Commune-level institutional arrangements and monitoring framework for integrated tree-based landscape management

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Contents

1. Introduction

Governance is a difficult task in the context of achieving landscape multifunctionality owing to the multiplicity of stakeholders, institutions, scale and ecosystem services: the 'many-multiple' (Cockburn et al 2018). Governing and managing the physical landscape and the actors in the landscape requires intensive knowledge and good planning systems. Land-use planning is a powerful instrument in landscape governance because it directly guides how actors will intervene in the physical landscape (land use) to gain commonly desired value. It is essential for sustaining rural landscapes and improving the livelihoods of rural communities (Bourgoin and Castella 2011, Bourgoin et al 2012, Rydin 1998), ensuring landscape multifunctionality (Nelson et al 2009, Reyers et al 2012) and enhancing efficiency in carbon sequestration, in particular (Bourgoin et al 2013, Cathcart et al 2007). It is also considered critical to the successful implementation of land-based climate mitigation, such as under Nationally Determined Contributions (NDCs), because the Land Use, Land-Use Change and Forestry (LULUCF) sector is included in the mitigation contributions of nearly 90 percent of countries in Sub-Saharan and Southern Asia countries and in the Latin American and Caribbean regions (FAO 2016).

Viet Nam has been implementing its NDC, which includes forestry and land-based mitigation options under the LULUCF sector. The contribution of the sector to committed national emission reduction is significant and cost-effective compared with other sectors. In addition to achieving emission reduction targets, implementation of forestry and land-based mitigation options has the highest benefits for social-economic development and achieving the Sustainable Development Goals (MONRE 2020). Challenges, however, lie in the way national priorities and targets are translated into sub-national delivery plans and the way sub-national actors are brought together in orchestration (Hsu et al 2019) in a context where the legal framework for climate-change mitigation is elaborated at national rather than sub-national levels and coordination between government bodies and among stakeholders is generally ineffective (UNDP 2018).

In many developing countries, conventional 'top–down', centralized land-use planning approaches have been widely practised, with very little success, a result of a lack of flexibility in adapting local peculiarities (Amler et al 1999, Ducourtieux et al 2005, Kauzeni et al 1993). In forest–agriculture mosaic landscapes, the fundamental question is how land-use planning can best conserve forest and agricultural land, both as sources of economic income and environmental services (O'Farrell and Anderson 2010).

This paper provides guidance on monitoring integrated tree-based landscape management at commune level, based on the current legal framework related to natural resource management (land and forest) and the requirements of national green-growth development and assessment of land uses in two communes in Dien Bien and Son La provinces. The concept of integrated tree-based landscape management in Viet Nam is still new and should be further developed for wider application across levels.

2. Legal framework for land-use planning and green-growth development

Viet Nam has issued numerous polices governing land-use planning, natural resource management, climate-change mitigation and adaptation, ecosystem services and green growth to achieve socio-economic development through sustainable management of its natural resources. The key policies are summarized below.

Land Law 2013[1] requires land-use planning and preparation of land-use plans from central to local levels (Article 35). Land-use planning is conducted for a period of 10 years and land-use plans are prepared for 5-year periods. The law also regulates that land-use planning and plans have to be implemented at three levels: national, provincial and district (articles 37 and 38). The basis for the development of land-use plans across levels is mainly information on socio-economic development and sectoral plans, land-use status and land potential. Land-use planning for lower levels must ensure compliance with higher levels.

Planning Law 2017[2] provides the general requirements for overall planning at different levels (national, regional and provincial) and sectors, including socio-economic activities, national defence and security associated with the development of infrastructure, resource use and environmental protection in determined territories to effectively use the country's resources for the purpose of sustainable development for a planned time period. This law requires taking into consideration various factors during the planning process, as outlined below.

- National infrastructure planning (Section 3, Article 25): Orientation of land-use arrangements for development of the national infrastructure sector and environmental protection and climate-change response activities and conserving national-ranked ecology, landscapes and monuments.

- National resource planning (Section 4, Article 25): Orientation for environmental protection, natural disaster prevention, and response to climate change (Point g, Section 4, Article 25).

- National environmental protection planning (Section 5, Article 25): Assessment of the status of, and changes in, environmental quality, natural landscapes and biodiversity; the situation and forecast of waste generation; impact of climate change; the situation of environmental management and protection; environmental zoning, nature and biodiversity conservation; waste management; environmental monitoring and warnings.

- Planning for biodiversity conservation (Section 6, Article 25): Identifying and zoning high-value biodiversity areas, important ecological and landscapes areas, nature reserves, biodiversity corridors and biodiversity conservation facilities.

Forestry Law 2017[3] regulates the use and management of forests according to designated functions, including production forests (mainly for timber production), protection forests (watershed and coastal protection) and special-use forests (gene and biodiversity conservation).

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[1] Land Law No. 45/2013/QH13 dated 29 November 2013
[2] Land Law No. 45/2013/QH13 dated 29 November 2013
[3] Forestry Law No. 16/2017/QH14 dated 15 November 2017

The law importantly recognizes the significance of environmental services provided by forests. These services are regulated in Article 6: 1) Protection of soil and minimization of erosion and sedimentation in lakes, rivers and streams; 2) Regulation and maintenance of water sources for production and everyday life; 3) Absorption and retention of forest carbon; reduction of greenhouse-gas emissions by reducing forest loss and deterioration, sustainable forest management, and green growth; 4) Protection and maintenance of natural beauty and landscapes, and preservation of the biodiversity of forest ecosystems for tourism services; and 5) Provision of breeding grounds, food sources, natural breeders, forest-based water sources and elements from forest environment and ecosystems for aquaculture cultivation.

Law on Environment Protection 2020[4] emphasizes the importance of implementing measures in response to climate change, particularly, ecosystem-based adaptation measures (Article 90, Chapter V). It also requires implementing mitigation measure for greenhouse-gas reduction and measurement and monitoring of emissions (Article 91, Chapter V).

National Strategy on Climate Change[5] provides the legal framework to respond to climate change. The relevant actions related to land uses are reforestation and sustainable forest management to help mitigate natural disasters and land degradation, to strengthen the protection and development of coastal mangrove forests and wetland ecosystems, to reduce forest-related carbon emission, and to enhance carbon sequestration. Specific targets related to LULUCF are 1) Increase forest cover to 45%; 2) Sustainable management of 16.24 million ha of forest land, of which 8.1 million ha is production forests; 5.8 million ha is protection forests and 2.1 million ha is special-use forest; and 3) Develop and implement programs and projects on emission reduction, carbon enhancement and sustainable forest management.

National Strategy on Green Growth[6] provides green-growth targets in three broad categories: 1) low-carbon economic development; 2) enrichment of natural resources; and 3) emission reduction and carbon enhancement. In the forestry and land-use sector, it encourages actions on forest restoration, avoided emissions associated with land-use change, low-carbon development, biodiversity conservation and enhancement of carbon sequestration. To assess green growth, a draft set of criteria was proposed, focusing on three key aspects: 1) reduction of national emission intensity at a rate of 1.5–2.0% per year but, in the energy sector, the emission reduction targets aim at 20–30% compared to business as usual; 2) greening production, which focuses on reviewing and updating existing planning; using resources economically and efficiently; encouraging the development of green industry and agriculture with appropriate structures of industries, technologies and equipment to ensure environmentally friendly principles are followed, and investment in development of natural capital and pollution prevention; and 3) Greening lifestyles and promoting sustainable consumption that emphasizes waste management, environmental improvement and urban tree areas.

The Ministry of Investment and Planning is now preparing national criteria for green-growth monitoring and evaluation. It focusses on three aspects: 1) greenhouse-gas emission reduction

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[4] Environment Protection Law No. 72/2020/QH14 dated 17 November 2020
[5] Prime Minister Decision No. 2139/QD-TTg dated on 5 December 2011
[6] Prime Minister Decision 1393/QD-TTg dated 25 September 2012

and promotion of clean and renewable energy; 2) Greening production; and 3) Greening lifestyles and promotion of sustainable consumption. The following are the key tasks for the agriculture sector to monitor green growth.

- Reducing greenhouse-gas emissions through the development of sustainable organic agriculture and enhancing the competitiveness of agricultural production. The indicators include 1) The amount of chemical fertilizers and pesticides used per hectare of arable agricultural land; 2) Existing forest area; 3) Forest cover; 4) The ratio of biomass fuel extracted from agriculture, forestry and fisheries to the total fuel used.

- Economical and efficient use of resources. The expected indicators include 1) Area and land-use structure; 2) Proportion of fisheries reserves at the limit of ecological sustainability; 3) Ratio of the area of degraded land to total land area; 4) Proportion of natural ecosystems of international importance, degraded country restored; biodiversity preserved and used sustainably.

- Sustainable infrastructure development: Traffic, energy, irrigation and urban infrastructure, including the following indicator 1) Ratio of crop land to be irrigated and drained with controlled irrigation.

- Technological innovation, popularization of cleaner production, including 1) Percentage of cultivated land applying good agricultural practices (GAP and equivalents: climate-smart agriculture, ecosystem-based adaptation etc; 2) Proportion of aquacultural area reaching GAP and equivalents; 3) The proportion of enterprises eligible to obtain ISO 14001 certification compared to total number of businesses operating; 4) Proportion of craft villages meeting environmental requirements.

Forestry Development Strategy 2021–2030 and Vision to 2050[7] prioritizes management of forest resources for improved ecosystem services, biodiversity, natural disaster reduction and responses to climate change. It also aims to set up a national forest estate and prepare forestry plans for 2021–2030.

In summary, the current legal documents recognize the significance of, and need for, integration of environmental-related issues in planning processes to maintain and improve forest resources and ecosystem services to achieve green-growth objectives and to respond effectively to climate change.

However, the monitoring of this integration lacks detailed legal guidance, especially, for the forestry and land-use sector and at local management level.

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[7] Prime Minister Decision 523/QD-TTg dated 1 April 2021

3. Institutional arrangements for land and forest management

The Land Law 2013 and Forestry Law 2017 are the key pieces of legislation governing forests and land management across levels (central, provincial, district and commune). A unified management of land and forests is operated from central to local level by responsible State agencies. The figure below provides overall requirements and responsibilities for preparation and approval of land use planning across levels.

Figure 1. Land-use planning and preparation of plans across levels
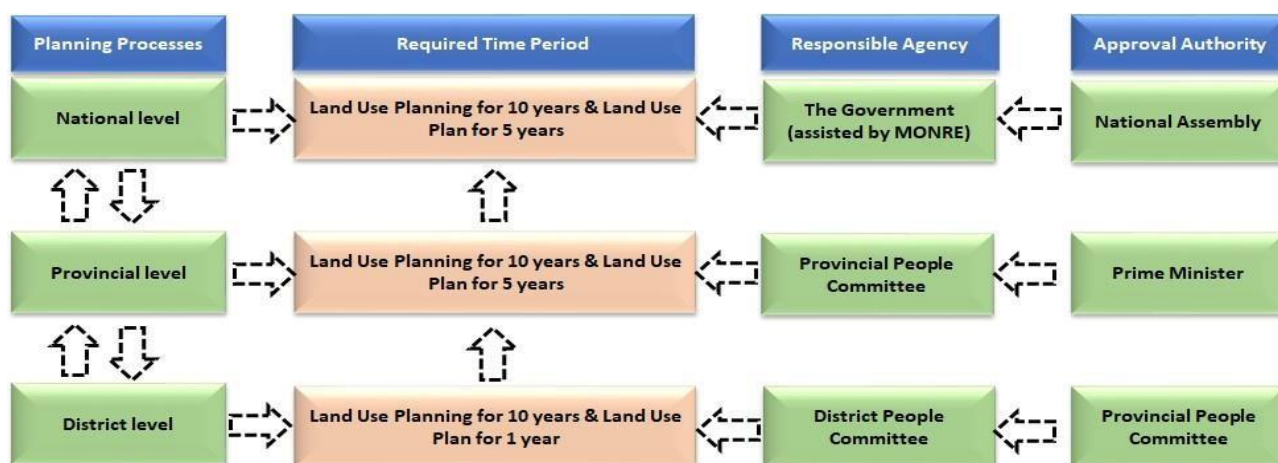
The roles and responsibilities of State management agencies engaged in land and forest resource management are summarized below.

- **National Assembly**: 1) Approval of laws, national land-use planning (10-year period), national land-use plan (5-year period) and other national planning; 2) Approval of plan on changing function of special-use forests, watershed protection forests and frontier protection forests with change of 50 ha or more; coastal protection forests with change of 500 ha or more; and production forests with change over 1000 ha.

- **Government of Viet Nam**: Approval of legal documents (decrees) on land and forest management, provincial land-use planning (10-year period) and land-use plans (5-year period) and other planning (national defence and security etc).

- **Prime Minister**: 1) Approval of sectoral planning and development strategies, national target programs etc; 2) Approval of plan on changing function of special-use forests, watershed protection forests and frontier protection forests with change of 20–50 ha; coastal protection forests with change of 20–500 ha; and production forest with change of 50–1000 ha.

- **Ministry of Natural Resources and Environment** (MONRE): 1) Prepare legal documents (for example, laws, decrees, sectoral plans, strategies) for managing land and biodiversity resources to submit for approval; 2) Prepare national land-use

planning and land-use plan to submit to National Assembly for approval; 3) Appraisal of provincial land-use planning and land-use plan; 4) Implement national land-use inventory every 5 years; 5) Prepare sectoral planning (biodiversity, environmental protection etc); 6) Report annually the implementation of approved land-use planning and land-use plans to Government of Viet Nam. Under MONRE, there is the Department of Natural Resources and Environment (DONRE) at provincial levels and the Division of Natural Resources and Environment (DiNRE) at district levels to support MONRE and provincial people's committees implement State management of land and environment.

- **Ministry of Agriculture and Rural Development** (MARD): 1) Prepare legal documents (for example, laws, decrees, sectoral plans, strategies) for managing forest resources to submit for approval; 2) Implement national forest inventory every 5 years; 3) Prepare national programs on forest management and development for approval. Management of forest resources at local level is supported by the Department of Forest Protection at provincial level and Forest Protection Stations at district level.

- **Provincial People's Committee**: 1) Prepare provincial land-use planning and land-use plan; 2) Approval of district land-use planning and land-use plan; 3) Report implementation of approved land-use planning and plan to MONRE; 4) Allocate and lease land and forests; decide changes in land and forest use; revoke allocated land and forests for land users and forest owners as organizations; 5) Submit to the Provincial People's Council for approval of plans on changing function of special-use forests, watershed protection forests, frontier protection forests and coastal protection forests with change of less than 20 ha; and production forest with change of less than 50 ha.

- **District People's Committee**: 1) Prepare and submit land-use planning and annual land use plan to PPC for approval; (2) Allocate and lease land and forests; make decision on conversion of land and forest use purposes; revocation of land and forests for land users and forest owners who are individuals, households and community;

- **Commune People Committee** (CPC): (1) Report implementation of approved land use planning and land use plan to DPC; (2) Make decision on land lease for land used for public purpose of the commune; (3) Manage forests that are yet allocated to forest owners.

- **Stakeholders engaged directly in land and forest management**: individuals and organizations allocated and rented land and forests for management and business. These actors include:

  > Forest management boards of special-use forests; forest management boards of protection forests; economic entities, including enterprises, forest companies, cooperatives and other types of legally established economic entities; military units; organizations operating in the fields of science and technology, education and training, and vocational training in forestry; local households and individuals; communities; and foreign-invested enterprises renting land to invest in production forests.

4. Limitations and challenges in planning for land use and green-growth development

The implementation of land-use planning and integration of green-growth development into planning processes reveals several limitations and challenges, as follow (Do et al 2019, Vu et al 2018).

Top–down planning and lack of local participation in decision-making processes. Policies and decisions relating to resource management in Viet Nam are often imposed from the top down and lower-level agencies must act within the scope limited by their direct superiors. Public consultations on land-use planning and land-use plans are required at district and provincial levels. At those levels, consultation meetings are often attended by representatives of line management departments and representatives of the concerned private sector. At the commune level, village heads are consulted during the process of land-use planning and the approved plan for the commune is made available at the commune office. Our findings also indicate that engagement of villagers in communes and villages is very limited. Interviews with local people in Na Nhan Commune, for example, revealed that 57% of the interviewees claimed that they were not provided with any information on land-use planning and 18% of these mentioned that there was no impact of the land-use planning on their land use. About 35% of the interviewees noted that they were not engaged in the process of land-use planning.

Insufficient information supporting land-use planning and preparation of land-use plans. Legal documents require baseline information to support preparation of land-use planning. However, our findings show that there is no spatial analysis of current land cover, assessment of land potential and suitability and market potential analyses nor a needs assessment for environmental services. Most information used for land-use planning is based on statistics and this follows a bottom–up reporting approach. Other information related to climate change, land potential assessment, markets etc is taken from literature reviews, if available. However, the studies on those matters are not available because they are not planned as part of the land-use planning process. Modelling and other planning tools are not used in the planning process at local levels. Inappropriate information used in land-use planning could lead to low quality and feasibility of the land-use planning and land-use plans.

Integration of sectoral planning into land-use planning is not effective. To date, there is no separate spatial sectoral planning for agriculture and forestry. These are developed in the form of national strategies (for example, the Viet Nam Forest Protection and Development Strategy 2006–2020, national strategy on agriculture and rural development 2011–2020 etc). These strategies provide national direction for sectoral development that are not suitable to integrate into provincial and district land-use planning. The newly approved Planning Law (VNA 2017) regulates the implementation of sectoral planning that includes national planning for forestry, environmental protection and biodiversity conservation. This planning will help better provide information for land-use planning across levels.

Unclear concept of integrated land-use planning and integration of green-growth development into planning processes: Existing legal documents do not clearly provide the concept of integrated land-use planning across levels. Consideration of environmental-related issues — such as environmental services, conservation areas — is not adequately addressed in

the planning process. Though national green-growth development policies are available, detailed guidelines on implementation, particularly, lower-level planning (commune level) are lacking.

Lack of capacity for implementing land-use planning and land-use plans. The Department of Natural Resources and Environment at provincial and district levels (DONRE) is responsible for preparation of land-use planning and land-use plans. Their responsibility is for administration and management procedures and they are not directly involved in development of land-use planning and land-use plans. Consultancy firms are contracted to implement land-use planning and preparation of land-use plans. DONRE at provincial and district levels has responsibility for organization of reviews and approvals. District and provincial DONRE offices reported that implementation of land-use planning requires different expertise than that required to conducting the baseline survey. They agreed that the capacity of staff is limited, particularly, in the application of tools and software for spatial analysis and data management and analysis (for example, GIS and interpretation of remote-sensing imagery). In addition, staff capacity to assess ecosystem services for integration into planning is limited.

Limited investment for preparation of land-use planning. It was reported that the costs allocated to implement land-use planning and formulation of land-use plans are limited. In Dien Bien, the allocated fund for implementation of land-use planning is about VND 1 billion at district level and VND 2 billion at provincial level. This budget is intended to cover all costs of mapping, data analysis, reporting, consultation, appraisal and approval processes. Findings from discussions with district and provincial DONRE staff show that this fund is insufficient to conduct the key baseline assessment, such as land-suitability assessment, market survey, climate-change impacts, ecosystem services, to provide adequate information for planning, especially, for aspects of green-growth development.

5. Proposed institutional arrangements and monitoring framework for integrated tree-based landscape management

5.1 Approach and objectives

The purpose of monitoring integrated tree-based landscape management is to understand how management of tree-based land uses can contribute to the green-growth strategy. The specific objectives of the monitoring follow.

- Provide evidence that each tree-based activity at landscape level has achieved its stated targets and impact over the planned time period and long-term perspective.

- Monitor the progress of implementing tree-based actions to ensure that they are on track with delivery of planned outputs and outcomes.

- Provide recommendations on efficient allocation of resources and improvement of institutional arrangements for managing natural resources to meet green-growth objectives.

The monitoring framework for integrated tree-based landscape management could be simple or sophisticated, depending on the financial and technical capacity of responsible actors. The simple approach for monitoring includes the following key steps.

- Formulating questions to ensure accurate assessment of the planned performance results and impacts.

- Developing indicators for monitoring that help reflect the questions asked.

- Developing a baseline that will be used as the benchmark to assess whether or not the planned outputs have been met.

- Gathering data and information thorough monitoring implementation.

- Overall assessment of outputs and impacts against the baseline for improvement and policy recommendations.

The monitoring framework should engage local participation across levels and external evaluation considering the capacity of stakeholders. It should also apply both qualitative and quantitative methods during data collection and assessment. The monitoring framework should be open for effective dialogue and feedback to continually refine the framework and improve landscape management to achieve the desired outcomes. The monitoring framework will help documentation of good practices and lessons learned for policy recommendations and long-term sustainable landscape management (see Annex 1 for additional information on designing a monitoring framework).

5.2 Monitoring criteria and indicators

The proposed criteria and indicators for monitoring focus on assessing 1) institutional arrangements for implementation of integrated tree-based planning; and 2) outcomes and impacts of integrated tree-based landscape management at commune level.

5.2.1 Monitoring institutional arrangements for implementation of integrated tree-based landscape planning

This focusses on several key aspects of institutional arrangements for implementation of planning with regards to green-growth development, including 1) Availability of guiding documents for implementation of tree-based landscape planning; 2) Capacity building for stakeholders; 3) Implementation and decision-making process. (For details see Annex 2.)

o *Availability of guiding documents*

This focuses on assessing the readiness of the legal framework for implementation of integrated tree-based landscape planning and includes the following.

1) Number of guiding documents provided

2) Relevance of the guiding documents

3) Level of detail of the guiding documents

4) Application of the guiding documents

o *Capacity building for stakeholders*

This assesses how capacity building is provided to the responsible management agencies and other stakeholders to support integrated tree-based landscape planning and management at commune level. The indicators include the following.

1) Number of training sessions organized (topic, participants etc)

2) Training material provided

3) Funding sources for training

4) Other meetings

o *Implementation and decision-making process*

This provides understanding of actual implementation and the decision-making process regarding the preparation and approval of integrated tree-based landscape plans and management. The proposed indicators include the following.

1) Required implementation of baseline assessment

2) Quality of tree-based landscape planning documents

3) Percentage of local people engaged in planning process

4) Number of consultation meetings

5) Satisfaction of local people with tree-based landscape plans

5.2.2 Monitoring outcomes and impact of integrated tree-based landscape management

The indicators for monitoring and assessing outcomes and impact include 1) State of physical natural capital; 2) Changes in ecosystem services; and 3) Impact on land-based socio-economics. The indicators should 1) reflect outcomes and impact; 2) measurable through quantitative and qualitative assessments; 3) Cost-effective. (For details see annexes 3 and 4.)

o *State of physical natural capital*

These indicators aim to quantify how the physical capital (forests and land uses) change over time associated with landscape management plans compared to the baseline. The indicators are listed below.

1) Total forest area (ha)

2) Total natural forest area (ha)

3) Total plantation area (ha)

4) Protected forest area for headwater protection (ha)

5) Protected area for biodiversity conservation (ha)

6) Forest area for recreation and local culture (ha)

7) Restored forest area (ha)

8) Loss of forest area (ha)

9) Upland crop area without agroforestry practices (ha)

10) Upland crop area with agroforestry practices (ha)

11) Lowland annual crops (ha)

12) Improved home-garden area (ha)

o *Changes in ecosystem services*

The indicators are used to quantitatively and qualitatively assess the quality of ecosystems influenced by the change in forest and land-management practices. The indicators include the following.

1) Emission reductions from avoided deforestation and forest degradation (tCO_2e)

2) Carbon enhancement resultant from forest restoration and reforestation (tCO_2e)

3) Carbon enhancement from application of tree-based practices (agroforestry)

4) Soil erosion exposure

5) Water flow in dry season

6) Flood control

7) Biodiversity losses and conservation

8) Cultural and spiritual values

o *Impact on land-based socio-economics*

The indicators are used to assess socio-economic impact associated with forest and land-based management practices. They include the following.

1) Income from forests products (timber, non-timber forest products (VND/ha)

2) Income from payment for environmental services (VND/ha)

3) Income from tree-based crops (agroforestry) (VND/ha)

4) Income from home-gardens (VND/ha)

5) Job creation in forestry-based activities (numbers, percentage of women)

6) Job creation and tree-based land management (numbers, percentage of women)

5.3 Institutional arrangements for monitoring implementation

The overall institutional arrangements for implementing tree-based landscape management are suggested in Figure 2. At provincial level, DONRE is the lead organization for monitoring implementation. DARD is a key partner. The direct agencies of DARD at provincial level are the Forest Protection Department and Agriculture Extension Centre. At district level, key actors that should be engaged in monitoring are DiNRE, DARD, Forest Protection Stations.

Figure 2. Institutional arrangements for monitoring of tree-based landscape management
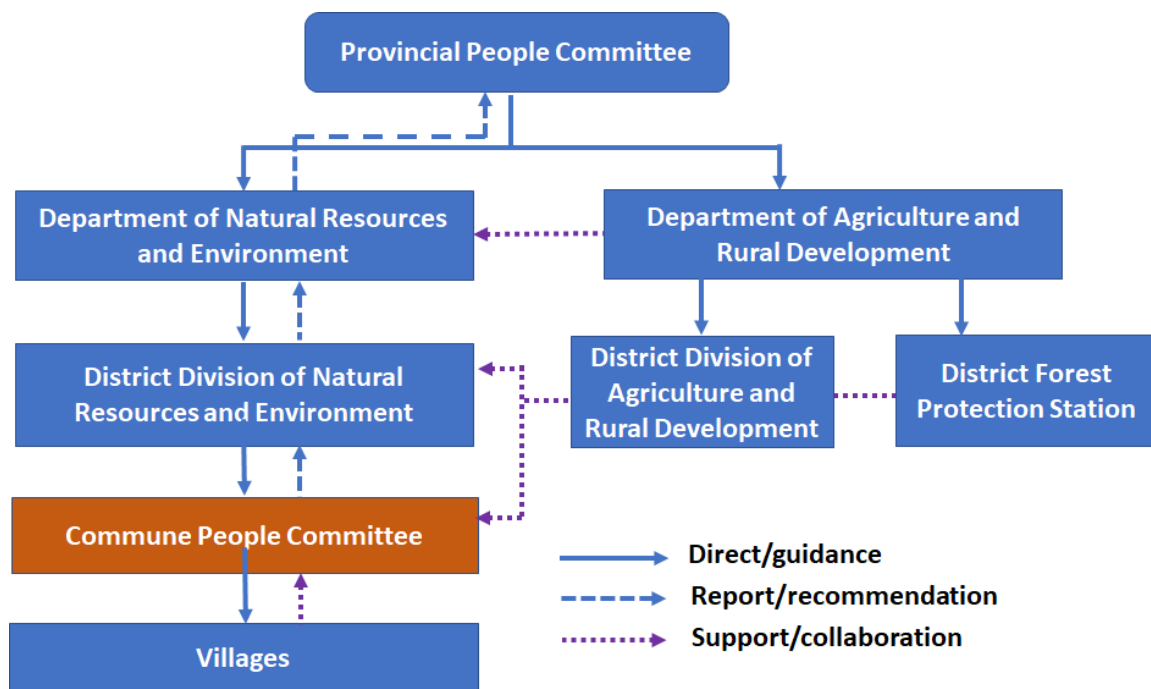
5.3.1 Department of Natural Resources and Environment (DONRE)

DONRE acts as the lead organization to coordinate implementation of monitoring commune-level tree-based landscape management. The key partner for supporting monitoring is DARD and its agencies at district level. A plan for a monitoring and collaboration mechanism should be agreed by both DONRE and DARD and then be approved by the Provincial People's Committee before monitoring is implemented. The responsibilities of DONRE are listed below.

1) Prepare the monitoring plan

2) Prepare and mobilize resources for monitoring

3) Organize training on implementing monitoring

4) Coordinate and provide guidance for the implementation of monitoring

5) Make recommendations to provincial people's committees for improvement of tree-based landscape management

5.3.2 Department of Agriculture and Rural Development (DARD)

DARD should work closely with DONRE under the approved collaboration mechanism to provide support to the implementation of monitoring, including the following.

1) Coordinate its line departments (such as Forest Protection, Forest Protection Station, district Division of Agricultural and Rural Development)

2) Provide support to data collection

3) Support capacity building

5.3.3 District Division of Natural Resources and Environment (DiNRE)

DiNRE should work under the guidance of DONRE and collaborate with line departments at district level to support implementation of the monitoring at commune level. The main responsibilities of DiNRE are listed below.

1) Support preparation of the monitoring plan

2) Support organization of training on implementation of monitoring

3) Coordinate and provide guidance for the implementation of monitoring at commune level

4) Support data collection and report preparation

5) Provide recommendations to DONRE for improvement

5.3.4 Commune authorities

Commune authorities are key actors in implementing monitoring. A commune should assign staff to be responsible for monitoring and reporting results. The tasks include the following.

1) Baseline information development: following criteria and indicators selected for monitoring integrated tree-based landscape management, baseline data need to be collected and compiled before monitoring starts. The baseline data for collection in specific areas of integrated tree-based landscape management are outlined in Annex 2.

2) Lead in data collection and compilation

3) Reporting monitoring results (see Annex 3)

5.3.5 Village heads

Village heads in a commune will be required to work closely with responsible staff assigned by the commune authority to implement monitoring activities. The main tasks of the village heads follow.

1) Assisting in collecting baseline data

2) Assisting in collecting data used for monitoring (see annexes 2 and 4)

5.3.6 Other line agencies

This includes line agencies — such as Forest Protection, Agriculture Extension Centre — and projects and programs. These bodies should work closely with DONRE and DiNRE to provide support to the commune authority to implement monitoring, as listed below.

1) Capacity building for responsible staff of the commune and village heads regarding the implementation of monitoring, data analysis and reporting

2) Implement baseline assessment

3) Data collection for baseline information and monitoring

4) Provide expert support for estimation of emissions and carbon enhancement associated with tree-based land use management

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Annex 1. Additional guidelines on development of indicators for monitoring integrated tree-based landscape management

Key issues for consideration	Description
1. Establish clear objectives for the monitoring	It is important to set goals under each aspect (natural capital, ecosystem service or societal) to measure success against, even if the ultimate land restoration goals are broad and to a degree, 'open-ended'. Indicators should measure progress but do not need to be explicitly linked to targets.
2. Adopt metrics that monitor outcomes not activities	Metrics should, wherever possible, include responses (physical capital, such as area of forests, tree-based land uses etc, selected ecosystem services, land-based socio-economic impacts) and not just implementation itself. These principles underpin monitoring requirements of integrated tree-based landscape management.
3. Identify interim objectives (milestones)	Given the complexities of working at large spatial scales and over lengthy time-scales, consideration should be given to identifying realistic interim outcomes. These should reflect tangible and intended outputs (goods, services) or responses to forest and land management activities that contribute, possibly indirectly, to long-term, fundamental and durable change.
4. Indicators should be diagnostic, including contrasts, controls or benchmarks, where possible	Indicators should show a strong relationship with the desired outcome and, where relevant, incorporate controls, contrasts or benchmarks to compare against changes in attributes of the tree-based areas in a way that illustrates the effect of the interventions. Some anticipated responses may not occur for reasons that are outside of the implementer's control, even if the program is successful. Some changes may occur owing to factors unconnected to the program. To identify such instances, methods for selected indicators (most likely those associated with the program's outcomes; this won't be possible or affordable for all indicators) should, ideally, include replication, 'before and after comparisons', 'with and without intervention' or other contrasts that help demonstrate a reliable, constant and general response. This may require the collection of data outside the area, where integrated tree-based landscape management is not applied.
5. Indicators should be cost effective and easy to understand	Indicators based on summarized metrics from more complex data (collected in the field, from remotely-sensed datasets or obtained through interviews) provide a cost-effective means of describing complex processes in simple terms. This helps provide feedback and wider communication and facilitates pragmatic data collection.

Key issues for consideration	Description/explanation
6. Indicators should be robust, representative and replicable	To ensure interpretability and long-term comparability, wherever possible, measures used as indicators should quantify information in a way that is objective, representative (with an appropriate sampling strategy), structured (to account for temporal and spatial scales of information required), and systematic (through careful design and a methodical approach) to provide replicated information to monitor change through time. Methods should ideally be well documented and well established but the use of innovative methods is encouraged where appropriate.
7. A combination of quantitative data together with expert assessments are likely to be required	Where appropriate, data collected and indicators used should be based on robust, quantitative assessments as described above so they are transparent and repeatable. However, some measures (for example, changes in institutional arrangements, legislation or cultural practices) may be best captured using well-established qualitative methods, narratives or expert assessments in attributing changes.
8. Use common frameworks and existing data gathering, where available	The integrated tree-based landscape management guidance is designed to ensure that monitoring is underpinned by a common framework so that best use can be made of the information. Where appropriate, this may include the use of common and integrated protocols for data capture (for example, web-based tools). Existing monitoring and data gathering — for example, from national monitoring schemes, land-cover-change measures or from population censuses — may provide important information for impacts within and outside implementation areas.
9. Use methods that are sustainable	Monitoring methods need to be sustainable in terms of available resources and commitment to collect information in a consistent and repeatable manner. Measures should cover expected short-term responses as well as proxies or longer-term indicators likely to be sustainable through capacity building. Programs should demonstrate how they will sustain long-term monitoring.

Annex 2. Baseline information collection

A. Institutional arrangement baseline (for year …..)

ID	Criteria Indicator	Data/rating
I	**Availability of guiding documents**	
1	Numbers of guiding documents (policies, guidelines etc)	
2	Relevance of guiding documents (high, medium, low)	
3	Level of detail of the guiding documents (comprehensive, sufficient, not sufficient)	
4	Application of the guiding documents	
II	**Staff capacity**	
1	Number of responsible staff in responsible agencies across levels (commune, district and province)	
2	Number of staff by expertise in responsible agencies across levels (commune, district and province)	
3	Number of training sessions organized annually across levels (commune, district and province)	
4	Annual funding provided for building staff capacity across levels (commune, district and province)	
III	**Implementation and decision-making process**	
1	Baseline assessment for land-use planning	
2	Quality of tree-based landscape planning document (good, medium, poor)	
3	Engagement of local people in planning (yes/no)	
4	Number of consultation meetings	
5	Satisfaction of local people with tree-based landscape plans	

B. Tree-based landscape baseline (for year ………)

ID	Criteria Indicators	Data/rating
I	**Physical capital**	
1	Total forest area (ha)	
2	Total natural forest area (ha)	
3	Total plantation area (ha)	
4	Protected forest area for headwater protection (ha)	

5	Protected area for biodiversity conservation (ha)	
6	Forest area for recreation and local culture (ha)	
7	Forest area managed by community (ha)	
8	Forest area managed by State organizations (ha)	
9	Forest area managed by smallholders (ha)	
10	Upland crop area without agroforestry practices (ha)	
11	Upland crop area with agroforestry practices (ha)	
12	Lowland annual crops (ha)	
13	Home-garden area (ha)	
II	**Ecosystem services**	
1	Carbon stocks of forests and land uses	
2	Soil erosion in upland area (high/moderate/low)	
3	Water flows in dry season (high/moderate/low)	
4	Flood frequency (frequent/moderate/few)	
5	Biodiversity values (high/medium/low)	
6	Cultural and spiritual values (high/medium/low)	
III	**Land-based socio-economics**	
1	Income from forest products (timber, NTFPs) (VND/ha)	
2	Income from payment for environmental services (VND/ha)	
3	Income from tree-based crops (agroforestry) (VND/ha)	
4	Income from upland crops (without trees) (VND/ha)	
5	Income from home-gardens (VND/ha)	
6	Number of persons engaged in forestry-based activities and percentage of women (%)	
7	Number of persons engaged in tree-based land management and percentage of women (%)	

Annex 3. Monitoring framework for integrated tree-based landscape management

A. Institutional arrangements

ID	Indicator	Method	Frequency	Responsible actor	Expected output
I	**Availability of guiding documents**				
1	Number of guiding documents (policies, guidelines etc)	Review and interview	Annually	DONRE	List of guiding documents
2	Relevance of guiding documents (high, medium, low)	Review and interview	Annually	DONRE	Assessment
3	Level of detail of the guiding documents (comprehensive, sufficient, not sufficient)	Review and interview	Annually	DONRE	Assessment
4	Application of the guiding documents (not at all, partially and widely)	Review and interview	Annually	DONRE	Assessment
II	**Staff capacity**				
1	Number of responsible staff in management agencies across levels (commune, district and province)	Review and interview	Annually	DONRE	Data
2	Number of staff by expertise in management agencies across levels (commune, district and province)	Review and interview	Annually	DONRE	Data
3	Number of training sessions organized annually across levels (commune, district, province)	Review and interview	Annually	DONRE	Data
4	Annual funding provided for building staff capacity across levels (commune, district, province)	Review and interview	Annually	DONRE	Data
III	**Implementation and decision-making process**				
1	Baseline assessment for land-use planning	Review and interview	Annually	DONRE	Assessment
2	Quality of tree-based landscape planning document (good, medium, poor)	Review and	Annually	DONRE	Assessment

		interview			
3	Percentage of local people involved in planning	Review and interview	Annually	DONRE	Data
4	Number of consultation meetings	Review and interview	Annually	DONRE	Data
5	Satisfaction of local people with tree-based landscape plans	Review and interview	Annually	DONRE	Assessment

B. Change in physical natural capital (compared to baseline data)

Indicator	Method	Frequency	Responsible actor	Expected output
1. Total forest area (ha)	Statistical data collection; spatial assessment	Annually	Commune authority	Area change data
2. Total natural forest area (ha)	Statistical data collection; spatial assessment	Annually	Commune authority	Area change data
3. Total plantation area (ha)	Statistical data collection; spatial assessment	Annually	Commune authority	Area change data
4. Protected forest area for headwater protection (ha)	Statistical data collection; spatial assessment	Annually	Commune authority	Area change data
5. Protected area for biodiversity conservation (ha)	Statistical data collection; spatial assessment	Annually	Commune authority	Area change data
6. Forest area for recreation and local culture (ha)	Statistical data collection; spatial assessment	Annually	Commune authority	Area change data
7. Restored forest area (ha)	Statistical data collection; spatial assessment	Annually	Commune authority	Area change data
8. Loss of forest area (ha)	Statistical data collection; spatial assessment	Annually	Commune authority	Area change data
9. Upland crop area without agroforestry practices (ha)	Statistical data collection; spatial assessment	Annually	Commune authority	Area change data
10. Upland crop area with agroforestry practices (ha)	Statistical data collection; spatial assessment	Annually	Commune authority	Area change data
11. Lowland annual crops (ha)	Statistical data collection; spatial assessment	Annually	Commune authority	Area change data
12. Improved home-garden area (ha)	Statistical data collection; spatial assessment	Annually	Commune authority	Area change data

C. Change in ecosystem services

Indicators	Monitoring methods	Frequency	Responsible actors	Expected outputs
1. Emission reductions from avoided deforestation and forest degradation (tCO$_2$e)	Stock-change method	Annually	Expert assessment	Emission estimates for deforestation and degradation
2. Carbon enhancement resultant from forest restoration and reforestation (tCO$_2$e)	Stock-change method; expert assessment	Annually	Expert assessment	Carbon-change estimates for restoration and reforestation
3. Carbon enhancement from application of tree-based practices (agroforestry) (tCO$_2$e)	Stock-change method; expert assessment	Annually	Expert assessment	Carbon-change estimates for tree-based land uses
4. Soil erosion	Participatory assessment; score-card method	Annually	Village heads	Qualitative assessment
5. Water flow in dry season	Participatory assessment; score-card method	Annually	Village heads	Qualitative assessment
6. Flood control	Participatory assessment; score-card method	Annually	Village heads	Qualitative assessment
7. Biodiversity loss	Participatory assessment; score-card method; statistical data	Annually	Village heads	Qualitative assessment; statistical data on endangered species
8. Cultural and spiritual values	Participatory assessment; score-card method	Annually	Village heads	Qualitative assessment

D. Change in ecosystem services

Indicators	Monitoring methods	Frequency	Responsible actors	Expected outputs
1. Income from forest products (timber, non-timber forest products) (VND/ha)	Statistical and sample survey	Annually	Commune authority	Income data
2. Income from payment for environmental services (VND/ha)	Statistical and sample survey	Annually	Commune authority	Income data
3. Income from tree-based crops (agroforestry) (VND/ha)	Statistical and sample survey	Annually	Commune authority	Income data
4. Income from home-gardens (VND/ha)	Statistical and sample survey	Annually	Commune authority	Income data
5. Job creation in forestry-based activities and percentage	Statistical and sample survey	Annually	Commune authority	Number of jobs created and percentage of women involved (%)
6. Job creation in tree-based land management	Statistical and sample survey	Annually	Commune authority	Number of jobs created and percentage of women involved (%)

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