



**Royal Government of Bhutan**  
**Ministry of Agriculture and Forests**  
**Department of Forests and Park Services**  
**Social Forestry and Extension Division**

# **National Strategy for Plantation and Forest Nursery 2019**

**Social Forestry and Extension Division**  
**Royal Government of Bhutan**

**November 12, 2019**



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Department of Forests and Park Services

Ministry of Agriculture and Forests

Royal Government of Bhutan

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Bhutan

# Foreword

Plantation forests play a crucial role in sustainable management of forest resources and maintaining sound ecological balance. Plantation forests complement natural forests in meeting the ever-increasing demand for timber, fuel wood and non-wood forest products for local communities and raw materials for wood-based industries.

The Royal Government has given priority to this programme from the earliest times. This is evident from the plantations established in the 1940s by the civil authorities, even before the Forest Department was set up in 1952. After the establishment of the Department of Forest, a network of plantations was established in southern Bhutan. In late 1960s this programme was expanded to other parts of the country.

Sound policies developed by visionary leaders have enabled Bhutan to maintain over 71% of its land under forest cover. However, urbanisation and other development activities, together with population growth are deteriorating Bhutan's forest wealth. Forest is rapidly being converted to other land-use. Urgent interventions are needed to address land degradation, and to uphold the goals and objectives of existing Government policies. To make the plantation programme more productive economically, socially and environmentally, this strategy document has been revised and developed to streamline the plantation programme in a more coordinated manner. This document will help combat forests degradation by turning barren and degraded land into forest and reforestation in cleared or logged forests. Through this strategic plantation programme, barren and degraded areas can be re-stocked to sustain forest productivity and at the same time improve the environment. With this strategy document in place, the Department will be in a better position to effectively plan and implement the plantation programme in the country and at the same time meet the forest resources requirement in line with the recent policy and legislation of the Royal Government of Bhutan.

Finally, we are hopeful that this strategy document will help to curb any further degradation of Bhutan's precious forests resources, and will contribute towards reclaiming past forests losses. The aim is to make a substantial contribution to environmental conservation and the target of maintaining 60% of Bhutan's land under forest cover at all times, as enshrined in the Constitution of the Kingdom of Bhutan.



**Lobzang Dorji**

(Director)

Department of Forests and Park Services

## Executive Summary

Forests are the dominant land cover in Bhutan, and constitute over 71% of the geographical area of the country (FRMD, 2016). Annually, large areas of forest are cleared for hydropower schemes, road constructions, urban development, mining, irrigation and other development activities (SFED, 2010). The majority of degraded forest land is generally in the vicinity of human settlement both in rural and urban settings (SFED, 2010). Without a proper plantation programme to replenish natural forest it would be a mammoth task to maintain 60% of the forests cover for all the times to come as mandated by the Constitution of the Kingdom of Bhutan (SFED, 2010). Also the plantation and nursery programmes are important for safeguarding our biodiversity, ecosystem services, promoting sustainable forest management, meeting domestic timber demand, fuel wood, and to support Bhutan's commitment of carbon neutrality and climate change.

Since 1947, the Royal Government of Bhutan has initiated the plantation programme to make up for the loss of forest resources and in the 12<sup>th</sup> five-year plan the plan target has been set to 2000 hectares. The plantation programme has mostly suffered from the lack of a clear legal and regulatory framework, no proper planning and inadequate funding, biotic interference including cattle grazing, lack of quality nurseries and inadequate supply of quality planting materials, limited participation by the local communities, forest fires, natural hazards, poor silvicultural treatments and shortage of relevant research support (SFED, 2010).

The National Strategy for Plantation and Forest Nursery 2019 aims to achieve the following objectives:

1. To re-stock and enrich degraded forests to safeguard ecosystem services through plantation initiatives.
2. To enhance the production and protection capacity of ecosystem services through plantation.

3. To contribute towards conservation of indigenous species and reduce pressure on biodiversity.
4. To increase timber resources to meet the industrial and local demands through plantation.
5. To ensure sufficient and appropriate supply of seedling through nursery development and management.
6. To rehabilitate watershed/catchment areas to sustain flow of water or perennial water source.
7. To improve socio-economic status of communities through community and private plantation programmes.

The following strategies will support the achievement of the above objectives of the National Strategy for Plantation and Forest Nursery 2019.

Strategy 1: Develop plantation management framework to guide plantation and nursery programme.

Strategy 2: Formulate resource mobilization framework to increase funding for plantation and nursery programme.

Strategy 3: Enhancing institutional development and capacity building.

Strategy 4: Enhance or strengthen nursery development and management.

Strategy 5: Institutionalize research and development.

Strategy 6: Develop monitoring and evaluation framework/plan.

To achieve vision and objectives of the above strategies, there are 39 strategic actions stipulated for effective planning and implementation of the plantation and nursery programmes. For efficiency and effectiveness of the plantation and nursery programme, it is of paramount importance to take collective measures and responsibility of all the relevant Government and private agencies, the communities and private citizens. The importance of methodical planning and executing plantation and nursery programmes can only be reiterated and highlighted.

## Abbreviation

BBPL	Bhutan Board Product Limited
CFMG	Community Forest Management Group
DoFPS	Department of Forests and Park Services
FNCRR	Forest and Nature Conservation Rules and Regulations
FRMD	Forest Resources Management Division
FYP	Five Year Plan
M&E	Monitoring and Evaluation
MoAF	Ministry of Agriculture and Forests
NCD	Nature Conservation Division
NFP	National Forest Policy
NPS	National Plantation Strategy
NRDCL	Natural Resources Development Corporation Limited
NSPFN	National Strategy for Plantation and Forest Nursery
NWFP	Non-wood Forest Product
PSC	Plantation Steering Committee
R&D	Research and Development
RGoB	Royal Government of Bhutan
SFED	Social Forestry and Extension Division
SRF	State Reserved Forest
UWICER	Ugyen Wangchuk Institute for Conservation and Environment Research



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## 1. Introduction

Bhutan is a small country with geographical area of 38,934 km<sup>2</sup> and the population is about 0.8 million (NSB, 2017). The country is mainly dominated by rich forest cover, which constitutes to over 71% of the geographical total area (FRMD, 2016). The forest provides various goods and services and plays a crucial role for substantial contribution to Gross Domestic Product (GDP) in the country through hydropower generation. Bhutan should not be complacent with its good forest cover because of the fragile hilly terrains and increasing pressure on the forest resources. The restoration and improvement of the degraded and barren forest lands are considered as one of the important programme in the National Forest Policy (NFP) 2011.

The degradation of forest and its resources is happening at a faster rate and has become a global threat and a challenge in this current endeavour to combat recent phenomena of the climate change while also demands more adaptation and mitigation measures. Nevertheless, efforts for improving the forest conditions are in a right direction to ensure its sustainability.

Bhutan is insistent in hydropower development and plantation in the watershed and is paramount to keep the rivers recharged with the rainwater inception. The plantation is also one of the major evolving practices to conserve and manage the forests sustainably, landscaping, biodiversity conservation and ensuring the delivery of the environmental services. To contribute to the biodiversity conservation and management, carbon sequestration, rehabilitation of critical and degraded watersheds and strengthen social and economic benefits, the National Plantation Strategy (NPS) for Bhutan was developed and endorsed in 2010. After the implementation for about eight years, it was felt necessary to revise due to NFP adoption in 2011 which came after the NPS 2010. The revision of the Forest and Nature Conservation Rules and Regulations (FNCRR) of Bhutan 2017 asserts requirement to revise the strategy document too.

There is no doubt that, first evaluation of the NPS 2010 and revision

is important to understand gaps, challenges and opportunities, which need to be taken care while framing the new strategy. Prior to revision, NPS 2010 was evaluated, gaps and challenges identified and explored opportunities and strategized accordingly in this strategy document.

## **2. Current situation**

Reafforestation of the degraded and barren forest lands was the earliest national conservation initiative in Bhutan. As early as 1947, the first forest plantation was established in Bhutan along the southern belt and this introduced commercial harvesting of the forest products through a clear-felling system (SFED, 2010). To enhance the productivity of the clear-felled area, large-scale artificial regeneration was introduced with planting of Teak (*Tectona grandis*), Sal (*Shorea robusta*), Champ (*Michelia champaca*) and other valuable species (SFED, 2010).

Since early 1960s, the programme was expanded to other parts of the country to combat degradation and to return the degraded forests to full forest cover (SFED, 2010). Currently, a total of 63,367 acres of land has been afforested and re-afforested (SFED, 2018). The Royal Government of Bhutan (RGoB) has started reaping the benefits from many of these plantations in terms of timber, fuel wood, fodder, etc. and indirect benefits such as water quality, air quality, and other ecosystem impacts have also resulted (SFED, 2010). In some cases, the Department of Forests and Park Services (DoFPS) has met the requirements for high value broadleaf timber such as Champ, Teak, and Sal from plantations in the south (SFED, 2010). However, on a national scale the production of timber from the plantations is negligible (SFED, 2010). In contrary, about 4,338 acres were considered failure and about 14,722 acres were not traceable (SFED, 2015) on the ground.

The DoFPS is responsible for the rehabilitation of the depleted forest land and reafforestation in clear felled forest areas as enshrined in the NFP since 1974 (SFED, 2010). To coordinate and technically

backstop afforestation and reafforestation activities across the country, the Afforestation Division (now the plantation programme under SFED) was established in 1989 (SFED, 2010). Until the year 2000, the Territorial Forest Divisions (TFDs) took the leading role in coordination and establishment of the plantation activities in the field (SFED, 2010). With the decentralization policy, the implementation of the afforestation component of the plantation programme has been decentralized to the Dzongkhags (SFED, 2010). In 1993, the idea behind this decentralization initiative was to involve local people in planning and implementing the plantation activities along with other social forestry activities (SFED, 2010).

Afforestation plantations are classified into two major categories: *normal plantation and rehabilitation plantation* (SFED, 2010). The normal afforestation plantation refers to planting of suitable species in *barren, degraded or wasteland areas* (SFED, 2010). These types of areas are mostly available in the vicinity of settlements (SFED, 2010). The rehabilitation plantations are established in *the critically degraded areas such as eroded, fire burnt, landslide affected and mining areas* (SFED, 2010). This includes planting of fast growing and soil binding species combined with soil and water conservation techniques (SFED, 2010).

## **2.1. National forest policy goal for forest plantation**

The NFP adopted in 2011 states the policy goal *“Bhutan’s forest resources and biodiversity are managed sustainably to produce a wide range of social, economic and environmental goods and services for the equitable benefit of all citizens and natural environment while still maintaining a minimum of 60% of the land under forest cover thereby contributing to Gross National Happiness”*.

## **2.2. National forest policy objectives for forest plantation**

In order to achieve the policy goal, the broad objective related to plantation is to *“facilitate raising forestry crop on registered lands of individuals or institutions and accrue ecological, social and economic*

*benefits*” (RGoB, 2011). To achieve this objective the plantation is the main programme, which will contribute to it, and the objectives of the plantation forestry are enshrined under different forest management components in the NFP 2011.

***Under the sustainable management of state reserve forest (SRF), it is stated that:-***

- Pursue forest plantation of appropriate vegetation composition in areas where natural regeneration is inadequate or absent. The Royal Government should realize funds for such investments from beneficiaries of watershed and ecosystem services. Further, the Department should carry out plantation of shrubs and low height tree species under high-tension transmission lines to maintain forest cover.
- Ensure wood balance by planting equal or more saplings than the numbers of volume cut and removed in a year from the forests for allotment to various groups. The Department should also promote planting of saplings through religious forum as an act of accumulation of merits for departed soul.
- Ensure rehabilitation and restoration of SRF land used for purposes other than sustainable forest management.
- Ensure compensatory plantation with suitable local species to compensate for the loss of forest cover due to establishment of development projects.

***Under the production forest, it states that:-***

- Ensure plantation of the harvested areas with appropriate species, by the harvesting or beneficiary agency in areas where commercial or large-scale harvesting of forest resources per unit area and also enhance efficient utilization of low-quality timber.
- Plantation of suitable bamboo species shall be carried out as an alternative to reduce pressure on timber resources by relevant agency identified by DoFPS.

***Under the Forest Based Industries, it states that:-***

- Support industries to develop commercial plantation forests, including on leased SRF land to produce industrial materials.

**3. Purpose of the revision of plantation strategy**

The NPS was developed in 2010 and will be eight years in 2019. Within the period of eight years, substantial changes have taken place. The NFP of Bhutan was endorsed in 2011, revised FNCRR 2017 in place, number of community-based forest management has increased drastically, a new institution Green Bhutan Corporation Limited (GBCL) was instituted in 2017, Bhutan set a World Guinness record on plantation, Bhutan declared as a carbon neutral country, encouragement of agar plantation, etc. One critical note is the emergence of the climate change as a major policy issue in the country. The plantation programme has huge potential to contribute to carbon sequestration by implementing adaptation and mitigation strategies. There are many changes that have taken place over the years in policy, social, legal and global arena; it is timely to reflect achievements and even impacts (which would need separate study though). In addition, it is critical to identify the issues and opportunities and incorporate these in the revised strategy document and adapt to the changing political, economic, policy and social context.

**4. Guiding principles**

The guiding principles were kept as it is as mentioned in the NPS 2010 because of the focused clarity. The following will be the guiding principles for the National Strategy for Plantation and Forest Nursery (NPSFN) 2019.

- Policy, legal and regulatory frameworks are to form the basis for further development of the plantation programme (SFED, 2010).

- Conservation of the environment is the overriding goal of the plantation programme, only after which socio-economic benefits from the plantation forests are to be derived (SFED, 2010).
- Plantations are to be established with clear objectives, and relevant agencies shall be held accountable in order to increase the success of the plantation (SFED, 2010).

#### **4.1. Vision statement**

The vision for the NPSFN 2019 is to “*enhance the plantation programmes to contribute in ensuring 60% forest cover for all times to come and support sustainable forest management for socio-economic, ecological benefits and to contribute to climate change mitigation and adaptation*”.

#### **4.2. Objectives**

1. To re-stock and enrich degraded forests to safeguard ecosystem services through plantation initiatives.
2. To enhance the production and protection capacity of ecosystem services through plantation.
3. To contribute towards conservation of indigenous species and reduce pressure on biodiversity.
4. To increase timber resources to meet the industrial and local demands through plantation.
5. To ensure sufficient and appropriate supply of seedling through nursery development and management.
6. To rehabilitate watershed/catchment areas to sustain flow of water or perennial water source.
7. To improve socio-economic status of communities through community and private plantation programmes.

#### **5. Strategies and actions**

In order to achieve the vision and the objectives of the NPSFN 2019, the following strategies with actions are stipulated.



## **5.1. Develop plantation management framework to guide plantation and nursery programme**

### ***Rationale***

Most of the plantations have been carried out on ad-hoc basis, with no clear objectives and poor planning. Also, once the area has been planted, later lost to other developmental activities, which is clear indication of lack of land-use plans, and no focus-based plantations. In addition, there is lack of long and short-term planning of the plantation, no site-appropriate choice of the species. Sometimes, choice of the species planted is based on what is available in the nursery, so there is lack of prior planning which species to be raised in the nursery. Some species take three to four years to be raised in the nursery before taking out for the plantations, such species need careful planning. The fundamental success of the plantation will be based on quality of seedlings and its maintenance after the establishment.

The plantation management framework should provide avenue for improved planning. It should at a minimal, include the following key elements within the framework.

- Where and why to plant?
- What regeneration method to administer?
- Choices of species specific to site?
- Multiple or single species?
- What type of planting stock?
- When to plant?
- How to protect the seedling and do maintenance?
- M&E system.

Therefore, to achieve the above strategy, the following actions are suggested for implementation.

Action 5.1.1: Develop plantation master plan (10 years plan – with well-defined plantation types, plantation area, needs and site conditions).

Action 5.1.2: Formulate annual plantation plan incorporating all the above elements.

Action 5.1.3: Production of seedling from good seed sources (proper selection of seeds) and development of seed orchard.

Action 5.1.4: Raising site specific species and seedlings.

Action 5.1.5: Spatial plantation database and standardize plantation journal to be maintained to guide the plantation programmes.

Action 5.1.6: Ensure annual reporting of plantation status to SFED and relevant entity.

Action 5.1.7: Develop action plan for plantation maintenance.

Action 5.1.8: Develop financial resource mobilization plan.

## **5.2. Formulate resource mobilization framework to increase funding for plantation and nursery programme**

### ***Rationale***

The plantation programmes are mostly dependent on RGoB budget. Budget for the plantation are only for the establishment and no maintenance budget provided, which is the most critical action for successful plantation. The priorities given by RGoB on the plantation programmes are tepid and all the issues arising from the plantation and nursery development and management are due to limited resources. Few of the plantation programmes get funding support from the hydropower projects and other funding sources but most funding agencies within Bhutan are not keen on supporting the

plantation project per se. Therefore, the resource mobilization has been and will be challenging.

The plantation can reforest timber harvested areas, rehabilitate the degraded watersheds, contribute to biodiversity conservation and in this current era, trees are important component to sequester carbon from the atmosphere as well as stock carbon. The plantation in degraded and barren area stabilizes the landslides and erosion, reduces hazards. The plantation programme has immense ecological, social, environmental and economic benefits. Hence, the formulation of resource mobilization framework to tap funding is important and to make this programme successful.

Therefore, to achieve the above strategy, the following actions are suggested for implementation.

Action 5.2.1: Document historical background of the area identified (to ascertain the feasibility of the plantation or nursery establishment), assess the cost for plantation programme and identify collaborating entity or entities to support plantation and nursery development.

Action 5.2.2: Categorize the plantation types (e.g., industrial plantation, avenue plantation, enrichment plantation, compensatory plantation, protection plantation, reforestation, and afforestation, etc.).

Action 5.2.3: Identify funding source based on the plantation category and mobilize resources.

Action 5.2.4: Identify and allocate plantation site based on specific objective of the plantation.

Action 5.2.5: To mobilize resources develop or formulate innovative project proposal align with ecological benefits (watershed), climate change, adaptation, mitigation and rural livelihood.

### **5.3. Enhancing institutional development and capacity building**

#### ***Rationale***

The NPS 2010 has proposed to form a Plantation Steering Committee (PSC) mainly to oversee the planning and monitor the programme but was not established due to various reasons. Most of the TFDs have plantation unit to oversee the plantation programme, however, due to limited fund support, it has not been able to strengthen their capacity in terms of data management and monitoring.

For any plantation programme, the institutional development and capacity building initiatives will go a long way in how the programmes perform. There is pertinent reason to ensure that the capacity to implement plantation and nursery programme is based on sound scientific and technical framework. Also, as the plantation activities cut across various institutions and partner, being able to foster collaboration and partnership is critical.

Therefore, to achieve the above strategy, the following actions are suggested for implementation.

Action 5.3.1: Strengthen plantation section under SFED/field offices in terms of human and resource capacity.

Action 5.3.2: Build capacity of relevant training institutions/colleges to train/update the field offices, other agencies on nursery and plantation norms, nursery pests and diseases management.

Action 5.3.3: Provide annual refresher course on nursery and plantations approaches to the field staffs, caretakers, and communities at relevant institutions.

Action 5.3.4: Explore the possibilities of outsourcing/privatizing the plantations with enhanced monitoring from DoFPS (central and field level).

Action 5.3.5: Review and update the curriculums in training institutes.

#### **5.4. Enhance or strengthen nursery development and management**

##### ***Rationale***

Most of the TFDs and parks have established the nurseries for tree seedling production. The seedlings in the nurseries seem to be of poor quality, which may be due to poor quality seeds or seed collectors are aware or not aware of mother tree selection. Since 1979, the seedlings were distributed freely to any Bhutanese willing to plant, but once distributed it was never been monitored to see the success or failure. The seedlings production involved cost and free distribution of the seedlings could be re-looked from the points of sustainability and responsibility. Most of the nurseries in the country are poorly managed.

The nursery has an important role in determining how the plantation programmes progress. Proximity of the nursery to plantation site is also a key factor and, in some cases, detrimental to the success or failure of the plantation programmes. Development and establishment of the nursery at appropriate site/location should be of paramount importance. In addition, good planning of the nursery establishment and management is essential to produce quality seedlings. Most the nurseries are managed by caretaker, and lack skill and capacity to manage the nursery, hence need to build their capacity.

Therefore, to achieve the above strategy, the following actions are suggested for implementation.

Action 5.4.1: Establish/initiate central nurseries in different regions (east, west, central, south).

Action 5.4.2: Have working level committee to work on plantation and nursery development.

Action 5.4.3: Conduct training need assessment and capacity building (seed collection, storage and treatment).

Action 5.4.4: Registration of private nurseries with the Department.

Action 5.4.5: Train CFMG on nursery development and management.

## **5.5. Institutionalize research and development**

### ***Rationale***

The research component in the plantation and nursery is extremely weak. There are no scientific plantation specific publications that show-case the impacts of the plantations (socially, ecologically and economically). Only few publications are available that provides records of the plantations.

It has prominently featured in focus group discussions as well as in the national stakeholder workshop that it is important to strengthen the research and development (R&D) component of the plantation and nursery. There is an urgent need to study the impacts of plantation programme in Bhutan (environmentally, ecologically, socially and economically). Besides conducting study on impact of the plantation, it is also important to document some of the experiences through case studies and papers. Such scientific research and findings should guide policy formulation, management decisions and resource mobilization.

Therefore, to achieve the above strategy, the following actions are suggested for implementation.

Action 5.5.1: Studies to be conducted on the past vegetation history for the degraded area.

Action 5.5.2: Research on plantation site, aspect, altitude, soil, rainfall, spacing, and timing for different species.

Action 5.5.3: Research on the species (diversity of flora species), including non-wood forest product (NWFP) for the different ecological zone or altitudinal zone.

Action 5.5.4: Studies on the impact of the introduced (exotic) species on ecological, economic and social parameters (e.g. Teak, Cryptomeria, Cypress, Eucalyptus, etc).

Action 5.5.5: Studies on the plantation dynamics (yield), (e.g. Sal).

Action 5.5.6: Studies on the factors that determine the success and failure of the plantation and nursery establishment.

Action 5.5.7: Studies on the methodology for seeds collection and selection of mother trees.

Action 5.5.8: Studies on the different propagation and treatment methods in the nursery.

Action 5.5.9: Looking at the feasibility of wildling collection.

## **5.6. Develop monitoring and evaluation framework**

### ***Rationale***

Other than ad-hoc and un-planned field technical monitoring method of surveying the seedlings survival rate, no systematic and proper M&E framework/guidelines is in place. The M&E is weak due to lack of proper systematic approach/methods, in-sufficient resources and manpower.

The monitoring is critical to make the plantation programme success. Consistent and effective M&E is important to assess whether the plantation and nursery programme is achieving its set target. Currently, there is no systemic M&E in place to ensure accountability, adaptive management and evidence-based decision making. There is a need to have a plantation M&E framework/system.

Therefore, to achieve the above strategy, the following actions are suggested for implementation.

Action 5.6.1: Develop a standardized national M&E framework/plan in consultation with all relevant stakeholders.

Action 5.6.2: Institute a system to enhance responsibility and accountability of plantation and nursery programmes.

Action 5.6.3: Revive or reinforce the responsibility of all the concern agencies to maintain plantation journal and adopt it.

Action 5.6.4: Create section in TFD and PA for plantation with adequate staff and financial resources.

Action 5.6.5: M&E of nursery- registration and certification of nursery in both Government and private sector.

Action 5.6.6: Assess and ascertain the most feasible plantation area requirement for successful plantation programme (e.g. could be 1-5 ha). Create plantation and nursery based on the identified optimal size.

Action 5.6.7: Conduct mid-term (2.5<sup>th</sup> year) and final evaluation (5<sup>th</sup> year) to verify if the objective and target of the plantation and nursery programmes have been met.

## **6. Implementation approach**

The key agencies to implement plantation and nursery programme are the Government agencies, forest and wood-based industries, local Government, local communities and the citizens. The SFED should play the focal role of ensuring the engagement, coordination, collaboration and most importantly monitoring of all the relevant stakeholders in plantation and nursery programmes.

Although, the plantation and nursery programmes are to some extent integrated in the 12<sup>th</sup> FYP, optimizing the implementation of the



activities should be addressed by SFED. The plantation and nursery programme should be designed based on the capacity and capabilities identified stakeholders. Different agencies can take up different types of plantation. The following stakeholders can be engaged for plantation and nursery development.

- Plantation by Territorial Division (TFD) and Park Area (PA),
- Plantation by Natural Resource Development Corporation Limited (NRDCL),
- Plantation by Industries,
- Plantation by individuals,
- Plantation by community forest management groups,
- Plantation by municipalities,
- Plantation by schools and other institutions.

Under the coordination of SFED, a working level plantation and nursery steering committee should be formed with clear terms of reference for the committee and for the members of the committee. The committee should have member from various functional divisions and relevant stakeholders but not limited to the below.

1. Social Forestry and Extension Division (SFED),
2. Watershed Management Division (WMD),
3. Forest Resources Management Division (FRMD),
4. Nature Conservation Division (NCD),
5. Bhutan Board Product Limited (BBPL),
6. Natural Resource Development Corporation Limited (NRDCL),
7. Green Bhutan Corporation Limited (GBCL),

## **7. Monitoring and evaluation**

The monitoring and evaluation (M&E) unit has to be established within the SFED to monitor the progress and for effective coordination/collaboration in the implementation of the NSPFN 2019. This unit will be supported by the plantation and nursery working committee. The progress of the implementation of the six strategies will be assessed on an annual basis.

The M&E framework or plan should be developed during the first year of the adoption of the NPSFN 2019. The M&E framework or plan should include at the minimum, purpose and timing for monitoring, standard protocol/method for data collection, database and how information collected through monitoring will be utilized for adaptive decision making and informing the relevant stakeholders.

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## Annexure

### Annexure 1: Proposed strategies with issues and gaps to identify actions during the stakeholders workshop (national and regional)

<b>Group 1. Develop a plantation management framework to guide plantation and nursery programmes</b>		
<b>Issues and gaps</b>	<b>Actions</b>	<b>Implementing Agency</b>
Most of the plantation activities are carried out at an ad-hoc basis	Develop plantation master plan (10 years plan) (define plantation types, define plantation area (mapping assessment), define needs) site conditions	SFED
Most plantations activities lack clear objectives	Annual plantation plan	SFED and Field Office
Poor planning contributing to wrong site selection and species selection contributing poor success rate	Production of seedling from good seed sources (proper selection of seeds), development of seed orchard	UWICER
Budget is always insufficient and leads to low priority	Raising site specific species and seedlings	Implementing agency (NRDCL, GBCL, Field Offices)
Overall Land Use Planning has not been done	Mass plantation of high demand species (Teak, Sal, Champ, Walnut, Toona, Boemeria regulosa, Acer, Lindera)	SFED/FRMD/ Field Offices
Long-term and short-term national plantation plans based on Dzongkhag plan is not available	Develop long term-funding strategy	SFED/NRDCL/ GBCL
	Spatial plantation database and	SFED/FRMD/ Field Offices

	standardize plantation journal	
	Monitoring guidelines	SFED
	Annual reporting of plantation status	Field Office/SFED
	Plantation maintenance action plan	
	All agencies implementing plantation activities needs to be legally binding to ensure successful establishment.	DoFPS/SFED
<b>Group 2. Formulation of resource mobilization framework to increase funding for plantation and nursery programmes</b>		
<b>Issues and gaps</b>	<b>Actions</b>	<b>Implementing Agency</b>
Most of the TDs are totally dependent on RGoB funding for plantation	Historical background, area identification, costing and collaborating.  Allocation of site based on specific objective.	SFED
Few TDs get funding support for plantation from the Hydro-power projects and other funding sources	Categorize the plantation type. (Industrial, avenue, enrichment, compensatory, protection, reforestation, afforestation etc.)	SFED/TD/ Hydro-powers
Most funding agencies within Bhutan are not keen on supporting plantation project <i>per se</i> .	Identify funding source based on the plantation category Development of project proposal if there is no relevant funding agency.	
Budget for plantation are only for establishment – no maintenance budget	Funding agency will have priority over resource share.	RGoB

is provided		
Resource mobilization has not been a concerted effort	Funding responsibility till establishment	SFED/TD/PAs
<b>Group 3. Enhance institutional development and capacity building</b>		
<b>Issues and gaps</b>	<b>Actions</b>	<b>Implementing Agency</b>
There is no Plantation Steering Committee as proposed in the NPSB 2010.	Establish/initiate central nurseries in different regions (east, west, central, south) (REMOVE)	
Most of the Territorial Divisions have plantation focal point but there is a need to strengthen the plantation unit (need to give priority)	Have working level committee.	
Due to limited financial and human resources most, TD are not able to strengthen Plantation Unit.	Strengthen plantation section under SFED/field offices in terms of human and resource capacity	SFED
There is no capacity and system for early warning system to monitor disease outbreak	Build capacity of relevant training institutions/colleges to train/update the field offices, other agencies on nursery and plantation norms, nursery pests and diseases etc	
There is the need to regularly train and build capacity of foresters, caretakers and communities in plantation and	Provide refresher course on nursery and plantations to the field staffs, caretakers, and communities at relevant institutions	

nursery management.		
Currently, there is a limited financial resource for capacity building opportunities.	Explore the possibilities of outsourcing/privatizing the plantations with enhanced monitoring from DoFPS (central and field level)	
In the context of plantation curriculum in training institutes in Bhutan – suggested the need to assess the theory vs application of such courses.	Review and update the curriculums in training institutes	
<b>Group 4. Strengthen nursery development and management</b>		
<b>Issues and gaps</b>	<b>Actions</b>	<b>Implementing Agency</b>
Poor planning, lack of capacity, poor quality of seeds, and low quality of saplings from the private nurseries are cited as issues.	Conduct training need assessment and capacity building (seed collection, storage, treatment, etc)	
Although, most of the Territorial Divisions and other institutional partners have nursery, the establishment of nursery in each ecological zone under Dzongkhag has not happened.	Develop and manage Regional Nursery in each ecological zone.	
Procurement of sapling from outside the border has been cited as an issue.	Register of private nurseries with the department	

Ban sapling procurement from outside.		
Free distribution of sapling should be re looked for its sustainability	Train CFMG on nursery development & management	
The provision of wage for labour (National Wage vs market wage)		
The saplings supplied from the private nurseries are of poor quality – (success rate)		
There is also no proper monitoring of exotic spp coming into Bhutan		
Most of the nurseries are poorly maintained or do not have full time and trained caretaker.		
Lack of capacity and skills in plantation management and nursery development.		
<b>Group 5. Institutionalize research and development</b>		
<b>Issues and gaps</b>	<b>Actions</b>	<b>Implementing Agency</b>
This component of the plantation is extremely weak.	Studies to be conducted for the past vegetation history for the degraded area.	
There are no scientific plantation specific publications that showcase the impacts of plantation	Research on plantation site, aspect, altitude, soil, rainfall, spacing, and timing for different species.	



– socially, ecologically and economically.		
There are few publications that provide records of plantation.	Research on the species (diversity of flora spp.), including NWFP for the different ecological zone or altitudinal zone.	
Almost all the respondent stated the need to strengthening the R&D component of plantation.	Studies on the impact of the introduced (exotic) species on ecological, economic and social such as Teak, <i>Cryptomeria</i> , <i>Cupressus macrocarpa</i> , Eucalyptus, etc.	
	Studies on the plantation dynamics (yield), eg: Sal,.	
	Studies on the factors that determine the success and failure for the plantation establishment.	
	Studies on the methodology for seeds collection and selection of mother trees.	
	Studies on the different propagation and treatment methods in the nursery management.	
	Wildling collection	
<b>Group 6. Develop monitoring and evaluation framework</b>		
<b>Issues and gaps</b>	<b>Actions</b>	<b>Implementing Agency</b>

<p>The M&amp;Es are conducted by Forestry staff and this to some extent creates biasness – that reduces accountability among institutions/individual.</p>	<p>Accountability to be borne by the concern agencies responsible for the plantation in case of failure</p>	
<p>M&amp;E is weak due to lack of proper system, resources and manpower</p>	<p>Standardize monitoring processes during plantation (Site selection, choice of species, quality of seedling &amp; planting methods)</p>	
	<p>Allocate sufficient resources</p>	
<p>In some TD the plantation areas are scattered and small. There is a need to have a Plantation M&amp;E framework/system.</p>	<p>Standardize the minimum plantation area requirement (1-5 ha)</p>	
	<p>Develop online M&amp;E system</p>	

**Annexure 2: List of participants of the stakeholder workshop on evaluation and revision of NPS for Bhutan 2010**

<b>Ser. No.</b>	<b>Participant's name</b>	<b>Designation</b>	<b>Organisation</b>
1	Lobzang Dorji	Director	DoFPS
2	Sonam Yangdon	SSE	NLCS
3	Norbu Yangdon	FO	SWS
4	Phuntsho Namgay	FO	Wangdue Division
5	D.B. Gurung	GM	BBPL
6	Jigme Dorji	DCFO	Zhemgang Division
7	Rinchen	RM	NRDCL, Phuntsholing
8	Karma Leki	DCFO	Trashigang Division
9	Phurba	FO	Samdrup Jongkhar Division
10	Ugyen Tshering	PM	JWS
11	Pema Gyeltshen	Sr. FR	Gedu Division
12	Pema Rinzin	FO	Paro Division
13	Cheten Thinley	Sr. FO	UWICER
14	Ugyen Wangchuk	CFO	Pemagatsel Division
15	Kencho Dukpa	CFO	Dagana Division
16	Gyeltshen Dukpa	CFO	Thimphu Division
17	Sonam Tobgay	CFO	JKSNR
18	Yonten Norbu	CFO	PNP
19	Samten Wangchuk	CFO	RMP
20	Sonam Dorji	Sr. FR1	Sarpang Division
21	Rinzing Dorji	CFO	JDNP
22	Tshering Dhendup	PM	WCNP

<b>Ser. No.</b>	<b>Participant's name</b>	<b>Designation</b>	<b>Organisation</b>
23	Dorji Rapten	PM	PWS
24	Kuenzang Dorji	FO	Samtse Division
25	D.S Rai	CEO	GBCL
26	Pankey Dukpa	CFO	Bumthang Division
27	Choki Dorji	Sr. FR	JSWNP
28	Kado Tshering	CFO	Mongar Division
29	Sonam Tobgay	DCFO	Wangdue Division
30	Karma Tempa	CFO	BWS
31	Dorji Wangdi	DCFO	FRMD
32	Tshering	DCFO	FPED
33	Chukey Wangchuk	Consultant	Private
34	T.B. Rai	Sr. FR1	SFED
35	Tashi Wangchuk	Sr.FO	SFED
36	Tshewang Dorji	Sr. FR1	SFED
37	Pema Wangda	ED	BFL
38	Golong Tshering	Sr. GM	BCCL
39	Pasang W. Norbu	CFO	SFED
40	Sithar Wangdi	Sr. FO	SFED
41	Siegyel Delma	CFO	WMD
42	Dimpal Thapa	CFO	Tsirang Division

