

Root Crop-based Feeds for Intensifying Village Pig Production

A livelihood alternative for shifting cultivators in northern Laos

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Introduction

Subsistence production of upland rice by shifting cultivation is the predominant livelihood system in mountainous areas of northern Laos. Increasing population and land use restrictions have resulted in decreasing fallow rotation cycles, with declines in yield and returns to labor. Most households are deficient in their staple food for 4-5 months each year.

Livestock are the primary source of cash income for many upland villagers and intensification is important to provide cash for rice purchase. Most households raise a few local breed pigs in low input, low productivity systems. Pigs are often free-ranging and subsist by scavenging and supplemental feedings of household food waste, rice bran, and collected greens. Villagers do not have access to, nor can they afford to buy commercial feeds. Pigs are often kept 2-3 years before they reach marketable weight.



In 2004/2005, the CIAT/CIP project: *Participatory Research for Development in the Uplands* and the CIAT project: *Integrated Cassava-based Cropping and Livestock Systems* began training extensionists and planting cassava, sweetpotatoes, and forages with farmers in remote villages in Houn and Pak Baeng districts, Oudomxay province, northern Laos. In 2006, farmers implemented feeding trials to test potential for intensification of pig production, using locally grown feed resources and improved management, as a possible alternative livelihood to upland rice production.

Materials and Methods

Cassava Root and Starch Yields (t/ha)



variety	root yield	starch content (%)	starch yield
Rayong 2	18.4	17	3.1
Rayong 5	17.5	24	4.2
Rayong 60	17.4	19	3.4
Rayong 72	23.4	23	5.5
Rayong 90	16.7	24	3.9
KU 50	20.4	25	5.0
Ha Natee	13.0	18	2.4
Local (red)	13.0	18	2.4

Sweetpotato Root and Vine Yields (t/ha)

varieties	vines	roots
KL5	21	25
KB1	21	31
97-6	37	45
97-15	28	40
98-5-15	15	30
KB1/KL5	36	43
K51	7	40
Local	4	2
Average (introduced)	24	36

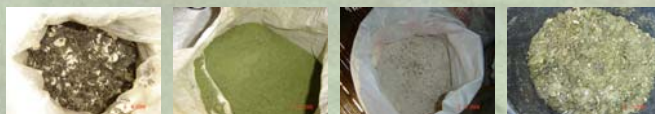


- 4 farmers (2 in 2 villages)
- 4 cross-bred pigs / farmer
- Disease control (quarantine, vaccination, de-worming)
- Improved housing, feed troughs, water access
- all pigs fed 50% silage / 50% dry feed (as-fed weight basis), mixed with water at feeding time. **No cooking of any feed.**
- 2 feed formulations (higher nutrition & lower nutrition dry feeds)



Ration: Silage Formulas -- fed to all pigs (seasonal availability of raw materials)

Silage Formulas (%)	early season		late season	
	energy (roots)	protein (leaves)	energy (roots)	protein (leaves)
cassava roots (slices)	70	--	70	--
paper mulberry leaf	30	90	--	--
cassava root meal	--	10	--	10
sweetpotato vines	--	--	30	90
salt	0.5	0.5	0.5	0.5



Ration: Dry Feed Formulas (based on age of pigs, nutrition regime)

Dry Feed Formulas (%)	young pigs		older pigs	
	higher nutrition	lower nutrition	higher nutrition	lower nutrition
rice bran	25	30	25	25
cassava root meal	20	30	20	45
cassava leaf meal	25	40	25	30
maize flour	20	--	20	--
soybean flour	10	--	--	--
stylo leaf meal	--	--	10	--

Results

Indicators of Pig Growth



(means of 4 pigs/trial)	lower nutrition		higher nutrition	
	Pak Baeng	Houn	Pak Baeng	Houn
average initial weight (kg)	37	31	39	36
average final weight (kg)	67	66	81	60
average feed intake (kg/head/day)	2.7	2.4	3.8	2.3
average daily gain (g/day)	250	240	350	250
survival rate (%)	100	100	100	100

Conclusions

1. Farmers in remote subsistence economies can intensify village pig production systems by growing, processing, and utilizing root crop-based and other supplemental, locally produced feed resources.
2. The average household (6.7 people) can meet rice sufficiency by selling 6.4 pigs/year. Land required for production of feed resources (~0.5 ha) is significantly less than for upland rice in shifting cultivation systems (1.5-2.0 ha).
3. Processing root crops (drying and ensilage) provides a steady and consistent supply of feed for village pig production systems. These feed resources do not require cooking and significantly reduce energy, time and labor requirements, particularly for women.