Recommendations

• Evaluate soil quality periodically (about every 3 years) to document changes,

• Periodic assessments in a field should be done by the same person and under similar soil moisture conditions (e.g. similar seasons),

• Assessments are qualitative and do not represent absolute measures,

• For better assessments, check several spots per field,

• Examine the distribution of indicator values. Even if most of the indicators are scored 9 (healthy), the soil may still have serious problems,

• Careful consideration should be used to identify the cause of the problem(s),

• Impaired properties may need immediate action and should be closely monitored,

• Keep completed Soil Quality Cards on file for future reference,

• For more information on soil quality, contact your local District Agricultural Land Management Office, or visit the EFICAS web site at *www.eficas-laos.net.*

Soil Quality Card for Lao Uplands

A locally adapted tool designed with farmers for farmers

Developed by:

EFICAS project

Eco-Friendly Intensification and Climate resilient Agricultural Systems

What is Soil Quality?

The terms "soil quality" and "soil health" are used interchangeably. There are many definitions of soil quality, but basically, it is the ability of the soil to:

1. Absorb and hold water,
2. Support plant and animal life,
3. Act as an environmental buffer.

Soil quality is very important to all people. Healthy soil absorbs and holds more water, and has better physical, chemical, and biological properties. If we have good soil quality, we will have productive land, good water quality, good air quality, and a healthy environment.

How to Improve Soil Quality?

Management greatly affects soil quality. Lao Upland farmers can increase the amount of soil organic matter in their land and improving the soil's quality by following some basic agronomic principles. They are:

1. Limit soil tillage, even with hoe,
2. Maintain trees (at least 60 to 80 trees/ha) in your cropland,
3. Leave adequate amounts of crop residue on the soil surface each year (at least 3 to 5 tons/ha/year),
4. Use cover crops, especially on fields where low residue producing crops such as soybean, mung bean, peanuts, or vegetable are grown,
5. Diversify crop production through crop rotations, relay cropping or intercropping,
6. Use natural or planted vegetative strips, especially in erosion-prone areas.

Also, talk with other conservation tillage farmers. They can give you some ideas on how they are changing the quality of their land.

How to Use the Lao Upland Soil Quality Card?

Tools required: a GPS, a showel, a soil probe or wire flag, a soil test tool kit box (e.g., KU or LDD)

- Turn over a shovel full of soil (about 15-20 cm deep) and rate each indicator by making an "X" or shading out the box that best represents the value for that indicator,
- Determine soil compaction by simply pushing the probe or wire flag into undisturbed soil and noting the resistance.

Date *[May - June]:*_____ Evaluation by: _____ Position:_____
Province: _____ District: _____ Kumban:_____ Village: _____
Field owner: _____ Field location *[local name if any]:*_____ GPS *[decimal degree]:* Position N _____ Position E: _____
Topography *[steep slope, rolling to hilly, flat]:*_____ Soil type *[clayey, loamy, sandy]:*_____ Surface stones: _____
Crop: _____ Crop sowing date:_____ Previous crop: _____ Tillage System: _____

Indicator	Observation	Rating									Indicator value		
		1	2	3	4	5	6	7	8	9	1 to 3	4 to 6	7 to 9
1. Crop Growth											Uneven stand; stunted crop growth; discoloring common	Some uneven stand; stunted growth; slight discoloring	Even stand; vigorous & uniform crop growth
2. Soil Erosion											Many gullies, 5-10 cm deep or more, crop damage, siltation	Beginning signs of gullies, gullies < 5cm	No visible signs of erosion
3. Water run-off/ Infiltration [after rain]											Excessive runoff; ponding on soil surface	Some runoff; rain soaks in, some ponding	Very little runoff /ponding; rain soaks into soil quickly
4. Crop Residue											<30% of soil surface is covered with crop residue	30-60% of soil surface is covered with crop residue	>60% soil surface covered with crop residue
5. Surface Soil Color											White, light gray, or red	Dark gray or light brown	Dark brown or black
6. Soil surface smell											Little or no odor	Some odor, mineral odor	Pungent, sweet “earthy” odor
7. Soil Structure											Cloddy; hard; crusty; aggregates hard to break	Somewhat blocky; Some visible crumbly structure	Crumbly; mellow or loamy and easily worked
8. Soil Compaction/Crusting											Severe compaction; cannot push probe into soil; crusting is prevalent	Some or few restrictions; can push probe soil with force; some soil crusting	Little to none; probe enters soil easily; no soil crusting
9. Biological Activity											Few insects, worms, root channels or fungi in the soil	Some insects, worms root channels or fungi in the soil	Many insects, worms root channels or fungi in the soil
10. Soil pH											pH <5.0	5.0 < pH < 6.0	pH > 6.0
11. Soil Nutrients (N, P, K)											Two or more than 2 elements not within recommendations (low or below)	One element not within recommendations (low or below)	All elements within recommendations (medium or higher)
12. Other indicator													

Make your soil as good as it can be. Leave your soil in better shape than you found it for future generations