

# **Working with Ethnic Group: A Case Study of Introducing Pig Fattening to Garay Ethnicity in Ouyadav District Ratanakiri Province**

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## **Introduction**

Ka Te and Samkaninh are villages of Lumchor and Soam Thom commune, respectively which are belong to Ouyadav district of Ratanakiri province, those villages totally 98% are Garay Ethnicity whose main job relies on cassava and rice cropping as well as forestry (RPDA, 2010). Pig raising is one of the source of income for farmers through selling of pigs, pork and processed pork, which a good source of protein (Sorn, 2011). 92.81% of Pig production was held by smallholder in 2010 and this percentage decreased to 84.87% in 2013 (DAHP, 2013). In general, small scale animal production is dependent on locally available feed resources such as rice bran, broken rice, sugar cane tops, sweet potato vines, cassava roots and kitchen waste; while commercial feeds are rarely used due to high cost. The proportion of commercial feed used is about 20 % of pig smallholder, while the remaining 80 % depends on mainly crop residues and farm by-products, which are often of poor quality and low nutritional value (Borin et al., 1996). In Ratanakiri, the pigs of Ethnic group were freely raised and challenged with poor feeding and high risk of diseases and mortality rate. In addition, due to land converting from free land to plantation, less scavenging areas are available. These lead to hesitation of farmers to hesitate to expand, or even continue their raising pigs. The

introduction of pig fattening by concentrate diet supplemented to local basal diet would be a solution above constraint, while at the same time pig production performance and farmer's income would be improved. So, on the farm-trial in this paper is hypothesis testing and a lesson-learned for participant famers and especially, the neighboring farmers can easily observe. Hence, a group of students and lecture from Royal University of Agriculture had launched **a case study of introducing pig fattening to garay ethnicity in Ouyadav District Ratanakiri Province**. The study aimed to demonstrate the targeted ethnic group to adopt new technique for more income generation through utilization of local available crops and by-product to fatten their pigs and bio-security intervention.

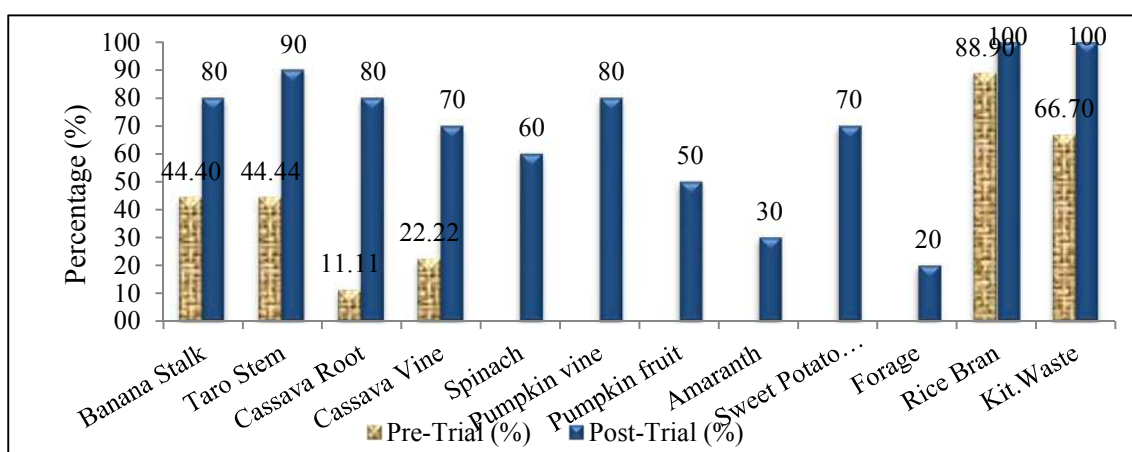


Figure 1. Livestock Production in Cambodia 2010-2013  
Source: DAHP (2013)

## Methodology

There are 2 steps in this study; the first is to select the focused group and set up trial of pig fattening, and the second is farmer adoption study.

## Background of the group

Ratanakiri is located remote northeast of Cambodia. It borders with Laos PDR to the west and Vietnam to the east. It is about 600 km from Phnom Penh and the average annual temperature is in the range of 26-31 °C (Wikipedia, 2014)

In order to see the real challenging of livelihood of indigenous farmers in Ratanakiri province initially, there were a group of students led by Royal University of Agriculture lecturer to visit and interview farmers face to face to identify general status of livestock and crop production in the location of study. As a result of this visit, pig production was prioritized as the main development activity by the team. They had set a group discussion plus suggestion from lecturer, and decided to visit there again to set up trial on pig fattening and market chain study. In June 2013, 4 students and a lecturer had set up the on-farm experiment on fattening pig with the expectation that the famers can learn the process and consider which condition is possible to them. The lecturer puts the students in charge of setting up the experimental design, contacting to local authority, accessing training and facilitating the famers during the experiment. For monitoring the trial, one of students travelled to visit focused farmers for 1 week per month, and at the same time he convinced focused group to follow the technique introduced and he also learned about local culture. At the end, 3 months after on-farm trial had finished, they came again to study about the farmer adoption.



**Photo 1** Farmer interviewing



**Photo 2** Trader interviewing in market

### Farmer Selection to set up a trial on Pig Fattening

In order to facilitate the work, the team has discussed with provincial department agriculture Chief and local authority about farmers' situation in selected villages, and then project team has organized the meeting with farmer to introduce the project activities and purpose; and selected volunteer farmers to join in the project. Then, the team went to visit house to house to observe farmer resources. The criteria of selecting the farmers were as follows; be ethnic group and willing to work with research team, have available labors and house-land for constructing the pig pen, and grow some vegetable for the pig. The household head that is woman, widow and disable people are encouraging. After all selection criteria were met, the selected farmers were trained on fattening pig production—breed and breed selection, feed and feeding, housing, and bio-security. Finally, all of them had done thump-print on contracted letter and then allocated them into two groups experiment by randomized voting.

### Experimental design

The selected farmers were assigned into 2 treatments, according to Completely Randomize Design (CRD) with five replications (farmers), and two piglets per farmer.

The two treatments were; C: control group by feeding conventional feed and S: supplemented concentrates at 40% plus with cassava root chip 30% and rice bran 30%. Totally, the experiment consists of 10 farmers (one woman), with 2 piglets of each farmer (total 20 piglets).

**Table 1** Feed Supplementation ( kg/day)

Group	(Control)		(Supplement)	
	Jul-Aug	Sep-Oct	Jul-Aug	Sep-Oct
Quantity for 2 piglets	0.4	0.5	0.8	1.0
Crude Protein (CP)	9.5 %		20.5 %	



**Photo 3** Student explained farmers about housing and fattening piglets management



**Photo 4** Lecturer explained contracted letter to farmers

### Piglet distribution

Twenty local breed piglets were bought in nearby villages at 3 months of age and distributed to volunteer farmers by lucky draw which was held by village animal health worker by written all piglet appearances on the small pieces of paper and the farmer choose the rollaway papers by chance. All piglets were kept in the pen and adapted with basal feed at first week after it was bought from other famer.



**Photo 5** Pigs before keeping in pen



**Photo 6** Piglets keeping in pen for first two weeks

### **Pig housing**

The pig pens were built after volunteer farmers received the training course on pig management. Pens size 2 meters in width and 3.5 meters in length whose floor made by concrete, roof made from iron sheet, and it's used wooden bar to protect the piglets out.

The students assist the farmer to construct pig pens with full participation from farmers. This process is to help the farmers to improve their understanding about pig pen, learning by doing as they have no experience to construct the pens for pig. It was also hard work for research team as well as to guide them. Additionally, and pigs were kept in the pen, it can avoid from crop of neighbor farmers.





**Photo 7** Housing location preparation



**Photo 8** The pen after completely building

### Feed and feeding for pig fattening

Concentrate diet and rice bran were purchased from private shop at Banlung market around 40 km from Ouyadav district, while cassava root chip were purchased from farmers then distributed to participating farmers. In supplemented group, we provided concentrate feed, rice bran and cassava root chip, and control group was provided only rice bran as daily basal diet. As the team workers would like to introduce selected farmers how much feed rich-protein improves the growth performance of their pigs, hence concentrate feed was used as one part of concentrate diet. The basal diet used in both groups were based on locally available feed resource such as taro steam, banana stalk, sweet potato vines, pumpkin fruit, papaya fruit and vegetables.



**Photo 9** Basal feed; taro stem and stylo grass,



**Photo 10** Farmer cuts taro stem before feeding piglets

#### Automatic drinker for piglet

Based on our observation, those areas are facing with shortage of water, therefore, one set of drinker was provided to each participant farmer for providing drinking water to the piglets. After installing, the pigs could not get used to it, however farmers tried to teach them every time so they were quickly to learn and had experience. And finally, the farmers satisfied with this device and were happy, because it is easy to use and prepare, keep water clean at all time, especially the hygiene by keeping the pen clean and dry.



**Photo 11** Drinker installation



**Photo 12** Farmer are satisfying with drinker



## Management

After distribution the piglets to the farmers, the anti-biotic 10 mg were mixed with the feed or rice bran for 7 days, to prevent the respiratory problem and other secondary bacteria, that will be infected when the piglets got stress due to transportation or changing environment. The piglets were kept in individual pens with concrete floors and were provided with drinking nipples. All the pigs were vaccinated against hog cholera diseases. They were also treated with an anti-parasitic drug (Ivomic given by injection) at first week of keeping and beyond after one month next. We kept some medicine—antibiotic and vitamins solution with village animal health worker to cure the pigs in case of it get sick irregularly. They were fed 2-3 times per day depending on available time of the farmers.



**Photo 13** Vaccination to piglet



**Photo 14** Deworming to piglet



**Photo 15** Piglet feeding by farmers



**Photo 16** Pen cleaning by farmers

**Table 02 Vaccination**

<b>Date</b>	<b>Piglet Age</b>	<b>Drug name</b>	<b>Disease</b>	<b>Usage</b>
27/07/2013	3 month	Pest Porcine	Hog Colera	Muscle injection
27/08/2013	4 month	Pest Porcine	Hog Colera	Muscle injection

#### Data collection

The adaptation period was 1 week to allow them acclimating to the new environment such as feed and confinement. The piglets were weighed in the morning before feeding. It was commenced to record data in Microsoft Office excel 2010, since experiment starting from 01<sup>st</sup> of July 2013, then they were weighed every 2 weeks. Feed offered and feed refusals were recorded daily. The study about adoption was done 3 months after experiment finished by questionnaire.

#### Chemical Analysis

Samples of feeds offered and refusals were analyzed for DM and N according to Undersander et al. (1993) and AOAC (1990), respectively.

#### Data analysis

All recorded data will be analyzed by PASW Statistics (SPSS version 18) by using Independent Sample T-test. These data include; average of daily growth performance, and growth performance deviation every 2 weeks. The adoption data was recorded and analyzed by Microsoft Excel to calculate the average or percentage and go graphic.

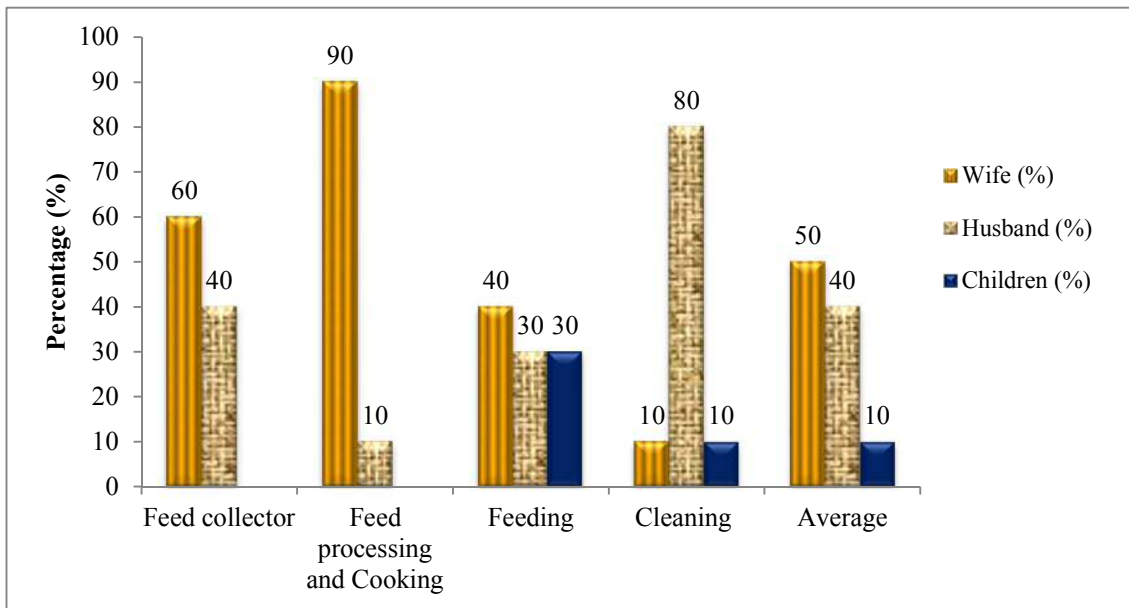
## Results and discussions

Through the calculation, the supplementation group received higher daily weight gain than control group, piglets in supplementation had DWG at 277.59 gram per day ( $P < 0.001$ )

**Table 3** Average Daily Gain of Pig (Gram/day/head)

N.0	Group	N	Mean	Std. Deviation	P
1	Group 1 (Control)	10	86.25	16.363	0.000
2	Group 2 (Supplement)	10	277.59	26.046	

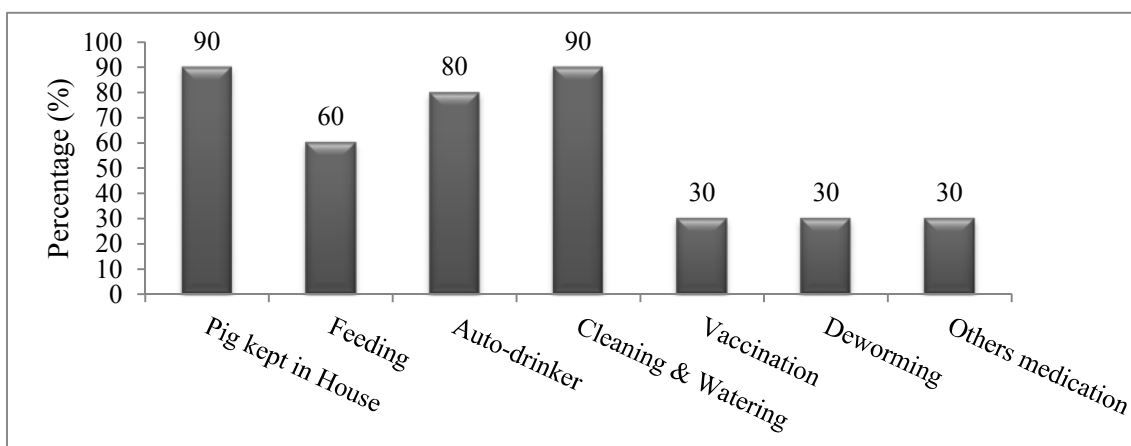
As compared to Phengsavanh and Lindberg (2013), it was reported that an experiment in Lao PDR providing the concentrated feed containing CP 20 % on Growing Local Breed resulted in average daily gain of 263.5 gram/day. Ramesh et al. (2009) found that pure breed—yorkshire had ADG at  $354.58 \pm 37.16$  gram/day, and Landrace  $388.99 \pm 38.86$  gram/day. Yin (2008) showed that cross breed of local and exotic breed fed by normal food of famers—rice bran and kitchen waste, provides growth performance  $82.00 \pm 9.36$  gram/day and another group supplement commercial concentrated feed 15% of live body weight (LBW) provides up to  $313.00 \pm 18.00$  gram/day.



**Figure 2** Feed used as Pig's food pre-intervention and post-intervention

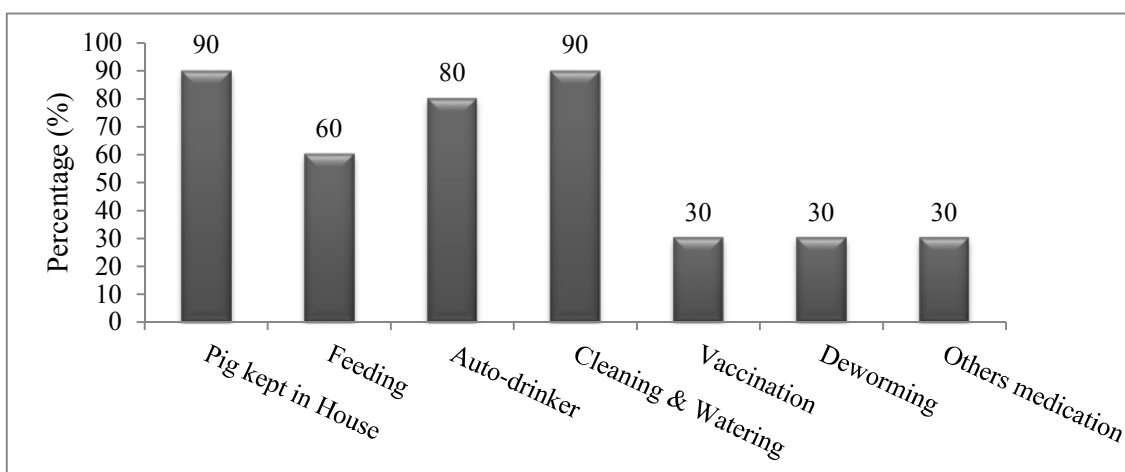
Before, the Garay Ethnicity has raised their pig by letting them to free scavenge and poor feeding. They have fed irregularly; they give food to the animal just before they go to farm or when they return. The banana stalk and taro stem were cut and boiled with no rice, and then fed to the pigs with few rice bran and kitchen waste.

After 7 months of participatory of training conducted by the lecturer and students, the focused farmers have been utilizing some available things to feed their pigs such banana stalk, taro stem, cassava root, cassava vine, spinach, pumpkin vine, pumpkin fruit, amaranth, sweet potato, some forages ( Stylo 184 ), rice bran, kitchen waste, and other local vegetables.



**Figure 3** Family participation in pig production

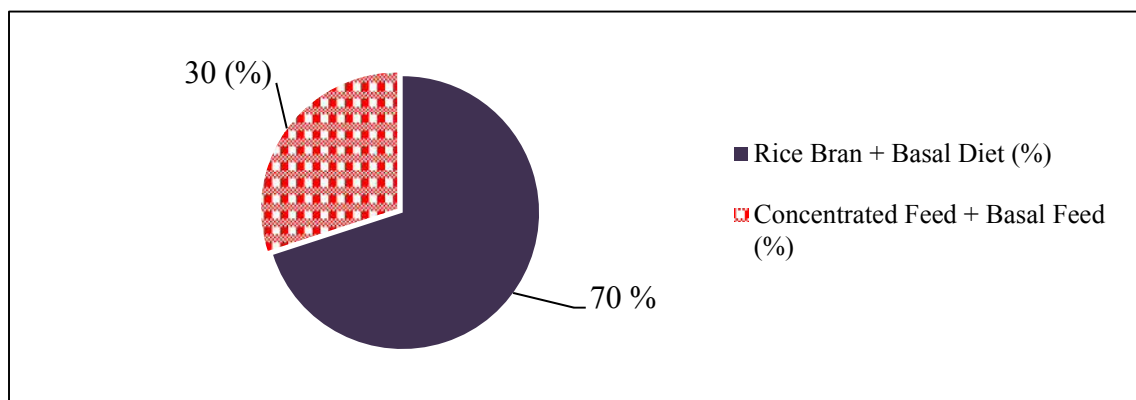
Garay live traditionally—men work on farm and murder animal only. All housework and taking care children are practiced by the women and even carry water from the well and breaking the wood for daily usages. However, the women are always shy and not allowed to make a decision for doing something. During training we encourage women to work with production and actively contact with us and even the men and their children were encouraged. For the study show that whole thing was participate by women 50 %, men 40 %, and children 10 %.



**Figure 4** Farmer adoption to component intervention



During the study; the farmer have kept their pigs in pen, and pigs were feed 2-3 times a day regularly depending on each farmer's available time. 2 auto-drinkers were broken by biting from the pig when they grow up and the others left still process well. Every morning they clean the pen and pigs, and even they didn't stay home, their children do. Some famer houses have a machine hence they seem easier to do a clean. However, the vaccination and deworming process were complained by farmers since the process is complicated and they felt they are expansive. Moreover, the vaccination used to donate from Department of Animal Health and Production; hence the farmers expect to get from that activity.



**Figure 5** Farmer adoption to component intervention

The farmers said commercial feed is too expensive and the market is far from them, so they could not travel to buy as pig diet. However, there are only 3 farmers who have bought the commercial feed for their pigs, and for other people have used the rice bran mix with vegetables in the village. In the other hand, we don't recommend farmer to used commercial feed sold at the market, because we understand that it's not economical. Their pigs are local breed and the feed convert ratio is too low. We would like them only to use their resource to feed the animal and process as pig food.

## Estimate Economic Efficiency

**Table 4** Economic efficiency

Items	Unit	(Control)			(Supplement)		
		Price/unit (USD)	Number	Price	Price/unit (USD)	Number	Price
Piglets	heads	15	10	150	15	10	150
Food	Kg	0.23	500	112.5	0.54	1000	540
Medication	per cycle	0.5	10	5	0.5	10	5
Housing	per cycle	2.65	10	26.5	2.65	10	26.5
Drinker	per cycle	0.38	10	3.75	0.38	10	3.75
Grand expense	USD			297.75			725.25
Gross Income	USD	2.125	160.5	341.063	2.125	375	796.875
Economic efficiency	(%)			<b>1.15</b>			<b>1.10</b>

There is no much different between Groups. Group 2 which were supplement the concentrate feed is looked less economic than causing from the high cost of concentrate feed that is produced by commercial company.

### Conclusion

Using of commercial feed supplement for pig production improved the grow performance but they are expensive causing the production was not much economical.

On-farm experiment would help farmers more to understand the real condition and they can more effective making decision to follow the process that they consider to be possible for their area. Some more technical and complicated process such as doing vaccination farmers hesitated to follow hence they always thing it would do by government. Moreover, the group of intervention agent gained the new information from this on-farm practice hence it's rare to be done on station in the university previously.

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