely impact the condition of the watershed, in the future. Therefore, the plan considers the possible issues that may pose a threat to the future condition of the watershed. Annexure II provides a description on the derivation of core problem for the watershed management plan. The four core issues (details in table 3) that would cause the watershed health to deteriorate were identified as follows:

- Actual and potential pollution of streams, springs and marshes
- Drying up of water sources and marshes
- Landslides and erosion from farm road and irrigation channels
- Invasive species in marshes and grazing area

Table 2. Key Issues in Buli Watershed

Issues	Geographical Occurrence	Likelihood of management interventions to address issues
Actual and potential pollution of streams, springs and marshes		
Increase use of weedicides and pesticides	Buli chiwog dryland and wetlands	Train farmers on organic farming and through awareness program
Increase in sewerages	Buli chiwog settlements	Contrast proper drainage system surrounding wetlands
Increase in litter (solid waste)	Buli chiwog	Intervene waste management system
Drying up of water sources and marshes		
Encroachment of marshes by farm lands	Buli chiwog wetlands areas	Proper monitoring and compliance of construction as per the farm road construction standards
Infrastructure development (government offices and road construction)	Mainly near old Ziwakha marshes Area	Address through strong chiwog watershed conservation guidelines
Drainage of water from marshes	Ziwakha marshes area	Assessment studies and interventions as per the study
Natural water flow in marshes disturbed, siltation of the marshes	Ziwakha marshes area	Assessment study and intervention
Presence of secondary forest near streams/settlements may alter flow pattern	Surrounding forest in Buli chiwog	Reforestation
Change in rainfall pattern	Nangkhor Gewog	Study climate change pattern
Landslides and erosion from farm roads and irrigations channels		
Change in rainfall pattern (more erratic events)	Nangkhor Gewog	Study climate change pattern
Poor maintenance of semi earthen channels (obstruction in irrigation channels)	Buli chiwog irrigation channels	Renovation
No proper drainage within farm roads (some section only)	Buli chiwog farm road	Renovation works
Invasive species in marshes and grazing area		
Animal dispersal	Wetlands, marshy areas and grazing grounds	Awareness and through manual uprooting

5.2 Goals, Objectives and Activities

Based on the concerns and problems elucidated in the previous chapter, a set of goals, objectives and targeted strategies were developed.

5.2.1 Goal

The overall goal of the Buli watershed management plan is to conserve wetlands for the provision of ecosystem goods and services to support sustainable local livelihood in the context of climate change.

5.2.2 Objective

The objectives are:

- To mitigate present and potential future influences,
- To enhance provision and management of domestic water supply,
- To improve construction and maintenance of farm roads and irrigation channels to minimize erosion, landslides and water loss,
- To minimize the adverse impact of invasive plant species in the landscape.

5.2.3 Management Strategies and Actions

Objective 1. To mitigate present and potential future influences

Output 1.1. Build capacity of the Buli farmers on responsible use of pesticides and weedicides

Activities:

a. Develop training materials
b. Carry out training for Buli chiwog (100 households)
c. Carry out monitoring on use of chemicals (bi-annually)

Output 1.2. Manage sewerage and grey water to minimize pollution of wetlands

Activities:

a. Carry out assessment of sewerage and grey water disposal within Buli area
b. Build proper sewerage and water drainage system to minimize pollution of wetlands

Output 1.3. Manage solid waste to minimize pollution

Activities:

a. Carry out assessment including mapping on waste disposal
b. Carry out awareness and education for 100 households
c. Develop and institute waste management system including facilities

Output 1.4. Restore Ziwakha wetlands to natural condition

Activities:

a. Carry out assessment on status of Ziwakha wetlands to identify activities needed to restore wetlands to natural condition
b. Implement recommended activities from the assessment
c. Carry out awareness program on importance of wetland ecosystem on livelihoods

Output 1.5. Zone watershed to indicate critical areas

Activities:

a. Carry out community consultation
b. Carry out mapping of watersheds and identify critical areas to guide future development
c. Obtain endorsement from concerned authority

Output 1.6. Come up with regulatory framework to legitimize zonation plan

Activities:

a. Develop regulatory framework (Buli chiwog bylaws)
b. Enforce bylaws

Output 1.7. Study on drying up of springs and marshes

Activities:

a. Carry out study
b. Implement recommendations of study to rehabilitate springs and water sources

Output 1.8. Institutional strengthening

Activities:

a. Carry out capacity building of key institutions involved in natural resource management

Objective 2. To enhance provision and management of domestic water supply

Output 2.1. Improve and manage water reticulation system for the community from source to household

Activities:

a. Carry out assessment on water reticulation system, make recommendation and prepare budget
b. Implement the assessment recommended activities

Output 2.2. Create awareness on sustainable management of water resources

Activities:

a. Develop IEC awareness materials
b. Carry out awareness and education programmes
c. Carry out study tour to significant wetlands sites within and outside country

Objective 3. To improve construction and maintenance of farm roads and irrigation channels to minimize erosion, landslides and water loss

Output 3.1. Build and maintain the farm roads in conformity with EFRC guidelines

Activities:

a. Carry out assessment to determine areas require rehabilitation
b. Carry out maintenance activities as recommended in report

Output 3.2. Build and maintain irrigation channels in conformity with guidelines

Activities:

a. Carry out assessment to determine areas require rehabilitation
b. Carry out maintenance activities as recommended in report

Objective 4. To minimize the adverse impact of invasive plant species in the landscape

Output 4.1. Manage and control invasive plant species

Activities:

a. Carry out assessment study to determine the extent of invasive species
b. Conduct awareness campaign to community and institutions
c. Implement the recommended activities reflected in 4.1.1 assessment report
d. Study on the potential/economic use of invasive plant species

Table 4: Logical Framework Analysis (LFA) Matrix

Outputs	Activities	Means of verification	Responsible agency for implementation	Collaborating Partners	Local area based plan	Budget (M Nu)	Years				
							1	2	3	4	5
Objective 1. **To mitigate present and potential future influences that disturb natural water flows in wetlands**											
1.1. Farmers in Buli watershed trained in responsible use of pesticide and weedicide	1.1.1. Develop training materials	Training materials	Gewog Agriculture, irrigation Extension	Dzongkhag Agriculture RSPN	Buli chiwog Five Year Plan	0.2	√				
	1.1.2. Carry out training for Buli Chiwog (100 households)	Training Report Interview with Farmers	Gewog Agriculture Extension	Dzongkhag Agriculture RSPN		0.3	√	√			
	1.1.3. Carry out monitoring on use of chemicals (bi-annual)	Reports and field verification	Gewog extension agent	Dzongkhag agriculture		0.1	√	√	√	√	√
1.2. Sewerage and gray water managed to minimize	1.2.1. Carry out assessment of sewerage and gray water disposal within Buli area	Reports	Gewog office	Buli BHU II and Gewog engineer	Buli chiwog Five Year Plan	0.1	√				

pollution of wetlands	1.2.2. Built proper sewerage and water drainage water system to minimize pollution of wetlands	Reports and field verification	Gewog office	Buli BHU II and Gewog engineer		5.0		a. √	√		
1.3. Solid waste managed to minimize pollution	1.3.1. Carry out assessment including mapping on waste disposal	Reports	RSPN	Gewog administration	Buli chiwog Five Year Plan	0.15	√				
	1.3.2. Carry out awareness and education for 100 HH	Reports	RSPN	Gewog administration, RNR Sector, school, Buli BHU II		0.4		√	√	√	
	1.3.3. Develop and institute waste management system including facilities.	Field verification and evaluation reports	RSPN	Gewog administration, RNR Sector, school, Buli BHU II		6.0				√	√
1.4. Zewakha wetlands restored to natural condition	1.4.1. Carry out assessment on status of Zewakha wetlands to identify activities needed to restore wetlands to natural condition	Assessment reports	WMD	RSPN, Gewog administration	Buli watershed management plan	0.2	√	√			

	1.4.2. Implement recommended activities from the assessment	Implementation reports, field verification	RSPN	WMD, gewog administration		0.5			√	√	
	1.4.3. Carry out awareness program on importance of wetland ecosystem on livelihoods	Reports	RSPN	WMD		0.5				√	√
1.5. Watershed zoned to indicate critical areas	1.5.1. Carry out community consultation	Consultation reports	Beat office	WMD, RSPN	Buli watershed management plan	0.1	√	√			
	1.5.2. Carry out mapping of watersheds and identify critical areas to guide future development	Reports, zonation maps	Beat Office	WMD, RSPN, Gewog Administration		0.5		√	√		
	1.5.3. Obtain endorsement from concerned authority	Endorsed document	Gewog Administration	RSPN, WMD,		0.3			√		

1.6. Regulatory framework to legitimizes zonation plan	1.6.1. Develop regulatory framework (Buli chiwog bylaws)	Bylaws	Chiwog	WMD, RSPN, Gewog, Range office and Dzongkhag	Buli watershed management plan	0.5		√			
	1.6.2. Enforce bylaws	Bylaws, field inspection and community consultation	Chiwog	Gewog, Range office and Dzongkhag		No budget required					
1.7. Study on drying of springs and marshes	1.7.1. Carry out study	Reports	WMD	RSPN, Range office	WMDs annual work plan	No budget required-WMD budget					
	1.7.2. Implement recommendations of study to rehabilitate springs and water sources	Implementation reports	RSPN	Range office, gewog office	Buli watershed management plan	2.0		√	√	√	√
1.8. Strong institutions to manage natural resources	1.8.1. Carry out capacity building of key institution involve in natural resource management	Reports	RSPN	WMD, Dzongkhag and Gewog administration	Buli watershed management plan	0.5			√	√	√

Objective 2. To enhance provision and management of domestic water supply											
2.1. Water reticulation system for the community from source to household improved and managed effectively	2.1.1. Carry out assessment on water reticulation system make recommendation and prepare budget	Reports	Gewog engineer	Gewog administration, Range office	Buli chiwog Five Year Plan	0.05	√				
	2.1.2. Implement the assessment recommendation	Progress report	Gewog administration	Dzongkhag health sector		1.0		√	√		
2.2. Communities aware of sustainable management of water resources	2.2.1. Develop IEC awareness materials	Awareness materials	RSPN	Gewog administration and range office	Buli watershed management plan	0.03	√				
	2.2.2. Carry out awareness and education	Awareness report	RSPN	Gewog administration and range office		0.4	√	√			
	2.2.3. Carry out study tour to significant wetlands sites within and outside country	Tour report	WMD	RSPN, Gewog, Dzongkhag and range office		2.0			√	√	

Objective 3. **To improve construction and maintenance of farm roads and irrigation channels to minimize erosion, landslides and water loss**											
3.1.Farm roads built and maintained in conformity with EFRC guidelines	3.1.1. Carry out assessment to determine areas require rehabilitation	Assessment report	DOR, Gewog engineer	Gewog and Dzongkhag	Buli chiwog five year plan	0.1	√				
	3.1.2. Carry out maintenance activities as recommended in report	Work completion report	DOR, Gewog engineer	Gewog and Dzongkhag		3.0		√	√		
3.2. Irrigation channels built and maintained in conformity with guidelines	3.2.1. Carry out assessment to determine areas require rehabilitation	Assessment report	Gewog engineer and gewog agriculture sector	Dzongkhag administration	Buli chiwog five-year plan	0.05	√				
	3.2.2. Carry out maintenance activities as recommended in report	Work completion report	Gewog engineer and gewog agriculture sector	Dzongkhag and Gewog administration		1.0		√	√		

Objective 4. **To minimize the adverse impact of invasive plant species in the landscape**											
4.1. Growth of invasive plant species managed and controlled	4.1.1. Carry out assessment study to determine the extent of invasive species and make recommendation to control spreading	Assessment report	RSPN	WMD, Range office	Buli management plan	0.1	√				
	4.1.2. Conduct awareness campaign to community and institution	Awareness report	RSPN	Range, dzongkhag and gewog administration		0.3		√	√	√	
	4.1.3. Implement recommendation made in 4.1.1 assessment study	Implementation report	RSPN and Gewog administration	Dzongkhag RNR sector and Forest Territorial Division		0.5			√	√	√
	4.1.4. Conduct thorough study on potential economical and traditional importance value of invasive plant species.	Study report	RSPN and Division Field office Buli	Gewog RNR sector		0.1	√	√			

5.3 Roles of Players and Stakeholders

Implementing the watershed management plan involves various expertise and skills such as technical expertise, project management, monitoring and evaluation, and communication. The roles and responsibility of key partners and stakeholders are stated in detail in Table 4 (LFA Matrix) and in Annexure III.

5.4 Implementation Strategies

A sound implementation strategy is crucial in achieving the outputs set in the management plan. RSPN, WMD, Dzongkhag administration and gewog officials deliberated and agreed on the implementing strategies. It is divided into three categories:

- RSPN will coordinate the overall implementation of the management plan and initiate to secure funds from external donors for implementation of activity as prescribed in LFA.

- The local government, sectors within the gewog office and Zhemgang Forest Division will implement the plan and propose budget in the annual Dzongkhag and gewog sector plans. More importantly, since the plan is proposed to be implemented during the 12th Five Year Plan (FYP), the budget has to be proposed during the finalization of 12th FYP as per activities prescribed in LFA matrix.

- While the planned activities will be executed according to Table 4, monitoring and evaluation of the outputs and impacts will be carried out by the gewog administration, RSPN and WMD.

5.5 Monitoring and Evaluation

Monitoring and evaluation during and after implementation of planned strategies form an indispensable component of watershed management. The implementation of activities needs to be periodically reviewed and compared with those outlined in the work plan. The results collected through monitoring programs need to be in parallel with the interim targets and corrective measures applied if ongoing workplan and planned activities do not adequately meet expected targets. Lessons and best practices from M&E are useful for scaling up projects and programs. An evaluation plan with quantitative indicators to measure the inputs, and outcomes are necessary part of the watershed management plan.

To fully engage local partners on the progress of work and any necessary adjustments in implementation, the local governments (Dzongkhag and Gewog) will assume the responsibilities for regular monitoring of the activities during the implementation phase.

RSPN and WMD will make biannual monitoring visits to the Buli watershed area. Reports on the status of the implementation will be produced quarterly to update the stakeholders and communities on progress, challenges and way forwards.
In addition, mid-term and end-term evaluation will be carried out to assess the watershed health and its functionalities as an outcome of the watershed management plan. Evaluation shall be carried out by RSPN and WMD.

Since the watershed management plan is for a period of five years (June, 2018 – June 2023), the management plan will be reviewed and amended by the WMD based on the monitoring and evaluation reports, and in consultation with the watershed communities and implementing agencies.

5.6 Budget planning and resource mobilization

Close to Nu. 25.98 million is estimated for successful implementation of Buli watershed management plan, its activities, research, monitoring and evaluation. As deliberated and described in the strategies for securing funds, every sector agency and partner outlined in plan (see Table 4) will submit budget proposals in the local plan parallel to the 12th FYP processes. Subsequently, RSPN will expedite fund mobilization from external donors and domestic funding partners to implement the activities.

6 Reference

Gross National Happiness Commission (2013). Eleventh Five Year Plan (July 2013- June 2018). Zhemgang Dzongkhag. Thimphu, Bhutan

National Environment Commission (2016). National Integrated Water Resources Management Plan. Thimphu, Bhutan.

Portland Watershed Management Plan (2005). Actions for Watershed Health, Environmental Services, City of Portland, Oregon.

Royal Society for Protection of Nature (2007). Phobjikha Landscape Conservation Area Management Plan. Thimphu, Bhutan.

Royal Society for Protection of Nature (2015). Biodiversity Assessment. Thimphu, Bhutan.

Royal Society for Protection of Nature (2015). Socio-Economic Report on Wetland Conservation and Sustainable Management of Buli. Thimphu, Bhutan.

Royal Society for Protection of Nature (2015). Buli Wetland Biodiversity Report. Thimphu, Bhutan.

Royal Society for Protection of Nature (2015). Rapid Watershed Assessment Report of Buli Watershed. Thimphu, Bhutan

Royal Society for Protection of Nature (2015). Socio Economic Report. Thimphu, Bhutan

Royal Society for Protection of Nature (2016). Report on Consultative Meeting on Buli Wetland Management Plan/Strategy Development. Thimphu, Bhutan.

Royal Society for Protection of Nature (2016). Field Report on Buli. Thimphu, Bhutan

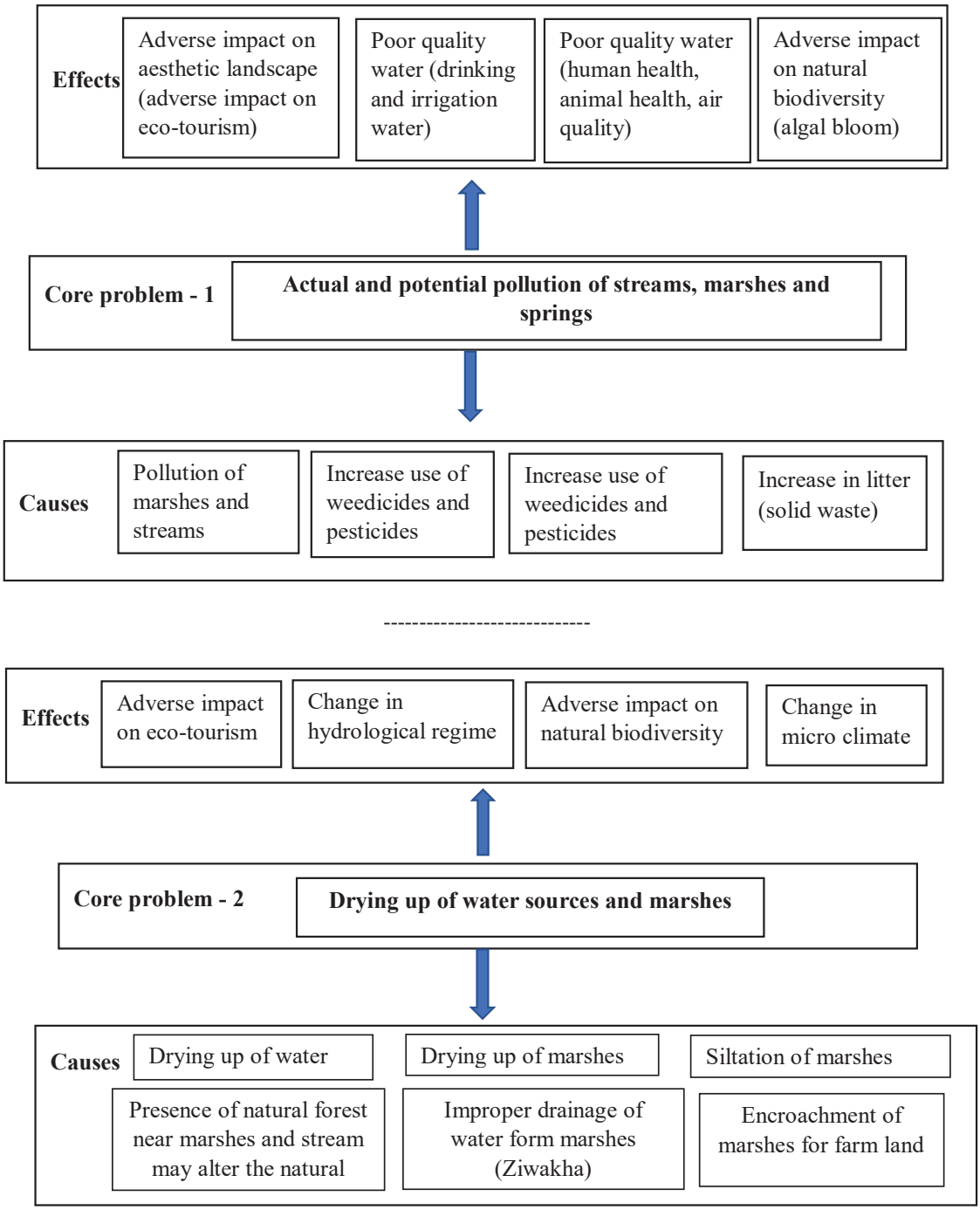
World Bank (1998). Environment Impact Assessment: Dakpai – Buli Road. Retrieved from http://documents.worldbank.org/curated/pt/321081468768026812/pdf/multi-page. pdf

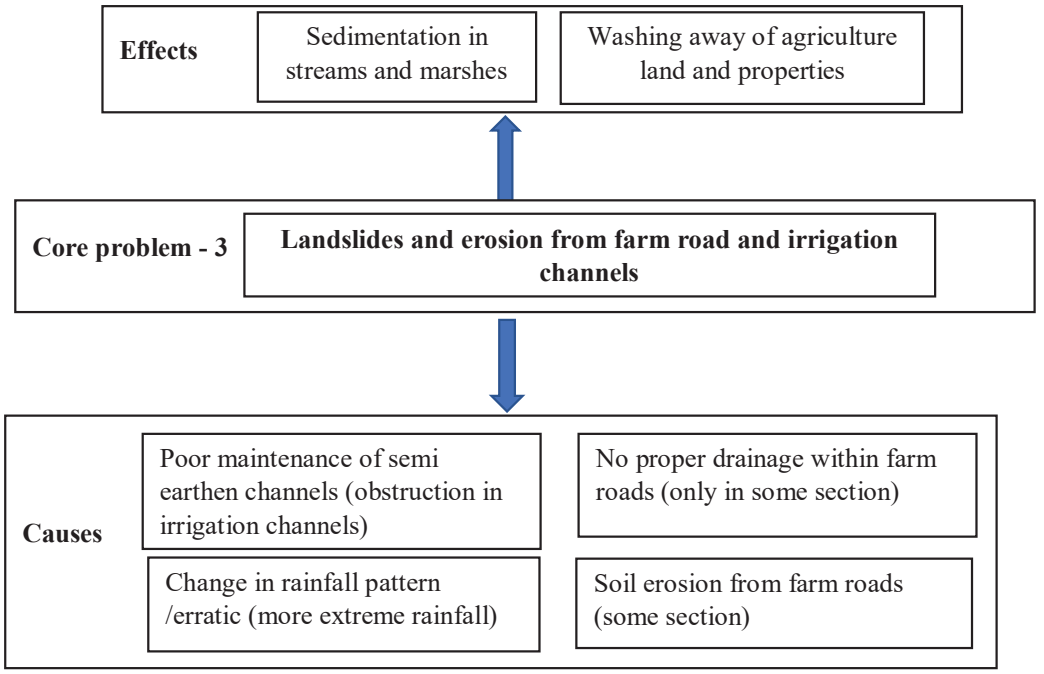
Annexure I: Avian Check list

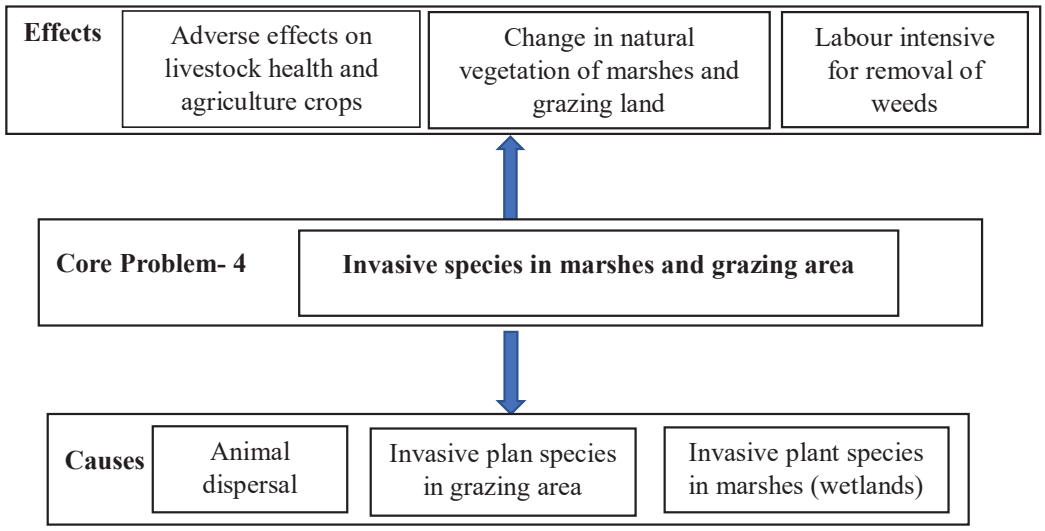
Sl.no	Species name (common)	Species name (*scientific*)
1	Blacked backed forktail	*Enicurus immaculatus*
2	Asian barred Owl	*Glaucidium cuculoides*
3	Black bulbul	*Hypsipetes leucocephalus*
4	Black faced laughing thrust	*Trochalopteron affine*
5	Black tailed crake	*Amaurornis bicolor*
6	Black-Billed magpie	*Pica pica*
7	Blue whistling thrush	*Myophonus caeruleus*
8	Chestnut-headed Tesia	*Cettia castaneocoronata*
9	Chestnut-tailed minla	*Minla strigula*
10	Common hoopoe	*Upupa epops*
11	Common kestrel	*Falco tinnunculus*
12	Common myna	*Acridotheres tristis*
13	Darter	*Anhinga melanogaster*
14	Green-tailed sun bird	*Aethopyga nipalensis*
15	Grey hooded warbler	*Seicercus xanthoschistos*
16	Grey Tree pie	*Dendrocitta formosae*
17	Grey wagtail	*Motacilla cinereal*
18	Grey winged black bird	*Turdus obscurus*
19	Grey-headed canary flycatcher	*Culicicapa ceylonensis*
20	Hodgson's redstart	*Phoenicurus hodgsoni*
21	House crow	*Corvus splendens*
22	House sparrow	*Passer domesticus*
23	Kalij pheasants	*Lophura leucomelonos*
24	Large billed crow	*Corvus macrorhynchos*
25	Lesser adjutant	*Leptoptilos javanicus*
26	Long tailed shrike	*Lanius schach*

27	Long tailed thrush	*Zoothere dixoni*
28	Mountain bulbul	*Ixos mcclellandii*
29	Orential magpai Roben	*Copsychus saularis*
30	Oriental turtle dove	*Stretopelia orientalis*
31	Plumbeous water redstart	*Rhyacornis fluginosus*
32	Red faced liocichla	*Liocichla phoenicea*
33	Red jungle fowl	*Gallus gallus*
34	Red vented bulbul	*Pycnonotus cafer*
35	Red wattled lapwing	*Vanellus indicus*
36	Rufous necked Hornbill	*Aceros nipalensis*
37	Ruddy shelduck	*Tadorna ferruginea*
38	Sharp tailed sand piper	*Calidris acuminata*
39	Spotted dove	*Streptopelia chinensis*
40	Sultan tit	*Melanochlora sultanea*
41	Verditer flycatcher	*Eumyias*
42	White breasted waterhen	*Amaurornis phoenicurus*
43	White capped water redstart	*Chaimarrornis leucocephalus*
44	White crested laughing thrush	*Garrulax lucolophus*
45	White throated laughing thrush	*Garrulax albogularis*
46	White wagtail	*Motacilla personate*
47	White-tailed Nuthatch	*Sitta himalayensis*
48	White-throated fantail	*Rhipidura albicollis*
49	Scaly-breasted Munia	*Lonchura punctulata*

Annexure II: Problem tree for Buli watershed development with core problems, causes and effects




Effects
Sedimentation in streams and marshes
Washing away of agriculture land and properties
Core problem - 3
Landslides and erosion from farm road and irrigation channels
Causes
Poor maintenance of semi earthen channels (obstruction in irrigation channels)
No proper drainage within farm roads (only in some section)
Change in rainfall pattern /erratic (more extreme rainfall)
Soil erosion from farm roads (some section)


Effects
Adverse effects on livestock health and agriculture crops
Change in natural vegetation of marshes and grazing land
Labour intensive for removal of weeds
Core Problem- 4
Invasive species in marshes and grazing area
Causes
Animal dispersal
Invasive plan species in grazing area
Invasive plant species in marshes (wetlands)

Annexure III: stakeholders and their roles

Main stakeholders	Roles and responsibility
Nangkhor Gewog Tshogdu	Discuss issues related to implementation of the plan Review and discuss progress of plan implementation Facilitate in conflict management
Nangkhor gewog	Integration of plan activities in their annual sectoral programs for budgeting and implementation. Seek budget support and implement the identified watershed management plan activities
Divisional Forest Office, Zhemgang	Regulate access to natural resources in important watersheds and wetlands areas Assist in establishing private and community forest Assist in protection of the riparian streams
Zhemgang Dzongkhag administration	Integrate and synchronize the watershed management plan activities into annual gewog plans Monitor the progress of plan implementation and report to WMD Exploring funding for implementation of plan activities
WMD	Provide technical support and other guidance for exploring, mobilizing funds and for implementation of plan activities Monitoring and evaluation of plan activities in collaboration with RSPN, carry out mid-term review and report to respective agencies.
RSPN	Coordinate the plan implementation, Monitoring and evaluation in collaboration with relevant agencies
Communities of Buli chiwog	Collaborate and provide necessary support during the implementing plan activities

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