

Farm-Generated Feed Using Fermented Banana Stems: a Low-Cost Alternative to Commercial Pig Feed



ECHO Asia Impact Center

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Introduction

The integration of livestock on a smallholder farm is key to its productivity. Livestock play a unique role on the farm, transforming plant materials and other waste products into important sources of protein, either for consumption on the farm, or for sale beyond it. Pigs are one of the most efficient in this sense, as they are omnivores, and will eat a wide variety of food types, making them excellent ‘waste disposal’ partners.

On the ECHO Asia Farm we seek to create our own ‘Farm-Generated Feeds’ in order to use the materials we have available on the farm, as well as to bring down our costs of production. In addition to the meat produced, we also highly value the manure, which we compost and use in crop production. To make our feeds we use our most readily available resource, banana stems. These are fermented to break them down and used as a base for our pig feeds, being mixed with various other low-cost raw materials that are locally available, including rice bran, corn meal, and fish meal, etc...(see details below).

Making Farm-Generated Feed Using Fermented Banana Stem

For several months we have been trialing our Fermented Banana Stem feeds, with our local Black Pigs, to see how they compare to commercial feeds in a small production system. The objective was to compare the overall price of producing our own feeds, while maintaining comparable weight gains. 3 pigs were fed commercial feed, while the other 3 were fed our On-Farm Feed mix, all pigs belonged to the same litter and were split evenly according to male-female.

Due to the high moisture of the fermented banana stem portion of the feeds, we learned that we must feed roughly 50% more of the On-Farm Feeds in order to keep pace with that of the commercial feeds. Listed below is a summary (Table 1) of our Farm-Generated Feed rations based on 3 different protein rates. The goal was to produce a feed from on-farm materials and low-cost, locally available materials, that might compare to a commercial feed in terms of weight gain and cost.

Feed Source	Amount (kg)	Protein (%)	Protein (Total)	Cost per Kg (Baht)	Total Cost (Baht)
20% Protein Feed – Feed to Pigs Weighing 10-30 kg					
Fermented Banana Stem	40	6	2.4	3	120
Rice Bran	12	12	1.44	10	120
Corn Meal	15	9	1.35	7	105
Fish Meal	10	60	6	40	400
Soy Meal	22	40	8.8	15	330
Premix	1	0	0	35	35
Total	100	19.99			1110
18% Protein Feed – Feed to Pigs Weighing 30-60 kg					
Fermented Banana Stem	45	6	2.7	3	135
Rice Bran	12	12	1.44	10	120
Corn Meal	12	9	1.08	7	84
Fish Meal	15	60	3	40	200
Soy Meal	25	40	10	15	375
Premix	1	0	0	35	35
Total	100	18.22			949
16% Protein Feed – Feed to Pigs Weighing 60+ kg					
Fermented Banana Stem	55	6	3.3	3	165
Rice Bran	10	12	1.2	10	100
Corn Meal	10	9	0.9	7	70
Fish Meal	6	60	3.6	40	240
Soy Meal	18	40	7.2	15	270
Premix	1	0	0	35	35
Total	100	16.20			880

Table 1. Summary of the recipes used for the Farm-Generated Feeds, based on protein content, and the size of pigs receiving them



Figure 1. Pigs were weighed every 2 weeks

Figure 2. Banana stem based feeds were made weekly

Even when feeding 50% more of the on-farm feeds, we found that our Farm-Generated Feeds still resulted in a cheaper feed per ration (Table 2)

Feed Type	On-Farm Feed		Commercial Feed	
	Cost/kg	Cost/pig per daily ration	Cost/kg	Cost/pig per daily ration
20% Pt	11.10	17.25	18.00	18.00
18% Pt	9.49	21.35	15.50	23.25
16% Pt	8.80	26.40	14.00	28.00

Table 2. Cost of both feed types

The following table (Table 3) is a breakdown of the daily rations fed to pigs, using the 50% higher rate (due to high moisture content of on-farm feed).

Pig Weight (kg)	% Pt	Feeding Time	*On-Farm Feed		Commercial Feed	
			Kg per Pig/ per day	Kg per Pig/ per feeding time	Kg per Pig/ per day	Kg per Pig/ per feed time
10 – 30	20	Morning	1.5	0.75	1	0.5
		Evening		0.75		0.5
30 – 60	18	Morning	2.25	1.125	1.5	0.75
		Evening		1.125		0.75
60 – 90	16	Morning	3	1.5	2	1.5
		Evening		1.5		1.5

Table 3. Summary of daily feeding rations based on feed type and protein content



Figure 3. Farm-generated feed; local Black Pig; Pigs raised in Deep-Litter Systems; Banana stems were chopped using a machine chopper

Results from Feeding Trials

Our results show that pigs raised on commercial feed will take 133 days to reach market weight (70kg target) and will consume approximately 105 kg of feed (calculated when pigs are 7 weeks old and beyond). We calculate that the cost of feeding will therefore be 1733 THB per pig. See Table.

Pigs raised on our farm-generated feeds gained weight more slowly (only reaching market weight after 145 days) and therefore consumed roughly 2 more weeks worth of feed (a total of 189kg). Although the on-farm feeds are cheaper to produce per kg, they had to be fed at a higher rate (each day and for a longer period), and therefore resulted in a higher overall cost to the producer, in this case 1895 THB.

At first glance, these results seem disappointing, but we feel this approach may still be of great value to farmers living in remote areas, where commercial feeds may be more expensive, or difficult to obtain. Our numbers for producing these Farm-Generated feeds also assumes the cost of producing banana stems, a number that could be lowered or eliminated.



Figure 5. Visiting local farmer in northern Thailand to weigh pigs from the same litter.

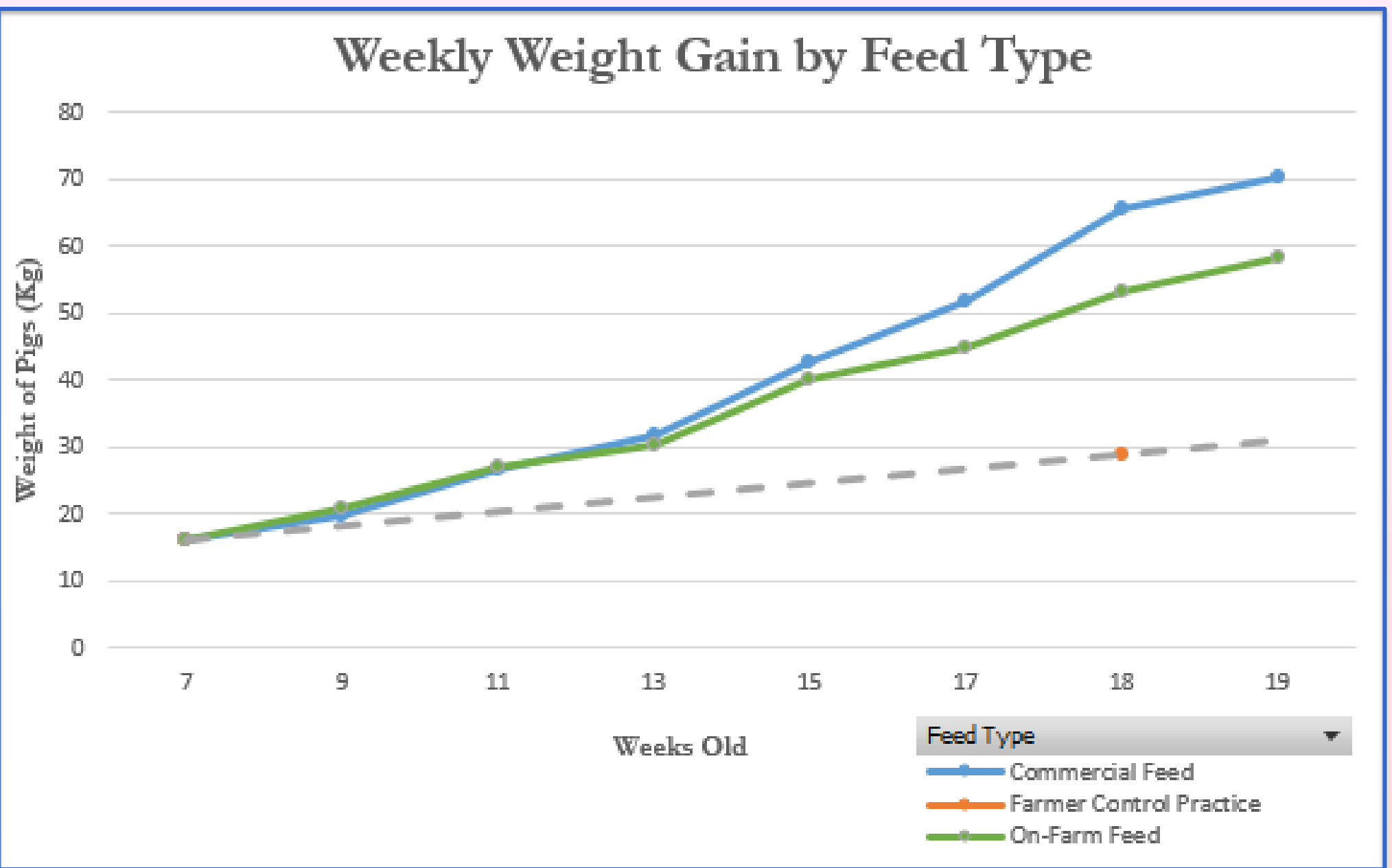


Figure 4. Weight gain of pigs by week depending on the feed type. Farmer control included a visit to weigh piglets from the same litter being raised on farm using local practice.

Feed to Bring Pig up to Market Weight of 70kg		
	On-Farm Feed	Commercial Feed
Days to Reach Market Weight*	~145	~133
Total Amount of Feed (after 7 weeks)	189 kg	105 kg
Total Cost of Feed (THB)	1895 (THB)	1733 (THB)

Table 4. Overall weight gain and feeding costs depending on feed type

Considerations for Producing Feeds on the Farm

Disadvantages

- More time consuming
- More feed required
- Slower production

Advantages

- Some or all inputs can be produced on-farm
- Can be done organically → can be sold at a higher price
- All inputs can be locally sourced

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