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LOWERING EMISSIONS IN ASIA'S FORESTS

# Guidance on Low Emission Land Use Planning

August, 2015
Revised December, 2015

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The guidance is developed by the USAID Lowering Emissions in Asia's Forests (USAID LEAF) program and the United States Forest Services (USFS) International Program in support of USAID LEAF's regional effort to build capacity for substantive and meaningful emission reductions in the forest and land use sector. The guidance provides a general framework that is flexible, replicable and adaptable to different contexts with the goal of developing a low emission land use plan. The guidance also supports USAID LEAF's regional climate change curriculum development work and is used as 'textbook' for the Low Emission Land Use module.


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## Acronyms

| | | |
|---|---|---|
| AFOLU | - | Agriculture, Forestry and Other Land Uses |
| BAU | - | Business as Usual |
| GHG | - | Greenhouse Gas |
| GIS | - | Geographic Information System |
| GIZ | - | Deutsche Gesellschaft für Internationale Zusammenarbeit |
| IPCC | - | Intergovernmental Panel on Climate Change |
| LEAF | - | USAID Regional Development Mission for Asia's Lowering Emissions in Asia's Forests |
| LEDS | - | Low Emission Development Strategy |
| NAMA | - | Nationally Appropriate Mitigation Actions |
| NGO | - | Non-Government Organisation |
| M&E | - | Monitoring and Evaluation |
| MRV | - | Measuring, Reporting and Evaluation |
| QA/QC | - | Quality Assurance/Quality Control |
| REDD+ | - | Reducing Emissions form Deforestation and Degradation |
| SBIA | - | Social and Biodiversity Impact Assessment |
| $tCOe_2$ | - | tons of Carbon Dioxide equivalents |
| USAID | - | United States Agency for International Development |
| UNFCCC | | United Nations Framework Convention on Climate Change |
| USFS | - | United States Forest Service |

# Introduction

Land use planning combines the scientific disciplines of ecology, economics and social sciences in an effort to meet current and future societal needs for the utilization and conservation of land and natural resources. It must combine the best of current technology (such as satellite imagery) with the oldest of human values (e.g., people and their relationship to the land and the land of their ancestors) in an open and transparent process. It must engage people (the stakeholders), who often hold different interests and values, in a dialogue that reaches agreement on sustainable land use in rural areas.

But the task of developing a land use plan is becoming increasingly difficult. Climatic patterns are changing and becoming highly variable challenging our current institutions and regulations governing land use planning. Changing climatic patterns are also redistributing and generally limiting resource availability and increasing competition and demands on these resources. National policy makers are also now introducing carbon constraining policies and directing land management agencies to introduce greenhouse gas mitigation actions to meet national targets. The question is therefore: **How can greenhouse gas emissions (and removals from the atmosphere) be incorporated into a land use planning process to achieve environmentally sustainable, socially just and economically sound land use?**

This guidance document has been written to help land use planners at the sub-national level respond to this question. It provides a **general framework** that is flexible, scalable and adaptable to a variety of different contexts with the goal of producing a low emission land use plan. It is not a detailed blueprint on land use planning, nor a highly technical document on landscape level carbon accounting. Rather it is a guide that provides a simple framework, some **high level guidance** on moving through the key process steps, outlines **key challenges** that planners may encounter at each step and presents a number **important tools**, **methodologies** and **web resources** that provide further detail and implementation information for those wanting to dig deeper into the subject.

By working through the framework it is hoped that land use planners and the stakeholders involved in the low emission land use planning process can:

1. Equitably and sustainably balance competing resource needs and land use values, in which carbon may be an important ecological and (potentially) economic factor in defining this balance; and
2. Assess the contribution of a low emission land use plan to reducing greenhouse gas emissions and corresponding contribution to any national greenhouse gas reduction targets that have been set.

### *How Has This Guidance Document Been Developed?*

Within the USAID Lowering Emissions in Asia's Forests (USAID LEAF) program, a number of sub-national jurisdictional low emission land use plans are being developed. This guidance document arises from the challenges these planning processes have faced and the lessons being learned through these processes. At the same time, USAID LEAF and the United States Forest Service (USFS) have been jointly developing curricula for Asia-Pacific universities on a range of issues including *Low Emission Land Use Planning*.

These two linked processes have allowed the evolution of this guidance document to be based on both actual field practice and academia thinking and text. Key background events have been:

- A series of regional workshop held to explore success. challenges and financing of low emission land use planning in Southeast Asia (July 2012[1] and June 2015[2]);
- In-country and mentoring support by USFS staff for the USAID LEAF Vietnam and USAID LEAF Lao PDR field staff on low emission land use planning (August 2012 through to early 2013);
- The development of a low emission land use planning hypothetical case study in Lam Dong Province, Vietnam with Da Lat University (May 2013); and
- Development of draft curricula on land use planning and climate change as part of the USAID LEAF's Regional Climate Change Curriculum Development (August 2013) and the testing of this curricula (January and August 2014)[3].
- A regional review of best practices and progress towards sustainable and financially viable Low Emission Development Strategies (LEDS) for the forestry and land use sector across Asia[4].

One of the key challenges for both the USAID LEAF field staff and the academics developing curricula on the subject of what a 'low emission land use plan' looks like and must achieve is the diversity of ideas, topics or themes that could influence it. The framework presented in this document **uses concepts and tools from several sources** that are briefly described in

[1] Workshop details available at: http://www.leafasia.org/leaf-news-notes/materials-leaf-usfs-low-emission-land-use-forest-planning-workshop-now-available

[2] Workshop details available at: http://www.leafasia.org/events/regional-forum-developing-and-financing-low-emissions-development-strategies-agriculture

[3] Many of the terms and issues are more fully explained in the 'Low Emission Land Use Planning' module jointly developed by USAID LEAF and USFS. It is also assumed that the reader of this guideline document has a general understanding of land use planning.

[4] Review can be downloaded at: http://www.leafasia.org/library/regional-review-low-emission-plans-strategies-and-activities-forest-and-land-use-sector

figure 1. What binds the pieces extracted from each of these sources is the need to balance substantive emission reductions and removals from the forest and land use sector with social equity, economic growth and environmental sustainability within an effective participatory stakeholder engagement process.

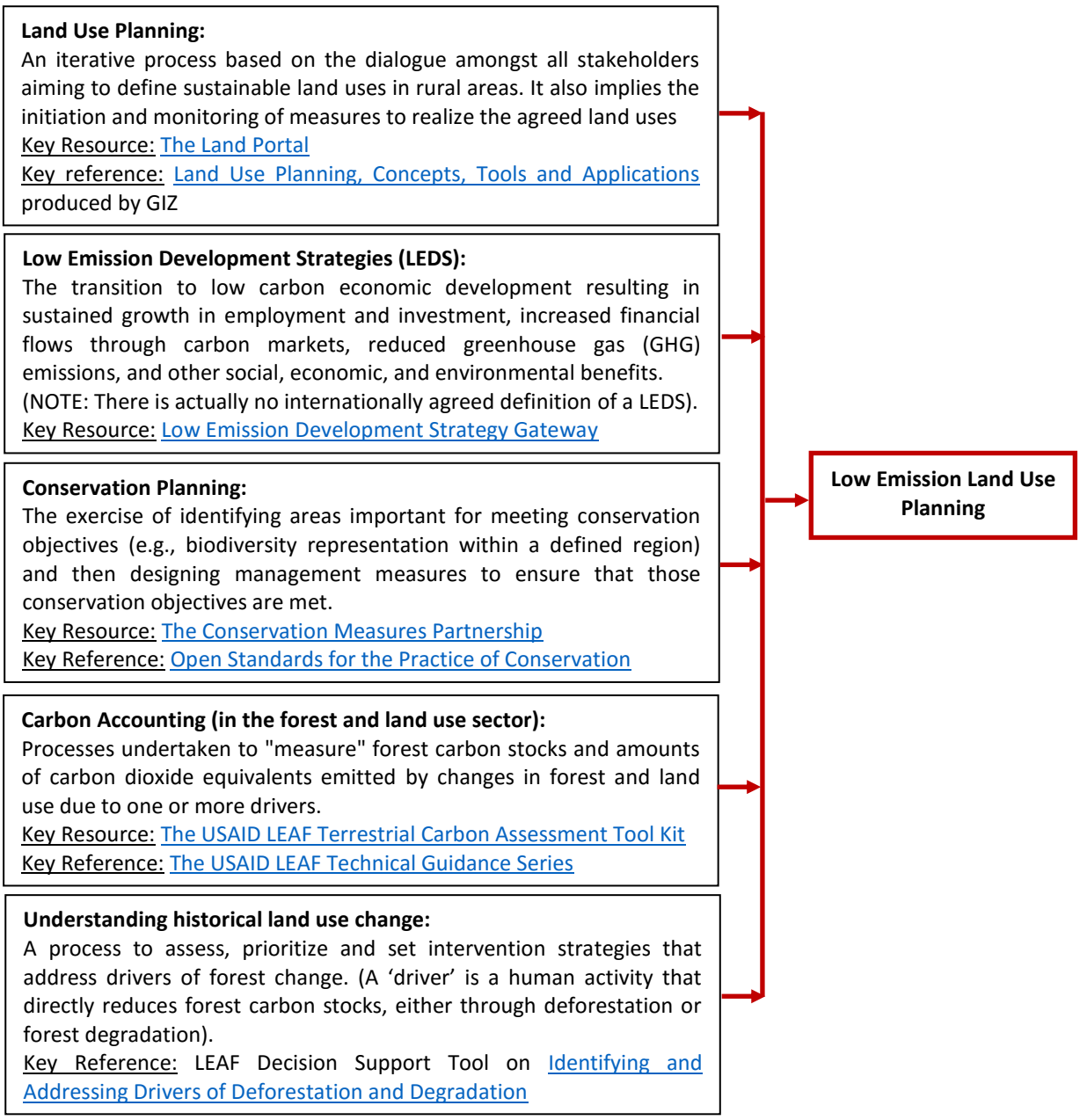


**Figure 1:** Key sources that have influenced the development of a Low Emission Forest and Land Use Plan

The document is a 'living' document. It is expected to grow and be revised as lessons learned from field work are generated and incorporated into the guidance document and new tools, methodologies and science further informs low emission forest and land use planning.

So while change is expected, there are a number of important guiding principles that all land use planning process should follow, including:

- **Orientated to local conditions** in terms of knowledge, methods, and cultural viewpoints;
- **A transparent dialogue** where information is shared openly and freely among a diverse group of stakeholders;
- **Interdisciplinary and cross-sector** to ensure a sustainable balance between the social, economic and environmental needs in land use;
- **Inclusive and empowering** of all stakeholders to improve their capacity to plan and take actions;
- **An iterative process** that is flexible and open for the inclusion of new findings and changing conditions; and
- **Outcome-based** to ensure meaningful and sustainable emission reductions are achieved and reported, yet balanced with social, environmental and economic benefits[5].

In presenting what this guidance document would like to achieve, it is also important to note the limitations of this current version. This guidance document:

- Does not consider the issues of incorporating climate change adaptation into a low emission forest and land use plan;
- Is not developed for carbon accounting technicians, remote sensing specialists or REDD+ experts. It is written for land use planners trying to develop strategies to link with and integrate these specialist skills into a low emission land use planning process; and
- Does not fully cover land use planning across all agriculture industries or within agricultural sectors (as an example the emissions associated with the application of nitrate based fertilizers).

[5] Adapted from Wehrmann, B. (2011), Land Use Planning. Concepts, Tools and Applications, February 2011, Published by GIZ, Eschborn, Germany.

### *How To Use This Guidance Document?*

The document is divided into five sections (see figure 2) and for each section, a number of steps are examined. For each of these steps, the following is considered:

1. The objectives for the specific planning step;
2. Key terms and important issues relevant to the planning step; and
3. A structured and step-wise section that considers:
    - Key questions that could be considered to help with the analysis for each step.
    - Guidance on possible steps that could be taken to reach the required outcomes.
    - Suggested outcomes for each of the frameworks steps.

In the final section of the document, the Section 'Useful References, Tools and Resources' lists down some key references and resource material for each step that readers are encouraged to explore to gain a deeper understanding of the technical issues and access to other published tools, methodologies and approaches.

Two annexes are included that provide greater detail on the following issues:

1) Monitoring and evaluation terminology (Annex 1); and
2) Data considerations in low emission land use planning (Annex 2).

## Low Emission Land Use Planning Framework

### *Overview*

The framework steps involved in *Low Emission Land Use Planning* are shown in figure 2. Although this document presents each of the steps or modules in linear format (e.g., Sections 1 to 5) land use planning is not a linear process but rather a continual and iterative one (as explained by the guiding principles outlined in the *Introduction*). It is often advantageous to revisit earlier phases in the process and make adjustments based on evolving information, monitoring results, and changes in social or economic factors (i.e., adaptive management).

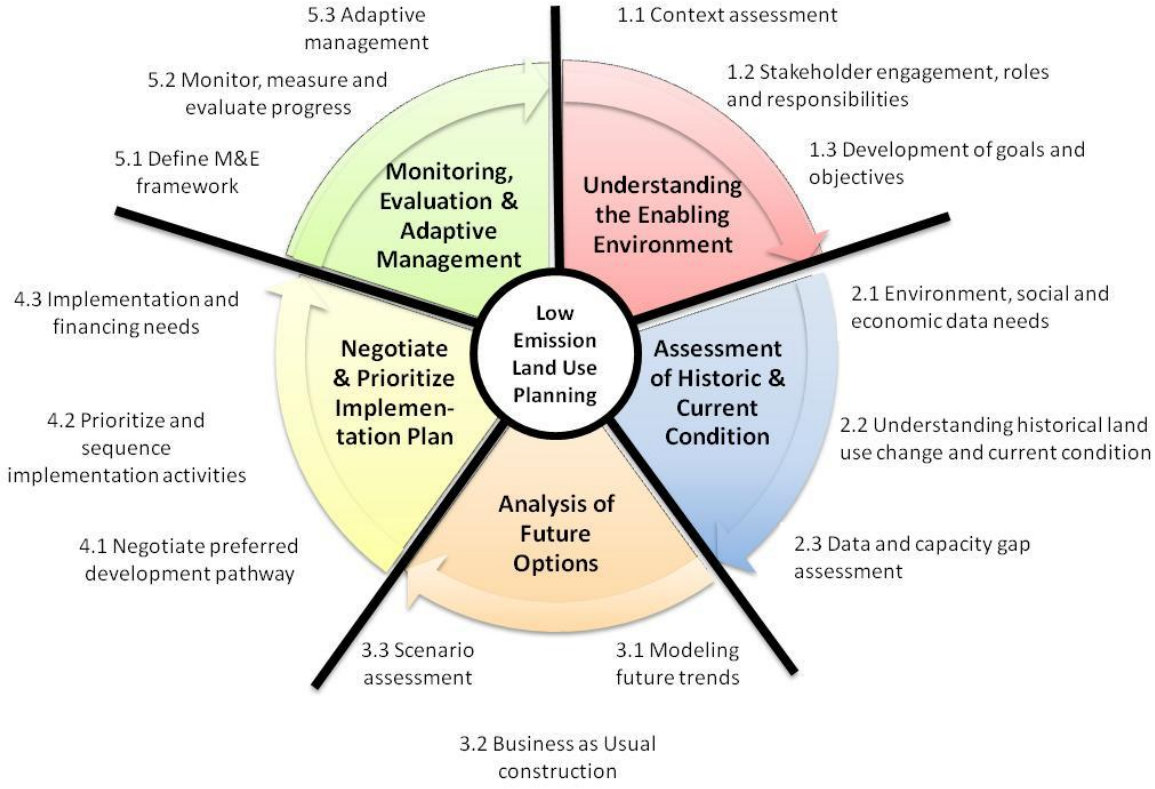


**Figure 2:** A general low emission development planning framework

## Step 1: Understanding the Enabling Environment

The *'enabling environment'* is the shorthand term for conditions in which decisions can be made, and proposed objectives achieved, at all levels of action[6]. It comprises all policy, regulatory and institutional aspects that define the '*rules of the game*' in which stakeholders and institutions play their respective roles in the planning, development and management of land resources. Understanding the 'enabling environment' is a critical first step in land use planning and requires an understanding of land use, ownership, tenure and land-use change and how these issues interact with each other and the institutions and regulations that set and control these function

### *1.1 Context Assessments (Integrated Jurisdictional and Cross-Sector Assessment)*

The objectives for this step are to:

- Document the jurisdictional and sector planning frameworks that will guide the low emission land use plan.
- Identify limitations and boundaries within which the low emission land use plan must be developed.

When developing a land use plan, a clear understanding of the scale, regulatory frameworks and sectors that will influence the plan is necessary. **Scale** refers to the geographical area of the land use plan but it has important implications in the planning process by affecting such things as goals and objectives (strategic versus operational), stakeholder participation (who, when, how often), data and information used (sources, resolution, accuracy), resources and investment and management responses.

**Institutions**[7] and **regulatory frameworks** will also affect any land use planning process and associated decisions. Many Asian countries have laws or policies that dictate how and when land use planning should be done (e.g., Indonesian Law 26/2007 on Spatial Planning). Other countries may have more general strategies (e.g., Vietnam's National Green Growth Strategy for the period 2011-2020 with a vision to 2050) to reduce carbon emissions while promoting economic growth but may lack any policy that ensures other forest and land use values (e.g., biodiversity, clean air, clean water, etc.) are protected during any land use planning process.

[6] FAO and UNEP. (1999). The Future of Our Land - Facing the Challenge: Guidelines for Integrated Planning for Sustainable Management of Land Resources.

[7] Institutions are sets of rules governing the actions of individuals and organizations and the negotiation of differences between them. Institutions are made up of both formal rules (constitutions, regulations, laws, etc.), informal rules (norms of behavior, conventions, self-imposed codes of conduct, etc.) and enforcement characteristics (through police or military, fines, demotion, social exclusion of people, etc. or positive enforcement such as land access)

In addition to working within the 'rules' of any established regulatory framework, land use planning must consider the variety of **jurisdictions** affected by the land use plan. Construction of the plan may ultimately be the responsibility of one government department or ministry but the plan will involve lands or resources administered by a variety of different sectors that have jurisdiction over land and livelihoods affected by land use planning decisions including land management, social, economic, transportation or energy. This may be conflicting at times when multiple **sectors** claim rights to certain resources that are not compatible. For example, the agriculture sector may wish to pursue a large-scale plantation in a certain geographic location that the forestry sector has identified to maintain as primary forest for biodiversity conservation and the mining sector has also identified for potential mineral exploration. Therefore, a clear understanding of the authorities of the different sectors within the planning area is critical.

Sector and jurisdiction claims may also overlap with **land tenure** claims. Land tenure is the set of rules that define the rights by people to land and the resources on that land. These rules may pertain to formal, customary or informal rules and a thorough understanding of how these 'rules' overlap is essential. Problems often arise when two or more systems coexist (**legal pluralism**). As an example, a market economy with a statutory land tenure system defined by national laws often does not recognize customary rules regulating access and use of land where local people apply their own tenure system and ignore the formal one. Understanding tenure complexity and competing land claims is essential.

**Key Questions:**

- What geographical scale will the low emission forest and land use plan consider?
- What jurisdictions need to be involved in the planning process and what jurisdictional policies, practices and plans are currently in place that will guide or influence the planning process? Are there contradictions in these policies and practices?
- What sectors and sector plans will guide or influence the planning process? Are there contradictions in these plans?
- What authorities will have responsibility for development and implementation of the low emission land use plan?
- Are the tenure rights for the identified land known (both formal and informal)? Will the planning process strengthen or limit certain tenure rights? What stakeholders will benefit or lose from this process?

**Considerations and Possible Sequencing:**

- Seek agreement on the scale of the low emission forest and land use plan.
- Review the current regulatory framework for land use planning, including a description of the role and responsibilities of the various agencies involved.
- Identification of additional agencies or institutions that must be included in the low emission planning process and the incentive for these new agencies to be involved in the planning process.
- Identification of known and possible land disputes and how these disputes may be exacerbated or ameliorated through the development of the low emission land use plan.

**Outcomes:**

- Documentation of existing policies and the regulatory framework that will influence the low emission land use planning process;
- Documentation of existing land use plans at different jurisdictional, sectorial, and spatial levels and how they will affect the current land use planning process or plan.
- De facto and de jure tenure rights to land and natural resources are quantified and documented.
- Contradictions or ambiguities between current plans are identified and acknowledged.

**Common Challenges and Lessons Learned:**

- The sharing of information and data between 'siloed' agencies and sectors is notoriously poor. The reluctance to share information and data is further compounded due to the perception that low emission land use planning is complex, but benefits may be substantial.
- Limited knowledge on climate change mitigation options in the forest and land use sectors leads to poorly conceived planning processes and poor carbon and non-carbon outcomes from the implementation of the plan.

**Emerging Opportunities:**

- A growing number of national policies and emission reduction targets have been set that can incentivize sub-national low emission planning efforts.
- National policies and targets can be used to facilitate cooperation between sectors and jurisdictions.

### *1.2 Stakeholder Engagement, Roles and Responsibilities*

The objectives of this step are to:

- Identify all stakeholders that need to be involved in the planning process and will be impacted by the plan.
- Identify vulnerable groups at risk from the implementation of a plan and possible mitigation strategies to avoid.

Effective **participatory stakeholder engagement** is critical to a successful planning process. By its very nature, land use planning addresses multiple layers of complexity around social, economic, and ecological issues that reflect a variety of interests and values. Identifying and engaging stakeholders early, and throughout, the planning process leads to greater transparency and helps to develop political and institutional support for the plan.

**A stakeholder is any person, group or organization who can affect or is affected by a land use plan.** Typical stakeholders include: (1) anyone with government oversight of actions identified in the land use plan; (2) anyone who is a beneficiary of goods and services derived from the implementation of the plan (local communities, timber companies, etc.); (3) any group that is disadvantaged through the implementation of the plan; and (4) universities, scientists or NGO leaders that can contribute to the understanding of the best available science that can be used in the assessments conducted during the land use planning process. Every effort should be made to include stakeholders from across line agencies, sectors and the private/public divide.

Genuinely engaging stakeholders in a collaborative process is challenging due to oftentimes **competing interests between stakeholders**. As mentioned in Section 1.1, different sector stakeholders (i.e., agriculture, forestry, mining companies and local communities) may have competing interests for land or resources and therefore a vested interest in the outcomes of a land use plan.

A successful **multi-stakeholder collaborative process** is centered on leadership, team building, and communication. It relies on the establishment of ground rules for communication and interaction. It also relies on defining roles, responsibilities of the stakeholders and how stakeholders interact throughout the planning process.

**Key Questions:**

- Who are the key stakeholders? What are their roles, responsibilities, returns (benefits) and relationships in developing and implementing the plan?
- Do the stakeholders have the capacity, knowledge and influence to meaningfully participate?
- Who are the vulnerable groups and what are the risks to these groups from the implementation of the plan? How can these risks be mitigated and potential benefits enhanced for these groups?

**Considerations and Possible Sequencing:**

- Review published documents and literature to rapidly assess stakeholders.
- Select tool(s) to analysis stakeholder influence and importance.
- Convene stakeholder analysis workshop (using tool(s) selected above). Invite representation of stakeholder groups ensuring vulnerable or marginalized groups have a voice in the process.
- Confirm and verify accuracy of stakeholder analysis through select meetings with individual stakeholder groups or expert assessments.
- Complete and publish stakeholder analysis, including vulnerability assessment and possible mitigation actions to reduce perceived risks and increase potential benefits.
- Periodically return to stakeholder assessment throughout planning process and update with new information.

**Outcomes:**

- Stakeholders are identified and their roles, responsibilities and level of influence are documented.
- There is a clear understanding by all stakeholders of the process.
- The risks to vulnerable groups are identified in both the planning and implementation phases.

**Common Challenges and Lessons Learned:**

- Ignoring or simply forgetting about stakeholders. Every effort should be made to include stakeholders from different line agencies and sectors (including the private sector) and socio-economic and cultural groups. The broader the representation, the more holistic the outcomes.
- Broad and vague categorization of stakeholder's commonly masks important differences. For example 'government' or 'community' is not a useful description as risks and opportunities of sub-groups (i.e. Department of Agriculture or Department of Forestry or different ethnic minority groups) will be ignored.

- As low emission land use plans are new, many stakeholders may not have the capacity or knowledge to genuinely contribute to the process. Capacity building and training will be required and may need to run in parallel with the planning process.

**Emerging Opportunities:**

- There is tremendous interest in low emission planning, climate change mitigation options and adaptation opportunities. This interest and desire to learn should help facilitate a broad and inclusive process.

### *1.3 Development of Goals and Objectives*

The objectives of this step are to:

- Through a collaborative process, have stakeholders agree on the vision, goals and objectives of the low emission land use plan (including both carbon and non-carbon benefits)
- Determine the timeframe for implementation of the low emission land use plan.

Stakeholders need to define goals (desired long-term status) and objectives (desired short to medium term outcomes) for the planning area based on an accepted vision. A **vision** is a general statement of a desired state or ultimate condition that a land use plan is working to achieve. It is relatively general, inspirational (in outlining the desired change) and brief. **Goals** are formal statements that detail the desired **impact** of the plan and are: Linked to targets; impact orientated; measurable; time limited (generally 10 years or more) and specific. **Objectives** are formal statements detailing the desired **outcomes** of the plan and are: Result orientated; measurable, time limited (generally three to 10 years); specific and practical[8]

A **vision statement** is set through a consultative process where stakeholders discuss and agree on a description of the desired state or ultimate condition that they are collectively working towards. Once set, goals and objectives must be directed towards achieving the long-term visions. **Setting goals and objectives** may start out early in the planning process as

[8] Adapted from Conservation Measures Partnership (2013), *Open Standards for the Practice of Conservation*, Version 3.0/April 2013. Terms also further defined in Annex 1.

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qualitative measures such as increased carbon storage in forested cover types, positive economic growth, and improvement of drinking water quality and accessibility.

Later in the planning process after data compilation, analysis, and scenario evaluation, these may become more quantitative. For example: 20% reduction in tons of carbon dioxide equivalents over a five year time span, 2.5% economic growth per year, and 200 hectares of agroforestry plantations established in targeted villages per year. These goals and objectives are designed to be achievable within a well-defined planning cycle, typically five to 20 years. The quantification of goals and objectives is necessary to establish a **results** or **performance based framework** that allows the plans' implementation to be objectively measured and reported upon (see Step 5).

Many of these goals and objectives may already be set at higher planning levels and documented in national or provincial planning documents in addition to constraints that have been set at a lower level of tactical planning. The current land use planning process should not conflict or make irrelevant any existing plans across different land use sectors or at jurisdictional levels above or below the current planning level. Therefore, goals and objectives will need to be clarified through stakeholder consultative workshops to allow contextually and locally specific goals (and visions for the social landscape) to both direct and refine the planning process and desired outcomes.

**Key Questions:**

- What is the desired state or ultimate condition (i.e. vision) that the plan is expected to contribute to?
- What is the time frame of the low emission plan and the anticipated impacts of the plan within this time frame?
- What is the process to develop the goals and objectives for the low emission forest and land use plan?

**Considerations and Possible Sequencing:**

- Collect higher level strategies that set targets and lower level plans that may constrain the implementation of activities under the plan.
- Conduct a consultative workshop to set and agree on the broad parameters (vision) and specific goals (impacts) and objectives (outcomes) of the plan.
- Document the assumptions made in setting the planning goals and objectives.

**Outcomes:**

- A vision for the landscape that is agreed to by all stakeholders.
- Wide circulation of agreed goals and objectives that implementation outcomes will be assessed against.
- A narrative description of assumptions and critical influences (i.e., opportunities, limitations, and threats) that should be considered in the land use plan.

**Common Challenges and Lessons Learned:**

- National level policies and strategies may set arbitrary greenhouse gas emission reduction targets which are expected to be met at the sub-national level. Meeting these targets and balancing developments needs is a significant challenge for sub-national planners.
- Climate change mitigation targets and actions are quickly set to allow sub-national agencies to access funding sources without a complete understanding of the volume of greenhouse gas emissions and removals likely nor how these actions will contribute to a balanced set of goals and objectives for the planning jurisdiction.
- The development of goals and objectives is oftentimes considered a 'one-off' process and not part of an adaptive management process (see Step 5.3). As an understanding of the critical threats to the biophysical and social landscape increases, assumptions underpinning the goals and objectives are not re-evaluated.

**Emerging Opportunities:**

- Results based payment schemes (i.e. payment for environmental services or REDD+) are encouraging greater precision in setting land use goals and objectives and the criteria, processes and data needed to measure progress and outcomes.
- The cross-sectorial nature of a low emission plan should be considered as an opportunity to engage with different stakeholders and allow the formulation of broad and inclusive goals and objectives for the planning jurisdiction.

## Step 2: Assessment of Historic and Current Conditions

Knowing the condition of the environmental, economic, and social resources is critical in analyzing and evaluating the impacts of planning decisions and alternative scenarios. Because land use planning looks at a variety of resource uses into the future, a good understanding of both historic and current conditions is essential. This will include a variety of information on ecosystem goods and services. Although the objective of the land use plan may be low emission development, it is important to keep in mind that forests provide essential services such as clean air, clean water, biodiversity, and support small-scale livelihoods, in addition to containing resources commonly utilized for large-scale economic growth (e.g., timber, minerals, and agricultural land).

### *2.1 Environmental, Social and Economic Data Needs and Methods Compilation*

Objectives of this step are to:

- Agree on data (relative to the goals and objectives) and information products (relative to stakeholder needs) required.
- Compile all necessary data needed to: 1) calculate GHG emissions and 2) assess current condition and status of non-emission parameters (both environmental and socio-economic).

Current and accurate data is the key to good decision making and provides a solid basis for successful land use planning. Data compilation and analysis to derive information should always follow those methods promoted by the **best available science**. Because some data is not always in a format easily comparable to other data (e.g., forest cover and livelihood dependency), integrating various data and information into the planning process can be as much 'art' as it is science. Goals and objectives defined in Section 1 will determine what data is required and how this **data is turned into information** appropriate for stakeholders to make informed decisions before considerable time and expense are used to generate that data. It is imperative to always be aware of what the need for a specific set of data is and how will it be used. Additional data considerations can be found in Annex 2.

Estimating **greenhouse gas emissions and removals** in low emission development planning can either be activity-based or land-based (IPCC 2000)[9]. Activity-based accounting considers carbon stock changes attributably to a specific human activity, i.e. forest degradation or methane emissions from livestock grazing. Land-based accounting estimates the change in

[9] Activity-based and land-based accounting approaches are further explained in Goslee, K.M., et al 2015. Technical Guidance Series for the Development of a National or Subnational Forest Monitoring System for REDD+: Forest Degradation Guidance and Decision Support Tool. Developed by Winrock International and the United States Forest Service under the USAID LEAF Program (available at: http://www.leafasia.org/library/forest-degradation-guidance-and-decision-support-tool)

carbon stocks in a specified area of land, regardless of activities occurring. Activity-based sums the activities, while land-based sums the various land areas with advantages and disadvantages for each approach (Table 1).

**Table 1:** A summary of land-based and activity-based accounting

| **Aggregate or Land-Based Accounting**<br>• Land-based estimates the change in carbon stocks in a specified area of land, regardless of activities occurring. | **Activity-Based Accounting**<br>• Activity-based considers specific human activities leading to changes in carbon stocks and estimates emissions separately for each activity. |
|---|---|
| Full accounting of all land-based emissions. | Emissions combined across activities. |
| Can capture net effect of emissions and sinks across large areas. | Where multiple activities occur, it may be difficult to verify emissions. |
| Difficulty in distinguishing between effects of multiple activities. | Inherently distinguishes between activities. |
| Requires large amounts of data that are expensive to collect. | Cost effective approach; complexity of methods based on each activity |
| Measurement resolution will likely miss many localized small-scale impacts. | Small scale impacts can be included by activity if deemed significant. |
| May simplify tracking net emissions and removals from place to place or year to year. | Requires development of emission or removal factors for each activity in each region. |

Annex 3 provides more detail on the issue, but it is assumed the complexity and expense of collecting large amounts of interrelated data land-based accounting will tend to mean most low emission land use plans will focus initially on an activity-based accounting approach. In this case two data sources are required:

1. **Activity Data,** or the extent (usually expressed in hectares) of change in a land use/land cover category. It is generally obtained through assessment of satellite imagery over three time periods. *Example:* Between 2000 and 2010, 1,000 hectares of evergreen forest converted to cropping land.
2. **Emission Factors** are the emission or removal of GHGs associated with the change being measured (expressed as tons $CO_2$ equivalents/unit of change). Emissions factors are generally obtained from field data on forest carbon stocks. *Example:* If a hectare of forest (containing 500 tons of $CO_2$) is converted to a field crop of cassava (containing 20 tons of $CO_2$), the Emission Factor is 480 tons of $CO_2$.

Multiplying activity data by emission factors will provide estimates of greenhouse gases emitted or removed from the atmosphere. In the above example, the gross emissions from the land use change between 2000 and 2010 is 480,000 $tCO_2$.

Data needed to assess other ecosystem values and services besides carbon will typically include environmental geospatial data such as land cover, streams, transportation networks, elevation, and slope. Tabular data from inventory methods may include environmental attributes such as timber volumes extracted or wildlife population surveys. These data can then be synthesized into measures of:

1. **Land suitability and capability.** Suitability is defined as a geographic feature's ability to support some specific activity or ecosystem function such as timber production, wildlife habitat or crop production. Capability is defined as a resource production potential such as Low, Moderate, or High quality for a specific ecological function such as timber productivity (tons/ha/yr growth rates) wildlife habitat quality (individuals/ha), or crop yields (kg/ha/yr); and
2. **Ecological integrity (or environmental quality)**, along with other resource valuescan be measured by metrics including:
    - Composition: What is the resource made up of (forest or land use types, age classes, etc.)?
    - Structure or Pattern: Where are the components located on the landscape?
    - Function or Process: Is there spatial or temporal variability in how the resource functions?
    - Connectivity: Are there landscapes linkages that allow for the movement of plants and animals?

Data on the ecological integrity of the planning area and the consequence of losing or reducing this integrity through conversion or degradation to another land use must be assessed. Common criteria used include measures of biodiversity, species richness, water quality and quantity and increasingly carbon storage and sequestration potential. Although helpful as qualitative measures, a quantitative definition would help when assessing current condition, future benefits/costs, and monitoring results of plan implementation. For example, ecological integrity may be characterized by key ecological characteristics that are measureable (e.g., species richness and vertical structure and quantifiable carbon stock changes).

The range of **socio-economic data** that could be collected will be wide and varied. The goals and objectives (Step 1.3) will help define what types of socio-economic data needs to be collected, but interest should be focused on how land use decisions impact (both negatively

and positively) livelihoods or human well-being[10]. Historical assessment of economic and social data related to meeting the plan's goals and objectives (i.e. population growth, economic growth, and other variables) also provides useful predictors for future trends. A common framework to assess livelihood or social change is based on:

1. **Human capital**, e.g., education, formal, and informal skills, health;
2. **Natural capital**, e.g., natural resources such as farming and grazing land, forests and non-timber forest products, wildlife and water resources;
3. **Physical capital**, e.g., shelter, roads, buildings, irrigation systems, and productive assets such as seed, tools, livestock, and other farm and processing equipment;
4. **Financial capital**, e.g., cash income and remittances, credit, savings in kind and cash;
5. **Social capital**, e.g., formal and informal institutions (including markets), associations (e.g., forest user groups, savings and credit co-ops), extended families, and local mutual support mechanisms.

While much of this data may only exist in tabular format, it is helpful to link these data sets to some geospatial feature class (e.g., districts, communities, households) to facilitate any needed spatial analysis in relation to environmental factors for scenario evaluation.

Determining data needs is also a function of required **accuracy and precision levels** and resources required to fill known data gaps (see Step 2.3). Accuracy is the degree of closeness of measurements of a quantity to that quantity's actual value. Precision is the ability to reproduce repeated measurements under unchanged conditions. A measurement can be accurate but not precise, precise but not accurate, neither, or both.

**Key Questions:**

- Is the collection of data appropriate and matched to the goals, objectives and indicators of the planning process?
- In calculating GHG emissions and removals linked to forest and land use change:
  a. What accounting approach will be used?
  b. What level of accuracy is required for the development of emission factors[11]?
  c. What level of resolution is required for the development of activity data[12]?

[10] The Millennium Ecosystem Assessment defines human well-being as: 1) the basic material for a good life (access to resources such as food, building materials or income for a viable livelihood), 2) health, 3) good social relations, 4) security, and 5) freedom of choice and action.

[11] Uncertainty of 20% or less at 95% confidence level is generally considered acceptable

d. What data already exists at sufficient accuracy and resolution? What additional data will need to be collected?

e. (Depending on the depth of GHG analysis – please also consult USAID LEAF's 'Technical Guidance Series on Developing National or Subnational Forest Monitoring Systems for REDD+')

- What data sets are required to assess non-carbon (environmental, social and economic) parameters? What resolution and accuracy is required? What data already exists? What additional data will need to be collected?
- Are there unique assets within the landscape that require higher levels of accuracy and/or precision in data (i.e., High Conservation Value Forests, significant cultural sites, high value landscape sites of important tourist value)?
- Are definitions of key parameters (i.e. forest definition) and classification systems (i.e., forest and land use classifications) uniform across all data sets? If not what can be done to standardize data sets and definitions?
- Is there sufficient data on possible biophysical constraints (i.e., flood, fire or market risks), jurisdictional constraints (i.e., protected area boundaries) or development constraints (i.e., road development) that may limit the implementation of the plan?

**Considerations and Possible Sequencing:**

- Decide on the accounting approach, what data must be collected and what level of accuracy and precision is required for this data.
- Complete literature reviews to discover and start collating all necessary data relevant to the carbon and non-carbon parameters under consideration.
- Establish processes to collect 'new' data.
- Establish an information system and policy to store and analysis datasets. This includes metadata for each data element or data set that includes its description, source, processing history, and limitations of use.
- Establish protocols and standards for open and transparent access mechanisms for stakeholders to review data collection processes and stored data.

**Outcomes:**

- Data dictionary of all information to be used; including attributes (i.e., table columns)
- Metadata for each data element (or a commitment to create it) describing lineage and

[12] No hard standards have yet been set for the accuracy requirement of a land cover maps used for REDD+, but it is recommended they achieve ≥85-90% accuracy.

limitations of those datasets

- An open and transparent information system and policy that allows stakeholders to access the data

**Common Challenges and Lessons Learned:**

- Often the process of collecting data overshadows the goal of collecting data. It is important to remember not to get stuck in data collection and analyses and lose sight that the data's ultimate goal is to provide information for stakeholders to make better planning decisions.
- Data is often stored across various agencies where access is limited and there is no or limited uniformity in data descriptions (particularly for metadata), classifications or definitions. Further the trust and cooperation of information management stewards (e.g., GIS analysts and technicians, planners, ecologists, foresters, social scientists, etc.) and department heads to share data is often lacking. Collating data from different sectors, line-agencies and projects is an historical problem that continues to this day.
- Reconciling spatial and non-spatial data, qualitative and quantitative data and social, economic and biophysical data is a challenge. Reconciling different data sets and converting or displaying that data in a format appropriate for stakeholders to make informed decisions requires a unique skill set.

**Emerging Opportunities:**

- The introduction of REDD+ programs into many countries has generated a renewed interest in forest management and forest and land use change resulting in numerous donor funded projects generating tremendous amounts of forest and land use data. This presents a unique opportunity for the 'harvesting' of data and information for inclusion in a low emission land use plan.
- Data is becoming more accessible and affordable. As an example, Vietnam has recently launched their own satellite that has the ability to map forest cover, floods, fires and track storms.
- Methodologies are becoming more standardized. As an example, at COP19 the UNFCCC agreed on the REDD+ 'rule book' and there are now a larger number of methodologies to measure, monitor and report GHG emissions under a number of voluntary carbon standards (i.e. VCS, CFS, Plan Vivo, CCBA, Gold Standards).
- The resolutions of global and regional datasets are becoming sufficiently high for use within local land use planning processes. As an example, The University of Maryland has recently released global data sets on deforestation rates between 2000 and 2014 that can provide important data estimates at the provincial level.

### *2.2: Understanding Historical Land Use Change and Current Condition*

Objectives of this step are to:

- Determine historical emission trends from the forest and land use sector.
- Determine drivers or causes of forest and land use change and the 'actors' involved.
- Determine current land and natural resource condition.

**Understanding historical change and reasons for change is often the best predictor of future trends** (figure 3). Explaining land use change, or the 'drivers' of this change is an essential part of the story. Quantifying drivers of forest and land use change (mainly deforestation and degradation, but also afforestation and reforestation) and identifying the actors involved in these processes will help identify possible interventions to reduce pressure on the forest landscape. The information required to assess drivers and historical emission levels includes:

1. Whether drivers act directly or indirectly to cause the problem (as an example, a direct driver may be forest conversion for agricultural production, the indirect driver may be economic policy and population growth);
2. The historical level and scale of deforestation and forest degradation and the calculation of historical emission levels (the sum of Activity Data and Emission Factors, see Step 2.1) for identified forest strata;
3. A driver's trajectory, or direction of a driver and the pressure it places on a forest over time;
4. Interaction between drivers;
5. The key actors or stakeholders involved with the identified driver; and
6. The summation and trend of historical emissions by deforestation and degradation driver.

Deforestation and forest degradation are critical factors affecting landscape greenhouse gas emissions but they also have significant effects on other ecosystem services. Land clearing oftentimes negatively affects water quality and timing (e.g., increasing flood hazard) but there are also significant positive effects of deforestation such as the economic growth and food security provided by conversion of forestland to agricultural production. By better understanding "where, why, and how" land use change historically occurred, coupled with **land suitability** and **capability** and **environmental quality** (described in Step 2.1), a balance of competing interests can be evaluated in the context of historic and projected future trends.

Much of the analyses needed to assess historical land use changes in the agricultural and forestry sectors, and thereby the estimation of historical emissions, are extrapolations of historical vegetation changes and process relationships. These analyses rely on the products produced from vegetation classification, mapping, and inventory data sources such as land cover and land zoning, for which remote sensing products play an important role. The outcome of this process are historical **land use change matrices** which 'map' land use transitions over given time periods.

Given the complex land use patterns and mosaics within a jurisdiction, it may be important to map the scope and scale of these transitions at both the jurisdictional level and for the broad functional **land use zones**[13] (ie forest, conservation, agricultural, settlement, etc.[14]) within the jurisdiction. Mapping transitions within a land use zone level may aid multi-stakeholder discussions in the subsequent steps of the low emission land use plan.

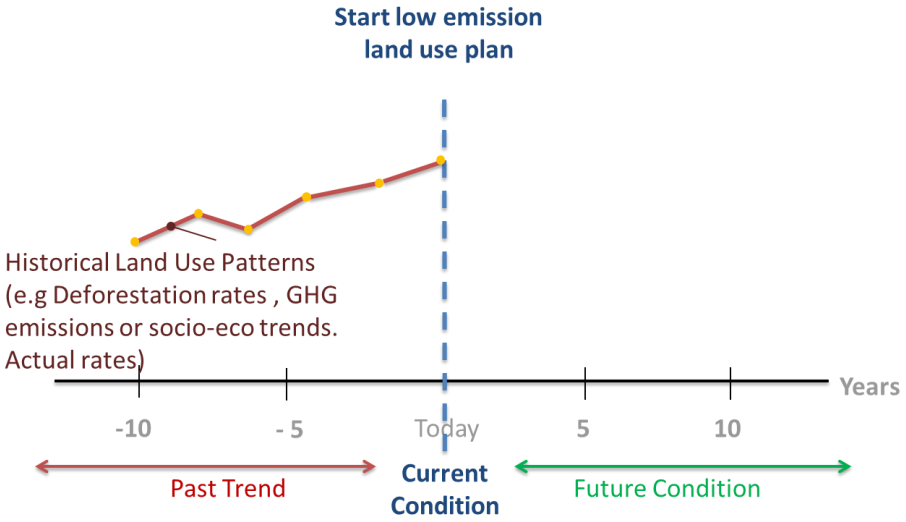


**Figure 3:** Quantification of Historical Rates of Change

[13] **Land use zoning** is the "delimitation of homogenous zones in regard to their characteristics (topography, soil, vegetation, land cover, forest classification, ecological system etc.) or functions (current land use, land use potential, agricultural potential, conservation values, ecosystem services etc.), should be part of any land use analysis. The categories for zoning should be derived from the key problems, major challenges and/or main potentials of the planning area or – if already identified – from the planning objective(s)" (GIZ 2011).

[14] When setting land use zones, efforts must be made to align national or sub-national zones to the IPCC AFOLU land use categories of Forest Land, Crop Land, Grassland, Wetlands, Settlements and Other Lands be used. For further guidance see the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Prepared by the National Greenhouse Gas Inventories, published IGES, Japan.

**Key Questions:**

- What is the time period and intervals to assess historical forest and land use change?
- What are the deforestation and degradation rates and resulting GHG emissions and removals for each of these time periods?
- Who are the key 'agents of change' or stakeholders involved in the forest and land use change process?
- What is the current status and historical trends for the socio-economic and environmental parameters under consideration?

**Considerations and Possible Sequencing:**

- Determine the historical time period for analysis (i.e., 2000-2015) and time intervals for assessment (i.e., every 5 years).
- Complete a drivers assessment for this time period and examine additional environmental and socio-economic trends that have not been picked up in this assessment (i.e., population numbers of endangered species or water quality).
- Create land cover maps for the agreed time intervals and a current, accurate (and agreed upon) forest map.
- Create a land use change matrix by overlaying the land cover maps from two different time periods and calculate land use change transitions for each land and forest category (Activity Data) (this may simply be forest to non-forest or more complicated such as evergreen forest to shifting cultivation).
- Estimate historical GHG emission rates by multiply Activity Data for each land use transition with Emission Factors.
- Publish final reports and background papers.

**Outcomes:**

- Quantification and description of historical forest and land use change (land use change matrix, and forest land cover maps) plus a description of both 'direct' and 'indirect' drivers and the stakeholders involved.
- Status report on current condition/status of socio-economic and environmental parameters under consideration in the land use plan (this may include a 'base-map' that describes current condition of land resources and vegetation communities).
- Historical GHG emissions and removals for the historical time intervals are calculated.
- Agreed methods on the analysis of data and the integration of information for presentation to

stakeholders at an appropriate level.

**Common Challenges and Lessons Learned:**

- The necessity to measure historical emission levels and include this information within a land use planning process requires new skills and knowledge, additional resources and possibly introduces new stakeholders into the process. This increased level of complexity will challenge land use planners and place additional pressures on land management agencies.
- Accurate and consistent historical data is notoriously difficult to gather. It is often spread between different line agencies, inconsistent over the time period considered, unreliable in its accuracy and precision, and often poorly and erratically defined.
- Capacity for interpretation of historical satellite imagery is often limited at the sub-national level and generally confined to national capitals. The distance between data analysis and field level interpretation is often a challenge.

**Emerging Opportunities:**

- As outlined in Step 2.1, donor funded REDD+ project and programs are now investing considerable resources in building capacity to collate historical emission data and build capacity for the interpretation of this data. These programs can be used to facilitate cooperation and collaboration for the sharing and reviewing of historical data.

### *2.3 Data and Capacity Gap Assessment*

Objectives of this step are to:

- Determine what limitations there are in the data collected, data precision and accuracy levels, and develop appropriate plans of action to overcome these data limitations.
- Establish a multi-disciplinary team that has the knowledge, skills and capacity required to develop the plan.

Very few land use planning efforts have all the data needed, enough time allotted to collect all the required data at the necessary precision levels and all the necessary personnel to analysis the data. To meet the goals and objectives of the plan (**'known' parameters**), there will likely be data that is unavailable, missing or non-existent (**'unknown' data**). There will also likely be limited capacity to analyze existing data or collect additional data. An **inventory of data** needed should be compiled to determine data limitations, biases, gaps, inconsistencies and quality. In consultation with stakeholders, it should be agreed upon

whether resources (time, human capacity, funding) should be allocated to acquire, construct or synthesize additional data to produce the desired information.

Required levels of data **accuracy, precision and uncertainty** also dictate limitations and data gaps. Precision and accuracy levels need to be agreed by stakeholders early on in the process and **Quality Assurance and Quality Control** protocols established and maintained to ensure accuracy and precision targets are being met. Reporting on the **uncertainty** of the data will likely be required where performance-based emission reduction targets are compensated, or paid for. Reporting on data that is known to be inadequate or not meeting agreed upon precision targets must be avoided, particularly where the possible misuse and application of the **data can pose a risk** of harm.

A low emission land use planning process will need certain skills to be able to account for carbon and quantify emissions within the landscape of interest. However, most land use plans cover multiple disciplines to account for a variety of ecosystem services addressed in the planning process. Therefore, **a multi-disciplinary team** will be required for at least some stage of the planning process. **Building and capacitating this team** will likely be just as important as the actual data required to produce a robust low emission land use plan.

Depending on objectives of the plan the team may include:

- Geographers/spatial analysts specialists;
- Agriculture, forestry and carbon specialists;
- Economists;
- Hydrologists, biologists, wildlife ecologists, and other such specialists;
- Rural sociologists; and
- Policy makers and administrators[15].

[15] Adapted from World Bank Institute (2011), *Estimating the Opportunity costs of REDD+, A Training Manual,* Version 1.3, March 2011 (page 2-7).

**Key Questions:**

- Is the data sufficient and appropriate for meeting the goals and objectives of the plan and for measuring against indicator targets?
- Have data limitations been documented and an appropriately resourced plan of action been developed to overcome these limitations?
- Do quality assurance and quality control procedures need to be established for the collection, storage and analysis of data? Has the data collected met the accuracy and precision targets set out in Step 2.1?
- What knowledge and capacity development is required for all team members responsible for the development of the low emission forest and land use plan?

**Considerations and Possible Sequencing:**

- Complete an inventory of the data collected to determine data limitations, biases, inconsistencies, accuracy levels and low or poor quality data.
- Decide on how data limitations should be overcome and whether additional resources are required.
- Where data limitations are known but cannot be resolved, document and circulate to stakeholders.

**Outcomes:**

- A multi-disciplinary team that has the capacity and resources to produce the required plan.
- Data inventory and identification of data limitations and gaps.
- Where appropriate, implement actions to overcome data and information limitations and gaps (where individual or institutional capacity is the limitation, specific strategies may have to be developed to overcome capacity constraints).
- Where data limitations and gaps remain, document and detail implications for the low emission land use plan.

## Step 3: Analysis of Future Options

The goals of low emission land use planning is **ultimately to determine what land management actions will be taken in the future**. To best evaluate different future management options, it is necessary to estimate future emissions from the landscape if **no action is taken** to lower emissions (i.e., a '**Business as Usual'** scenario[16]). Planning objectives and regulatory requirements are typically qualified early in the planning process (see Step 1) and help define the future vision. New policies and measures need to be considered that ensures the Business as Usual scenario is not followed and the expected environmental and socio-economic outcomes of implementing each of those new scenarios works towards achieving the plan's vision, goals, and objectives.

Typically, a planning cycle is anywhere from five to 20 years but oftentimes a plan's goals operate over much longer time periods, such as climate change mitigation strategies or long-term maintenance of biodiversity stocks. Therefore, the analysis of management options or scenarios on what the landscape may look like in the future will oftentimes exceed that of the current planning cycle.

[16] A Note on definitions: Unfortunately many important terms are used interchangeably throughout the literature. In this document we will use the following:

**Business as Usual (BAU) scenario**: A future emission profile in the absence of any new policies or measures to reduce emissions. The BAU is what is expected to happen if a low emission plan was never established.

**A Baseline**: This is a generic term that describes a point or line from which future measurements can be made. A BAU scenario can be used as a baseline, but you could also have an historic emission baseline, or a future baseline projecting poverty rates or species numbers.

**Reference Level (RL):** A specific type of baseline that refers specifically to the quantity of GHG emissions and removals in the absence of a low emission plan. It is the terminology used by the UNFCCC upon which actual GHG emission and removals are measured against – it is how 'performance' is measured. It is really the same as a BAU baseline.

**Reference Emissions Level (REL)**: A REL generally refers to emissions only from deforestation and degradation activities. (A RL refers to both emissions from deforestation and degradation and removals from activities that enhance carbon.)

### *3.1 Modeling Future Trends*

The objective of this step is to:

- Reach agreement with stakeholders on the most appropriate method to project GHG emissions, socio-economic and environmental parameters into the future.

Since consequences of management actions (or inactions) cannot be guaranteed, an assessment of the likely, or most probable, outcomes of implementing the land use plan scenarios is needed. These are then compared to the likely outcomes of no plan (i.e., Business as Usual). Modeling is a method used to predict an outcome based on the best available data or knowledge of the ecosystem process being modelled. Models can be 1) very quantitatively complex, data intensive, statistically rigorous and expert driven; 2) strictly qualitative in nature based solely on stakeholder opinion; or 3) anything in-between these two. Often the most complex or analytically rigorous models are not necessarily the most useful. Sometimes the best model is often the simplest because it can be understood by stakeholders who may be required to make informed decisions on the model's outputs.

Data needed for baseline construction, scenario development and the evaluation of options will be built from the data (environmental, economic, and social resource data) needed for the assessment of historical and current condition (see Section 2.1). However historical data may only provide half the picture due to changing climate adding additional variability and uncertainty into projected future scenarios.

**Key Questions:**

- Has the future time period that the plan will cover been confirmed? (Step 1.3 should have considered this issue.)
- What model or approach is the most appropriate to project GHG emissions and non-emission parameter into the future? Will different parameters require different approaches or models to make predictive forecasts into the future?
- Are the data that have been identified in Step 2.1 adequate for the agreed approach?
- Can outcomes of the modelling approach be communicated to all stakeholders in such a way that they can make informed decisions based on the modelling outcomes?

**Considerations and Possible Sequencing:**

- Decide the level of sophistication of the predictive model and the parameters to be considered in the model.
- Select or build model. (There are a number of purpose built models [see section on 'Useful

References, Tools and Resources'] each with advantages and disadvantages. A review of possible models may be needed to select an appropriate one. If none of the models provide the necessary functionality or only a very simple model is required, a predictive model may have to be built.)

- Test the model with a number of known parameters and assess accuracy of model outputs.
- Run model, record outputs and document outcomes for stakeholder analysis and interpretation.

**Outcomes:**

- Modelling needs are defined for GHG emission and non-emission benefits based on the agreed goals and objectives of the plan (Step 1.3), data availability (Steps 2.1 and 2.3) and stakeholder interests and capacities (Step 1.2).
- Modelled outputs are recorded, documented, and possibly synthesized for stakeholder interpretation.

**Common Challenges and Lessons Learned:**

- There is a common tendency to build highly complex models when simple approaches are sufficient. The model and modelling approach must be based on stakeholder's ability to positively contribute to the development of the model and interpretation of the model's outputs. If this does not occur, no matter how accurate or important the model's outputs are, results will be ignored or simply dismissed as irrelevant.
- 'Rubbish in – Rubbish out'. The outputs from any model will only be as good as the data and assumptions used to build the model. Not critically considering data limitations, gaps or inconsistencies (examined in Step 2.1) may lead to flaws or errors in the model outputs – ultimately leading to poor land use planning decisions. Not clearly stating and agreeing on assumptions used to build the model may lead to stakeholders rejecting the model.

**Emerging Opportunities:**

- A number of land use, conservation and cost-benefit models have now been developed that are relatively easy to use (See 'Useful References, Tools and Resources'). Likewise the functionality of Microsoft Excel allows simple models to be developed that are often sufficient in many land use planning processes.

### *3.2 Business as Usual Construction*

The objective of this step is to:

- Establish Business as Usual baselines upon which future scenarios can be compared. (Guidance provided here focuses on setting a potential future 'business as usual' GHG emission scenario, but baselines for other metrics may also need to be established depending on the goals of the low emission plan).

To adequately evaluate potential future scenarios, a business as usual (BAU) scenario (or BAU baseline) must be constructed (figure 4). Alternative future scenarios can then be assessed and measured against this BAU. The BAU evaluation provides information on the positive and negative impacts of **current development** objectives, and forecasts the likely future social, economic, and environmental trends should the BAU scenario continue. This allows for **alternative scenarios** to be considered which may maintain the positive attributes, while mitigating the negative impacts, and provides an opportunity to compare and contrast tradeoffs, risks, and benefits among alternative approaches. An outcome may be recommendations on how the proposed plan objectives, priorities or general scenarios may be optimized to meet desired conditions. This is especially critical for determining BAU emission levels as the **'additionality'** assessment of scenarios against BAU will provide the incentive and mechanism for implementing different actions.

There are three basic ways to construct a baseline scenario: 1) use a single value as a reference condition, generally based on a **historical average** that is well documented 2) using **historic data** to develop a trend analysis, or 3) model an existing or new **policy** that will alter the historic baseline. BAU scenarios are most commonly constructed for emissions but development of BAU scenarios and consequences for other ecosystem services such as wildlife habitat, biodiversity, hydrologic function, or economic development will help in balancing competing interests during the scenario assessment process. Regardless of what parameter a BAU baseline is being set for, the BAU and the process by which it is set should be transparent, consistent, comparable, complete and accurate.

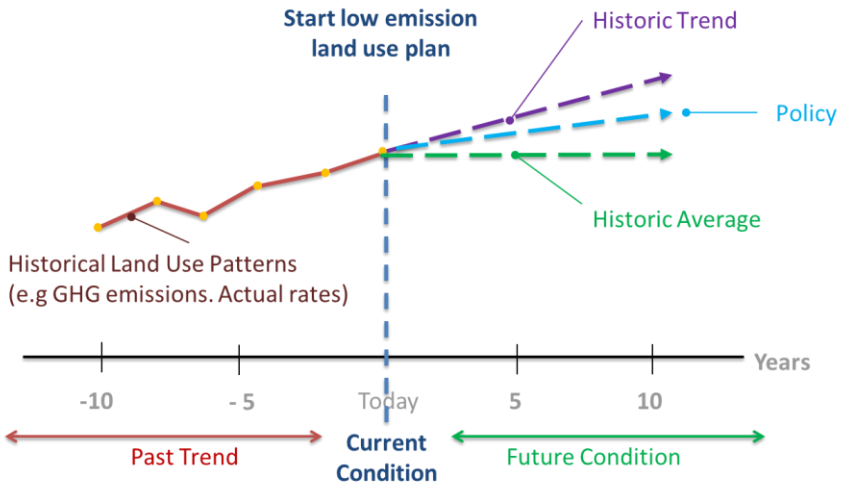


**Figure 4:** Future Projection Types Based on 'Business As Usual' Scenario

**Key Questions:**

- Based on historical emission levels (calculated in Step 2.2), what are the expected future emissions levels under a scenario of 'business as usual' or no change in current management practices?

**Possible Additional Questions:**

Because the emphasis of this guidance document is on low emission land use planning, a priority has been placed on setting a baseline upon which future greenhouse gas emissions and removals can be measured against. If a baseline needs to be set for non-carbon benefits, the following questions could be asked.

- Considering the historical threats to biodiversity or other environmental services (considered in Step 2.2), what are the expected future projections in the biodiversity and environmental parameters being measured if there is no change in current policy and management practices?
- Considering the historical trends in the socio-economic conditions (Step 2.2) of those living within the planning area, what are the expected future projections in the socio-economic parameters being measured?

**Considerations and Possible Sequencing:**

- Examine historical emission levels (calculated in Step 2.2) and decide on future projection methods. This may include: 1) projecting a simple historical average into the future, 2) projecting historical trends into the future, or 3) modelling new policies that may alter the BAU baseline.
- Seek agreement with stakeholders on the BAU baseline.
- If necessary, follow a similar process for the establishment of a BAU baseline for non-emission

parameters.

**Outcomes:**

- A Reference Level for greenhouse gas emissions and removals is established and agreed upon by stakeholders.

*Possible Additional Outcome:*

- A baseline for non-emission benefits (environmental and socio-economic) is agreed and quantified.

**Common Challenges and Lessons Learned:**

- If accurate historical data is not available, making valid assumptions upon which to predict a Business as Usual scenario is difficult.
- Setting a BAU baseline is a policy decision and therefore political pressures may come into play. The goals of the planning process (Step 1.3), stakeholder capacity (Step 1.2), data availability and accuracy levels required (Step 2.1) and reporting requirements (step 5) will provide parameters for a policy to be set, but there will be incentives for some policy makers to over or underestimate the BAU scenario.
- The 'nesting' or integration of project and/or sub-national Reference Levels into national level Reference Levels will be complex. Agreeing on common definitions, resolutions, methods and boundaries across vertical and horizontal scales is proving to be a considerable challenge across Asia.

**Emerging Opportunities:**

- Very few greenhouse gas BAU baselines have been established. This provides a wonderful opportunity to explore and share lessons learned between various projects, programs and sub-national planners now attempting to set a baseline. The sharing of information and learning should lead to an openness and desire to share methodologies across jurisdictional and sector boundaries.

### *3.3 Scenario Assessment*

Objectives of this step are to:

- Develop future greenhouse gas emission scenarios and related social, environmental and economic benefits and risks for each of these emission scenarios.

- Establish assessment criteria for which the benefits and risks of each scenario can be assessed against the agreed BAU scenario and the goals and objectives of the planning process.

A scenario is a logically constructed and **realistic 'story' about the future** and is critical in allowing a variety of possible futures (and their trade-offs and uncertainties) to be explored. It is not simply considering 'business as usual', but looking at impacts on the land use plan from such things as economic and market changes, resettlement patterns, new land and resource use policies, rules on land use and eligibility, changing composition and intensity of land use drivers, impacts of payment for environmental services on land use, and carbon estimates and pricing.

**Stakeholder engagement is critical** in constructing and evaluating different future scenarios. Before scenarios are constructed, the incentive structures related to the key stakeholders must be identified. For example, some stakeholders may wish to promote a scenario for expanded conversion of natural forest to plantation while others may wish to promote a scenario where natural forests are maintained for non-timber forest products. Alternatively, some stakeholders may wish to promote protected status to minimize human disturbance on a sensitive ecological population. When considering emission trends, economic development and ecosystem service scenarios, multi-dimensional results can become complex quite rapidly. It is often best to **distill different 'single factor' scenarios** (e.g., emission or economic growth) into a 'planning' or 'management' scenario for comparison purposes. A simple example (figure 5) might be:

**Scenario 1:** Promote Economic Growth

- Emissions exceed BAU
- Forest cover decreases by 30%
- Roads are expanded into previously un-roaded areas

**Scenario 2:** Balance Economic Needs with Conservation

- Emissions are less than BAU
- Forest cover is maintained at current levels
- Existing roads are improved for greater transport of goods

**Scenario 3:** Promote Conservation

- Emissions are less than BAU
- Forest cover increases by 10% due to afforestation measures
- New roads are not permitted with Protected Area and current roads are closed.

Considering different scenarios within each **land use zone** (i.e., agricultural zone, settlement zone, forest zones, etc.) within the jurisdiction may help the multi-stakeholder negotiation process to reach and/or agree to targets that may be set for each land use zone. This may also facilitate discussion on **'leakage'** between zones (within a jurisdiction) and facilitate communication between disparate stakeholders on ways to resolve this problem.

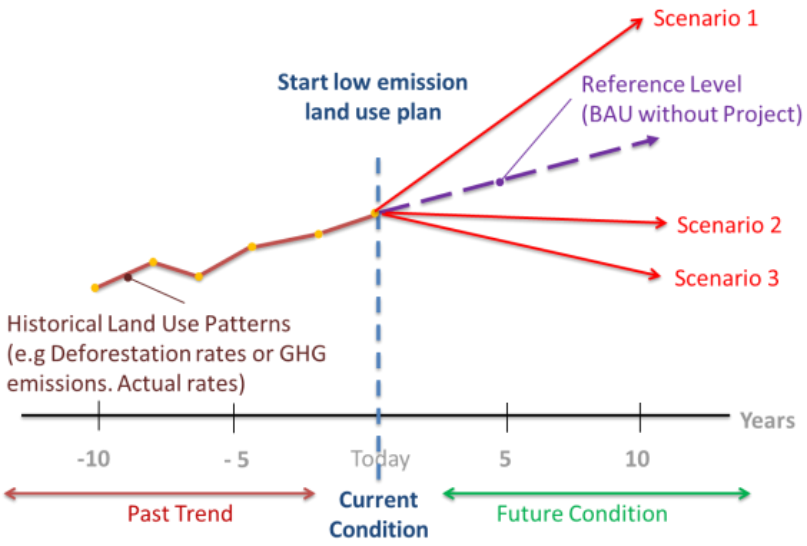


**Figure 5:** Modeled emission levels (or some other planning parameter) under 3 land use planning scenarios

A range of criteria can then be developed which should represent how well **one or more scenarios respond to the goals and objectives of the plan** (see Step 1.3) and identified stakeholder interests. By conducting the benefit analysis, the trade-offs among alternatives can be displayed and an evaluation of how each alternative responds to meeting the plan goals and objectives can be determined more easily. Regardless of the method selected, the process of identifying the **trade-offs** (as defined as a loss [disadvantage] of one thing with a gain [advantage] in another) for each scenario (figure 6) needs to be presented to stakeholders for them to make a valued judgment on the most appropriate course of action in context of the goals and objectives of the planning process. A simple trade-off assessment for the above example might look something like below.

| | Employment | Biodiversity | Forest Cover | Water | GHG Emissions |
|---|---|---|---|---|---|
| Scenario 1 | +++ | -- | - | + | -- |
| Scenario 2 | - | - | + | + | - |
| Scenario 3 | - | ++ | ++ | - | ++ |

**Figure 6:** Simple example of scenario trade-offs[17] ('+' indicates gains, '-' indicates losses)

[17] Note: This simple example provides the outcomes of a hypothetical qualification or quantification of different ecosystem services based on data. If this effort melds into a value-based assignment of scenario preferences by

**Key Questions:**

- What future greenhouse gas emission scenarios are possible under a variety of probable management and policy decisions and socio-economic trends? What scenarios are possible under these same conditions for the non-emission parameters being considered?
- What are the criteria for selecting one scenario over another scenario? What is the process to generate the criteria and has the process been open and inclusive?
- What are the socio-economic and ecological trade-offs (gains/benefits/advantages or losses/risks/disadvantages) of implementing those scenarios?
- Have these trade-offs been mapped or compared against the 'business-as-usual' baseline set in Step 3.2?

**Considerations and Possible Sequencing:**

- Identify appropriate stakeholders to be involved in scenario assessment process.
- Identify focal questions or criteria (including the plan's goal and objectives) for judging or scoring each of the scenarios.
- Develop the scenarios.
- Analyze each scenario by reaching agreement on the advantages or disadvantages (trade-offs or cost-benefits) of each scenario and a comparison with the BAU baseline scenario.
- Document the outcome of the process and circulate among stakeholders.

**Outcomes:**

- Greenhouse gas emission and non-emission scenarios are projected forward based on a variety of probable policy and management decisions and socio-economic trends.
- Each scenario is assessed against a number of assessment criteria (including the plan's goals and objectives) as well as the BAU scenario and trade-offs for each of the scenarios are agreed by all appropriate stakeholders.

**Common Challenges and Lessons Learned:**

- Setting assessment criteria and agreeing on ranking preferences is a process commonly directed by stakeholders of high office. This may lead to decisions in which the preferences and needs of side-lined or vulnerable stakeholders are ignored and the full risks and benefits of any scenario are not fully evaluated and understood. The challenge in this step is to ensure the process of setting and agreeing on assessment criteria and scenario trade-offs is open and transparent and

stakeholders, then this process could easily merge into a stakeholder prioritization exercise described in Step 4.1.

not dominated by a select few or unnecessarily delayed through unproductive consultative processes.

- Data to fully assess the risks and benefits for all scenarios may be difficult to collect. This however should not be used to skip or ignore this importand step. Where data gaps are known, there should be documented and revisited as the implementation plan is written (Step 4) and implmented and monitored (Step 5).

**Emerging Opportunities:**

- There are a number of relatively simple tools and methods now available to help with an integrated assessment of the value of environmental services (e.g., INVEST). Likewise there is a growing body of knowledge on simple and participatory processes to assess the social and environmental risks of any land use plan (e.g., Social and Biodiversity Impact Assessment (SBIA).

## Step 4: Negotiate and Prioritize Implementation Plan

As with most of the previous land use planning steps, stakeholder engagement is critical in negotiating scenarios, finalizing the plan, and implementing the plan's management actions. Although not all stakeholders will be active in finalizing and implementing the plan, their ability to participate in scenario evaluation is critical to ensuring the success of the plan in the long-term. If certain stakeholders are left out of the process, the potential for conflict over land and use rights is certain to be high. Once consensus is reached on a preferred scenario, prioritization and sequencing of implementation activities is conducted. This will involve political will, institutional capacity, and clear roles and responsibilities. An additional critical element for moving the agreed scenario into operational plans is determining the implementation costs and how to finance specific activities.

### *4.1 Negotiate Preferred Development Pathway*

Objectives of this step are to:

- Reach agreement on one scenario that is considered to provide the most benefits for the broadest range of stakeholders.

Once scenarios have been developed and the trade-offs for each scenario are clearly documented, a negotiation process is required to select one scenario, or development pathway that will meet most of the needs of most stakeholders (figure 7). As different stakeholders tend to have significantly different expectations of how the land resource can (or should) be managed, reaching consensus can be a difficult process. For example, a scenario that reduces greenhouse gas emissions by eliminating all deforestation or forest

degradation activities may not meet the needs of certain stakeholders who require a certain level of timber revenue or agricultural conversion to maintain modest economic growth for local communities.

Conversely, deforestation that creates an economic boost for some communities may result in degradation of water quality and destruction of agricultural lands from flooding in a downstream community. A successful mediated negotiation will allow stakeholders to express their divergent needs but move forward on a process of identifying and working towards an agreement on **joint interests** that include reducing emissions of greenhouse gases while maintaining critical ecosystem services and economic growth.

No stakeholder is likely to get everything they had hoped for from the agreement but conversely, every stakeholder should feel that their most important needs are meet by the selected scenario. In addition, different stakeholders will hold different positions of power and influence in the negotiation process which can intimidate or dis-enfranchise certain stakeholders. Since the negotiation process can be more inter-personal than scientific, a good **mediator** might be required to: open communication channels, balance power differentials, provide procedural steps and help all stakeholders (regardless of their power or influence) reach common ground and develop an acceptable agreement. Where a negotiated process is not possible, alternative avenues to reach agreement (e.g., through the courts) may have to be sought.

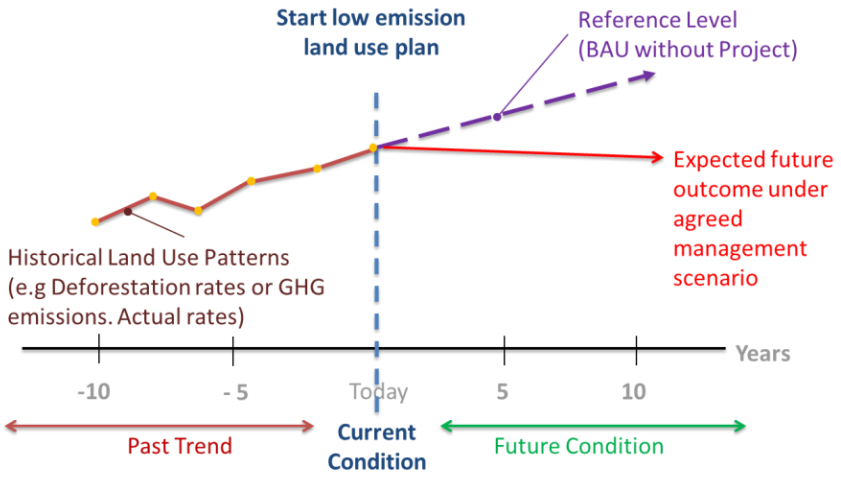


**Figure 7:** Agreement on future planning scenario and expected future outcomes

**Key Questions:**

- Will the negotiation process be open, transparent and equitable for all stakeholders?
- Is the level of importance and power to influence the negotiation process for each stakeholder known and actions to 'level-the-playing' field being considered? Will a third party be required to facilitate the process?
- Are the positions, incentives and underlying interests of those stakeholders negotiating a land use planning known?
- Are stakeholders involved in the negotiation process representing their constituents? If so does the process allow time for them to consult with their constituents, seek feedback and have this feedback included in the process?
- Who has the ultimate authority to approve this decision and how will the agreement be communicated to all relevant stakeholders?

**Considerations and Possible Sequencing:**

- Gain agreement on the process and place to negotiate and finalise the low emission land use plan. Consider the need for a third-party to facilitate the process.
- Identify stakeholders that should attend the meeting (or series of meetings), recognising possible constraints to their attendance (e.g., meeting times, meeting venues, etc.). Communicate roles and responsibilities for all involved in the process.
- Establish process and 'ground-rules' for reaching agreement on the preferred scenario.
- Document agreement, noting dissenting views and communicate outcome to all stakeholders.
- Seek approval for the final agreement through the relevant authorities and agencies.

**Outcomes:**

- The process to evaluate alternative scenarios and negotiate a decision is established and agreed upon by all appropriate stakeholders.
- An agreement or decision on the low emission land use plan to be implemented is reached.
- Agreement is approved by relevant authorities and communicated to all stakeholders

**Common Challenges and Lessons Learned:**

- Negotiating land use decisions are complex and difficult tasks. Powerful stakeholders tend to dominate and actively advocate their interests, often ignoring the risks to vulnerable stakeholders or those excluded from the process.
- De facto tenure and resource use rights of local communities are often ignored or extinguished

through poorly conceived land use plans. Tenure is a complex issue, further compounded by the unregulated or unknown status of carbon rights.[18]

- While the authority for approval and implementation of many land use plans is often known, contradictory, complex and confusing policies and regulations often mean these authorities, and the plan itself, is often ignored. The classic example is a village or district land use plan which is ignored during provincial planning processes or where a private investor's needs (which are often granted at the provincial level) run counter to the agreed land use plan.

**Emerging Opportunities:**

- There is a significant history in facilitating and negotiating land use plans. Lessons learned and best-practice guidance can be easily accommodated to include additional planning parameters, such as GHG emissions. Those knowledgeable and skilled in land use planning should be mobilised to contribute to the low emission land use planning process.

### *4.2 Prioritize and Sequence Implementation Activities*

Objectives of this step are to:

- Agree on a realistic, sequenced and time bound process for moving the agreement into an operational plan.
- Assign roles and responsibilities to appropriate stakeholders for the implementation of the plan.

Land use planning tends to be strategic in nature and the tactical implementation follows a decision on the parameters or 'boundaries' in which actual management activities can occur on the ground. The **prioritization and sequencing of activities determines the "what, where and how"** and may involve a **different set of stakeholders** than those who participated in the negotiation process. This is also the time to consider integration both vertically (decisions and actions above or below the current planning level) and horizontally (across different sectors).

Common elements to consider in prioritizing actions include: political support to establish policy and legal frameworks; mandating roles and responsibilities of stakeholders for implementation; capacitating and resourcing local implementation agencies and organizations; timing of implementation activities (do some activities need to occur before others due to some environmental, social, or economic factors?); and allocating 'feasible'

[18] A discussion of carbon rights is beyond the scope of this document. The guidance provided here is simply to support a more inclusive and balanced decision on land use planning where reducing GHG emissions is a requirement under national or sub-national regulations or goal of local stakeholders.

implementation packages to the appropriate implementers (usually by sectors but coordinated by the overall planning authority). The level of effort (e.g., time, labor, political/social capital) needed to implement activities will affect the 'how' and 'when', and potentially 'where' those activities occur.

The prioritization and sequencing of activities can oftentimes be influenced by the financing mechanisms used or elements of a **Benefit Distribution System** (BDS) put in place for the low emission land use plan. A BDS commonly contains **opportunities** (e.g., revenue, infrastructure, education, health, etc.), **security** (e.g., ecosystem service, tenure and access rights, etc.), and **empowerment** (e.g., capacity building, stakeholder engagement). Benefit sharing creates legitimacy for the plan for all stakeholders and as a result, promotes 'positive' actions by institutions and individuals.

**Key Questions:**

- What policy or political decisions need to be made for the low emission land use plan to be implemented? Have roles and responsibilities for implementation been assigned to and agreed by the appropriate stakeholders?
- What actions and implementation activities will have immediate impact and should be prioritized? Which actions can be delayed or implemented later? What actions and implementation activities can be bundled into feasible implementation packages?
- What actions and implementation activities must be prioritized for subsequent actions to be implemented (i.e., do vulnerable communities need to be consulted before policies on forest conservation are enacted?)

**Considerations and Possible Sequencing:**

- Consider regulations and other regulatory requirements both vertically and horizontally (including any safeguard requirements) that will influence the priorities, sequencing and implementation mechanism for all actions.
- Determine responsible authority for coordination of the plan implementation in addition to identifying specific institutions and organizations that will implement specific activities within their sectors.
- Determine whether the institutions and organizations have adequate resources and capacity to fulfil their responsibilities.
- Prioritize activities and write the tactical plan in implementation 'packages'. Widely circulate to all responsible stakeholders to implement.

**Outcomes:**

- A specific time sequenced implementation plan is agreed upon that clearly outlines what actions and implementation activities must take place, where these activities will take place, how these activities will be implemented and which stakeholder(s) is responsible for implementation.

**Common Challenges and Lessons Learned:**

- Low emission land use plans are not being integrated into national and sub-national regulatory frameworks and the few low emission land use plans that have been developed remain isolated. As an example there is still uncertainty as to how Vietnam's Provincial REDD+ Action Plans will be incorporated into the provincial Forest Development Protection Plans or the provincial Social and Economic Development Plans.

- Due to the 'untested' and politically 'ambiguous' nature of low emission land use plans that are now being produced, political leaders and leaders of high-influence are showing some scepticism or reluctance to take ownership. Ownership currently remains with lower level technicians that have responsibility for development but not implementation.

- Related to the above issue, while low emission land use plans must be inherently multi-disciplinary and cross-sector in nature, agencies and ministries outside the forestry sector are showing only vague interest in application and ownership.

**Emerging Opportunities:**

- The emergence of valid and proven results-based or performance-based mechanisms where funding is truly incentivized has the potential to transform low emission land use planning. These mechanisms could prioritize the development and implementation of low emission land use plans across all sectors.

### *4.3 Implementation and Financing Needs*

Objectives of this step are to:

- Determine implementation needs (technology, capacity, and financial) of stakeholders and, if necessary, develop a resourcing/financing plan.
- Agree on institutional coordination and (if necessary) joint responsibility for the implementation of the low emission plan.
- Understand implementation costs and explore financing mechanisms for a low emission land use plan.

Moving plans to on-the-ground actions often requires a change from the status quo. Changes in perceptions, capacity, actions, and process will help drive innovation. Innovation is critical to overcoming challenges brought about by the uncertainties of climate change. In addition to embracing change and innovation, enhancing relationships (i.e., connections) between people and institutions (civil society, government entities, implementing agencies, etc.) involved in the plan (either through a coordinating, implementing, or benefit receiving role) should be strengthened.

For a 'User' of the plan (e.g., individuals) to be successful, they must have the knowledge, skills, attitude, technology, and resources to fulfil their roles and responsibility for plan implementation. In addition, to support those 'Users', the 'Delivery Agency' they work for must have organizational capacity in things such as strategy, structure, shared values and commitment to the agency's goals and objectives. If both individual and institutional capacity does not currently exist, measures must be taken to build the needed capacity.

The costs of implementing a low emission land use plan can be categorized as **Opportunity costs**, **Implementation costs**, and **Transaction costs**. Opportunity costs the cost of an alternative that must be forgone in order to pursue a certain action and are usually considered in scenario development and assessment (Section 3). However, implementation and transaction costs are important **financial considerations** that must be considered to ensure that there are adequate resources to fully implement and execute the plan. Without financial security to implement the plan, a well-established plan will soon run into financial constraints and bottlenecks.

Budget allocation from line ministries or even municipal allocations should be considered as the primary source of funds. This will engender ownership and integration with other planning processes. External funding through results-based mitigation programs, such as REDD+, National Appropriate Mitigation Actions (NAMAs) or other climate financing are emerging and may provide important financial incentives for the reduction of greenhouse gas emissions and enhancement of associated social and environmental benefits (often called multiple or co-benefits).

**Key Questions:**

- Do stakeholders assigned with implementation tasks have the necessary capacity, technical resources and financial support to implement their allocated tasks? Are they willing to change to facilitate innovation? Does a separate financial, human resource, technology or capacity building plan need to be developed to overcome known or anticipated limitations?

- What institutional coordination mechanisms or organizational capacity development measures need to be strengthened or established to regulate joint-responsibility between agencies and/or facilitate the allocation of necessary resources for the implementation of the plan?

- Do incentives (financial or in-kind) need to be built-into the implementation plan to ensure adequate and appropriate responses by stakeholders? Have sanctions or penalties been developed and agreed if stakeholders fail to meet agreed implementation targets?

**Considerations and Possible Sequencing:**

- Secure authority and financial resources for the implementation of the plan. If appropriate resources cannot be secured, revisit the strategized actions developed in Step 4.2.

- Assess technology, human resourcing, financing and capacity needs for both individuals and institutions. If necessary, develop an action or resourcing plan to overcome known or anticipated limitations.

- If required, develop a financing plan based on expected avoided greenhouse gas emissions and removals and the potential to 'bundle' other ecosystem services. (This financing plan is to attract 'start-up' funds and is not performance-based.)

- Incorporate sufficient incentive mechanisms in the plan to incentivize stakeholder responsibility for action at an expected level of functional quality.

- If required, set up appropriate penalty structures if responsible stakeholders fail to meet agreed implementation deadlines or acceptable levels of quality (this should be linked to the plan's monitoring and evaluation plan outlined in Step 5).

- Implement plan according to sequenced actions established in Step 4.2

**Outcomes:**

- The low emission land use plan is implemented according to agreed roles, responsibilities, deadlines and resourcing schedules.

- If required, action strategies are written to leverage additional resources (including financial)

and strengthen stakeholder capacities.

**Common Challenges and Lessons Learned:**

- As low emission planning is new, new processes and practices are required. This means change and change is hard.

- Because early discussion on REDD+ focused on payment mechanisms, financial flows and monetary values of carbon credits, efforts were directed to discussing and designing benefit distribution systems and the establishment of safeguards to ensure equity and transparency in these systems. Unfortunately much of this work has preceded the development of any plan and what emission reduction levels may be possible. The challenge of overcoming the high (financial) expectations some stakeholders have from REDD+ and low emissions strategies continues.

- The technical capacity for the development of low emission land use plans continues to be built within many land management agencies. But 'known' implementation challenges and bottlenecks remain including limited/no resources for implementation by lower level land management agencies, limited/no private sector involvement, confused/complex implementation responsibilities and limited/no 'local level' stakeholder engagement in setting planning objectives.

- Historically, capacity needs assessments were generally not completed and it was simply expected 'Users' and 'Delivery Agencies' were capacitated and incentivized to implement. Financial gaps often meant capacity gaps were ignored.

**Emerging Opportunities:**

- The setting of national and sector emission targets (see Step 1.3) is providing an important opportunity to genuinely 'mainstream' low emission plans within sector and socio-economic development plans. It is hoped this will result in more funded, substantive and sustainable greenhouse gas emissions and removals when compared to a 'project' level approach.

## Step 5: Monitoring, Evaluation, and Adaptive Management

Land use planning is not a one-time event; situations change, unexpected actions occur (such as natural disturbances) and climatic patterns are changing, so **strategies and implementation tactics must adapt**. A land use plan is a living document, and should be continuously monitored and periodically evaluated **to determine** whether the plan is achieving its objectives, or if conditions and assumptions upon which the plan is based have changed. A monitoring and evaluation framework should be an **integrated component** of a land use plan, and can provide the information to assist stakeholders in evaluating outcomes, quantifying **co-benefits**, and measuring impact. Because of the uncertainty in natural resource processes, climate change, and socioeconomic pressures, a low emission land use plan must subscribe to the principles of **Adaptive Resource Management** (ARM). Monitoring and evaluation results will help guide changes in plan implementation tactics to support an ARM approach to ensure ecosystem sustainability to support ecological and socioeconomic goals for the long-term.

### *5.1 Define the Monitoring and Evaluation Framework*

The Objective of this step is to:

- Understand the elements necessary to develop a monitoring and evaluation (M&E) plan, including the factors necessary for the execution of a successful plan

**Monitoring** is a continuing function that focuses on the implementation process and progress towards the achievement of land use planning objectives. **Evaluation** is a selective exercise done at specific time intervals to determine how well the planning activities have met expected objectives and/or the extent to which changes in outcomes can be attributed to the low emission land use plan.

The successful development, implementation and sustainability of a M&Esystem requires four essential building blocks: 1) Vision, 2) Capacity to supply information, 3) Capacity to use information, and 4) Political support to ensure Longevity. The vision requires strategic leadership and political will to change. The capacity to supply M&E information requires a commitment to resource the M&E system as well as providing an enabling environment to allow it to develop and mature. Technical capacity includes both the existence of credible and relevant data and information-gathering systems as well as the skilled personnel to gather, analyze and report on the performance of government policies and programs. The capacity to 'use' M&E information requires government institutions to actually incorporate and use the M&E information as part of the normal process of business to ensure the system is supported in the long-term. Longevity (and sustainability) comes through political commitment to invest and use the M&E system to learn, change and adapt to remain relevant and useful.

The successful development and implementation of an M&E system takes more than political will. **Even with a resource commitment to invest in M&E development, the technical hurdles may require a lengthy process** to put in place and develop credible data systems; train needed M&E specialists; and educate managers throughout the system on how and where M&E information will be used. This is generally a lengthy and iterative process, as the experience of most countries using M&E systems would attest to; and, one where allowance for continuous learning and improvement through oversight mechanisms is particularly beneficial to the improvement of the M&E system.

A low emission land use plan should set a net emission reduction target, or at least a low emission development pathway, and monitor progress towards this target. The monitoring framework should also describe what other targets (e.g., co-benefits or other ecosystem service) will be monitored and how this will be done. The framework elements will often mimic the criteria used for scenario development; as these were the things most important to stakeholders. These elements will usually be categorized as 1) environmental; 2) economic; 3) social and 4) emission reductions. It is important to monitor both impact and process so that process (e.g., participation, administrative procedures, communication protocols) can be constantly improved and the outcome (i.e., impacts) adjusted.

The low emission development plan should also document how often the monitoring and collection of data will take place and who will be responsible for the data collection. The monitoring methods and timing/frequency of data collection should be appropriate to be able to adequately assess an indicator. **Methods must be**: Accurate; reliable; cost-effective; feasible and appropriate[19]. Performance indicators measure progress and achievements, as understood by the different stakeholders. Indicators can be quantitative (e.g., number, percent, rate) or qualitative (e.g., compliance, extent, level). They can also be indirect (or proxy) indicators that approximate or represents a phenomenon in the absence of a direct measure. The components of a generic monitoring and evaluation framework might look something like what is shown in figure 8.

| Element | Indicator | Target | Method | Frequency | Responsibility | Reporting Mechanism |
|---|---|---|---|---|---|---|
| **Environmental** | Forest canopy cover is maintained | 60% Forest Cover | Remote Sensing Change Detection | Annual | Department of Forestry | Every 3 years |

**Figure 8:** Example of a simple monitoring and evaluation framework

[19] Adapted from Conservation Measures Partnership (2013), *Open Standards for the Practice of Conservation*, Version 3.0/April 2013. Terms also further defined in Appendix 1.

**Key Questions:**

- What is driving the demand for M&E? How will M&E information be used? By whom? And, for what audience(s)?
- Is there commitment or safeguards in place either by political and institutional will or policy to not only launch an M&E exercise, but to also sustain it for the long-term?
- Is there capacity (data systems & infrastructure) to collect reliable data in addition to adequate analytical capacity (skilled personnel) to analyze and report credible information results?
- Is the M&E information that gets reported credible, timely and responding to the priority issues?
- Will the 'performance' of the M&E system itself be measured? Adjusted as necessary?

**Considerations and Possible Sequencing:**

- Convene a stakeholder consultative meeting to review the plan's goals, objectives and agreed baseline and gain agreement on the indicators and targets that will measure progress and performance, as measured against the baseline and the plan's intended goals and objectives.
- Document the M&E plan, assigning roles and responsibilities to appropriate stakeholders for the implementation of the plan.
- Review required capacity and resources for implementation and develop strategies where gaps or limitations may exist, including bringing in experts where specialist knowledge and skills as needed to measure and monitor specific indicators (e.g., wildlife numbers, greenhouse gas emissions from forest degradation, changes in livelihood levels of vulnerable communities)
- Circulate the M&E plan to all appropriate stakeholders.

**Outcomes:**

- An M&E plan is documented and circulated, including roles and responsibilities for the responsible agencies and stakeholders.

**Common Challenges and Lessons Learned:**

- M&E process (e.g., participation, gender, administrative procedures, communication protocols) is difficult, challenging and often ignored. But important. A robust M&E plan needs to focus on specific and measurable bio-physical targets, but must also focus on stakeholders, their interactions and the targeted beneficiaries.
- Many REDD+ projects and programs have placed a considerable emphasis on the development of a Measuring, Monitoring and Verification (MRV) system specific to greenhouse gas emissions, often at the expense of establishing an accurate and agreed baseline. Development of a MRV

system (or an M&E plan) without setting a baseline line is 'putting the horse before the cart'.

**Emerging Opportunities:**

- A number of climate change mitigation programs (i.e., USAID LEAF) have now established robust M&E plans and methods for measuring greenhouse gas emissions and changes in livelihood and environmental indicators as a result of the project/program. These programs provide examples and knowledge and skills that other low emission programs can build upon.

### *5.2 Monitor, Measure, and Evaluate Progress*

Objectives of this step are to:

- Determine what is required to implement a Monitoring and Evaluation (M&E) plan.
- Implement the M&E plan by continually monitoring, measuring, and periodically documenting and evaluating progress towards performance indicators aimed at achieving the plans goals and objectives.

Many inventory frameworks currently exist to **monitor and measure** (see section on 'Useful References, Tools and Resources') and those methodology frameworks should be leveraged to help provide useful information that can be applied across sectors and jurisdictions. Stakeholders should assist in the gathering and analysis of the monitoring information when possible and monitoring data should be stored in a transparent format that is accessible to all stakeholders.

An information management system should be constructed for the storage, retrieval, and distribution of data and derived information. A good information management system and associated policies will prevent loss or corruption of the data and will also facilitate a process to ensure data quality. It also provides a basis for data transparency through the publication of data collection standards and distribution mechanisms.

To adequately **evaluate** monitoring data, an analysis plan will help determine how the information collected will be organized, classified, inter-related, compared and displayed relative to the evaluation questions. These data are then interpreted to give meaning to the findings derived from the analysis. This information will be used to evaluate if the monitoring targets are being met or 'performance' is achieved (figure 9 presents a simple illustration of measured 'performance'). This evaluation process should assess if the goals and objectives of the plan are being met, and if they are not, what is the cause. It is also a

time to determine if the methods used for monitoring are providing enough information to adequately assess the indicator of the target.

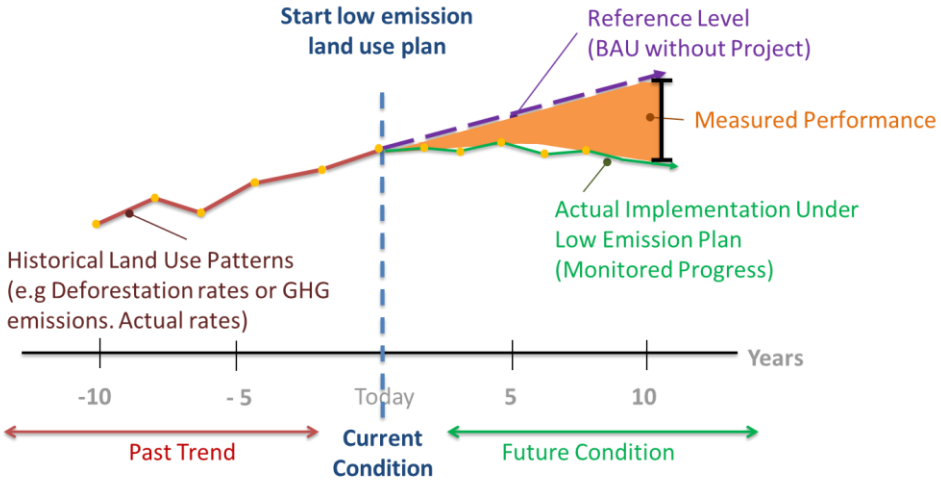


**Figure 9**: Hypothetical monitored and measured parameter(s) for any payment for environmental service activity that may include low emission planning.

During the evaluation process, it is best to consider alternative ways to compare results and generate alternative explanations for findings and indicate why these explanations should be discounted. Recommending actions or decisions should be consistent with the conclusions and be limited to situations, time periods, persons, contexts and purposes for which the findings are applicable.

**Key Questions:**

- When will data be collected? Who is responsible and what resources are required?
- Are special approvals required from authorities and stakeholders for the collection of this data?
- Are certain statistical methodologies required to achieve required accuracy levels for the data (i.e., before and after measurements and/or control and intervention measurements).
- What quality control and quality assurance (QA/QC) systems must be established?
- How will the data be stored? Who has access to it and permission to edit or revise it? Is it secure from loss or corruption?

**Considerations and Possible Sequencing:**

- Gain necessarily approvals for data collection.
- Establish and communicate QA/AC protocols to all stakeholders involved in data

collection.

- Complete any training that may be required (e.g., training for local community members in participatory carbon monitoring, or participatory rural appraisal methods to measure livelihood changes).
- Collect data as agreed under the M&E plan and the QA/QC protocols.
- Establish an appropriate information management system that allows for the storage and retrieval of collect data and information.
- Record, upload and store all data in the information management system according to the QA/QC protocols.
- Assign responsibility for analysis of the M&E data and reporting of progress to the required authorities.
- Prepare data, analyse results and draw preliminary conclusions from the data. Present data and information in a format appropriate for stakeholders to draw their own conclusions and recommendations.

**Outcomes:**

- QA/QC protocols are established and communicated to all stakeholders involved in the data collection process.
- A consistent and coherent information management system is established.
- Data is collected according to the M&E plan, the QA/QC protocols and uploaded and stored in the information management system.
- Monitoring reports that describe the M&E outcomes are published in a format appropriate for all stakeholders that is submitted to the relevant authorities.
- Evaluation report(s) that assesses the results or progress of the implementation activities against the plan's goals, objectives and baseline(s).

**Common Challenges and Lessons Learned:**

- Data complexity, data overload and finding a balance between collecting critical data and data that is simply 'good to know' is a difficult balance to find (a very similar challenge to those outlined in Step 2.1). Remember that the objective of collecting data is to derive good information to improve decision making.
- QA/QC of data collection, storage and analysis is generally very poorly done. However, it is a critical element of a robust M&E system. Investing sufficient resources in setting up and communicating good QA/QC protocols is a worthy investment.

- Developing and implementing an M&E plan is generally considered the last step of the planning cycle. It therefore receives little attention leading to sub-optimal M&E plans and systems. Developing an M&E must commence at Step 1.1 and be integrated across all steps. Without this, a piecemeal approach to M&E may eventuate.

**Emerging Opportunities:**

- There are now a growing number of projects that are trying to combine the measurement and monitoring of carbon and non-carbon benefits. One such project is the SNV project, 'Delivering Environmental and Social Multiple Benefits from REDD+ in South East Asia (MB-REDD)'.

### *5.3 Adaptive Management*

Objectives of this step are to:

- Ensure stakeholders have access to and understand monitoring results to adequately determine whether any changes need to be made in tactical implementation of the plan or even to the plan's goals and objectives.
- Understand what **adaptive resource management** (ARM) is and the importance of this to the low emission land use planning process.

A key feature of adaptive management includes creating an open and transparent process that shares learning with all stakeholders. Lessons learned from an evaluation comprise the new knowledge gained from the M&E process that is applicable to and useful in other similar contexts. Monitoring results (i.e., the synthesis of monitoring data collected) need to be presented to stakeholders in a format appropriate for them to draw their own conclusions and recommendations.

Once monitoring results have been reported and discussed among stakeholders, there may be a need to make adjustments to the plan or tactical implementation of activities if monitoring targets are not being met. This final part of the planning process is essential to build learning and knowledge among a broad range of stakeholders and further adapt and modify the low emission development plan as needed. This **adaptive management principle** relies heavily on the trust and relationships built by stakeholders through the entire planning process.

Adaptive management is the process of managing natural resources in the face of **uncertainty**. Where much of the measurement, evaluation, and reporting of monitoring results are very much science-based, the iterative phase of what to do in the face of unexpected results (or when results indicate that the plan's goals and objectives are not being met) is as much art as it is science. Especially considering the unknown impacts of

climate change on ecosystems, a change in tactical implementation of the plan or even revisiting the plans goals and objectives may be warranted. However, as long as stakeholders are engaged in the adaptive management decision-making process and the process is transparent and defensible, it will lead to acceptance and long-term success of the plan.

**Questions:**

- Are stakeholders engaged in a process to review and evaluate progress towards the desired state (as articulated in the plan's goals and objectives)?
- If progress is not sufficient, are outcomes from the M&E process being used to revise and adapt the low emission plan's strategic goals and objectives, implementation tactics or management systems?

**Considerations and Possible Sequencing:**

- Convene stakeholder meeting to review and reflect upon progress against the baseline(s), targets, objectives, goals and assumptions. Seek consensus on results or performance, applicability of original assumptions and goals, validity of indicators and targets and where results or performance is not being achieved, mechanisms to improve performance.
- Write and submit adaptive management recommendations to responsible authorities.
- Document what has been Learned and share widely with all stakeholders involved in the process.

**Outcomes:**

- Agreement amongst stakeholders on the results, performance or impact of the plan. This assessment may include reaching agreement on necessary implementation (tactical) changes or strategic changes to the plan's goals and assumptions.
- Presentation to relevant authorities of any recommended management or implementation changes to and, if necessary, assessment of the implications of these changes, including moving back to Step 1.1 and adapting the plan based upon the low emission planning cycle.
- A consultative workshop(s) and supporting document that generates knowledge of key result areas and stakeholders learnings. This may include possible ways to adapt implementation of the on-going or new low emission planning processes.

**Common Challenges and Lessons Learned:**

- There are no jurisdictional low emission forest and land use plans whose performance has been evaluated and outcomes reported. The lack of examples upon which others can follow and adapt is the single biggest challenge to development of a low emission land use plan. This guidance document hopes to fill a part of this void by drawing upon other sources to illustrate likely steps

forward.

**Emerging Opportunities:**

- Just as there is a challenge for planners because no jurisdictional low emissions forest and land use plan that has been evaluated and reported on, it also presents a number of emerging opportunities. Support is being provided through donor projects and international support and national interest in Low Emission Development Strategies or Green Growth Strategies is growing..

# Useful References, Tools and Resources

This section provides useful references, tool and resources corresponding to each of the Framework steps outlined above.

### Introduction and General References

The following is a list of general references and web resources that provide general guidance on a range of low emission land use planning processes.

The most important and most thorough set of reference material is available through the USAID LEAF **Regional Climate Change Curriculum Development program**. The module, **Low Emission Land Use Planning** provides a comprehensive set of material covering all 5 steps of the low emission development planning framework.

#### *Land Use Planning*

- Wehrmann, B. (2011), *Land Use Planning: Concepts, Tools and Applications*, February 2011, Published by GIZ, Eschborn, Germany.
- The Land Portal – a web resource

#### *Conservation Planning*

- Conservation Measures Partnership (2013), *Open Standards for the Practice of Conservation*, Version 3.0/April 2013
- The Open Conservation Measures Partnership – a web resource

#### *Low Emission Development Planning*

- Low Emission Development Strategy Gateway – a web resource
- Low Emission Capacity Building Program – a web resource
- Platform for Climate-Smart Planning – a web resource

#### *Carbon Accounting*

USAID LEAF Program has produced many important decision support tools and guidance documents on a range of REDD+ related issues – please review USAID LEAF's Tools and Resources.

#### *Key LEAF references include:*

- Walker, S., Swalis, E., Petrova, S., Goslee, K. Casarim, F. Grais, A. and Brown, S. (2012), *Technical Guidance on Development of a REDD+ Reference Level*, Developed by Winrock International for the USAID LEAF Program.
- Brown S., Casarim F., Goslee, K. Grais, A. Pearson, T. Petrova, S. Swails, E. and Walker, S. (2013). *Technical Guidance Series for the Development of a National or Subnational Forest Monitoring System for REDD+: **Framework Document***. Developed by Winrock International under the USAID LEAF Program.
- USAID LEAF's Technical Guidance Series for the Development of a National or Subnational Forest Monitoring System for REDD+

- USAID LEAF (2013), *Technical Guidance Series for the Development of a National or Subnational Forest Monitoring System for REDD+:* ***Activity Data for Deforestation***, Developed by Winrock International under the USAID LEAF Program.
- USAID LEAF (2013), *Technical Guidance Series for the Development of a National or Subnational Forest Monitoring System for REDD+:* ***Emission Factors for Deforestation***, Developed by Winrock International under the USAID LEAF Program.
- USAID LEAF (2013), *Technical Guidance Series for the Development of a National or Subnational Forest Monitoring System for REDD+:* ***Estimating Historical Emissions for Deforestation***, Developed by Winrock International under the USAID LEAF Program.
- USAID LEAF (2015), *Technical Guidance Series for the Development of a National or Subnational Forest Monitoring System for REDD+:* ***Forest Degradation Guidance and Decision Support Tool***, Developed by Winrock International under the USAID LEAF Program.
- USAID LEAF (2014), *Technical Guidance Series for the Development of a National or Subnational Forest Monitoring System for REDD+:* ***Calculation for Estimating Carbon Stocks***, Developed by Winrock International under the USAID LEAF Program.
- USAID LEAF (2013), *Technical Guidance Series for the Development of a National or Subnational Forest Monitoring System for REDD+:* ***Forest Carbon Stratification Using NFI Data***, Developed by Winrock International under the USAID LEAF Program.
- USAID LEAF (2015), *Technical Guidance Series for the Development of a National or Subnational Forest Monitoring System for REDD+:* ***Developing a Reference Level for Carbon Stock Enhancements***, Developed by Winrock International under the USAID LEAF Program.

- Broadhead, J., O'Sullivan, R., Costenbader, J., Pritchard, L. and Conway, D. (2012), *Decision Support Tool, Integrated REDD+ Accounting Frameworks: Nested National Approaches,* the USAID LEAF Program.
- Gibbon, A., Pearson, T., Walker, S., Broadhead, J., Andrasko, K. (2014), *Planning Guide: Integrating REDD+ Accounting Within A Nested Approach,* USAID LEAF program.

***Other important references include:***

- Walker, S, Pearson, T. Swails, E. Salas, W. Braswell, B. and Corbiere, M. *Analysis of Approaches for Landscape Based Accounting of GHG Mitigation from Agriculture, Forest and Other Land Use Activities* (Unpublished), Draft report submitted to the World Bank under WB1080640
- Harris, N., Pearson, T. and Brown, S. (2012), *Decision Support Tool for Developing Reference Levels for REDD+,* Prepared by Winrock International for the Forest Carbon Partnership Facility.
- Harris, N., Pearson, T. and Brown, S. (2012), *Draft Methodological Framework for Developing Reference Levels for REDD+*. Prepared by Winrock International for the Forest Carbon Partnership Facility.

***Drivers of Historical Landscape Change***

- ARKN-FCC (2014), *Decisions Support Tool – Identifying and Addressing Drivers of Deforestation and Forest Degradation*, Prepared by USIAD LEAF for AFKN-FCC.
- USAID LEAF and FAO reviewed drivers of forest change in the Greater Mekong Subregion and released the regional report:
    - Costenbader, J., Varns, T., Vidal, A., Stanley, L. and Broadhead, J. (2015), 'Drivers of Forest Change in the Greater Mekong Subregion: Regional Report', USAID LEAF and FAO.
    - For each of the five Greater Mekong Subregion countries a supplementary report was also produced:
    - Drivers of Forest Change in the Greater Mekong Subregion- **Cambodia**.
    - Drivers of Forest Change in the Greater Mekong Subregion- **Lao PDR**.
    - Drivers of Forest Change in the Greater Mekong Subregion- **Myanmar**.
    - Drivers of Forest Change in the Greater Mekong Subregion- **Thailand**.
    - Drivers of Forest Change in the Greater Mekong Subregion- **Vietnam**.
- Other important references include:
    - Kissinger, G., M. Herold, V. De Sy. *Drivers of Deforestation and Forest Degradation: A Synthesis Report for REDD+ Policymakers*. Lexeme Consulting, Vancouver Canada, August 2012.
    - Geist, H. and Lambin, E. (2001), *What Drivers Tropical Deforestation? A Meta-analysis of Proximate and Underlying Causes of Deforestation Based on Subnational Case Study Evidence,* (LUCC Report Series; 4)

## STEP 1: UNDERSTANDING THE ENABLING ENVIRONMENT

### Step 1.1 – Context Assessments (Integrated Jurisdictional and Cross-Sectorial Assessment)

USIAD LEAF and the United States Forest Service completed a review to identify regional best practices and progress towards sustainable and financially viable Low Emission Development Strategies (LEDS) for the forestry and land use sector across Asia.

- Barber, J., Grinspoon, L., Stephen, P. and Blate, G. (2015), *A Regional Review of Low Emission Plans, Development Strategies and Mitigation Activities in the Forest and Land Use Sectors*, USAID LEAF and United States Forest Service International Program.

A regional workshop on **'Regional Forum on Developing and Financing Low Emissions Development Strategies for the Agriculture, Forestry and Other Land Use Sector: Moving from Promise to Practice'** also presents the most up-to-date information on the regional context in which low emission land use plans are now evolving.

Apart from USAID LEAF's work in Lam Dong Province Vietnam, Madang Province Papua New Guinea, the Nam Xam National Protected Area in northern Laos and the Maesa-Kogma Man and Biosphere Reserve in northern Thailand an number of other useful guidance documents have been produced:

- At the local/community level, the Lao PDR National Agriculture and Forestry Research Institute have produced the excellent document: 'Handbook on Participatory Land Use Planning. Methods and tools developed and tested in Viengkham District, Luang Prabang Province'
- At the sub-national level, the World Agroforestry Centre have produced some excellent guidance and support in:
  - Indonesia (please see the: LUWES: Land use planning for Low Emission Development Strategy)
  - Vietnam (please see the document: 'An Assessment of Opportunities for Reducing Emissions From All Land Uses. Vietnam Preparing for REDD – Final National Report'.
- The Earth Innovation Institute have also published the excellent document, '*Fostering Low-Emission Rural Development From The Ground Up'*.
- At the national level: Various national governments (including Cambodia, Indonesia, Malaysia, Papua New Guinea, Philippines and Vietnam) have all produced Green Growth strategies or Low Emission Development Plans.

As this guidance document is aimed for land use planners at the sub-national level, there will need to be some discussion of how the low emission forest and land use plan will be integrated (or ***'nested'***) with higher level plans or other sectorial plans. USAID LEAF has produced useful guidance on 'nesting' REDD+ projects:

- 'Decision Support Tool: Integrated REDD+ Accounting Frameworks, Nested National Approaches'.

### Step 1.2 - Stakeholder Engagement, Roles and Responsibilities

There is a huge variety of stakeholder analysis tools that may be used. Two useful sources are:

1. Multi-Stakeholder Processes Knowledge Co-Creation Portal (hosted by Wageningen University) and the publication Tools for Analysing Power in Multi-stakeholder Processes - A Menu. Useful tools in this publication include: 'Importance against Influence Matrix', 'Stakeholder Characteristics and Roles Matrix', 'Spider Web Network Diagram' and 'Net-Map'.
2. Power Tools: For Policy Influence in Natural Resource Management (web resource produced by IIED). Useful tools include: 'Stakeholder Influence Mapping', 'Stakeholder Power Analysis' and 'The Four Rs'.

Gendered roles and responsibilities in a land use planning process are also essential considerations that will have important and long-term impacts in the equitable and sustainable implementation of any agreed plan. USAID LEAF project has published the Gender Mainstreaming Strategy and Checklist that provides useful guidance on this issue.

### Step 1.3 – Development of Goals and Objectives

The general literature on the project management cycle and monitoring and evaluation presents numerous processes and examples of setting broad and inclusive goals and objectives for any planning process. The Conservation Measures Partnership have produced an excellent guide on setting result-orientated conservation targets, objectives and goals:

- Open Standards for the Practice of Conservation (specific information related to this step is outlined in Section 2A of the document).

## STEP 2: ASSESSMENT OF HISTORIC AND CURRENT CONDITIONS

### Step 2.1 – Environmental, Social, and Economic Data Needs and Methods Compilation

GHG emission and removal data needs:

- USAID LEAF and Winrock International have published a number of useful documents that considers key decisions and data need for calculating GHG emissions and removals from the forest and land use sector:
  - Decision Support Tool for Developing Reference Levels for REDD+; and Draft Methodological Framework for Developing Reference Levels for REDD+.
  - Activity Data and Emission Factor, calculation of Historical Emission Levels from Deforestation and Forest Degradation Guidance and Decision Support Tool.
- A further document published by USAID LEAF, SNV and Winrock on 'Participatory Carbon Monitoring: Operational Guidance for National REDD+ Carbon Accounting' provides further insight into GHG data requirements and the role of stakeholders in collecting and assessing this data.

Social and Biodiversity Impact Assessment:

- CCBA, Forest Trends, FFI and Rainforest Alliance have jointly produced the 'Social and Biodiversity Impact Assessment (SBIA) Manual for REDD+ Projects' which considers both social and biodiversity data requirements to assess impact.

Biodiversity Data:

- An additional resource is the SNV and UNEP document, 'Participatory Biodiversity Monitoring for REDD+: Considerations for National REDD+ Programmes'.

Social Data:

- This is a specialized field with a tremendous amount written. Parallel to the SBIA Manuals is the useful Forest Carbon, Markets and Community publication, 'Methods for Assessing and Evaluating Social Impacts of Program-Level REDD+'

Economic Development Data:

Relevant data may be available from national census data, sector production statistics, business reports, household level production figures or district/provincial/national strategic plans.

### Step 2.2 – Understanding Historical Land Use Change and Current Condition

- USAID LEAF has supported ASEAN ARKN-FCC publish the 'Decision Support Tool: Identifying and Addressing Drivers of Deforestation and Forest Degradation'
- USAID LEAF has produced several guidance documents on estimating historical emission levels. The key reference is the 'Reference Level Technical Manual'.
    - First order estimates from forest degradation have been published in the USAID LEAF (2015), *Technical Guidance Series for the Development of a National or Subnational Forest Monitoring System for REDD+:* ***Forest Degradation Guidance and Decision Support Tool***, Developed by Winrock International under the USAID LEAF Program and at the regional 2015 USAID LEAF workshop on 'Moving on From Experimental Approaches to Advancing National Systems for Detecting, Measuring and Monitoring Forest Degradation Across Asia'
- A number of important global data sets are available that can now provide first order estimations of historical forest and land use change at a resolution appropriate for sub-national planning. The most important is likely to be the University of Maryland's assessment of Global Forest Change (2000-2013).
- First order estimation of Emission Factors can be derived from the IPCC Emission Factor Database

### Step 2.3 – Data and Capacity Gap Assessment

No specific references or resources are recommended for this step.

## STEP 3: ANALYSIS OF FUTURE OPTIONS

### Step 3.1 - Modelling Future Trends

There is broad array of potential models that can support low emission land use planning processes. Some important ones include:

- USAID Carbon Calculator (http://www.afolucarbon.org/) allows users to systematically estimate the CO2 benefits and consequent climate impacts of agriculture, forestry and other land use (AFOLU) programs worldwide. Emission reductions and removals can be quantified at the sub-national and project level for: forest protection, forest management, afforestation/reforestation, agroforestry, crop management and grazing management.
- The IDRISI Land Change Modeler (http://www.clarklabs.org/products/Land-Change-Modeling-IDRISI.cfm) is a suite of software tools to measure, project and assess land cover change and the associated implications for habitat and biodiversity conservation. (The IDRISI Land Change Modeler now incorporates the **GEOMOD** model developed by SUNY College of Environmental Science and Forestry).
- Marxam (http://www.uq.edu.au/marxan/) is a tool to assist in developing multiple-use zoning plans for natural resource management.
- Integrated Valuation of Environmental Services and Tradeoffs (INVEST) (http://www.naturalcapitalproject.org/InVEST.html) is a tool for conservation and environmental

planners to estimate, evaluate and integrate ecosystem services into natural resource planning and decision making.

- The Conversion of Land Use and its Effects (CLUE) (http://www.ivm.vu.nl/en/Organisation/departments/spatial-analysis-decision-support/Clue/index.asp) is a tool for the quantitative multi-scale analysis of actual land use and the modeling of land-use change scenarios.
- EX-Ante Carbon Balance Tool (EX-ACT) FAO toll - http://weadapt.org/knowledge-base/synergies-between-adaptation-and-mitigation/the-ex-act-tool
- Area Production Model - http://www.ncbi.nlm.nih.gov/pubmed/11505767

### Step 3.2 - Business as Usual Construction

The key resource to provide guidance on setting a BAU GHG emission scenario is the USAID LEAF 'Reference Level Technical Manual'.

### Step 3.3 - Scenario Assessment

A number of models outlined in Annex 3 provide the option for developing and assessing various scenarios, for example the Integrated Valuation of Environmental Services and Tradeoffs (INVEST) model. Other specific cost-benefit analysis tools include the:

- World Bank Institute's 'Estimating the Opportunity Costs of REDD+, A Training Manual'; and
- REDD ABACUS Software (an open source software developed by the World Agroforestry Centre).

A excellent guide produce by CARE provides guidance on facilitating a participatory scenario planning process:

- CARE (2012) Decision Making For Climate Resilient Livelihoods and Risk Reduction - A Participatory Scenario Planning Approach, Care International, Nairobi Kenya.

## STEP 4: NEGOTIATE AND PRIORITIZE IMPLEMENTATION PLAN

### Step 4.1 - Negotiate Options

Reaching a multi-stakeholder agreement through a negotiated process is a complex and specialised field. Highly contentious and debated land and natural resource management decisions may require skilled third party mediators to help broker or facilitate an agreement. However understanding the negotiation process and some of the simple tools and techniques that may be used during this process is important. A useful reference guide is the:

- FAO's document, 'Negotiation and Mediation Techniques for Natural Resource Management'

### Step 4.2 - Prioritize and Sequence Implementation Activities

No specific references or tools for this step

### Step 4.3 - Implementation Needs

There is a tremendous amount of literature written on REDD+ financing and other climate mitigation actions (such as Nationally Appropriate Mitigation Actions, NAMAs). Two useful resources include:

- USAID LEAF's 'International Experience With REDD+ And National Forest Funds'; and
- The Climate Change, Agriculture and Food Security analysis of 'How Can Small-Scale Farmers Benefit from Carbon Markets?'

## STEP 5: MONITORING AND EVALUATION

### Step 5.1 - Define Monitoring and Evaluation (M&E) Framework

There is a huge variety of M&E literature that can be adapted to a low emission forest and land use plan. The Conservation Measures Partnership has produced some very useful guidance on establishing an M&E plan for conservation projects that can be easily adapted to low emission forest and land use plans. Please see their document, the:

- Open Standards for the Practice of Conservation

There is also an ever expanding amount of literature specific to the Measuring, Monitoring and Verification (MRV) of greenhouse gas emissions and removals as agreed under UNFCCC negotiations. Specific advice and technical expertise should be sought if a low emission development plan is to be reported under a national or international emission reduction scheme with the expectation of funding through a results-bases system. A useful resource is to start exploring this area is:

- The Asian Community of Practice for Monitoring and Evaluation of Climate Change Interventions

Many of the Tools and Methods already listed provide further support for developing an appropriate M&E plan. Please refer to Tools and Methods listed in Step 2.1 (participatory carbon monitoring, participatory biodiversity monitoring and SBIA), Step 2.2 (USADI LEAF's Reference Level Technical Manual) and Annex 3.

Useful general documents on M&E worth considering are:

- The World Bank (2004), Monitoring and Evaluation: Some Tools, Methods and Approaches.
- UNDP (2009), Handbook on Planning, Monitoring and Evaluating for Development Results, UNDP, New York.

### Step 5.2 – Monitor, Measure and Evaluate Progress

The joint measurement and monitoring of carbon and non-carbon parameters against a baseline or targets has not been well described. Much has been written on MRV systems for REDD+, and the following is a useful (if large) document on this:

- Forest Carbon, Markets and Communities document on, 'REDD+ Measuring, Reporting and Verification Manual'

And much of the work on measuring and monitoring social and environmental benefits is linked to national safeguards, such as:

- World Resources Institute document, 'Safeguarding Forests and People: A Framework For Designing a National System to Implement REDD+ Safeguards'
- Climate Focus document, 'Safeguards in REDD+ and Forest Carbon Standards: A Review of Social, Environmental and Procedural Concepts and Applications'
- SNV's document, 'High Biodiversity REDD+ Operationalising Safeguards and Delivering Environmental Co-benefits' and the work SNV (under the MB-REDD project) has completed on mapping deforestation rates, forest carbon stocks and biodiversity indicators such as terrestrial vertebrate, amphibian and threatened species richness, threatened species richness, conservation corridors. Document is: 'Mapping the Potential for REDD+ to Deliver Biodiversity Conservation in Vietnam'

### Step 5.3 – Adaptive Management

The tools and methods outlined in Steps 5.1 and 5.2 will be equally important in this step. But a useful document produced by The Nature Conservancy does provide some guidance on capturing lessons learned and using this new knowledge to adapt the management and implementation of a project:

- 'A Guide to Capturing Lessons Learned'

## Annex 1: Useful Monitoring and Evaluation Terms.

The following has been taken from the (Conservation Measures Partnership, 2013)

**Vision:** A general statement of the desired state or ultimate condition that a project is working to achieve.

- **Relatively General** − Broadly defined to encompass all project activities
- **Visionary** − Inspirational in outlining the desired change in the state of the targets toward which the project is working
- **Brief** − Simple and succinct so that that all project participants can remember it

**Goal:** A formal statement detailing a desired impact of a project such as the desired future status of a target.

- **Linked to Targets** − Directly associated with one or more of your conservation targets
- **Impact Oriented** − Represents the desired future status of the conservation target over the long-term
- **Measurable** − Definable in relation to some standard scale (numbers, percentage, fractions, or all/nothing states)
- **Time Limited** − Achievable within a specific period of time, generally 10 or more years
- **Specific** − Clearly defined so that all people involved in the project have the same understanding of what the terms in the goal mean

**Objective:** A formal statement detailing a desired outcome of a project.

- **Results Oriented** − Represents necessary changes in critical threat and opportunity factors that affect one or more conservation targets or project goals
- **Measurable** − Definable in relation to some standard scale (numbers, percentage, fractions, or all/nothing states)
- **Time Limited** − Achievable within a specific period of time, generally 3-10 years
- **Specific** − Clearly defined so that all people involved in the project have the same understanding of what the terms in the objective mean
- **Practical** − Achievable and appropriate within the context of the project site, and in light of the political, social and financial context

**Strategy:** A group of actions with a common focus that work together to reduce threats, capitalize on opportunities, or restore natural systems. Strategies include one or more activities and are designed to achieve specific objectives and goals.

- **Linked –** Directly affects one or more critical factors
- **Focused** – Outlines specific courses of action that need to be carried out
- **Feasible** – Accomplishable in light of the project's resources and constraints
- **Appropriate** – Acceptable to and fitting within site-specific cultural, social, and biological norms

**Indicator:** A measurable entity related to a specific information need such as the status of a target, change in a threat, or progress toward an objective.

- **Measurable** – Able to be recorded and analyzed in quantitative and qualitative terms
- **Precise** – Defined the same way by all people
- **Consistent** – Not changing over time so that it always measures the same thing
- **Sensitive** – Changes proportionately in response to the actual changes in the condition being measured

**Method:** A specific technique used to collect data to measure an indicator.

- **Accurate** – The data collection method has little or no margin of error.
- **Reliable** – The results are consistently repeatable - each time that the method is used it produces the same result.
- **Cost-Effective** – The method does not cost too much in relation to the data it produces and the resources the project has.
- **Feasible** – The method can be implemented by people on the project team.
- **Appropriate** – Acceptable to and fitting within site-specific cultural, social, and biological norms.

## Annex 2: Data Considerations

The **horizontal integration** of data is an important consideration. Data and information is very often tightly guarded between different ministries, different departments and even different projects with little incentive for the sharing and agreement on data sources and information standards. Achieving the horizontal integration of data is made considerably harder if a proper stakeholder analysis and consolidation of stakeholder visions and objectives from the land use planning process is not adequately completed.

When compiling data, **vertical data integration** should also be considered. If the best available data is at a much larger spatial or thematic resolution than what is needed for the current planning context, how that will affect the analysis results must be disclosed. There is also a necessity to frame data and information to match the range of comprehension levels of the targeted stakeholders. A good understanding of a certain data source's origin and intended uses (i.e., metadata) is critical to credible and defensible analysis results.

**Transparency** is the key of data compilation and analysis. By establishing data standards, consistency can be optimized across both jurisdictional boundaries. Capacity for information management stewards (e.g., GIS analysts and technicians, planners, ecologists, foresters, social scientists, etc) is often lacking and different departments and ministries would benefit by 'pooling' technical resources. This however, requires the building of trust and cooperation between department heads.

The amount of **error** associated with both spatial and tabular data can vary tremendously. It is important to be aware of the errors associated with data prior to using those data for any subsequent analysis (for example, with geospatial data, this error can be either locational [e.g., features occur in the wrong place on the landscape] or thematic [e.g., features are mis-labeled in the attribute table]). Without a good understanding of the error associated with a specific dataset, when those data are used in analysis or combined with other data, error propagation will occur. Error estimates (if known) are usually disclosed in the datasets metadata (i.e., data about data).

A reliable method of having **confidence** in natural resource data analysis is to compare results based on both map and field inventory data. This is only possible if the map data and field inventory data use a common classification system. For example, to estimate forest cover across a jurisdictional extent using both inventory and map data, a common definition (i.e., classification) of what is considered forest cover is needed.

Social and economic data tend to be non-spatial tabular data of historic trends. These data can often be found from sources such as Social-Economic Development Plans for the jurisdictional level of interest. It is helpful to link these statistics to some geospatial feature (e.g., districts, communities, households) to facilitate any needed spatial analysis in relation to environmental factors (e.g., deforestation rates, agricultural productivity maps).

An inventory of data needed should be made to determine **data limitations, biases, gaps, inconsistencies and low or poor quality data**. Strong stakeholder involvement will keep issues such as data quality and reliability transparent throughout the planning process. The data inventory will need to align both with the goals and objectives of the plan as well as reporting requirements to higher authorities.

A note on **data and information – they are not synonymous**. Information tends to be a synthesis or analysis of data to better inform a situation or to ask a certain question. For example, if one of the objectives identified for the plan is to maintain a certain percentage of forest cover, there are several data sources that are needed to generate that information. Those might include forest and/or canopy cover information, land use category, and some jurisdictional boundary data for which to summarize those data.

# Annex 3: Accounting Approaches

The following has been extracted from:

> Goslee, K.M., et al 2015. Technical Guidance Series for the Development of a National or Subnational Forest Monitoring System for REDD+: Forest Degradation Guidance and Decision Support Tool. Developed by Winrock International and the United States Forest Service under the USAID LEAF Program (available at: http://www.leafasia.org/library/forest-degradation-guidance-and-decision-support-tool)

There are two accounting approaches, **activity-based** and **land-based** (IPCC 2000[20]). **Activity-based accounting** considers specific human activities leading to a change in carbon stocks (i.e. deforestation, forest degradation, livestock grazing, cropping) and estimates emissions separately for each activity. **Land-based accounting** estimates the change in carbon stocks in a specified area of land, regardless of activities occurring. Each approach has advantages and disadvantages.

**Land-based accounting** provides complete accounting of all changes in carbon stock across the identified land areas, irrespective of activity. The total change in carbon stocks is determined for the relevant time period; total emissions or removals are the sum of all stock changes over all applicable land area, net of adjustments. A substantial amount of field data and imagery are required for land-based accounting, resulting in high costs. Moreover, land-based accounting is likely to have high uncertainty in the resulting emissions estimates as the coarseness of methods across entire forest and agricultural areas will miss some types of activities or localized areas of activity.

**Activity-based accounting** is focused on identified activities, with methods targeted to those activities. Total emissions or removals are calculated by summing across all applicable activities. Activity-based accounting may provide higher certainty for individual activities, while increasing cost-effectiveness by focusing on the activities of most impact. It may also allow for better identification of actions that could reduce emissions from that activity (i.e. forest degradation or methane from rice production), as the causes of emissions are known. However, there is the potential to count a given area of land more than once if it is subject to multiple activities, resulting in double-counting and inaccurate accounting.

Implications to consider for both land- and activity-based accounting (IPCC 2000) are described in Table 2.

[20] IPCC (2000), IPCC Special Report – Land Use, Land Use Change and Forestry, Summary for Policymakers

**Table 2:** Implications for use of Land- and Activity-based accounting approaches.

| *Land-Based Accounting* | *Activity-Based Accounting* |
|---|---|
| A method for **full** accounting of all land-based emissions (i.e. forest degradation, rice cultivation, livestock production). | Emissions can be combined across activities, but only accounts for included activities. |
| Statistical sampling of large areas (e.g., a regional forest or agricultural area) at two points in time could capture net effect of emissions and sinks, eliminating need to track separate activities on individual forest patches or agricultural fields. | Where more than one activity occurs on a particular piece of land, carbon impacts of different activities may be difficult to verify. |
| Provides option for measuring and monitoring deforestation, degradation, and enhancement together, but creates difficulty in distinguishing between effects of these activities. | Inherently distinguishes between activities. |
| Requires large amounts of data that are expensive to collect if they do not already exist from a national forest inventory or similar. | Will form the most cost effective approach as the completeness and complexity of accounting approaches can be associated with the significance of emission sources. |
| Does not easily allow measurement of non-$CO_2$ emissions. | Can be used to estimate non-$CO_2$ emissions. |
| Statistical sampling methods for different pools are well-established. Cost varies with required degree of precision and frequency of measurement. Methods can be transparent and results verifiable. | Methods can be transparent, but verification of seasonal activities may be difficult or impossible at a later time. |
| Measurement resolution will likely miss many localized small-scale impacts. | Small scale impacts can be included by activity if deemed significant. |
| May simplify tracking net emissions and removals from place to place or year to year. | Requires development of emission or removal factors for each activity in each region. Some factors may need to be tied to specific land uses or soil types under some conditions. |