

Implementing direct seeding techniques for the rainfed upland rice

South of Sayaboury province – PDR Lao

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Slash and burn preparation for upland rice system

Main characteristics of upland rice system on the South of Sayaboury

Upland ecosystem accounted for about 35% of the area (12 000 ha) and 21% of the production (19 500 t); lowland and irrigated ecosystems accounted for a further 65% and 79% of the area and production, respectively¹ (22 000 ha, 75 000 t).

Sowing occurred from mid of May to end of June using traditional cultivars, photoperiod sensitive and highly weed competitive (large leaves and high tillering ability).

Land preparation is mainly based on slash and burn, pre-sowing herbicide application after burning and in some cases ploughing on steep slope. Increasing weeds pressure, decreasing soil fertility and erratic rainfall are the main constraints of the upland rice systems where no particular crop rotation is followed.

Objective

Implementing direct seeding techniques and rotations with cash crops for the upland rice system. Two main systems of direct-seeded rice were conducted : i) on former crop residues, ii) on former and cover crop (*Brachiaria ruziziensis*).

Methods

In 2002, direct seeded rice was conducted on three former crops and one cover crop (*Brachiaria ruziziensis*).

During the wet season 2001, *B. ruziziensis* (cv. ruzi) was broadcasted (15 kg.ha⁻¹) before weeding on Job's tears and maize crops. An association of maize and rice-bean (*Vigna umbellata*) provided the third system.

At the beginning of the wet season 2002, *B. ruziziensis* has been controlled by pre-sowing herbicide (3l.ha⁻¹ of glyphosate + 1.5l.ha⁻¹ of 2.4-D). Khao Pee Savanh, a traditional local cultivar was sown on 14 of June two weeks after herbicide application; each plot was 350 m² large.



Plot with Job's tears straws and *Brachiaria ruziziensis* (cover crop) before herbicide application

Results of direct seeding upland rice

Operations	2001	Rice system - Wet season 2002		
	Former crop Cover crop	Maize and rice-bean	Job's tears <i>B. ruziziensis</i>	Maize <i>B. ruziziensis</i>
1. Inputs				
1.1. Field preparation herbicide		22	22	22
1.2. Seeds		12	12	12
Total inputs (USD)		34	34	34
2. Labor (day.ha⁻¹)				
herbicide application		4	4	4
sowing		27	36	42
weeding		29	30	39
harvesting		15	17	10
treshing		16	18	11
Total Labor (day.ha⁻¹)		91	105	106
3. Yield (kg/ha)		2250	2625	1500
4. Gross income (USD)		207	247	127
5. Income per day (USD)		2.3	2.4	1.2



Direct seeded rice on ruzi mulch

Higher yield and income per day of rice crop are obtained with Job's tears + ruzi and maize + rice-bean mulch.

These differences can be interpreted as a cause of apparent systems differences in soil structure, fertility and weeds control.

Previous studies showed that higher yields of cash crops (peanut and sesame) were obtained with Job's tears former crop.

Triennial crop sequence with, Job's tears, rice-bean and upland rice, must be evaluated. Root system of Job's tears can replace mechanical ploughing by biological improvement of soil structure. On the other hand, former rice-bean crop improved soil fertility and weeds control for upland rice production.

¹ Lao National Rice Research Program and Lao-IRRI Project. 1999 Research highlights.



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Adaptation of direct seeding techniques for the upland ecosystem.