

# Scaling up Sustainable Land Management (SLM) practices by smallholder farmers

Working with agriculture extension services to identify, assess and disseminate SLM practices

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## Challenges of SLM

- Mis-interpretation of the green economy and the modernization of the GoL policy
  - *Specialized market-oriented production of high value crops for improving farmers' economic status*
  - *land use system has rapidly changed from subsistence to industrial crop plantations => Through a great use of agricultural inputs and the overexploitation of natural resources.*
- The unsustainable farming practices are causing land resources to degrade which in addition are challenged by climate.
- The best practices of farmers not well documented and disseminated.

## Scaling up SLM with smallholder farmers in Laos

“Scaling-up SLM practices by smallholder farmers: working with agricultural extension services to identify, assess and disseminate SLM practices”

Overall goal: is to enhance the resilience of smallholder farmers and rural landscapes to climate change shocks by scaling up SLM.

- Create a national SLM knowledge management system supporting extension services
- Support decision-making for scaling up SLM
- Enhance policy frameworks and incentive structures for scaling SLM



## SLM definition

**Sustainable Land Management (SLM)** in the context of the World Overview of Conservation Approaches and Methodologies (WOCAT) is defined as the use of land resources including soils, water, vegetation and animals to produce goods and provide services to meet changing human needs, while simultaneously ensuring the long term productive potential of these resources and the maintenance of their environmental functions.

An **SLM Technology** is a physical practice on the land that controls land degradation, enhances productivity, and/ or other ecosystem services. A Technology consists of one or several measures, such as agronomic, vegetative, structural, and management measures.

# WOCAT is ....

- A **global network** of specialists working in the field of **SLM**
- ... a framework for **Knowledge Management** and **Decision Support** for SLM

## WOCAT tools and methods

1. standardized **questionnaires** for documentation and evaluation of SLM technologies and approaches  
global **database** for storage, search, analysis and exchange of SLM technologies and approaches
2. **mapping** tool for local and regional assessment of land degradation and SLM
3. **decision support** tool for selection and scaling-up of identified best practices



## Questionnaires and Database for documentation and evaluation of SLM practices

Questionnaires on SLM Technologies, Approaches & Mapping

Documenting information from and with land users

Entering data in questionnaire

Data available online

# SLM Global – National database

**WOCAT SLM DATABASE**

Home Search SLM Data Add SLM data My SLM Data Login English

Search

Country: Select or type a country name Project: Select or type a project name Institution: Select or type a name Language: Select or type a language name

Advanced filter for: SLM Technologies SLM Approaches

Only data declared as public are visible.

Your search results (1919)

**Community-based Natural Resource Management [Afghanistan]**  
An approach to community participation in the sustainable management of natural resources  
Compiler: Aqila Haidery 02/09/2016 midnight

**Key Numbers**

- 2090 SLM Practices published from 133 countries by 421 users.
  - 1166 SLM Technologies
  - 475 SLM Approaches
  - 443 UNCCD PRAIS Practices
- 13 new practices drafted in the past 90 days.
- 86187 visits from 198 different countries since launch in August 2016.

Different language (Lao, Chinese, Thai, Khmer, English, French, etc)

## SLM collection documentations

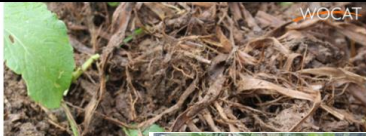
22 SLM technologies has been document and publish on WOCAT database

SLM technologies is belonging to five main categories:

1. Water harvesting and water management
2. Prevention of soil erosion
3. Improvement of soil fertility
4. Livestock management
5. Agroforestry and Intercropping

TECHNOLOGIES	<p><b>Coffee cultivation...</b> Coffee plants cultivated between big trees in sloping fallows for income generation...</p> <p>Compiler: Vongsackda</p> <p>LO EN</p>
TECHNOLOGIES	<p><b>Vegetable garden to...</b> The technique involving the creation of vegetable home gardens on sloping land was...</p> <p>Compiler: Khampheng</p> <p>LO EN</p>
TECHNOLOGIES	<p><b>Cultivation of Bamboo ...</b> Mai Sangphai (Bambusa oldhamii) planting technique for soil erosion control along river...</p> <p>Compiler: kang phanvongsa</p> <p>LO EN</p>
TECHNOLOGIES	<p><b>Local indigenous dyke...</b> A Local Indigenous Weir to Harness Water</p> <p>Compiler: kang phanvongsa</p> <p>LO EN</p>

## SLM documentations



..... 24 ..... 3 ..... 4 ..... 2 ..... 2 .....

### DESCRIPTION

**DESCRIPTION**  
 The authors have been able to identify a number of factors that are associated with the development of the disease. The first factor is the presence of a family history of the disease. The second factor is the presence of a chronic inflammatory condition. The third factor is the presence of a chronic infection. The fourth factor is the presence of a chronic autoimmune condition. The fifth factor is the presence of a chronic endocrine condition. The sixth factor is the presence of a chronic neurological condition. The seventh factor is the presence of a chronic psychiatric condition. The eighth factor is the presence of a chronic respiratory condition. The ninth factor is the presence of a chronic cardiovascular condition. The tenth factor is the presence of a chronic renal condition. The eleventh factor is the presence of a chronic hepatic condition. The twelfth factor is the presence of a chronic hematological condition. 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ເຜົ່າກນົກ ການປຸກຢາງໂບງ ປະສົມປະສານ ກັບການລ້ຽງສັດ ໃນພື້ນທີ່  
(People's Democratic Republic)



ການສ້າງຝ່າຍນັກລ້ານ ໂດຍການໃຊ້ໄມ້ ແລະ ຫີນ (Lao People's Democratic Republic)

**ព័ត៌មានបន្ថែម**

Un'azienda che produceva prodotti per la casa e per il turismo era stata colpita duramente dalla crisi. Il fatturato era diminuito del 40 per cento. Il proprietario, un signore di 65 anni, aveva deciso di vendere la sua azienda. Un'azienda che produceva prodotti per la casa e per il turismo era stata colpita duramente dalla crisi. Il fatturato era diminuito del 40 per cento. Il proprietario, un signore di 65 anni, aveva deciso di vendere la sua azienda.

**DESCRIPTION**

[illegible]

**DESCRIPTION**

[illegible]

## LOCATION



**Location:** ປະເທດລາວ ປະຊາທິປະໄຕ  
ສາທາລະນະ ລາວ  
Laos, Lao People's Democratic  
Republic

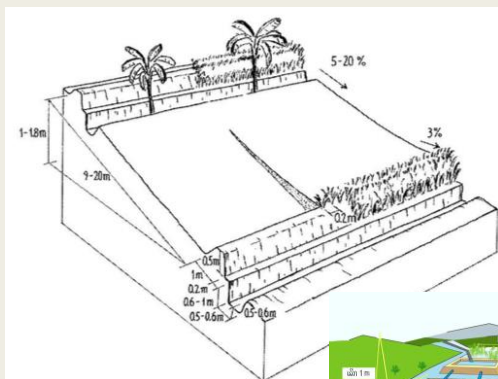
**No. of Technology sites analysed:** 2-10  
sites

**Geo-reference of selected sites**  
• 107.241, 15.67901

**Spread of the Technology:** applied at  
specific points/ concentrated on a small  
area

→ <https://laocat.nafri.org.la>

## SLM Technical drawing of technology



Comprehensive and detailed drawing (including dimensions) of the technology and indicate technical specifications, measurements, spacing, gradient, etc.

The technical drawing is crucial for understanding the Technology!





## Classification of SLM Technology

### SLM groups

**Natural and semi-natural forest management:** encompasses administrative, legal, technical, economic, social, and environmental aspects of the conservation and use of forests.

**Forest plantation management:** plantation forests comprise even-aged monocultures and are established primarily for wood and fibre production. They are usually intensively managed and have relatively high growth rates and productivity.

**Agroforestry:** integrates the use of woody perennials with agricultural crops and/or animals for a variety of benefits and services including better use of soil and water resources; multiple fuel, fodder, and food products; and habitat for associated species.

**Windbreak:** or shelterbelt is a plantation usually made up of one or more rows of trees or shrubs planted in such a manner as to provide shelter from the wind and to protect soil from erosion. They are commonly planted around the edges of fields on farms.

**Area closure (stop use, support restoration):** enclosing and protecting an area of degraded land from human use and animal interference, to permit natural rehabilitation, enhanced by additional vegetative and structural conservation measures.

**Rotational systems (crop rotation, fallows, shifting cultivation):** is the practice of growing a series of dissimilar/ different types of crops/ plants in the same area in sequenced season, letting it fallow for a period of time, shifting cultivation is an agricultural system in which plots of land are cultivated temporarily, then abandoned and allowed to revert to their natural vegetation while the cultivator moves on to another plot.

**Pastoralism and grazing land management:** is the grazing of animals on natural or semi-natural grassland, grassland with trees, and/ or open woodlands. Animal owners may have a permanent residence while livestock is moved to distant grazing

### CLASSIFICATION OF THE TECHNOLOGY

#### Main purpose

- ☒ improve production
- ☒ reduce, prevent, restore land degradation
- ☐ conserve ecosystem
- ☐ protect a watershed/ downstream areas – in combination with other Technologies
- ☐ preserve/ improve biodiversity
- ☐ reduce risk of disasters
- ☐ adapt to climate change/ extremes and its impacts
- ☐ mitigate climate change and its impacts
- ☒ create beneficial economic impact
- ☐ create beneficial social impact

**Improved plant varieties/ animal breeds:** refers to the development of new plant varieties or animal breeds that offer benefits such as improved production, resistance to pests and diseases, or drought tolerance, in response to changing environmental conditions and land users' needs.

**Water harvesting:** is the collection and management of floodwater or rainwater runoff to increase water availability for domestic and agricultural use as well as ecosystem sustenance.

**Irrigation management (incl. water supply, drainage)** aims to achieve higher water use efficiency through more efficient water collection and abstraction, water storage, distribution, and water application.

**Water diversion and drainage:** is the natural or artificial diversion or removal of surface and sub-surface water from an area

**Surface water management (spring, river, lakes, sea):** involves the protection of springs, rivers, and lakes from pollution, high water flows/floods, or over-abstraction of water, as well as protection measures against damage from waterbodies (e.g. river bank erosion, floods, tidal erosion)

**Groundwater management:** involves securing the recharge of groundwater reserves and their protection from pollution, overexploitation/ overuse, and rising groundwater levels leading to salinization.

**Wetland protection/ management:** managing wetland typically involves manipulating water levels and vegetation in the wetland, and providing an upland buffer.

**Waste management/ waste water management:** is a set of activities that include collection, transport, treatment and

#### Land use



**Cropland - Annual cropping**  
Main crops (cash and food crops): Cabbage and coriander

#### Water supply



☐ rainfed  
☐ mixed rainfed-irrigated  
☐ full irrigation  
☒ Spring water

Number of growing seasons per year: 2

Land use before implementation of the Technology: n.a.

Livestock density: n.a.

#### Degradation addressed



**chemical soil deterioration - Cn:** fertility decline and reduced organic matter content (not caused by erosion)



**physical soil deterioration - Pu:** loss of bio-productive function due to other activities



**biological degradation - Bc:** reduction of vegetation cover, Bq: quantity/ biomass decline, Bp: increase of pests/ diseases, loss of predators



**water degradation - Ha:** aridification

## Cost of inputs

Specify input	Unit	Quantity	Costs per Unit (LAK)	Total costs per input (LAK)	% of costs borne by land users
<b>Labour</b>					
Labour for selective clearing of fallow and land preparation	person day	18.0	20000.0	360000.0	100.0
Labour for seedlings preparation	person day	1.0	20000.0	20000.0	100.0
Labour for putting soil and seedlings into plastic bag	person day	32.0	20000.0	640000.0	100.0
Labour for fencing	person day	16.0	20000.0	320000.0	100.0
<b>Equipment</b>					
Big knife	piece	4.0	15000.0	60000.0	100.0
Shovel	piece	4.0	50000.0	200000.0	100.0
<b>Plant material</b>					
Seedlings	seed	30.0	1000.0	30000.0	100.0
<b>Fertilizers and biocides</b>					
Manure	kg	50.0	5000.0	250000.0	100.0
<b>Construction material</b>					
Sunlight protection sheet	Metre	10.0	10000.0	100000.0	100.0
Plastic bag for seed	bag	100.0	500.0	50000.0	100.0
<b>Other</b>					
Labour for planting the seedlings	person day	12.0	20000.0	240000.0	100.0
<b>Total costs for establishment of the Technology</b>				<b>2'270'000.0</b>	
<i>Total costs for establishment of the Technology in USD</i>				<i>283.75</i>	

# Impacts

- 1. Broom grass Integrated compost, mulching, Bio-extract to improve soil fertility and pest management on vegetable home garden**
- 2. cultivation** to prevent soil erosion in sloping area as well income generation.
- 3. Coffee cultivation between big trees** in sloping fallows for income generation as well as maintaining biodiversity and increased forest cover.
- 4. Wild cardamom plantation** for sustainable forest management. It take place in traditional agroforestry systems based on shifting agriculture.
- 5. Banana intercropping** in sloping land. It prevents soil erosion, air pollution (reduction of slash and burn cultivation) and it mitigates climate related drought.

## IMPACTS

### Socio-economic impacts

#### Crop production

decreased increased

#### crop quality

decreased increased

#### farm income

decreased increased

#### workload

increased decreased

Quantity before SLM: 25 Kg  
Quantity after SLM: 30 Kg  
Organic matter increased within the soil and subsequently it became more fertile as well as gained in moisture

Previously the soil was quite unsuitable to produce a good quantity and quality of vegetables as the soil had become clumpy due to compaction. After the use of rice straw the soil has become more fertile and it is possible to grow vegetables of a reasonably good quality.

Vegetable production has risen above the family's consumption needs, which has allowed them to generate a small income through the sale of vegetables in the village.

An increased workload has resulted because after the rice has been harvested, the farmers need to collect the rice straw from the fields and store it. Furthermore once it has decayed they need to spread it over the soil of the vegetable plots.

### Socio-cultural impacts

#### land use/ water rights

worsened improved

#### conflict mitigation

worsened improved

Under this technique the land user own the plantation area legally.

Reduction of land conflict because of stabilize shifting cultivation legalization of land use rights.

### Ecological impacts

#### soil moisture

decreased increased

#### vegetation cover

decreased increased

#### plant diversity

decreased increased

#### emission of carbon and greenhouse gases

increased decreased

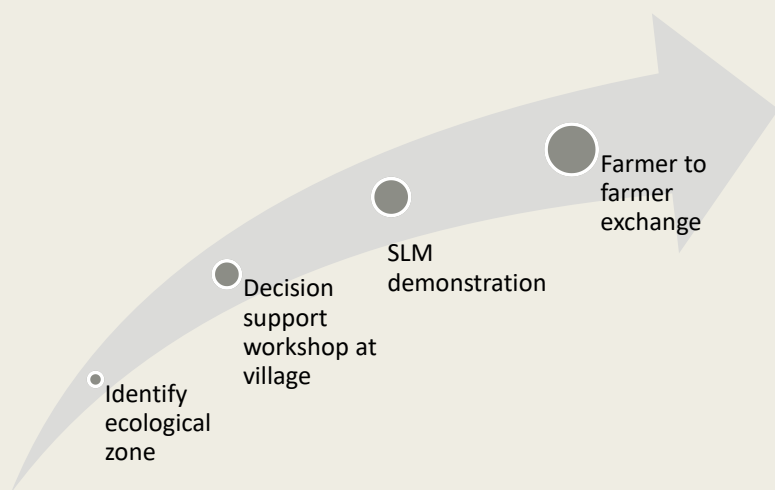
The land user uses the dry grase/leaves for mulching to improve soil moisture.

Increase in tree canopy as well as increase in forest cover.

Increase of local mushroom and wide vegetables for food consumption.

Due to the reduction in slash and burn cultivation, forest cover increased and in consequence, more greenhouse gases were assimilated and furthermore, the reduction in fires has decreased the emission of greenhouse gases.

## SLM scaling up through demonstration



## Knowledge products

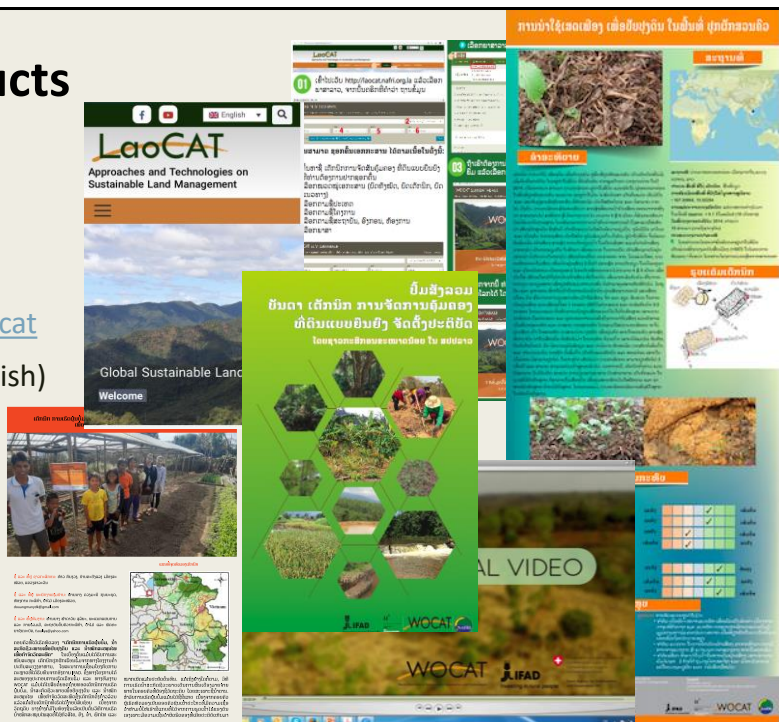
- National SLM data (online database)

<http://laocat.nafri.org.la>

<https://qcat.wocat.net/en/wocat>

- SLM booklets (Lao and English)
- SLM posters
- Instructional Video
- “TOLAKONG”

local voice record



Video of SLM Technologies is described which has positive impacts [http://laocat.nafri.org.la/?page\\_id=14](http://laocat.nafri.org.la/?page_id=14)



## SLM for food feed and fibre ... and beyond

This video was prepared for the Desertification and Drought Day 2020 illustrating that SLM goes beyond producing food feed and fibre: SLM protects land and people against disasters, floods and the drying up of springs. The video emphasizes the importance of evidence for decision making, considering both on- and offsite impacts of land management. It highlights the importance of partnerships, capacity building and investment in youth.



<https://www.wocat.net/library/media/219/>



## Key messages

- To continue producing enough and healthy food, we need to have a healthy environment that produces such food under the challenges of a changing climate, pressure on land etc.
- SLM technologies that produce food in a healthy environment, simultaneously help to improve food security.
- Good land management also provides benefits for communities
- Integrated fertility management, erosion control measures, and water harvesting are not only aimed at soil and water conservation, but also at production.
- Good SLM alone cannot solve all food security-related problems: adequate storage, efficient marketing, and effective distribution are also needed.

[www.wocat.net](http://www.wocat.net)

<https://qcat.wocat.net/>



Thank you!

