



COMMUNE LEVEL INSTITUTIONAL ARRANGEMENT AND MONITORING FRAMEWORK FOR INTEGRATED TREES-BASED LANDSCAPE MANAGEMENT

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1. Introduction

Landscape governance is a difficult task in the context of achieving landscape multifunctionality due to multiplicity of stakeholders, institutions, scale, and ecosystem services (ES)—the many-multiple (Cockburn et al. 2018). Governing and managing the physical landscape and social actors in the landscape requires intensive knowledge and good planning systems. Land use planning (LUP) 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 efforts such as the Nationally Determined Contributions (NDCs), as Land use, land use change and forestry (LULUCF) sector is included in the mitigation contributions of nearly 90 percent of countries in Sub-Saharan, Southern Asia countries, Latin America and the Caribbean region (Strohmaier et al. 2016).

Vietnam has been implementing its nationally determined contribution (NDC) which includes forestry and land-based mitigation options under land use, land use change and forestry (LULUCF) sector. The contribution of LULUCF sector to national committed emission reduction is quite significant and cost-effective comparing with other sectors. In addition to achieving emission reduction targets, implementation of forestry and land base mitigation options has highest benefits for social-economic development and sustainable development goals of the country (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 an orchestration (Hsu et al. 2019) in the context where legal framework for climate change mitigation is elaborated at national rather than subnational level while coordination between government bodies and among stakeholders are generally ineffective (UNDP 2018).

In many developing countries, conventional top-down, centralized LUP approaches have been widely practiced with very little success, as 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 that how LUP can best conserve forest and agricultural lands, 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 which is based on current legal framework related to natural resource management (land and forests) and requirements of national green growth development and assessment of land uses in two project communes in Dien Bien and Son La. Since the concept of integrated tree-based landscape management in Vietnam is still new, therefore this should be further developed for wider application cross levels.

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

Vietnam has issued numerous polices governing land use planning (LUP), natural resource management, climate change mitigation and adaptation, ecosystem services and green growth to achieve socio-economic development through promoting sustainable management of its natural resources. The key policies are summarized as follows:

Land Law 2013¹ requires preparation of LUP and land use plans from central to local level (Article 35). LUP is conducted for 10 years period and land use plan is prepared for 5 years period. It also regulates that LUP and land use plan have to be implemented for 3 levels: national, provincial and district (Article 37 and Article 38). The bases for development of land use planning across levels are mainly based on information on socio-economic development and sector plan, land use status and land potential. LUP for lower levels must ensure compliance with higher-level LUP.

Planning Law 2017² provides general requirements for overall planning at different levels (national, regional and provincial) and sectors including socio-economic activities, national defense and security associated with the development of infrastructure, resource use and environmental protection in the determined territory to effectively use the country's resources for the purpose of sustainable development for planned time period. This law requires to take considerations during the process of planning that include:

- National infrastructure planning (section 3, Article 25): Orientation of land use arrangement for development of national infrastructure sector and environmental protection and climate change response activities and conserve national-ranked ecology, landscapes and monuments (section 3, Article 25);
- National resource planning (section 4, Article 25): Orientations 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): Assessing the status and changes in environmental quality, natural landscapes and biodiversity; situation and forecast of waste generation; impacts of climate change; 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 biodiversity value areas, important ecological and landscapes areas, nature reserve, biodiversity corridor and biodiversity conservation facilities.

¹ Land Law No. 45/2013/QH13 dated 29 November 2013

² Planning Law No. 21/2017/QH14 dated 24 November 2017

Forestry Law 2017³ regulates the use and management of forests according to its designated functions, including production forests (mainly for timber production), protection forests (watershed and coastal protection) and special use forests (gene and biodiversity conservation). The Law, importantly recognizes the significance of environmental services provided by the forests. These services are regulated in Article 61 that are: (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 retaining 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 landscape, and preservation of the biodiversity of forest ecosystems for provision of 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 2020⁴ emphasize the importance of implementing measures to responses to climate change, particularly ecosystem-based adaptation measures (Article 90, Chapter V). It also requires implementing mitigation measure for green houses reduction and measurement and monitoring emissions (Article 91, Chapter V).

National Strategy on Climate Change⁵ provides legal framework to response 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 ecosystem, to reduce forest related carbon emission, and to enhance carbon sequestration. Specific targets relate to LULUCF are: (1) Increase forest cover to 45%; (2) Sustainable management of 16.24 Mha forest land, of which 8.1 Mha of production forests; 5.8 Mha of protection forests and 2.1 Mha of special use forest; and (3) Develop and implement programs and projects on emission reduction, carbon enhancement and sustainable forest management.

National Strategy on Green Growth⁶ provides green growth targets for Vietnam which have three broad categories: (1) low carbon economic development; (2) enrich 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 the green growth, a draft set of criteria was proposed, focusing on three key aspects: (1) reduction of national emission intensity with a rate of 1.5-2.0% per year, but in energy sector, the emission reduction targets aim at 20-30% compared to business as usual; (2) greening production which focuses on review and update existing planning; using economically and efficiently resources; encouraging the development of green industry and green agriculture with appropriate structure of industries, technologies and equipment to ensure environmentally friendly principles, and investment in development of natural capital and pollution prevention; and (3) Greening lifestyles and promoting sustainable consumption that emphasizes on waste management, environmental improvement and urban tree areas.

³ Forestry Law No. 16/2017/QH14 dated 15 November 2017

⁴ Environment Protection Law No. 72/2020/QH14 dated 17 November 2020

⁵ Prime Minister Decision No. 2139/QĐ-TTg dated on 5 December 2011

⁶ Prime Minister Decision 1393/QĐ-TTg dated 25 September 2012

The Ministry of Investment and Planning is now preparing national criteria for green growth monitoring and evaluation. It focusses on three aspects: (1) green house gases emission reduction and promotion of clean and renewable energy; (2) Greening production; and (3) Greening lifestyle and promotion of sustainable consumption. The followings are the key tasks for agriculture sector to monitor green growth:

- Reducing greenhouse gas emissions through the development of sustainable organic agriculture, enhancing the competitiveness of agricultural production. The indicators include: (i) The amount of chemical fertilizers and pesticides used per hectare of arable agricultural land; (ii) Existing forest area; (iii) Forest cover; (iv) 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: (i) Area and land use structure; (ii) Proportion of fisheries reserves in the limit of ecological sustainability; (iii) Ratio of the area of degraded land to the total land area; (iv) Proportion of natural ecosystems of international importance, degraded country restored; biodiversity is preserved and used sustainably;
- Sustainable infrastructure development: Traffic, energy, irrigation and urban constructions infrastructure: includes the following indicators: (i) Ratio of crop land to be irrigated and drained with water irrigation controls.
- Technological innovation, popularization of cleaner production: including (i) Percentage of cultivated land applying good agricultural land production processes (GAP and equivalent- CSA, EBA,...); (ii) Proportion of aquaculture area reaching GAP and equivalent; (iii) The proportion of enterprises that were eligible to obtain ISO 14001 certification compared to the total number of businesses operating; (iv) Proportion of craft villages meeting environmental requirements.

Forestry development strategy 2021-2030 and vision to 2050⁷: The strategy prioritizes management of forest resources for improved ecosystem services, biodiversity, natural disaster reduction and responses to climate change. It also aims to set up national forest estate and prepare forestry planning for 2021-2030.

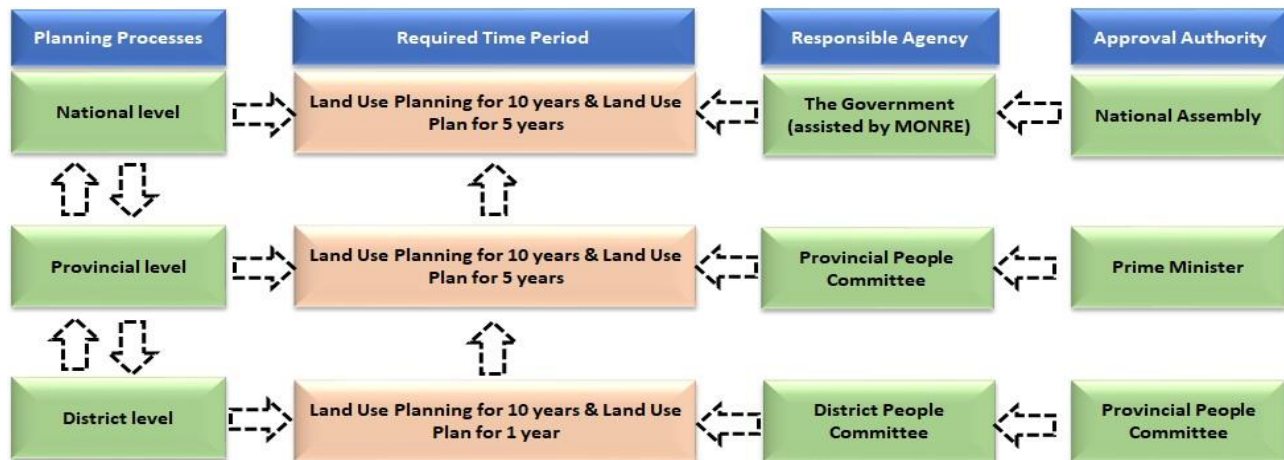
In summary, the current legal documents recognize the significance and need for integration of environmental related issues in planning processes to maintain and improve forest resources and ecosystem services to achieve its green growth objectives and to response effectively to climate change. However, the monitoring of this integration in the planning lacks the detailed legal guidance, especially forestry and land use sector and local management level.

3. Current Institutional arrangement for land and forests management across levels

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

Land Law 2013 and Forestry Law 2017 are the key legal legislation governing forests and land management across levels (central, provincial, district and commune level). 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 approvals of land use planning across levels.

Figure 1. Land use planning and plans preparation across levels



The role and responsibilities of state management agencies engaged in land and forest resources management are summarized as follows:

- **Vietnam National Assembly (VNA):** (1) Approvals of Laws, national land use planning (10 years period), national land use plan (5 years period) and other national planning; (2) Approval of plan on changing forest 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 forest with over 1,000 ha.
- **Government of Vietnam (GoV):** Approvals of legal documents (decree) on land and forest management, provincial land use planning (10 years period) and land use plan (5 years period) and other planning (national defense and security etc.);
- **Prime Minister (PM):** (1) Approvals of sector planning and development strategy, national target programs etc; (2) Approval of plan on changing forest function of special use forests, watershed protection forests and frontier protection forests with change from 20-50 ha; coastal protection forests with change of 20-500 ha; and production forest with change of 50-1,000 ha.
- **Ministry of Natural Resources and Environment (MONRE):** (1) Prepare legal documents (i.e. Law, Decree, sector planning, strategy) for managing land and biodiversity resources to submit for approvals; (2) Prepare a 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 in every 5 years; (5) Prepare sector planning (biodiversity, environmental protection etc.); (6) Report annually the implementation of approved land use planning and land use plan to GoV. Under the

MONRE, there is Department of Natural Resources and Environment (DONRE) at provincial level and Division of Natural Resources and Environment (DiNRE) at district level to support MONRE and PPC to implement state management over the land and environmental issues.

- **Ministry of Agriculture and Rural Development (MARD):** (1) Prepare legal documents (i.e. Law, Decree, sector planning, strategy) for managing forest resources to submit for approvals; (2) Implement national forest inventory in every 5 years; (3) Prepare national programs on forest management and development for approvals. Management of forest resources at local levels is supported by Department of Forest Protection at provincial level and Forest Protection Station at district level.
- **Provincial People Committee (PPC):** (1) Prepare provincial land use planning and land use plan; (2) Approvals 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 change in land and forests use purposes; revocation of allocated land and forests for land users and forest owners as organizations; (5) Submit Provincial People Council for approval of plan on changing forest 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 Committee (DPC):** (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.

Key stakeholders engaged directly in land and forest management are people and organizations who are allocated and rented land and forests for management and business. These actors include: (1) Forest management boards of special use forest; (2) Forest management boards of protection forest; (3) Economic entities including enterprises, forest companies, cooperatives and other types of economic entities legally established; (4) Armed-force units; (5) Organizations operating in the fields of science and technology, education and training, and vocational training in forestry; (6) Local households and individuals; (7) Communities; and (8) Foreign-invested enterprises renting land to invest in production forests.

4. Limitation and challenge in planning for land use and green growth development

The implementation of land use planning and integration of green growth development into planning processes reveal several limitations and face certain challenges. These are as follows (Do et al. 2019; Vu et al. 2018):

Top-down planning and lack of local participation in decision making process: It is well-known that the policies and decisions relating to resource management in Vietnam are often imposed from the top down, and lower-level agencies must act within the scope limited by their direct superiors. Public consultations on LUP and land use plans are required for district and provincial levels. At those levels, consultation meetings are often attended by representatives of line management departments and concerned private sectors. At the commune level, it reports that village heads are consulted during the process of the LUP and the approved LUP for the commune is made available at the commune office. Findings also indicate that engagement of villagers in the commune and villages is very limited. Interviews with local people in Na Nhan commune reveal that 57% of the interviewees supposed they were not provided any information on LUP and 18% of them mentioned that no impacts from LUP on their land use. About 35% of the interviewees noted that they were not engaged in the process of LUP.

Insufficient information supporting LUP and preparation of land use plan. Legal documents require a number of baseline information to support LUP preparation. However, the findings show that there is no spatial analysis of current land cover, assessment of land potential and suitability and market potential analysis as well as the need assessment for environmental services. Most information used for LUP is based on statistics and this follows bottom-up reporting approach and other information related to climate change, land potential assessment, market etc. is taken from literature review if available. However, the studies on those matters are not available since they are not planned as part of LUP process. The application of modelling and other planning tools is not used in the planning process in the local levels. The inappropriate information used in LUP could lead to the low quality and feasibility of the LUP and land use plans.

Integration of sector planning into LUP is not effective: Up to date there is no separate spatial sector planning for agriculture and forestry. Those are developed in the form of national strategies, for example Vietnam Forest Protection and Development Strategy 2006-2020; national strategy on agriculture and rural development 2011-2020 etc.). Those strategies provide national directions on the sector development that are not suitable to integrate into the provincial and district LUP. The newly approved Planning Law (VNA 2017) regulates the implementation of sectors planning that include national planning for forestry, environmental protection and biodiversity conservation. Those planning will help better provide information for LUP across levels.

Unclear concept of integrated land use planning and integration of green growth development into planning process: The existing legal documents do not provide clearly the concept of the integrated LUP across the levels. Consideration of environmental related issues such as environmental services, conservation areas etc. is not adequately addressed in the planning process. Though the national green growth development policies are available, but the detailed guidelines on implementation, particularly lower level planning (commune level) are lacking.

Lack of capacity for implementing LUP and land use plans. Department of Natural Resources and Environment at provincial and district level (DONRE) are responsible for preparation of LUP and land use plans. Their work is for administration and management procedures and they are not directly involved in development of LUP and land use plans. The consultant firms are contracted to implement LUP and preparation of land use plans. DONRE at provincial and district levels take

responsibility for organization of review and approval. District and provincial DONRE reports that to implement LUP, it requires different expertise to implement required baseline survey. They agree that the capacity of the staff is limited, particularly the application of tools and software for spatial analysis and data management and analysis (i.e. GIS, interpretation of remote sensing images, etc.). In addition, the staff capacity to assess the ecosystem services for integration into planning is also limited.

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

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

5.1. Approach and Objectives

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

- Provide evidence that each tree-based activity on landscape level has achieved its stated targets and impacts 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; and
- Provide recommendations on efficient allocation of resources and improvement of institutional arrangement for managing natural resources to meet the 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 be asked to ensure the 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 “benchmark” to assess whether or not the planning outputs have met;
- Gathering data and information thorough monitoring implementation; and

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

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

5.2. Monitoring Criteria and Indicators

The proposed criteria and indicators for monitoring focuses on assessing: (1) institutional arrangement for integrated tree-based planning implementation; and (2) Outcomes and impacts of integrated tree-based landscape management at commune level.

5.2.1. Monitoring institutional arrangement for integrated tree-based landscape planning implementation

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

Availability of guiding documents: This focuses on assessing the readiness of legal framework on implementation of integrated tree-based landscape planning and includes:

1. Number of guiding documents provided;
2. Relevance of the guiding documents;
3. Level of details of the guiding documents;
4. Application of the guiding documents;

Capacity building for stakeholders: This assesses how capacity building are provided to the responsible management agencies and other stakeholders to support integrated tree-based landscape planning and management at commune level. The indicators are:

1. Number of training organized (topic, participants etc.)
2. Training materials provided;
3. Funding sources for trainings;
4. Other meetings

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

1. Required baseline assessment implementation;
2. Quality of tree-based landscape planning document;

3. Percentage of local people engaged in planning process
4. Numbers of consultation meetings;
5. Satisfaction of local people on tree-based landscape plans

5.2.2. Monitoring outcomes and impacts of integrated tree-based landscape management

The indicators for monitoring and assessing outcomes and impacts include three aspects: (1) Physical natural capital state; (2) Ecosystem services changes; and (3) Land-based socio-economic impacts. The proposed indicators should be: (1) reflecting outcomes and impacts; (2) measurable through quantitative and qualitative assessment; (3) Cost-effective. Details see Annex 3 and Annex 4.

Physical natural capital change: The indicators for this aims at quantifying how the physical capital (forests and land uses) change over time associated with landscape management plan compared to the baseline. The indicators are:

1. Total forest area (ha)
2. Total natural forest area (ha)
3. Total plantation area (ha)
4. Protected forest area for water head 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 agro-forestry practices (ha)
10. Upland crop area with agro-forestry practices (ha)
11. Lowland annual crops (ha)
12. Improved home-garden area (ha)

Change in ecosystem services quantity: The indicators used to quantitatively and qualitatively assess the quality of ecosystem being influenced by the change in forests and land management practices. The indicators are:

1. Emission reductions from avoided deforestation and forest degradation (tCO₂e)
2. Carbon enhancement resulted from forest restoration and reforestation (ton CO₂e)
3. Carbon enhancement from application of tree-based practices (agro-forestry)
4. Soil erosion exposure
5. Water flow in dry season
6. Flood control
7. Bio-diversity losses and conservation
8. Cultural and spiritual values

Land-based socio-economic impacts: The indicators are used to assess socio-economic impacts associated with forest and land-based management practices. These include the followings:

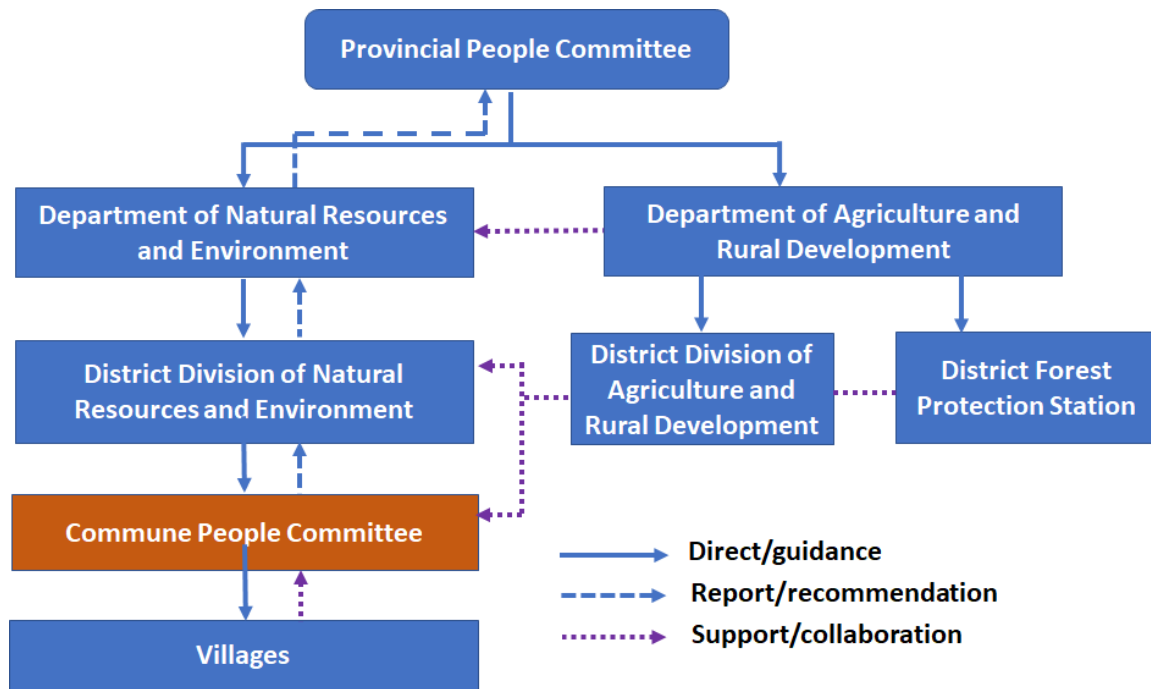
1. Income from forests products (timbers, non-timber forest products (VND/ha)
2. Income from payment for environmental services (VND/ha)

3. Income from tree-based crops (agro-forestry) (VND/ha)
4. Income from home-garden (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 arrangement for monitoring implementation

The overall institutional arrangement for implementing tree-based landscape management is suggested in the Figure 2. At the provincial level, Department of Natural Resources and Environment (DONRE) is a lead organization for the monitoring implementation. Department of Agriculture and Rural Development (DARD) is a key partner. The direct organizations of DARD at provincial level are Forest Protection Department and Agriculture Extension Centre. At district level, key actors should be engaged in the monitoring are division of natural resources and environment (DiNRE), department of Agriculture and Rural Development, forest protection station.

Figure 2. Institutional arrangement for monitoring of tree-based landscape management



5.3.1. Department of Natural Resources and Environment (DONRE)

DONRE acts as a lead organization to coordinate the implementation of monitoring commune level tree-based landscape management. The key partner for supporting the monitoring implementation is the Department of Agriculture and Rural Development and its branches at district levels. A plan for the monitoring and collaboration mechanisms should be agreed by both DONRE and DARD and then be approved by Provincial People Committee before the monitoring can be implemented. The responsibilities of DONRE are:

- Prepare the monitoring plan.
- Prepare and mobilizing resources for monitoring.
- Organize the trainings on the monitoring implementation.
- Coordinate and provide guidance to the implementation of the monitoring.
- Make recommendations to provincial people committee for improvement of tree-based landscape management.

5.3.2. Department of Agriculture and Rural Development (DARD)

DARD will work closely with DONRE under the approved collaboration mechanism to provide support to the implementation of the monitoring. These include:

- Coordinate its line departments (such as department of forest protection, forest protection station, district division of agricultural and rural development etc.) to support the monitoring.
- Provide support to data collection for the monitoring.
- Support capacity buildings.

5.3.3. District Division of Natural Resources and Environment (DiNRE)

DiNRE will 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 the DiNRE are:

- Support preparation of the monitoring plan.
- Support organization of the trainings on the monitoring implementation.
- Coordinate and provide guidance to the implementation of the monitoring for commune level.
- Support to data collection and report preparation.
- Provide recommendations to DONRE for improvement of monitoring implementation.

5.3.4. Commune authority

Commune authority is a key actor for implementing the monitoring. The commune should assign staff to be responsible for the monitoring and reporting the results. The tasks include:

- Baseline information development: Following the criteria and indicators selected for monitoring integrated tree-based landscape management, a baseline data needs to be collected and compiled before the monitoring starts. The baseline data for collection for specific area applying integrated tree-based landscape management include the followings and be compiled in Annex 2.
- Lead in data collection and compilation
- Reporting the monitoring results (see Annex 3)

5.3.5. Village heads

Village heads in the commune are required to work closely with responsible staff assigned by the commune authority to implement monitoring activities. The main tasks of the village heads are as follows:

- Assisting in collecting baseline data;
- Assisting in collecting data used for monitoring (see Annex 2 and Annex 4)

5.3.6. Other line organizations

Line organizations such as department of forest protection, agriculture extension centre, projects and programs etc. These organizations should work closely with DONRE and DiNRE to provide support to the commune authority to implement the monitoring. The supports include:

- Capacity building for responsible staff at the commune and village heads regarding the implementation of monitoring, data analysis and reporting.
- Implement baseline assessment supporting to land use planning.
- Data collection for baseline information and monitoring;
- Provide expert support to 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/explanation
1. Establish clear objectives of the monitoring	It is important to set goals under each theme (ecological 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 the monitoring requirements of the 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, maybe 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 project’s control, even if the restoration is successful. Some changes may occur due to factors unconnected to the project. To identify such instances methods for selected indicators (most likely those associated with project 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 based assessment are likely to be required.	Where appropriate, the 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-based assessments in attributing change to the landscape restoration project
8. Use common frameworks and existing data gathering where available	The integrated tree-based landscape management guidance is designed to ensure that monitoring of projects 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 (e.g. web-based tools). Existing monitoring and data gathering – e.g. from national monitoring schemes, land cover change measures or from population censuses – may provide important information for impacts within and outside restoration 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 as part of the project. Projects should demonstrate how they will sustain long-term monitoring.

Annex 2. Baseline information collection for monitoring

A. Institutional arrangement baseline (for year

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

B. Tree-based landscape baseline (for year

ID	Criteria Indicators	Data/Rating
I	Physical capital state	
1	Total forest area (ha)	
2	Total natural forest area (ha)	
3	Total plantation area (ha)	
4	Protected forest area for water head 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 the state organizations (ha)	
9	Forest area managed by small-holders (ha)	
10	Upland crop area without agro-forestry practices (ha)	
11	Upland crop area with agro-forestry practices (ha)	
12	Lowland annual crops (ha)	
13	Home-garden area (ha)	
II	Ecosystem services state	
1	Carbon stocks of forests and land uses	

2	Soil erosion issues in upland area (high/moderate/low)	
3	Water flows in dry season (high/moderate/low)	
4	Flood appearance frequency (frequent/moderate/few)	
5	Biodiversity values (high/medium/low)	
6	Cultural and spiritual values (high/medium/low)	
III	Land-based socio-economic state	
1	Income from forests products (timbers, NTFPs) (VND/ha)	
2	Income from payment for environmental services (VND/ha)	
3	Income from tree-based crops (agro-forestry) (VND/ha)	
4	Income from upland crops (without tree-based) (VND/ha)	
5	Income from home-garden (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 arrangement

ID	Indicators	Methods	Frequency	Responsible actors	Expected outputs
I	Availability of guiding documents				
1	Numbers of guiding documents (policies, guidelines etc.)	Review and interview	Annually	DONRE	List of guiding documents
2	Relevance of the guiding documents (high, medium, low)	Review and interview	Annually	DONRE	Assessment
3	Level of details 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	Numbers of responsible staff in management agencies across levels (commune, district and province)	Review and interview	Annually	DONRE	Data
2	Numbers of staff by expertise in management agencies across levels (commune, district and province)	Review and interview	Annually	DONRE	Data
3	Number of trainings organized annually across levels (commune, district, province)	Review and interview	Annually	DONRE	Data
4	Annual funding provided for staff capacity building across levels (commune, district, province)	Review and interview	Annually	DONRE	Data
III	Implementation and decision-making process				
1	Baseline assessment implementation for LUP	Review and interview	Annually	DONRE	Assessment
2	Quality of tree-based landscape planning document (good, medium, poor)	Review and interview	Annually	DONRE	Assessment
3	Percentage of local people in planning	Review and interview	Annually	DONRE	Data
4	Numbers of consultation meetings	Review and interview	Annually	DONRE	Data
5	Satisfaction of local people on tree-based landscape plans	Review and interview	Annually	DONRE	Assessment

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

Indicators	Methods	Frequency	Responsible actors	Expected outputs
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 water head 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 agro-forestry practices (ha)	Statistical data collection; spatial assessment;	Annually	Commune authority	Area change data
10.Upland crop area with agro-forestry 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 quality

Indicators	Monitoring methods	Frequency	Responsible actors	Expected outputs
1. Emission reductions from avoided deforestation and forest degradation (ton CO ₂ e)	Stock change method;	Annually	Expert assessment	Emission estimates for deforestation and degradation
2. Carbon enhancement resulted from forest restoration and reforestation (ton CO 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 (agro-forestry) (ton CO ₂ e)	Stock change method; expert assessment	Annually	Expert assessment	Carbon change estimates for tree-based land uses
4. Soil erosion exposure	Participatory assessment; sore card method	Annually	Village heads	Qualitative assessment
5. Water flow in dry season	Participatory assessment; sore card method	Annually	Village heads	Qualitative assessment
6. Flood control	Participatory assessment; sore card method	Annually	Village heads	Qualitative assessment
7. Bio-diversity loss	Participatory assessment; sore card method; statistical data	Annually	Village heads	Qualitative assessment; statistical data on endangered species
8. Cultural and spiritual values	Participatory assessment; sore card method	Annually	Village heads	Qualitative assessment

D. Change in ecosystem services quality

Indicators	Monitoring methods	Frequency	Responsible actors	Expected outputs
1. Income from forests products (timbers, 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 (agro-forestry) (VND/ha)	Statistical and sample survey	Annually	Commune authority	Income data
4. Income from home-garden (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 (%)