

Sustainable Land Management

Guidelines for
Impact Monitoring

SUSTAINABLE LAND MANAGEMENT MODULE

The importance of SLM

Pathfinder Module Guidance for users
Sustainable Land Management Module The importance of SLM
SLM Impact Monitoring Module A seven-step procedure for SLM-IM
Toolkit Module A selection of practical tools and cost-effective methods

SUSTAINABLE LAND MANAGEMENT MODULE

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SLM

Module Summary

Sustainable land management (SLM) is the foundation of sustainable agriculture, and a strategic component of sustainable development and poverty alleviation. In contrast to the situation just a few decades ago, there are currently only a few countries in the world that still have spare land resources to meet the needs of their expanding populations. In the majority of cases, production must be increased and intensified on land already under cultivation. Furthermore, in most developing countries, the majority of people are still engaged in primary agriculture, livestock production, forestry and fishery, and their livelihood and options for economic development are directly linked to the quality of the land and its resources.

SLM seeks to harmonise the often conflicting objectives of intensified economic and social development, while maintaining and enhancing the ecological and global life support functions of land resources. SLM postulates that both these aims can be achieved simultaneously in a true win-win situation if things are done appropriately. In fact, practising SLM principles is one of the few options for land users to generate income without destroying the quality of the land as a basis of production. SLM impact monitoring (SLM-IM) assists in this process by providing methods and protocols for determining whether land management practices are moving in the direction of sustainability or not. In this way, it supports decision-making on project activities and helps to avoid project failures.

SLM can be approached by looking for symptoms of unsustainability, such as soil degradation, water quality decline, loss of biodiversity, increased incidents of plant diseases, etc. Such symptoms are a result of inappropriate land management and exploitation of resources, the causes of which are often societal and political rather than technical or agronomic. SLM can also be approached through analysing the options to manage the land sustainably. Key questions are: Why do land users apply inappropriate management practices, or what keeps them from applying more appropriate technologies? Frequently, land users are aware of degradation but are not in a position to correct it, often due to political and economic circumstances, such as market price distortions, insecure land tenure, misuse of subsidies and incentives, etc. that limit their choice of options to practise SLM.

SLM, therefore, addresses both processes of resource degradation and underlying causes of unsustainability, and indicates possible solutions. However, this requires understanding of the main driving forces that operate at each level - farm, community, region, nation - and the inter-connections between them. The procedure of applying SLM-IM is not one of identifying the best (magic bullet) choice. But when participatory processes are applied with all major stakeholders, SLM-IM becomes a tool for gaining insights and providing guidance on how to effect the necessary changes.

1 Concept and Principles of SLM

Sustainable land management (SLM) can be defined as the use of land resources such as soils, water, animals and plants for the production of goods - to meet changing human needs - while assuring the long-term productive potential of these resources, and the maintenance of their environmental functions

Sustainable land management (SLM) deals with essential elements of the global life support system. Since experience with the detrimental effects of resource exploitation has become widespread, there has been growing awareness that productive lands are getting scarce, land resources are not unlimited, and that the land already in use needs more care. The health and wealth of all people depend on the quality of the land resources, but those who are directly using them may be the first to experience decline in the quality of the land. In developing countries the majority are direct land users who have an immediate interest in using the production potential of their resources, but also in maintaining this potential as the basis for their livelihood and survival. SLM is a delicate balance of production and protection, and the overall goal of sustainable development cannot be reached without giving due consideration to SLM.

SLM plays a central role in sustainable development

The wealth of indigenous resource conservation practices indicates that unsustainable land management and degradation of resources is not always due to lack of awareness on the part of land users. Often, there is more reason for concern that political, social and economic factors limit land users' choice of options to manage land resources in a sustainable manner. For example, insecure land tenure prevents the necessary investment in land care; market prices do not reflect the costs for protection of land resources; conservation activities usually last only as long as inappropriate incentives and subsidies are paid.

In this context, SLM seeks to harmonise the complementary but often conflicting goals of production and environmental protection. The aim must be an agreed trade-off from farm level and community level to the international level. The central question is not how to preserve nature in a pristine state but how to co-exist with nature in order to maintain the functions of the land resources for the benefit of society in a sustainable manner.

SLM focuses on the functions of the environment for the benefit of society

The functions of land resources

Productive functions	to produce food, fodder, fuel, construction material, industrial goods, etc.
Physiological functions	to ensure human health by minimising toxic substances in water, soils and plants, or hazards such as landslides, flash floods, etc.
Cultural functions	to preserve creation and the integrity of the landscape: the role(s) of water, land, forests and animals as an essential part of the cultural heritage, and to maintain the historical and aesthetic value of the landscape
Ecological functions	to ensure maintenance of ecosystem functions and global life support functions, including source/sink capacity for greenhouse gases, filtering of water and pollutants, and maintenance of global geochemical (nutrient) cycles, etc.

It is necessary to take a critical look at the term "sustainability", which is frequently defined absolutely, uniformly or globally. But the concept of sustainability can only be put into practice within a real-life local context. The views and experiences of local land users - which are already included in locally adapted and accepted indigenous technologies - can serve as a basis and be incrementally supplemented by the views of external stakeholders, such as scientists, urban dwellers, politicians, etc. Sustainability should be thought of as a desirable direction in which to proceed rather than a goal in itself. Instead of using the term sustainability, one can talk about a higher or lower degree of sustainability. SLM impact monitoring (SLM-IM) is thus not meant to be used as a measurement against standards of, for example, soil or water quality. Rather, it is intended to be used for understanding changes and observing and establishing trends, indicating whether land management is moving towards or away from sustainability.

Sustainability

There is no standard definition of sustainability, because it incorporates several, at times even conflicting issues, which require reconciliation at local and policy levels:

- Individual perceptions: farmers, pastoralists, forest dwellers, fishermen, policy-makers, scientists, even men and women within the same family may define sustainability differently, according to their own attitudes and economic, social and ecological interests, which are often contradictory and need to be harmonised.
- Spatial considerations: water use in tropical highlands, for example, may be sustainable for the highlanders but unsustainable in adjacent lowlands, where it can cause water shortage; on a local scale, farmers who practice unsustainable land management in the upper part of a catchment can cause flash floods or decline in the quality of drinking water for urban dwellers far away.
- Temporal scales and perspectives: it is not possible - and probably also not desirable - to define sustainability today on behalf of the next generation. But it is possible to maintain the potential of the land resources so that future generations can develop their own values, priorities and possibilities to satisfy their needs.

Within a local context, SLM combines policies, technologies and activities aimed at integrating socio-economic principles with environmental concerns so as to simultaneously:

- maintain or enhance production/services (productivity);
- reduce the level of production risk (security);
- protect natural resources and prevent their degradation (protection);
- be economically viable (viability is given e.g. if the contribution of the activity to income is sufficient to make its continuation attractive);
- be socially acceptable (acceptability is given e.g. if activities are negotiated among all stakeholders, when possible conflicts of interest are addressed and resolved, and when activities adequately meet the needs of poorer people).

These five objectives are known as the "5 pillars of sustainability", and they also represent five essential domains for SLM-IM.

Sustainability - and SLM - is a matter of compromising perceptions and objectives through negotiations among various stakeholders in a real-life local context

2 Looking at SLM from Different Perspectives

SLM requires a comprehensive understanding of a specific society within its environment. Usually, projects cannot wait until detailed studies are conducted and project activities need to be started as early as possible. In this case, there is a high

probability that a lot of unexpected impacts will occur later on. To avoid negative effects, projects need a point of departure to enhance SLM. One of the main questions is, which activities or corrective measures can contribute to SLM? In this respect, the Guidelines suggest two approaches, by looking at SLM in terms of (1) unsustainability and (2) the choice of options land users have to manage their land in a sustainable manner.

Success story or negative example?



Many implementers prefer to base their activities on success stories in other parts of the world, such as an increase in production through reduced degradation. Positive examples offer development opportunities, but it is misleading to assume that they can easily be extrapolated to other areas. Negative examples are useful as a point of departure to identify limitations to SLM, assess why local stakeholders are not in a position to implement SLM under the given circumstances, and determine where to start incremental improvement.

Looking at SLM in terms of unsustainability

Analysis of unsustainable land management can start with the identification of land problems (some publications use the term "land issues"). These are often similar in areas with the same agro-ecological conditions. Symptoms or signs of resource degradation are indications of unsustainability and usually do not occur in isolation. Processes that start degrading one resource will soon affect other resources as well. For example, if drought prevents the growth of plants it leaves the soil bare and soil erosion is likely to occur during the next rain storm. In turn, soil erosion removes part of the fertile topsoil layer, which further limits plant growth. So it is necessary to identify a complex of related land degradation processes to properly design corrective activities.

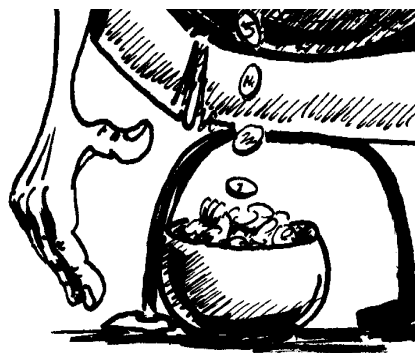
Common land problems	Dominant zone of occurrence
Degradation of soil resources <ul style="list-style-type: none"> • Soil erosion by water • Reduced topsoil depth (reduced water and nutrient retention capacity) • Wind erosion/dust storms, mobile dunes • Nutrient depletion (loss of organic matter, acidity) • Salinisation & alkalinity (under-irrigation, over-irrigation) • Compaction/Crust formation • Toxicity: pollution by pesticides, nutrients, acid rain 	sub-humid (steep lands, semi-arid) sub-humid (steep lands) arid, semi-arid humid, sub-humid arid, semi-arid arid, semi-arid sub-humid, industrial agriculture
Degradation of water resources <ul style="list-style-type: none"> • Depletion of groundwater table • Declining water quality • Sedimentation of water reservoirs • Increasing runoff, flash floods 	arid, semi-arid all all lowlands all
Degradation of plant resources <ul style="list-style-type: none"> • Drought • Reduced biodiversity • Reduced biomass and nutritive value • Reduced plant growth and cover • Plant diseases 	arid, semi-arid all all all all
Degradation of animal resources <ul style="list-style-type: none"> • Malnutrition • Animal diseases • Overstocking 	all all all

Looking for symptoms of unsustainability is a useful point of departure as long as it is not restricted to resource degradation but accompanied by an attempt to look for the reasons behind such symptoms. Most obvious direct causes of degradation are related to inappropriate land management.

Symptom or disease?



If environmental problems are addressed only as symptoms, without due consideration of the socio-economic and political framework, this rather narrow approach (repair-shop mentality) will not result in the necessary changes that are supposed to lead to sustainable development!



Inappropriate land management	Dominant zone of occurrence
<ul style="list-style-type: none"> • Reduction and mismanagement of woodlands 	sub-humid, humid
<ul style="list-style-type: none"> • Monoculture, inappropriate crop rotation 	industrialised agriculture
<ul style="list-style-type: none"> • Increase in cultivation of marginal land 	sub-humid (steep lands), semi-arid
<ul style="list-style-type: none"> • Overgrazing/rangeland degradation 	sub-humid (steep lands), semi-arid
<ul style="list-style-type: none"> • Decreasing length of fallow period 	sub-humid (steep lands), semi-arid
<ul style="list-style-type: none"> • Insufficient nutrient recycling 	all

Again, the identification of inappropriate land management practices is only an intermediate step leading to another level where indirect causes of resource degradation need to be found.

Societal changes and policy issues that may lead to land problems

- Marginalisation of the poor
- Impoverishment
- Malnutrition
- Spreading of diseases
- Rapid population growth or rapid population decline (out-migration)
- Decreasing investment
- Conflicts over natural resources
- Insecure land tenure and property rights, particularly for women as household heads
- Inappropriate environmental regulations and enforcement
- Inappropriate incentives and subsidies
- Imbalanced land reforms
- Rapid modernisation and loss of indigenous knowledge
- Unrealistic prices for land products
- Instability of input prices
- Poor infrastructure
- Insufficient education, training, agricultural extension, etc.

Looking at SLM in terms of land users' choice of options

Land users trigger degradation processes through inappropriate land management. This fact raises two questions: a) what choice of management practices is likely to result in farming systems more sustainable than the current ones; b) what keeps land users from adopting these management practices and systems? A close look at the choice of options available to land users and at limiting factors to more sustainable land management helps to identify both economic options (e.g. proper resource allocation, off-farm income) and political strategies (e.g. secured land rights, tax abatements), rather than only technical options (e.g. relay cropping, irrigation, soil and water conservation).

Any improvement in land management options must be made within the bounds of the natural environment, but it must also optimise inputs, provide better returns on investment and labour, etc. The object of improvement is a step-by-step progression of management options.

Land users' choice of options depends on:

- individual skills, gender-specific experience and knowledge,
- cultural norms and values,
- the economic framework,
- and policies regulating access to and the control over natural resources.



The importance of the political framework

Land users are often aware of unsustainable land management but are not in a position to enhance SLM. Peasants in the Ethiopian highlands are highly aware of soil erosion and they have a complex system of practices and a protective structure to deal with the problems. The socio-economic and geo-political framework, however, is not always supportive of farmers' efforts. For example, until 1991, the civil war absorbed manpower needed for farming; insecure land tenure and associated insecurity prevented the necessary investments in SLM; insufficient infrastructure restricted the availability of agricultural inputs and the marketing of products, and an imposed price policy lowered the real values of agricultural products. Thus, even if there was awareness of the problem, as well as the skills and the will to implement solutions, the political setting severely limited the choice of options available to rural people.

Activity options for enhancing the sustainability of land management

As seen above, SLM can be pursued through two alternative but complementary approaches: (1) unsustainability and (2) land users' choice of options. Both approaches have their benefits and limitations and basically serve to raise awareness of land problems. They should be used according to the project's preferences and needs. Despite the differences, both approaches should basically lead to the same understanding: SLM needs to address resource degradation processes, land management practices, and the social, economic and political framework as well as their inter-linkages. If such systems are identified in a participatory manner involving different stakeholders, indigenous experience and external knowledge (scientific, interdisciplinary expertise, etc.) can form a broad, common pool of possibilities for enhancing SLM. Starting points for corrective action can be found from the farm plot to the national level.

Know the symptoms, the disease and the process

When searching for project activities that have a positive impact on SLM, it is important to consider not only technological options, but also activities that create awareness, improve knowledge, land management skills and local planning procedures, support training and education, enhance institutional development, and tackle important policy issues.

Where to intervene?

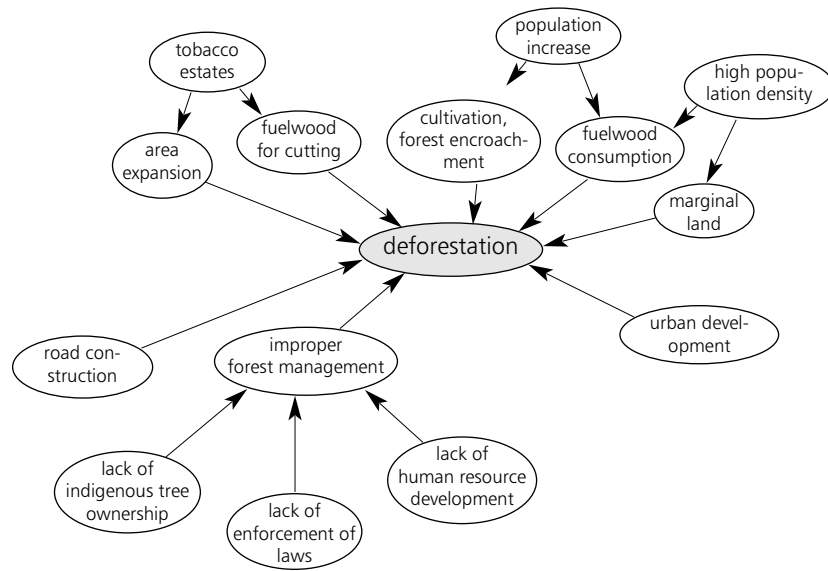


Projects are usually not in a position to intervene on all levels at the same time; they need to concentrate on those key points where their influence will probably be most promising; this may or may not be the point of highest cost-effectiveness. Country programmes should then seek to co-ordinate projects which enhance sustainable development from different angles. In this way, a holistic perspective can be maintained in the long run. The complex set of triggers of environmental degradation can be recognised; this leads to the development of appropriate strategies for corrective action.

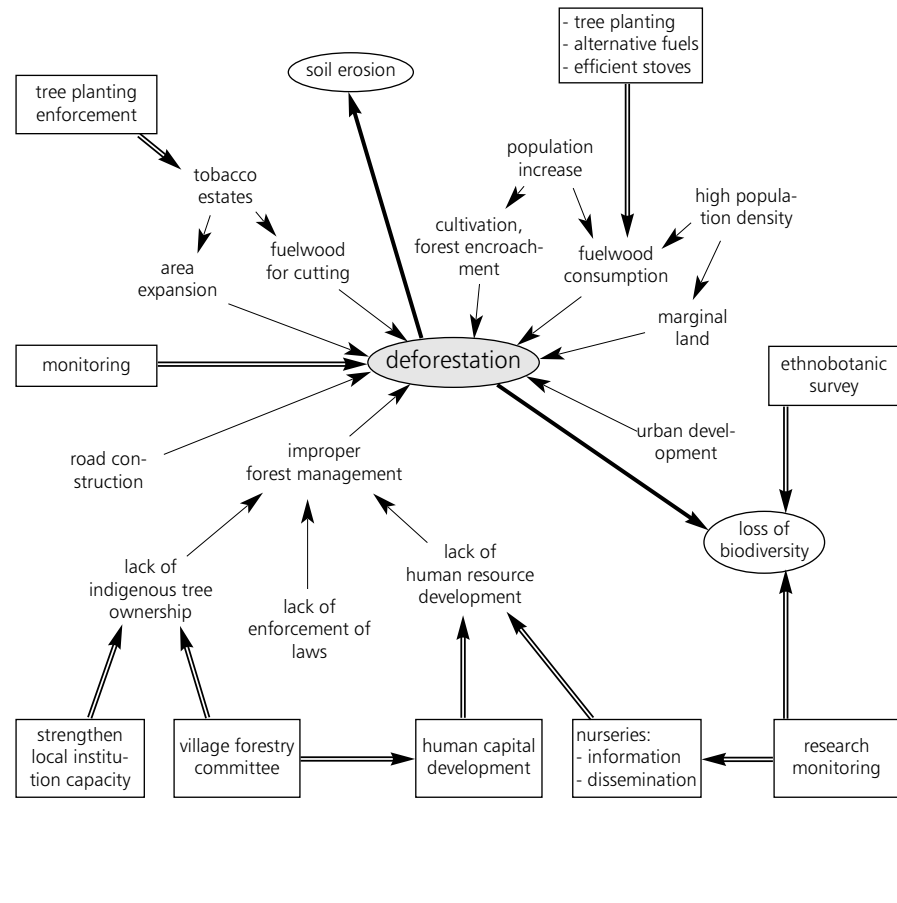


Looking for possible project activities

"Forest sector issues" related to "deforestation"



Possible project activities to address deforestation and consequent degradation processes, such as soil erosion and loss of biodiversity



SLM



Triggers of environmental degradation **Starting points for corrective action**

<ul style="list-style-type: none"> • Land users are unaware of the consequences of land use activities • Land insecurity prevents investment in SLM • Poverty prevents investment in SLM 	<p>Providing information through extension services</p> <p>Land reforms</p>
<ul style="list-style-type: none"> • Rapid population growth leads to cultivation of marginal land 	<p>Policies for poverty reduction along with redistribution of resources; agricultural and economic development</p> <p>Speeding up the pace of innovation and intensification; promoting trade and creating off-farm labour demand; improved education</p>
<ul style="list-style-type: none"> • Rapid population decline leads to neglect in maintaining protective practices • Policy failures create market imperfections, poverty and degradation 	<p>Providing information and technical assistance to the remaining land users</p> <p>Structural adjustment programmes; removing market price distortions; promoting trade or securing access to resources</p>

SLM



Possible project activities on different levels

The table may be adapted to suit specific project conditions

Levels	Activities: development of ...			
	... technology	... human resources	... institutions	... policy
field/plot	soil and water conservation; agro-forestry; improved land husbandry;...			
farm	labour-saving technologies; improved storage and processing of grains;...	empowerment; awareness creation;...		
community		education and training; communication;...	adaptive research; capacity building, dissemination of information;...	
district				secure land rights; equal access and control over resources for both women and men; SLM-enhancing legislation; improvement of infrastructure;...

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