

Validation of alternatives cropping systems based on no-tillage and crop residues management

Southern Xayabury. Lao PDR

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Erosion and weed pressure after ploughing on a maize crop

Context and objectives

In relation with high production costs of the conventional land preparation (ploughing), soil fertility regular decreasing and yield drops, farmers are shifting from ploughing to herbicide use, sprayed before or after crops emergence.

Crop residues and mulch of weeds are usually burned before ploughing or herbicide application, increasing mineral elements losses and soil erosion.

Farmers groups, including a total of 53 families and 22 ha, were associated on 8 different landscape units of Kenthao, Paklay and Botene districts in order to validate technical alternatives to limit rainfed areas degradation. Direct seeding systems on former crop residues are carried out for maize, Job's tears (*Coix lacryma Jobi*) and rice-bean (*Vigna umbellata*) crops.

Materials and Methods

At the beginning of the raining season, systemic herbicides (3 L/ha of glyphosate + 1.5 L/ha of 2,4-D, solution pH of 3) are applied to control existing weeds. Ten days after spraying, crops are sown using a hand-jab planter.

Some cash crops, as Job's tears or rice-bean crops, are really interesting since they assure a good cover of the soil (during their crop cycle), produce a high biomass and compete fiercely with weeds.

Agro-economical data (as labour requirements, work painfulness, yields, production costs) are followed. The table below presents average results based on 5 elementary plots of 1000 m² for each treatment (ploughing, DMC F0 and DMC F1). This validation step was conducted in Paklay district on clay soils.

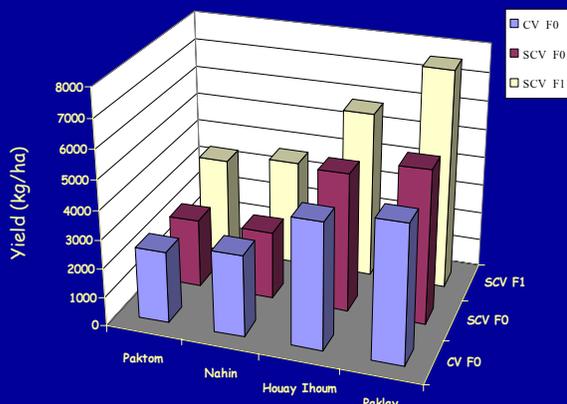


Results

Without mineral fertilisation, yields are significantly higher with direct-seeding on crop residues system. Net income and work productivity are also increased. The same kind of results were found in all the different situations tested in Paklay district. In average, without mineral fertilisation, work productivity increases of 90%.

Paklay district	DMC F0	DMC F1	CV F0
Labour (md/ha)	67	70	89
Dry grain yield (kg/ha)	5315	7600	4746
Production costs (USD/ha)	88	191	124
Net income (USD/ha)	241	279	169
Work productivity (USD/md)	3.6	4.0	1.9

F0 = no fertilizer - F1 = 400 kg/ha of 16-20-0
DMC = Direct-seeding Mulch based Cropping systems
CV = Conventional system



Grain yields variations for maize crop are important according to landscape and soil units. Such differences reflect the different levels of environment degradation.

In the South of Paklay district and along the Nam Heuang river (Houay Ithoum), which are recent areas of maize production, yields usually reach 5 t/ha without mineral fertilisation. In these areas, yields are generally higher when crop residues are preserved. Mineral fertilizers can also be valorised by the use of hybrid F1 varieties.

On the opposite side, and independently of land preparation, yield drops occur in the most degraded areas (Paktom, Nahin). Yields levels associated to high production costs do not allow the use of hybrid F1 varieties.

