

## Scoping study on pig value chains in Dak Lak and Dak Nong, Vietnam

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# Acronyms, abbreviations and Vietnamese terms

AI	Artificial Insemination
BMT	Buon Ma Thuot City
CGIAR	Consultative Group on International Agricultural Research
CIAT	<u>International Center for Tropical Agriculture</u>
CLVLP	Cambodia, Laos, Vietnam Livestock Project
CRA	Collaboration Research Agreement
DARD	Department of Agriculture and Rural Development
GDP	Gross Domestic Products
Ha	Hectare
HCMC	Ho Chi Minh City
ILRI	International Livestock Research Institute
MoU	Memorandum of Understanding
RVCA	Rapid Value Chain Assessment
TNU	Tay Nguyen University
US\$	United States Dollar
VND	Vietnamese Dong
Trang Trai	A pig farm with scale more than 120 fattening heads of pig or more than 30 head of sows
Gia Trai	A pig farm with scale more than 50 fattening heads of pig or more than 15 head of sows

# Introduction

## Background and objectives of the study

In Vietnam, the CGIAR Research Program on Livestock and Fish (L&F) has identified two clusters of provinces where the program will implement R4D activities in collaboration with a number of partners. These clusters have been identified through a systematic site selection process and guided by GIS techniques and complemented with stakeholder consultations. One cluster spans the North Central Coast and the North West provinces; the other cluster includes four provinces in the Central Highlands and the Southeast. Dak Lak and Dak Nong are two of the provinces that have been identified in the latter. Within the L&F collaborative framework, CIAT and ILRI are working together to develop synergies from ongoing implementation of the Cambodia-Laos-Vietnam Livestock Project (CLVLP) that is being led by CIAT and the L&F pig value chain program in Vietnam that is being led by ILRI. The scoping study of the pig value chain in two sites in Dak Lak and Dak Nong is one of the first initiatives to be implemented to complement the ongoing activities under the CLVP and L&F in Vietnam. This scoping study was implemented under a Collaborative Research Agreement between Tay Nguyen University (TNU) and the International Livestock Research Institute (ILRI) that was officially signed on 15th of November 2013. The project activities were implemented from December 2013 until February 2014.

The objectives of the study are:

1. To characterize the pig value chain in Dak Lak and Dak Nong including the types of breeds used, scale of production, nature of production practices in terms of feeding and health management, profile of pig producers and other value chain actors, market opportunities, and demand for pork locally and externally.
2. To identify opportunities for productivity gains through improved production practices (on feed, breed, animal health) and enhanced efficiency of the value chain and corresponding benefits to value chain actors through institutional and policy adjustments.

The main activities of the research study were:

- Site selection to identify study sites in the Central Highlands;
- Adapting the value chain assessment tools developed by the Value Chain Development team in L&F for use in data collection. The set of tools include the value chain scoping checklist and value chain assessment and benchmarking tools available for download at the L&F wiki ([http://livestock-fish.wikispaces.com/VC\\_Toolkit](http://livestock-fish.wikispaces.com/VC_Toolkit));
- Collecting primary data and information on the pig value chain at selected sites using the adapted tools and data analysis;
- Organizing a feedback workshop with stakeholders at study sites.

## The study team

The study team comprised of researchers from TNU, e.g., faculty of Veterinary and Animal Science, as well as members of the project team working with CIAT-led project on Forage-based feeding systems in Cambodia, Laos and Vietnam (CLVLP), and officers from district and provincial Agriculture and Rural Development Departments of the Ministry of Agriculture and Rural Development (MARD) (table 1).

Table 1. Members of the study team

	Name	Position	Role
1	Dr. Truong Tan Khanh	Deputy Head of Veterinary and Animal Science Faculty, Nguyen University	Team leader
2	Dr. Van Tien Dung	Head Department of Science and International relationship Forestry Faculty, Tay Nguyen University	Field work investigation
3	Dr. Tran Quang Hanh	Deputy Head of Veterinary and Animal Science Faculty, Nguyen University	Field work investigation
4	Dr. Pham The Hue	Head of animal production department	Field work investigation
5	Mrs. Chau Thi Minh Long	Vice head of animal science in WASI	Field work investigation
6	Mrs. Ngo Thi Kim Chi	Staff at Veterinary and Animal Science Faculty, TNU	Field work investigation
7	Nguyen Thi Hoa Quy	Head of animal production department, Provincial DARD	Field work investigation
8	Nguyen Thi Huong	Animal production department, Provincial DARD	Field work investigation
9	Nguyen Van Ha	Ea Kar district DARD	Field work investigation
10	Nguyen Van Dong	Head of extension office in Ea Kar	Field work investigation
11	Hoang Cong Nhien	Veterinary office in Ea Kar	Field work investigation
12	Nguyen Thi Hue	Veterinary office in Krong No	Field work investigation
13	Le Van Dung	Extension office in Krong No	Field work investigation

## Study work plan

The study was implemented during the period December 2013 to April 2014 including a no-cost extension to accommodate delays in project start-up. The original work plan and time table is shown below:

Table 2: Study work plan

Months	Dec	Jan	Feb	March
Organize study team, meet with local authorities to obtain agreement on project implementation at local level, finalize selection of study sites				
Adapt RVCA tools to local context, train study team on use of the tools pre-test, revise and implement				
Organize information collected from RVCAs in electronic datasets; collate, summarize, and synthesize data, and write up technical report				
Organize stakeholder workshop to report on study results and obtain feedback; write up workshop proceedings.				
Write up final report				

# Methodology

The study was divided into three steps

- **Preparatory work:** In July 2013, ILRI and TNU initiated discussions about formalizing the institutional partnership to pave the way for implementing collaborative activities in the Central Highlands of Vietnam between the two institutions, and specifically to provide a framework for implementing the pig value chain scoping study. In October 2013, ILRI met with TNU leaders to sign the Memorandum of Understanding (MoU) between TNU and ILRI and also to prepare the CRA for the scoping study. A field trip to visit possible sites for the study in Dak Lak and Dak Nong was also organized during this period. In December 2013, the TNU research team worked with ILRI in adapting the value chain scoping and assessment tools and also to finalize the site selection in Dak Lak and Dak Nong.
- **Site selection:** Ea Kar District in Dak Lak province and Krong No District in Dak Nong province were selected as study sites. Ea Kar District in Dak Lak Province is representative of a site with high pig production development, high access to markets and heterogeneous types of pig production systems and scales. Krong No District in Dak Nong Province is representative of a site with low access to markets and a predominance of smallholder pig production.
- **Field survey:** This activity involved consultations with different stakeholders in the pig value chain including input actors, producers, traders, processors, consumers, local authorities, extension officers, and member of farmer, women and youth associations to collect primary data and other information about the pig value chains in each study site. The team used the adapted value chain assessment tools for data collection.
- **Reporting:** This involved data analysis, report writing, organizing a feedback workshop and writing up the final technical report.

## Site selection

Dak Lak and Dak Nong provinces were selected for the pig value chain scoping study because they belong to the list of provinces identified as study sites for the Vietnam Pig Value Chain under L&F.

**District selection:** In October 2013, the research team from TNU and ILRI organized meetings with the local authorities in Dak Lak and Dak Nong provinces. The team met with provincial DARD, District DARD and extension offices at two selected districts, Ea Kar in Dak Lak and Krong No in Dak Nong. The district sites were chosen using L&F site selection criteria (e.g., poverty, pig population density, market access). Using this set of criteria, a short list of districts as potential sites was generated. The short list was then presented for discussion with local authorities to validate their suitability given other soft criteria such as presence of viable local counterparts to support the field activities and willingness of local authorities to cooperate with the research team. Based on the outcome of the consultations and ground-truthing, the following districts were selected as study sites:

- Ea Kar District, Dak Lak Province, representing a poor district, with high pig population and high access to markets, and



- Krong No District, Dak Nong Province, representing a poor district, with high pig population and low access to markets.

Within each district, communes were selected for as sties for the implementation of the field surveys in consultation with district authorities. Commune selection was based on their representativeness for pig production and market access. The communes selected in the two districts and their characteristics are shown in the table below.

Table 3. Site selection for pig value chain scoping study in central highlands

	Selected sites	Site characteristics
Provinces selected	Dak Lak	High pig population, still many poor people especially among minority groups, and high access to markets
	Dak Nong	Poor province, low access to market
Districts selected	Ea Kar (Dak Lak)	Poor district, high access to markets, high pig population
	Krong No (Dak Nong)	Poor district, low access to markets, highest pig population in Dak Nong
Communes selected		
Krong No	Dak D'ro	Mainly HH production, only local market
	Num N'dir	Mainly HH production , only local market
	Nam Da	Mainly HH production, more intensive, both local and outside the commune markets
Ea Kar	Ea Kmut	Intensive HH production and commercial farms, good access to market, some in local and mainly outside district and province
	Cu Hue	Mainly extensive HH production and some commercial farms, good access to markets, some in local and mainly outside district and province
	Ea Tyl	Mainly intensive HH production some commercial farms good access to market some in local and mainly outside district and province

### Data collection and analysis

Secondary data were collected from different sources including statistical yearbooks, records of livestock and veterinary departments at district offices, annual reports of extension offices, and annual reports of veterinary offices.

Primary data was collected using the following approaches:

- Group discussions with pig producers:

The tool used for group discussion was adapted from the L&F Value Chain Assessment tool kit after pre-testing and revision for implementation at the study sites (see Annex 1 for the adapted tools).

- Participatory group discussions:

Group discussions with farmers were organized in each site; there were 120 participants of farmers in both 2 sites were invited based on the following criteria: representatives is pig producers, representation for pig production in the site, 50% of women and 50% of men,

and 125 (Ea Kar was 62 and Krong No 63) farmers were participated workshops, in which 63 men and 62 women (the 5 of participants over of plan were the communes or villages' extension worker).

The group discussions were facilitated by the TNU research team comprising of five persons with specific responsibilities, i.e., two persons were facilitating two group discussions (one each for the group of male participants and female participants), two persons were documenting the process and taking notes during group discussions and one was supervising and leading the discussions at plenary.

- Individual interviews:

The individual interviews were conducted to survey other value chain actors and stakeholders. They included:

Traders, including the following:

- Five (5) large pig traders in Ea Kar (e.g., those who bring pigs in large numbers to other provinces);
- Five (5) small pig traders (i.e., those traders who conduct business within the district) in each district; and
- Two (2) brokers working in communes.

*Slaughterhouse operators and Processors:* including the district slaughterhouse (at least one) and three household-based abattoirs in the three survey communes.

*Retailers:* including retailers in local market outlets and in Buon Ma Thuot city markets in Dak Lak Province.

*Input actors:* including 2 animal feed dealers and 2 veterinary agents.

*Service providers:* including one each of extension worker and veterinary worker

*Local authorities:* including heads of District DARDs and leaders at district level.

The list of key informant interviewees is presented in Annex 2.

# Characterization of the pig value chain in Dak Lak

## Overview of socio-economic development

Dak Lak is one of five Central Highlands provinces (the others are Kon Tum, Gia Lai, Dak Lak, Dak Nong and Lam Dong). The provinces were formed in 2004 by dividing old Dak Lak province into two provinces: Dak Lak and Dak Nong. The characteristics of the province are shown in table 4.

Table 4: Land use and population

	Characteristics	Value
1	Total area (km <sup>2</sup> )	13,120.00
2	Agricultural land (ha)	537,681
3	Forest land (ha)	597,349
4	Population	1,796,666
5	Population density (persons/ km <sup>2</sup> )	137

Source: Dak Lak statistic book 2013

### Land resources

Dak Lak is well-known as the area of basaltic soils which are suitable for coffee and rubber plantation. The area of this fertile land is only limited to districts, such as Krong Buk, Krong Nang, Krong Pak, Buon Ma Thuot; the rest of the land are mainly of poor soils and not very good for agriculture. An estimate of about 22% of total land area in Daklak is bazantic soil<sup>1</sup> and about 92% of this is used for agriculture, mainly for coffee production.

### Forest resources

Dak Lak Province has 1.135 million hectares of agricultural and forestry land, of which 597,349 ha is forestland holding, or about 52%. The coverage rate of forest is 51%. An estimate by Van Hao 2014<sup>2</sup> indicates only 32% is natural forest that have a good capacity for land covering. The main reasons for natural forest reduction were 1) replacement of forest land with rubber plantation and 2) hydroelectricity building and timber exploitation.

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<sup>1</sup> **Phạm Thế Trĩnh, 2012**, NGHIÊN CỨU ĐẶC ĐIỂM SỬ DỤNG ĐẤT ĐỎ BAZAN (FERRALSOLS) TỈNH ĐẮK LẮK. Sci. & Devel., Vol. 10, No. 7: 1024-1031, Tạp chí Khoa học và Phát triển 2012. Tập 10, số 7: 1024-1031 [www.hua.edu.vn](http://www.hua.edu.vn) 1024

<sup>2</sup> [www.monre.gov.vn/v35/default.aspx?tabid=428&CateID=24&ID=131498&Code=YMCG131498](http://www.monre.gov.vn/v35/default.aspx?tabid=428&CateID=24&ID=131498&Code=YMCG131498)

## Population

In 2012, total population in Dak Lak is 1,796,666 people (table 5) and population density is 136 persons per km<sup>2</sup> (Dak Lak statistical yearbook 2013). Originally, the province used to be mainly inhabited by Ede and Gia Rai, M'ngong populations. Since the colonial times, it gradually became populated by Kinh people, as well as people belonging to population of other ethnic groups who are indigenous to other parts of the country. The province nowadays hosts 44 different ethnic groups, namely: Kinh, Nung, Muong, Tay, Thai, Dao, H'mong people, among others. Kinh people make up approximately 70% of the total population.

Table 5: Human population in Dak Lak, by administrative units.

District	Population ('000)
Buôn Ma Thuột	326.135
Buôn Hồ	96.685
Ea Súp	58.579
Krông Bông	87.139
Krông Buk	57.387
Krông Pak	198.009
Krông Năng	118.223
Krông Ana	81.01
M'Drăk	65.094
Lắk	59.954
Ea Kar	141.331
Ea H'leo	120.968
Cư M'gar	163.6
Cư Kuin	99.551
Buôn Đôn	59.959

Source: Dak Lak statistic book 2013

## Economic development

Dak Lak has so far a low industrialization level, apart from agro-industry. Its economy is still mainly based on agriculture. The economic structure of Dak Lak in 2012 was 51% agriculture, 33% industry and construction, and 16% services. In agriculture, the contribution of animal

production was 18%<sup>3</sup>. The Gross Domestic Product (GDP) per capita was US\$1158. The poor household rate in Daklak and Dak Nong are shown in table 6.

Table 6 Poverty rate level and trend by province

	2007	2008	2009	2010	2011	2012
Đắk Lắk	18.66	15.00	12.45	20.82	19.6	NA
Đắk Nông	15.70	16.58	17.35	29.25	25.9	23.3

Source: Provincial statistics data, 2012.

The increase in poverty rates in 2010 to 2012 was due to the government's use of the new poverty line that was much higher to align with the rising per capita income in Vietnam during these periods (table 7)

Table 7a. The Government's poverty lines for period 2006-2012 (VND)

	Urban	Rural
2004	218,000	168,000
2006	260,000	200,000
2008	370,000	290,000
2010	450,000	360,000

Table 7b. The Government's poverty lines for period 2010-2012

	Urban	Rural
2010 (new line)	500,000	400,000
2011	600,000	480,000
2012	660,000	530,000

Source: General statistic office, result of the Vietnam household living standard survey 2010.

#### Animal production

The share of animal production in the total GDP of province was not very high, especially in the areas where coffee production is dominant; however, animal production is very important for the poor households and in places where the natural conditions do not allow the development of coffee and other perennial crop industry. In Ea Kar District, livestock accounted for 40% of household income<sup>4</sup>. Livestock and fish farming was also known as the way for improving nutrition through increased consumption of protein by consumers in poor rural areas. Tables 8 and 9 show livestock production in terms of numbers and liveweight for different species.

<sup>3</sup> Statistical yearbook of Dak Lak, 2013.

<sup>4</sup> District DARD report in 2013

Table 8. Number of animals raised in Dak Lak 2012 (thousand heads)

	Animal production	Dak Lak
1	Buffalo (,000head)	32.10
2	Cattle (,000head)	158.50
3	Pigs (,000head)	701.50
4	Chicken (,000head)	6,790.00
5	Area of aquaculture (ha)	7,772

Source: Provincial statistic book, year 2013.

Table 9. Animal production (in live weight) in Dak Lak

	Types of animals	2009	2010	2011	2012	Average	%
	Buffalo	1,235	1,793	2,163	1,377	6,568	2
	Cattle	18,860	12,744	11,970	12,460	56,034	15
	Pig	53,179	56,364	67,869	49,680	227,092	62
	Chicken	11,298	19,250	19,329	26,333	76,210	21

Source: Provincial statistic book, year 2013.

The share of pig production in total animal production in liveweight is the highest among the different species raised in Dak Lak. Pig production contributes about 62% of total meat produced.

The pig production was not very stable by years (table 10). Two main reasons for the observed trend are:

- epidemic diseases, especially the blue ear disease (Porcine Reproductive and Respiratory syndrome, PRRS), in the years of 2009 and 2010; in 2012 the blue ear disease had an outbreak in Dak Lak Province causing negative effects on pig production. The reduction in output from household pig production was the most significant source of decline in total pig production during this period.
- Pig price: the price of pig during the last 5 years was very unstable, changing from 33,000 per kg liveweight to more than 50,000 per kg liveweight. The price changes were short-lived however, e.g., only 3 – 6 months. On the other hand, prices of feed have been continuously rising.

Table 10. Pigs production of Dak Lak from 2009 – 2012 (,000 heads)

	Number of pigs (,000 heads)	Growth rate (%)
2009	683.63	
2010	658.03	-3.7
2011	705.37	7.2
2012	701.50	-0.5
2013 (estimate)	750	6.9

- Source: Dak lak statistic book, June 2013

## Overview of Ea Kar district

Ea Kar is one of 15 districts in Dak Lak Province; it is located in the eastern side of the province. It has a total area of about 103 km<sup>2</sup>, with population density of 137 people per km<sup>2</sup> (table 11). Coffee, maize, cassava was the most important crop production in the district. The district has the highest animal production in province in terms of number of pigs, cattle and chicken (table 12).

Table 11: Land use and population in Ea Kar

	Characteristics	Ea Kar
1.	Natural are (km <sup>2</sup> )	103.747
2.	Agricultural land (km <sup>2</sup> )	50.127
3.	Forest land (km <sup>2</sup> )	37.859
4.	Population (people)	141,724
5.	Population density (people/km <sup>2</sup> )	137

Source: Provincial statistic book 2013

Table 12. Animal production in ea Kar 2013

	Animal	Number (heads)
1.	Buffalo	5340
2.	Cattle	13643
3.	Pig	101453
4.	Chicken	1226375
5.	Aquaculture (ha)	1368

Source: Provincial statistic book 2013

Pig production contributes 80% of total liveweight of animals produced in the district (Dak Lak Statistical Yearbook, 2013). The strong increasing number of pigs in 2012 and 2013 were explained by 1) absence of epidemic disease during this period, 2) establishment of many large farms that sharply increased pig numbers in the district, 3) favourable prices of pig during this period, encouraging households to start pig production or to expand their herd.

Table 13. Pig production development (2005 – 2013)

Year	Numbers (Heads)	Development rate
2009	79,498	
2010	68,293	-14
2011	73,626	8
2012	101,453	38
2013	120,000*	

Source: Dak Lak statistic book 2013

\*Report from district Department of Agricultural and Rural Development

## Livelihood analysis and gender analysis

In Ea Kar, farmers from different places and across gender were ranking important activities differently. In Ea Kmut, the neighboring commune of Ea Kar town, with small farm size (on average about 7000 – 8000 sqm/HH) and poor soils, farmers ranked the household pig and cattle production as top two most important livelihood activities; rice was ranked the third for household food security and coffee was fourth among men and fifth among women, as a cash income (table 14).

In Cu Hue, the commune with extensive agriculture and high rate of ethnic minority (40%), male farmers ranked coffee and pepper as the two most important activities and then maize, rice, and pig production, respectively. These activities are inter-linked in that almost all maize and rice by-products were used as feeds for pig production, and manure from pigs are used as the main fertilizer for the maize and rice fields. In ethnic minority groups, farmers' responses suggest that pig production in the community declined in the last 10 years. The reasons for this observed trend were:

- The new rural program was banning free grazing of local pig breed because of environment problems; however, this type of pig could not be kept in confined conditions with intensive feeding because of low feed conversion and thereby resulting to high fat to lean meat ratios.
- Poor marketing information; i.e., pigs were only sold to consumers who come to buy for special occasions like TET holiday, party, wedding, whereas there is potentially untapped demand from restaurants in the cities that sell special dishes using pork from local pigs.

In Ea Tyl, there is very low natural condition for high value crop production, due to poor soils, low water resource, among others. Pig production was developing quickly in recent



years; there were 18 pig “trang trai”<sup>5</sup> with scale >120 heads of pigs and 100 pig “gia trai”<sup>6</sup> with scale > 50 heads, and 60% of households are raising pigs as small scale (<50 heads). In Ea Tyl the male and female farmers both ranked sugarcane as the most important activity, followed by cassava and maize. These crops can be cultivated on less than fertile soil and commonly found in every household. The fourth most important activity was pig production for both men and women.

Table 14. Livelihood activity and importance ranking in Ea Kar.

Livelihood activities	Ea Kmut		Cu Hue		Ea Tyl		general
	Men	women	Men	women	Men	women	
Pig	2	1	5	4	4	4	1
Maize	5	6	3	1	3	3	2
Rice	3	3	4	5	6	5	3
Cassava	6	7	5	7	2	2	4
Cattle	1	2	6	5	8	8	5
Coffee	4	5	2	2	9	9	6
Chicken	7	4	7	6	5	6	7
Pepper	8	8	1	3	10	7	8
Selling labor	9	9	9	9	11	11	9
Fish		-	-		7	10	-
Sugar can					1	1	-
Goat		-	8	8	-	-	-

Source of data: Group discussion with producers

## Seasonal calendar

### Cropping calendar

Coffee: In Ea Kar, the land was not suitable for coffee plantation and farmers have to incur high labor cost but generate yields that are still lower than that in other places. Coffee production during the year requires labor at the time of watering and harvesting. Watering season is from January to April and harvesting season from November to December (table 15).

<sup>5</sup> “Trang trai” is defined by local authorities in Vietnam with larger farm compared to household production the herd more than 120 fattened pigs or more than 30 sows.

<sup>6</sup> Giatrai is defined as a household farm with number of fattened pigs more than 50 heads.

Maize: almost all farmers in group discussions were producing two crops of maize per year, the first crop from May to August, the second from September to January. For the second crop, only a small number of farmers plant maize and in only a small area because the yield is much dependent on wet season rains which if not enough may require water from irrigation. Mainly, maize was sold to feed companies after harvesting, and farmers only leave a quantity enough for pig production.

Rice: almost all farmers in the district practice rice production, and mainly paddy rice. Rice production is not only used for family consumption but it is also sold for cash income and for feeding animals.

Cassava: In some communes, cassava was ranked as an important crop (Ea Tyl); cassava root was sold for income mainly and only a small portion of produce is stored for pig production.

Table 15. Crop seasonal calendar

Crop	Month												
	1	2	3	4	5	6	7	8	9	10	11	12	
Coffee	—————												
Maize					—————			—————					
Rice	—————			—————									
Cassava	—————				—————								
Seasonal	Dry season				Wet season						Dry season		

#### Income and expenditure calendar

Table 16 summarizes all commune surveys. The differences across communes from results of three commune surveys were not extreme. In Ea Tyl, the income in March was highest from cassava harvesting but income in November and December was lower because coffee production in this commune was not very important. On the other hand, income from coffee was highest in other communes where coffee production was predominant. The main income sources of farmers in the district were crop production and animal production.

The expenditures were highest at two periods: April and May where spending is highest for crop production, e.g., preparing land, purchase of seeds and fertilizers, etc. for annual crops. December is the period when debts are repaid for credit obtained from the bank and private sectors. Two reasons for payment of loans at this time were 1) the time that they have highest income in the year, 2) Vietnamese habit to pay the debt before the new year comes.

Table 16. Seasonal income

	1	2	3	4	5	6	7	8	9	10	11	12
Level of Income	**	**	**	**	*	*	*	***	*	*	***	***
Income from	Pepper, cassava, pigs		rice					maize			coffee	
Level of expenditure	**	**	**	***	***	*	*	*	**	*	***	***
Expenditures for	TET	Coffee irrigation		Invest for annual crops				Children go to school			Loan payment	
*Lowest, ** middle, *** high level of income and expenditure												

### Gender and decision making

In this study, the gender analysis and decision making was conducted by group discussions in separate groups of men and women. The gender roles in household and other social activities were assessed by using the activity clock tools. The typical day of work for members in the household is described in figures 1a-c below:

All group discussions showed that a typical day work of men and women do not differ much. Both men and women work in the field in the morning and afternoon. The men are usually doing land preparation, watering coffee, while the women mainly look after pigs and chicken raised household farms, plant vegetables, among others. The women generally spend a longer time than men for household work and in looking after children. The children spend almost all their time during the day for studying and only spend a small amount of time for helping in household work.

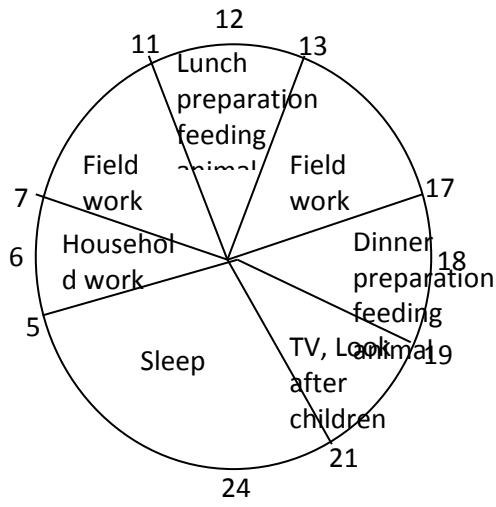


Figure 1 a. Typical day work of women in Ea Kar

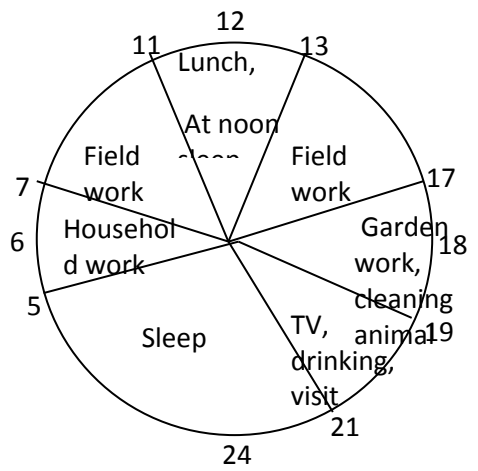


Figure 1 b. Typical day work of men in Ea Kar

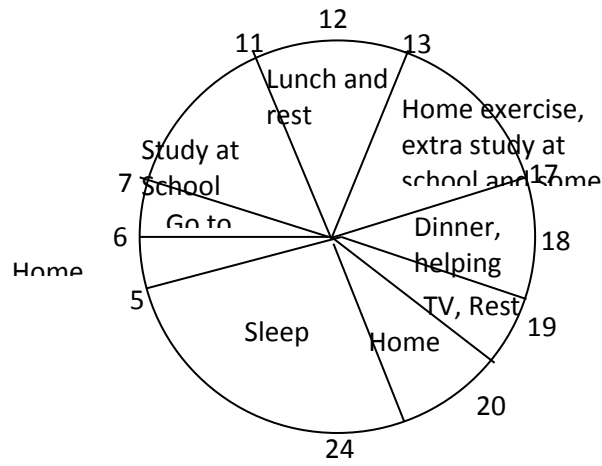


Figure 1 c. Typical day work of children in Ea kar

## Decision making

In terms of decision making, men and women generally make joint decisions about starting pig production, buying an animal, selecting breed for pig production and when selling animals (see table 17).

Table 17. Decision making

	Starting pig production	Buy a pig for fattening	When sell a fattened pig	Select breed for raising
Man	Joint/men*	Joint/women**	Joint	Joint/men
Women	Joint/men	Joint/women	Joint	Joint/men

\*Joint/men: Join discussion but the men is decision

\*\* Joint/ women: Join discussion but the women is decision

Almost all production decisions were made jointly and based on agreement between the men and women. Some other production activities are discussed jointly but final decision is made by the person who is mainly responsible for the work or activity. For the household pig production, the decision is often made by the husband and wife together.

## Task allocation in pig production, by gender

Most of the men and women in group discussions in Ea Kar perform almost the same tasks in pig production. More women than men tend to be involved in looking after pigs and buying pigs for fattening. Generally, buying pigs for fattening was only done in some special cases by women when their sows were not producing enough piglets and they usually buy piglets from their neighbors to add to their stock for fattening. About 62% of participants in the meeting indicated having joined training courses on pig production in 2013. Among men, 75% indicated they have received training; among women, 50% did the same. On the other hand, 100% of women participants indicated that they are responsible for looking after pigs. In Ea Kar, most of the pig producers treat and vaccinate their animals.

Table 18. Task allocation in pig production, by gender

Items	People involvement			
	men		women	
	Number	%	Number	%
Participation	24		24	
Look after animal	15	63	24	100
Buying pig for fattening	10	42	24	100
Selling pig	24	100	24	100
Buying feed	24	100	24	100
Access credit	12	50	8	33
Access to training	18	75	12	50
Treatment disease pig	20	83	8	33

## Pig production systems

### Purpose of pig production

In all group discussions, farmers indicated three purposes for pig production:

- To improve income of the family by using available labor and feed;
- To collect manure for crop production;
- To earn employment income from commercial production, rental income from hiring out their land to other pig producers, and returns to investment in concentrate feed production.

### Types of pig production system

The pig production in Ea Kar can be divided into three main systems:

#### Intensive system

This system is defined as the production with high investment and market orientation. This system is mainly found in commercial pig production, called “Trang trai” and some in “Gia trai” scales. The “trang trai” and “gia trai” scale are defined by local authorities as follows:

- “Trang trai”: a pig farm that is managed by a family or jointly with some families with scale of more than 120 heads of fattening pig or more than 30 sows.
- “Gia trai”: a pig farm that is managed by the family with scale >50 heads.

In Ea Kar there were about 51 “trang trai” and 150 “gia trai” pig production units that have been in operation from 2005 to 2013.

#### Semi-intensive system

This system mainly applies to the scale of “Gia trai” and also in household production (e.g., household scale is defined as the family farm with number of pigs less than 50 heads). In this system, farmer mainly uses exotic breeds and crossbred pigs and also feed their pigs with concentrate feeds combined with other locally available feed.

#### Extensive system

Extensive system mainly refers to producers who keep local pigs and wild pigs. For this type of production, pigs usually are free grazing in the village gardens or around a fenced area; others also try to keep pigs in pig pens. Feeds for this type of system only come from the household waste from family food and locally available feeds. The main diet of this type of pigs is usually vegetables and forages. In free grazing system, the natural feed that pigs can find for themselves are very important. The indigenous ethnic minority groups are the main producers in this system. The local pigs are traditionally and closely associated with their cultures.

# Pig value chain mapping

Pig value chain for crossbreeds and exotic pigs

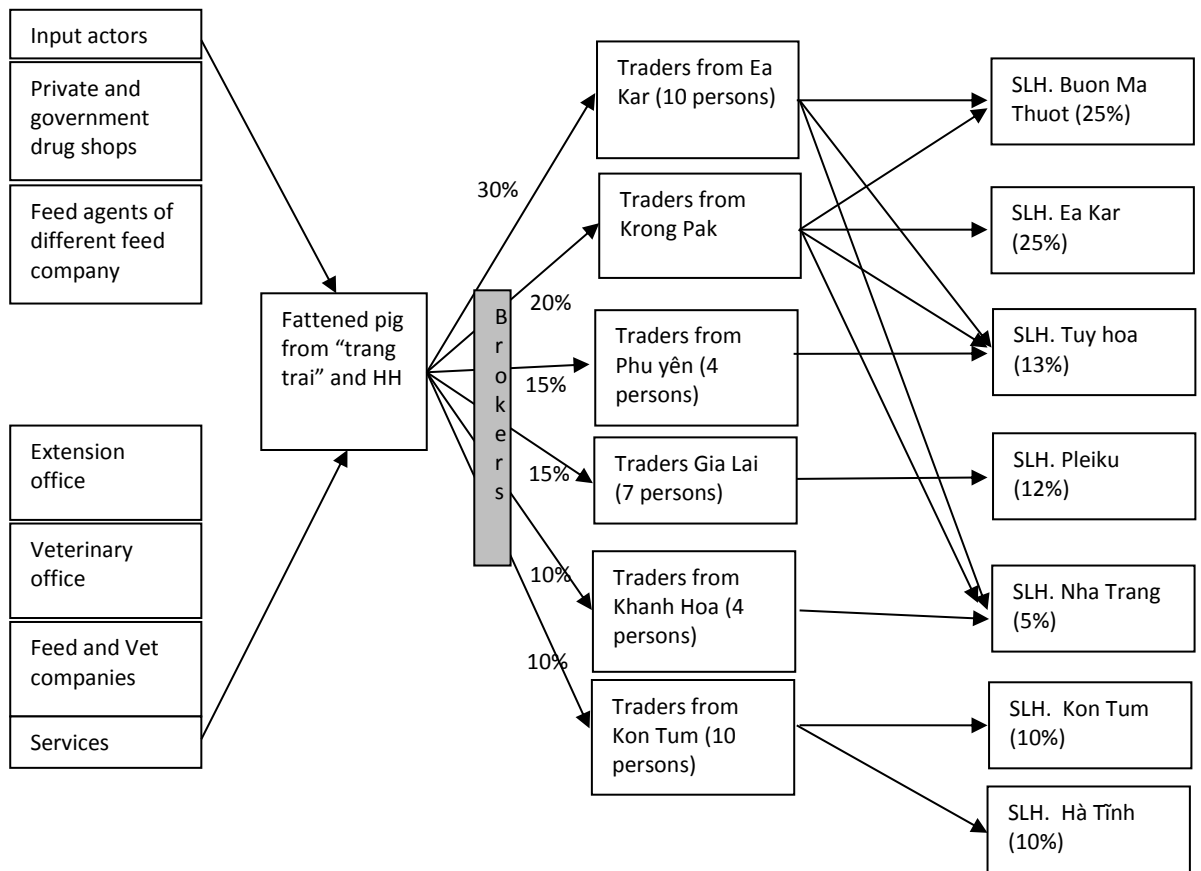


Figure 2. Fattened pig value chain map in Ea Kar

\*The percentage was estimated by trader group in Ea Kar, km 38, Gia Lai and Kon tum

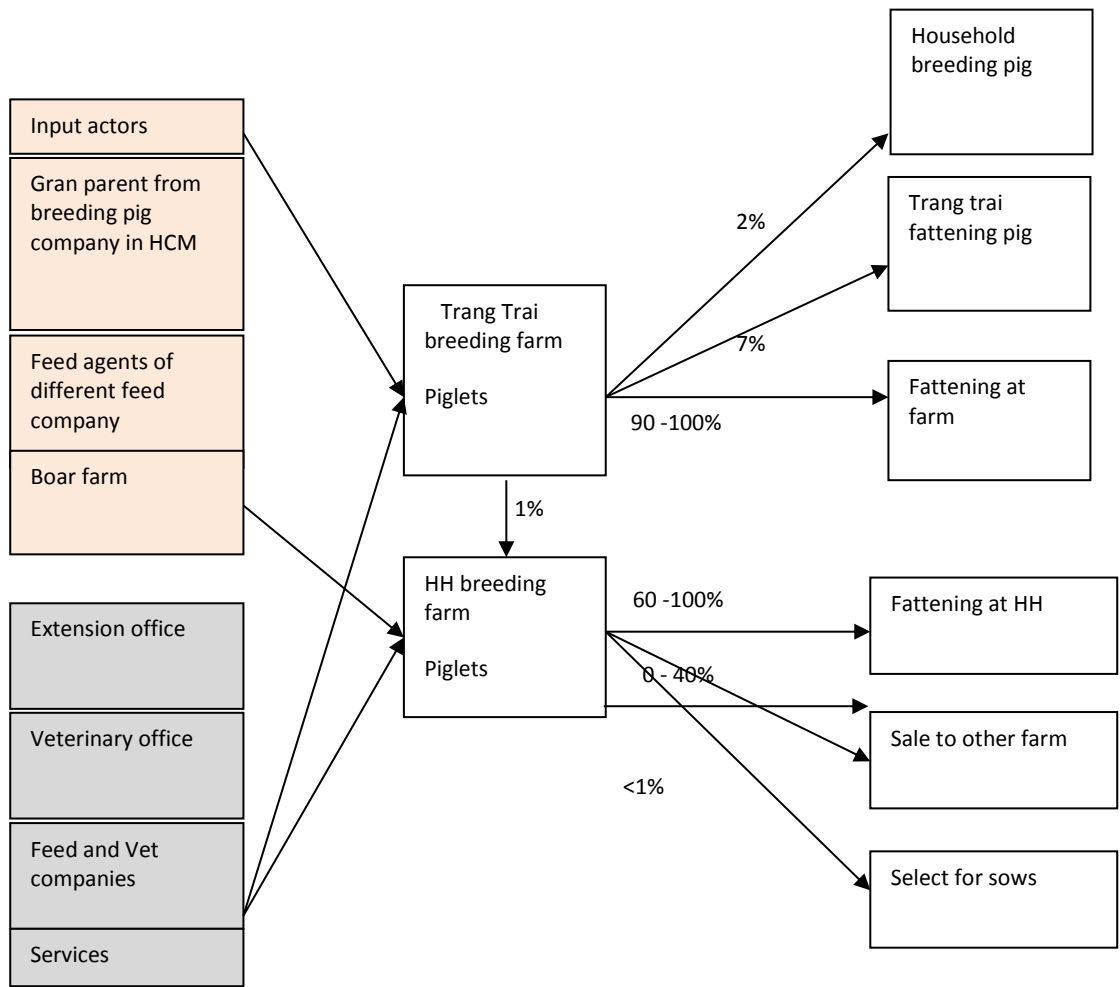


Figure 3. Breeding value chain map in Ea Kar



## Actors in pig value chain for cross bred and exotic

In Ea Kar, the different types of value chain actors and their functions are summarized in table 19.

Table 19. Actors in value chain

Input & service	Producers	Traders	Processor/ Slaughter house	Retailer	Consumers
Drug seller	HH farmers "trang trai" farm	Broker	District slaughterhouse	Retailers at town market Outlet in the rural	Urban consumers
Feed seller	Private Companies	Traders in district	Slaughterhouse point		Rural consumers
Breed seller	State companies	Traders outside district	HH abattoir		
Extensionists					
Veterinary workers					
NGO					
Projects					

### Main Products

The main products from pig production in Ea Kar are:

- Live pigs: These include three main types, namely, lean pigs, fat pigs, and local pigs.
- Piglets: Since there were no breeding farms that produce and sell piglets, almost all piglets are sourced from households and a few from some large farms. Households produced piglets on farm for their own fattening, while the piglets sold in the market are sold only from farm to farm.
- Manure as a by-product from pig production.

### Existing market

In Ea Kar, the existing markets for fattened pigs from the district are as follows:

- Inside the district: Slaughterhouses are the largest markets for pigs in the district at moment. There were 63 slaughterhouses in the district located around Ea Kar town and in every commune. On average, each slaughterhouse slaughters 4 heads per day (ranges from 1 – 15 head). The traders estimate that about 30% of pigs produced are consumed in the district.

- Buon Ma Thuot city: The capital of Dak Lak province, it is the second largest market that consumes about 25% of pigs produced from Ea Kar.
- Neighboring provinces: The traders from 4 neighboring provinces frequently buy pigs from Ea Kar. These traders come from Gia Lai, Kon Tum, Phu Yen and Nha Trang. Pigs from these traders are mainly consumed in the capital of these provinces, namely Pleiku, Kontum, Tuy Hoa and Nha Trang; only traders from Kon Tum indicated that they transport some pigs to Ha Tinh province although this is not a regular practice.
- The piglets are only sold from farm to farm in the district

#### Potential markets

The traders in Ea Kar commented that five years ago, some traders in Ea Kar transport pigs from Ea Kar to Ho Chi Minh City, and the demand from this market was very high. However, in the recent years, pig production around HCM city and the Mekong delta has grown and the price difference between Dak Lak and Ho Chi Minh (HCMC) market was no longer an attractive pull to traders. In addition, the quality requirements for pigs sold in HCMC are much more stringent and with higher transport price, selling to this market was no longer as highly profitable to traders as it was before.

Many traders said that the potential markets for pigs still remain to be Ho Chi Minh City and the north of Vietnam but it also very much depends on the growth of and opportunities for exports to China.

#### Market demand

Quantity demand: The reflection from traders show that the demand has always been higher than supply. The price fluctuations just reflect the supply and availability of pigs.

Quality demand: The result from farmer group discussions showed that the quality requirements from different market chains vary (table 20)

Table 20. Market criteria of different markets

Existing market	Pig selection for trading		
	Lean pig*	Fat pig*	Local pig
Ea Kar	x	x	x
Buon Ma Thuot	x	x	x
Gia Lai	x		
Kon Tum	x		
Phu Yen	x		
Krong No	x	x	x

\* lean pig and fat pig were classified by trader and producer by visual inspection based on breed and body condition; almost all pigs from “trang trai” and some in “gia trai” are lean pigs, some pigs from “gia trai” and most pigs from small households are “fat pigs”.

Almost all traders who sold pigs to slaughterhouse in cities bought only the lean pig, while the traders who sold to rural areas bought both fat and lean pigs. The retailers in rural areas said that most of consumers in the rural areas who do physical work which require more energy want to buy pork that have both lean and fat. The type of pork cut that is highly demanded in the rural areas, especially during coffee harvesting when the coffee farmers hire many laborers to harvest coffee, is pork belly (lean and fat meat).

Input actors: Feed provider

Almost all feed companies operating in Dak Lak are present in Ea Kar; there were 13 feed companies including international companies such as CP, Cargill, Posy, Jaffa, and domestic companies like Vina, Thanh Loi, and Dong Tien (table 21). These companies are selling feed for pigs in Ea Kar. The main types of feed sold were complete concentrate feed and concentrate feed. Each large company has a feed sale agent level 1 in the town; these sales agents mainly distribute feed to feed retailers in different communes in the district.

Table 21: Feed providers in Ea Kar

Types of provider	Number (unit)	Number Of feed sale per day (kg)
Feed company	13	-
Feed sale agents Level 1*	8	1500
Feed retailer	2 -3 per commune	200 - 500

\*feed sale agent level 1 is representative of feed company in an area, agent receiving feed direct from the company and deliver feed to other shop/feed retailer in the area.

Input actors: Drug provider

District veterinary shop is belongs to the veterinary office in the district and is the main drug source that supply and deliver to other shop in the district, especially providing vaccines for vaccination campaign or epidemic diseases and consulting for private drug shops (table 22).

Commune shops were private shops; the owners/operators of these shops were the graduate of veterinary schools, or also the paravets. They sell drugs and supply veterinary services directly to producers.

Veterinary companies are mainly private companies in different parts of the country. Many of these companies have access to the district and commune shops, and sell drugs from their companies and also provide training.

Table 22: Vet input providers in Ea Kar

Types of Drug provider	Type organization	Number of shop	Roles
District shop	Veterinary office (government)	1	Selling drugs, treatment, providing training
Commune shop	Private	20 commune shops (distribute in every commune)	Selling drugs, treatment,
Company	Supply drug for drug shops	0	Provide drug and training

Input actors: Service providers

Service provision in pig production mainly includes providing training courses on pig production and veterinary treatment. The providers are mainly from extension and veterinary offices, projects, and companies (table 23).

Table 23: Service providers

Types of service	providers	volumes	content
Training	Extensionists	Depend on government programs	Pig production technologies  Feed ration and feeding pig
	Veterinary officers,	Depend on government programs	Vaccination, Treating disease pig Veterinary hygiene...
	Companies, NGO (Feed, Drug company...)	8 – 10 courses per year	Introduce feeds  Feeding animal  Introduce drug
Demonstration	Extension	Every year	Lean meat pig production

#### Producers

In Ea Kar, producers were divided into three groups:

- Producers who are the holders the pig farm with “larger scale”, called “trang trai” (as explained above). Total pig production units classified as “trang trai” in Ea Kar was 51. These producers have good knowledge of pig production including breed and feeding systems, and market orientation. Problems that they identified were:
  - Lack of technologies to keep grand parent breeding breed parent stocks,
  - No place for testing feed nutrients and evaluate quality feed through nutrient content,
  - High risk from Foot and Mouth and blue ear diseases,
  - High cost of production,

- Pig price fluctuation during the last five years, with price changes happening over short period and the market prices difficult to predict, while the price of feeds continually increase.
- Environment: the cost of standard waste treatment (e.g., for manure, urine) was very high
- Producers who are classified as “medium scale” (gia trai)<sup>7</sup> have more than 50 heads of fattening pigs. The extension office report about 150 – 200 producers of this type in Ea Kar. As documented from producer discussions and information from extension officers and veterinary officers, it was shown that the knowledge and skills in animal production and markets among these actors were very variable. Only some of them have good knowledge and almost all of them still do not have very good knowledge. These households were most sensitive to the risks from epidemic disease and market instability; they invest significant economic assets for this activity, but face risks that are always unknown while their knowledge and skills are still not enough to enable them to manage disease risks effectively. Some problems highlighted by these producers were:
  - How to produce on their own the good piglets for producing lean pigs since the price of good quality piglets from trang trai or companies are very high,
  - Technologies for producing complete concentrate feed themselves in order to reduce cost of feeds,
  - Knowledge and skills on animal husbandry and veterinary practices,
  - Farm management,
  - Environment problems mainly the smell and waste from manure.
- Producers who have small scale of pig production are dominant, and also contribute the largest number of pigs in the district. The estimates from farmer group discussion was about 30 - 40 % of total households in the communes keep pigs with scale from 2 – 50 heads, and contribute more than 60% of pigs produced in the district. The problems identified by this type of producers were:
  - Most of them were poor or have low income,
  - The production cost in the household was higher than larger scale because of low quality breed and feed while the price of their product (fat pig) was low,
  - Household pig production was the most vulnerable to risks of epidemic diseases and fluctuation of prices,
  - Low knowledge and skills in breed selection and feeding pig in different systems, at different ages, and in application of veterinary interventions (most of them do not know the breeds of pig that they keep; they use feed from available feed sources but did not know how to improve feed quality),
  - Lack of market information; this group was perceived to be the most sensitive when it comes to the fluctuation of market prices, with many of them starting pig production when pig price was high and selling pigs when price is low,

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<sup>7</sup> The term that defined by local authorities

- Environment problems from air and water pollution were the factor limitations for household pig production.

#### Traders

Traders who bought pigs from Ea Kar come from different provinces in the central region of Vietnam. During the last 5 years, traders groups Ea Kar (10 persons) and Krong Pak (10 persons) districts in Dak Lak Province, Phu Yen (5 persons), Gia Lai (7 persons), Kon Tum (10 persons) and Khanh Hoa (5 persons) have been regularly trading in Ea Kar. The traders from outside Ea Kar usually buy the pigs from Ea Kar and sell them to slaughterhouses in the provincial capital. These traders mainly look for and buy lean pigs while the traders in Ea Kar district usually buy both lean and fat pigs.

#### Brokers

The broker for pig trading in Ea Kar is defined as the people supplying information about where the pigs are, who have fattened pigs for sale, when they are likely to sell, and in some cases even the prices offered by the traders to farmers. In Ea Kar, the brokers were working quite permanently for traders on field; one trader may work with some brokers in different communes and a broker mainly work with one trader but they have contact with other traders to sell pigs in case his/her traders can not buy. Brokers are paid by traders; the prices paid are almost the same among the traders, at about VND20,000 – VND 15,000 to 20,000 per head depending on the time of sale and quantity of pigs available.

#### Abattoirs

The district has no large slaughterhouse; the slaughterhouses were distributed in every commune, and the number of slaughterhouses per commune depends on the volume of meat consumption per day. There were 63 slaughterhouses in the district. On average one slaughterhouse slaughters 4 – 5 heads per day and at 70 – 100kg/head.

#### Retailers

The research group worked with two types of retailers in the district, namely retailers in the town market and retailers in the rural markets. The products from slaughtering were divided into three (3) classes with the same price. They are the “leg meat” including meat from legs, shoulders and tender loin, the belly meat and other parts including bone (bone and meat) and intestines.

The price of leg meat in the town is higher than in rural markets, but the price of belly in the rural markets is usually higher (table 24). Retailers explain that the leg meat was not the same quality for every shop; it depends on whether meat comes from fat or lean pigs. The customers who come to buy pork were mainly women; in rural areas, about 90% and in town about 80% of customers buying pork were women. The types of pork consumers want to buy were not dependent on the gender of the buyers but more on the purpose for which the meat will be used. At the time of coffee harvesting, pork is almost used to feed the labourers, so most customers wanted to buy the belly meat.

Table 24. Volume and price of pork sold by retailers in Ea Kar

Retailer	leg meat (kg/day)	Belly meat (kg/day)	Bone and other intestine (kg/day)
Volume of sale per retailer in town market (kg/day/retailer)	20.25	12.50	10.00
Volume of sale per retailer outlets and commune markets (kg/day/retailer)	13.00	15.00	9.33
Price of pork in town (,000/kg)	82.25	71.25	63.00
Price of pork in rural (,000/kg)	80.00	73.33	65.00

Source of data: interview retailers from the own and commune markets

#### Consumers

The share of pork in total meat consumption in the family was estimated by farmer groups to be about 70 - 80%, chicken and duck about 15 – 20%, and beef is only used in some special cases because it is very expensive. Most of the farmers said they want to eat belly meat because of its good taste and it is cheap. The lean meat is also preferred but it is quite expensive compared to belly meat.

#### Processors

The main pork processors in both districts were producing lean pork paste and fluffy dry meat (Pemmican). These processors buy the lean pork from slaughterhouses for processing into pork products. These pork products are found in traditional meals of Vietnamese households and are also often served in parties. There were only a few numbers of processors in the districts, and they are mainly producing in the towns and distributing to the rural markets. The volume produced depends on demand during holiday seasons like TET holiday, wedding season, etc.

## Pig value chain for local breeds

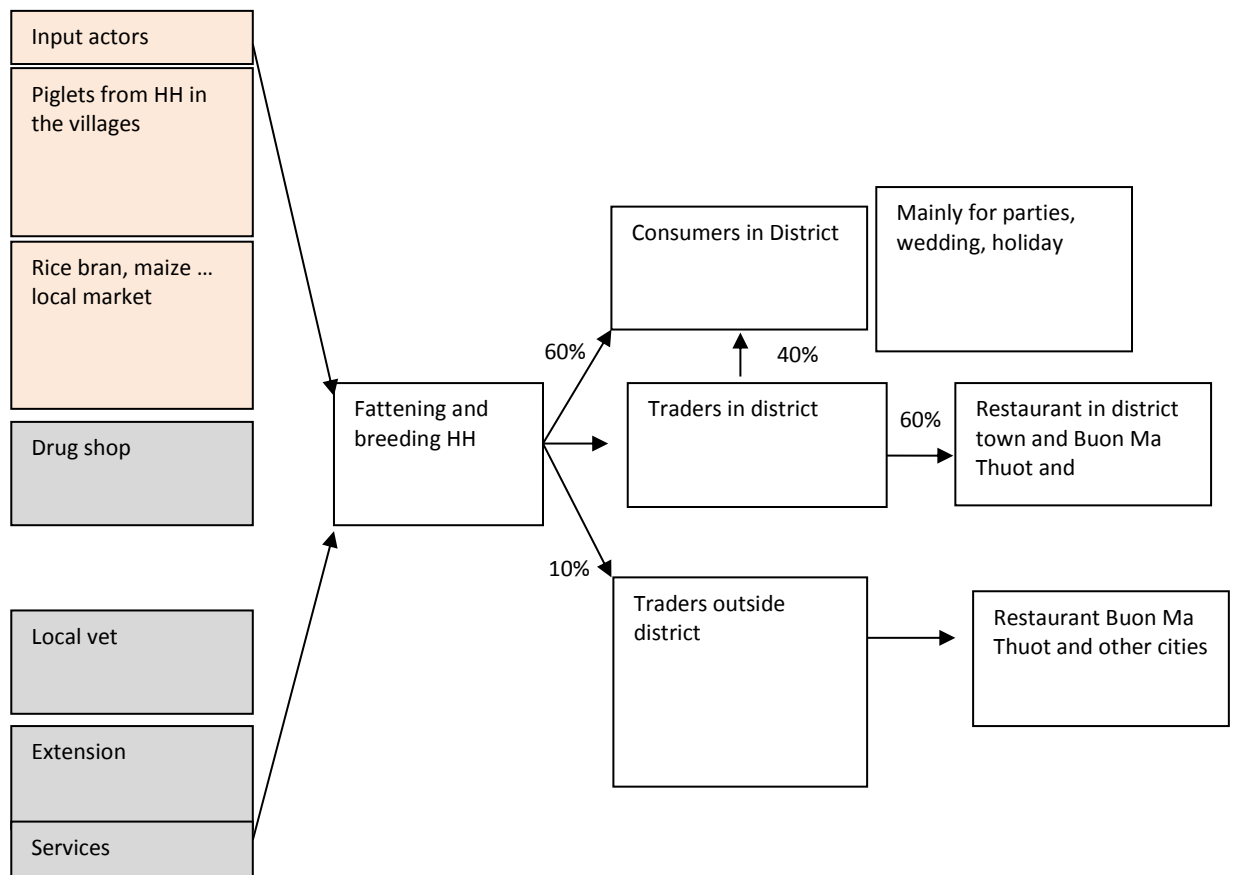


Figure 4 Local pig value chain map in Ea Kar

### Production system

The local pig is mainly kept in small households by people in ethnic minority groups in the central highlands. The local pigs can be scavenging for feeds quite far from the houses and villages. Traditionally, farmers let their pigs graze to search for feeds in natural conditions. Feed supplied from natural conditions depend on area of “grazing land” and available feeds. The natural feeds include vegetation roots, vegetables, and grasses on grazing lands.

### Products

The main products from local pig production can be classified into two types, namely small pigs called “MINI pigs” from 7 – 15 kg that are sold during the year and mainly used in restaurants, and mature pigs weighing with 40 -50 kgs that are mainly used for parties or TET holiday celebrations at the end the year.

### Markets

Markets for local pigs were different compared markets for exotic and crossbred pigs. The mini pig can be sold anytime during the year to restaurants that serve specialty dishes, and both mini and mature pig sales are quite high at the end of the year for parties and TET



holidays. The potential markets for mini pigs identified by traders were the city markets for special foods.

#### Input actors

Feeds used for local pigs usually come from household available feeds; farmers only buy some rice bran, maize or cassava when necessary from local markets. Drugs and veterinary services were also available in the areas. There were still no training courses for local pig production in the district.

#### Producers

In Ea Kar, there was a survey done by the extension office in early 2013 that showed that about 30% of ethnic minority households are keeping local pigs. On average, herd size ranges from 2 – 10 pigs. In the remote areas, the proportion of households keeping pigs was higher than in the areas around the town because they still have opportunity for grazing. In recent years, some Kinh people operated local pig farms on larger scale. Their production scale ranges from 20 to some hundred heads of pigs. The local pig was used as the sows for crossing with wild pigs for making F1 for fattening under commercial production. These pigs are sold mainly to restaurants or to other city markets such as Ho Chi Minh City, Buon Ma Thuot City, etc.

#### Traders

There were a few traders who were trading only local pigs, while most of pig traders in Ea Kar also bought some local pigs following the order from customers. The number of pigs traded in this system was not very high.

The research team has interviewed one woman who was only trading local pigs from Ea Kar and Krong Buk (neighboring district) to Buon Ma Thuot and outside of Dak Lak. She started trading local pigs since 2007 and started to transport local pigs to Ho Chi Minh City from 2011. The number of pigs sold is quite stable every month, at about 300 kg per month (20 – 30 heads). She delivers to Ho Chi Minh City about 200 kg per month. Most of the pigs she sold went to restaurants in Buon Ma Thuot and Ho Chi Minh City and some were sold directly to customers on order. The pigs weighing from 10 – 15 kg can be sold every month, but the pigs weighing 30 – 40 kg can only be sold during Tet holiday and wedding season. The price she paid for pigs at farm gate was VND 80,000/kg live weight; she sold them to restaurants in Buon Ma Thuot or to people who bring pigs to HCMC at VND110,000/kg live weight. In HCMC the price in restaurants was about VND150,000 – 170,000/kg live weight. Transport cost for 1 pig of 10 kg to HCMC was about VND100,000/kg live weight. The gross margin from 1 pig at 10 kg weight is computed as follows (table 25):

Table 25: Price of local pig trading to city markets

	Price at Farm gate	Transport cost from farm to BMT	Restaurant BMT	Transport cost BMT to HCM	Restaurant HCM
Price or cost incurred	800,000	50,000	1,100,000	150,000	1,600,000
Margin price			250,000		600,000

Source of data: interview a local pig trader in Dak Lak (Nguyen Thi Loan, Krong Buk district)

One pig of 10 kg that she trades to Buon Ma Thuot restaurants generates benefits of around VND250,000; if brought to HCMC, the benefits generated is around VND600,000. If she sells to Buon Ma Thuot 25 heads in one month, she generates benefits of around VND250,000, and if she sells to HCMC 15 heads in a month, she generates benefits of around VND600,000. Total benefits from her trading is about VND 12,250,000 in one month.

She commented that she can be expanding her trading business in Ho Chi Minh City by looking for new restaurants to supply, but the supply was limited and it was also difficult to find pigs that meet requirement of the markets with lean meat and body weight of 10 – 15 kg.

#### Consumers

The consumers of local pigs were mainly the customers in the restaurants or party groups. The local pig was often processed from a whole pig to make different dishes that is enough for one party. The pig weighing from 7 – 15 kg at 4 to 6 months is the most demanded by customers. The pig is also often used to make the traditional roast pig for weddings. During Tet holiday, the family or group of families often buy a local pig for use during their holiday celebration.

## Feeds and feeding system

### Feed usage

The main feeds used in pig production in the district were:

- *Complete concentrate feeds*, consisting a mix of different single feeds following a formulation that ensures to supply adequate required nutrients for each type of pigs.
- *Non- complete concentrate feeds*, consisting a mix of only some single feeds for supplying important nutrients (such as protein, mineral elements, vitamins) for each type of pigs. The pig keepers usually buy the non-concentrate feeds and mix these with other energy feeds following the direction on the bag to get the complete concentrate feeds.
- *Locally available feeds* are the feeds available in the household and village, and can be used in fresh form or in dry form and mixed with concentrate feed or any types of feeds that can be used to feed pigs.

### Feeding systems

The feeding systems differ among the production systems.

- In the intensive system, the producers keep exotic breeds and use mainly complete concentrate feeds for their pigs. For this system of feeding, the producers mainly rely for their feed supply on feed companies; in some cases, these producers obtain supply of feed in advance and pay back the cost to the company after they have sold their pigs.
- In semi-intensive systems, farmers mainly use both complete and non-complete concentrate feeds. Many farmers use the complete concentrate feeds only for the piglets after weaning. When the pigs have reached about 30 kg body weight up, they use the non-concentrate feeds mixed with locally available energy feeds for older

pigs. This way, the feed cost may be reduced although the quality of feed may not be guaranteed to provide sufficient and appropriate nutrient requirements.

Both complete and non-complete concentrate feeds were supplied at every commune by different feed sale agents. This situation was one of very important factors to encourage the development of exotic and crossbred pig production in the areas.

In terms of differences between the two systems, in the extensive system where mainly local pigs are produced, the feeds used were largely from locally available feed resources. A study from TNU in 2008 showed that traditionally, farmers let their pigs graze to search for feeds in natural conditions. The local pigs can be scavenging for feeds quite far from the houses and villages. Feeds supplied from natural conditions depend on the area of “grazing land” and feeds available. The natural feeds include vegetation roots, vegetables, and grasses on grazing lands. Feed intake of pigs from natural feeds is very important for their nutrition. On average, farmers supply only 1 kg of rice bran or other low protein concentrate (e.g., cassava, maize) and some kg of vegetables for 1 mature sow at 45 kg<sup>8</sup>. Under this feeding system, the production for this type of pig was very low. Under new alternative ways of management, pigs were kept in pens or fence that limits feed scavenging from natural condition to zero or very low. Farmers have to supply feed for their pigs in this new feeding system. The feeds were mainly from local feeds such as rice bran, maize, cassava and vegetables. Farmers have to buy these feeds from local markets. Problems that still persist include not having any feed nutrition standard for local pigs, and the rising cost of production.

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<sup>8</sup> Truong Tan Khanh, Indigenous pig breeds along Truong Son mountain chain (Vietnam), The proceeding of 7th RBI GLOBAL CONFERENCE on the Conservation of Animal Genetic Resources, *IMPACT OF THE GLOBALISATION ON THE ANIMAL GENETIC RESOURCES*, Hanoi, Vietnam (14-18 September, 2008)

## Pig breeds and breeding strategies

The breeds used in Ea Kar include:

- Exotic breed and crossbred such as Landrace, Yorkshire, Duroc, Pietrain, and crosses among these breeds to produce piglets for commercial fattening pigs. These breeds were only used in the intensive industrial systems with high investment to produce lean pigs.

The breeding production in this system mainly uses the crossbreeding between exotic pig breeds. The breeding strategy that is mainly used in Ea Kar is described below:

- Produce the mother pig breed by crossing between the boar of Landrace (L) and the sow of Yorkshire (Y).
- Using F1 (L x Y) as the mother breed, cross with Pietrain or Duroc boar for producing commercial piglet for fattening.

♂L x ♀Y (gran parent breeding stock)



♀F<sub>1</sub>(LY) x ♂P or D



F<sub>1</sub> (LY x P or D)

(Use for fattening)

This type of piglet is used to produce lean pigs that are then sold to different markets.

- Crossbred pig (heo lai): almost all the small scale producers in the study areas were using this type of pig. All pig keepers did not know the sources of the pig; they only know the breed was the result of crossbreeding of different pig breeds that have been present in the area for long time. These breeds have relatively longer growing period compared to the pure exotic breed, but they are also easier to keep as farmers can use lower quality, cheap feed types for feeding them. The product from this breed is usually considered a fat pig.
- Local breed: a breed that has been widely domesticated by indigenous ethnic minority people in the central highlands, called “heo soc” with small body size, low growth rate, and high scavenging ability to look for feed in natural conditions. The meat from this breed is highly appreciated by consumers.

Local breed of pig was named as “lon soc”; the characteristics of this local breed are low growth rate and small body size. Ethnic minority people usually keep the pigs only for self consumption or for villages’ party in some special festivals. However, in recent times, the food processing from the piglets of this breed has been highly demanded by consumers in many bigger markets in cities due to the increasing living standards and increased income. Many people organize parties, wedding in restaurants and the mini pig was usually chosen as a special food to serve. This demand for local pigs presents an opportunity for improving pig production through market oriented production.

## Constraints and opportunities

### Constraints

The main constraints identified during the study were:

- The price of fattened pigs fluctuated during the last 5 years. The main reasons for this observed trend were the weakness of market forecast by producers leading to unpredictability in quantity to supply to meet demand of markets, and also the effects of epidemic diseases on production. These market and production risks prevent producers in both large and small farms to expand their scale because they were afraid of investment losses from the uncertainty. The most vulnerable groups for these types of risks are perceived to be those engaged in small scale pig production.
- Epidemic diseases, especially Foot and Mouth Disease and Blue Ear disease, were always considered as threats to pig farms (mostly in Ea Kar); the threat was not only from animals dying but importantly they can not sell their pigs for long time during epidemics.
- The farmers engaged in small scale production in both districts complain that their pig breed (crossbred) were low growing, have low feed conversion ratios, and the products were the fat pigs with low price, while the good piglets from companies or trang trai were very expensive and difficult to keep because of high demand for feed and high investment for labor to manage this type of pig.
- Both the large and small scale production in two districts recognized that their sows have poor reproduction performance, the sows were only able to deliver good yield from the first to the fourth litter; from then on, the sows stop reproducing or show significant reduction in the number of piglets/litter. The farmers indicated that have no clear idea for the reason behind this observation.
- Producing piglets themselves for fattening was the best strategy that farmers consider for reducing cost of breeding stock, but farmers still have low knowledge in how to produce high quality piglets.
- In the trang trai scale, they keep the stock of grandparents and parents breed to produce high quality piglets, but it was expensive and required high technologies.
- Concentrate feeds have high price, while farmers do not have enough knowledge to make the formulation and mix complete concentrate feed on their own.
- Price of fat pigs was much lower than price of lean pigs, especially when pigs' price went down, while farmers did not know how to improve their products.
- Local pig breed is very low in both reproduction and growing rate; there is still no existing interventions or programs or projects to improve the situation of the breed.
- Inbreeding in local pig production as a factor for reducing the productivity of local breed.
- The grazing of local pigs in the villages was banned because of environmental issues but if farmers keep it in confined system the issues were lost money because of very low feed conversion ratios and high fat to lean meat ratio of pigs because farmers

often use mainly energy feeds for feeding animal and no places for pig to exercise; hence these pigs are so difficult to sell. There were still no researches and guidelines from any organizations to help farmers how to manage this type of pig efficiently.

- Local breed pork has become a special food for the city people, for parties, with high price paid by consumers but farm gate price received by producers has remained low.
- Lack of information on local pig markets.
- Low linkage between stakeholders in the value chain and between producers.
- Very few research on technologies for local pig production.
- Both the large and small scale producers recognized the important environment problems (e.g., hygiene, smell).
- The capacity and skills of veterinary and extension workers at village and commune levels still low.

#### Potential opportunities for improving the pig production in the areas

Although the household animal production has lots of weak aspects in terms of disease control and technology application, it is still very important for improving the livelihood of the rural people, especially since pig production is an activity that most households in Vietnamese villages have practiced for years. Pig production has been practiced not only as a source of income but also for improving the nutrition of the poor in rural areas in terms of providing low-cost protein to their diets. The Ministry of Agricultural and Rural Development has proposed a government-initiated program to help the household animal production improve their production efficiency and product safety. The support to researchers for improving pig production in the rural areas is necessary at this time. From the study, the potential opportunities for studying interventions to improve pig production in Dak Lak and Dak Nong are:

- For breed issues:
  1. Improve the knowledge and skills of pig keepers, especially for small household farmers on:
    - Pig breeds and their biology and production characteristics, nutrition requirement, and product quality.
    - Pig breeds selection for their farm based on their economic, technology conditions and markets demand.
    - Selection of pigs for breeding including sow and boar.
    - Producing high quality piglets through breed program in their family.
  2. Study on improving the production capacities of local breed on reproduction and growing rate.
  3. Building pig breed centre/farm in the areas.

- Feed and feeding systems
  1. Improving knowledge and skills of local extension and development workers and pig keepers on:
    - Animal nutrition requirement,
    - Knowledge and skills for making complete concentrate feed base on available feeds for different types of pigs,
    - Feeding fattening pigs, breeding pigs in different stages.
  2. Study of factors affecting low yield of reproduction of the sow in area, increasing the yield of sows through improving feeding systems.
  3. Study on feed and feeding systems, pig management of local pig breed to meet the demand of different markets and increase efficiency of production.
  
- Marketing & Economy
  1. Improving knowledge and skills of pig keepers, extension officers, development workers on market oriented production.
  2. Value chain study and market development for local pig, identify potential markets, market volume demand and market criteria of products, building the development strategy of local pig breed.
  3. Improve linkage among actors in the value chain.
  4. Improve linkage between producers through forming farmer groups or cooperatives
  5. Improve market information systems
  6. Planning for a pig farm
  
- Veterinary
  1. Improve awareness and knowledge of pig keepers on animal diseases and how to prevent their pigs from the disease.
  2. Improve knowledge and skill of veterinary grass roots at commune and village levels
  3. Environment: Study on reducing environment pollution from pig production



# Characterisation of the pig value chain in Dak Nong

## Overview of social economic development

Dak Nong is one of five Central Highland provinces (the others are Kon Tum, Gia Lai, Dak Lak, and Lam Dong). The province was formed in 2004 by dividing old Dak Lak province into two provinces: Dak Lak and Dak Nong. The characteristics of the province are shown in table 26.

Table 26: Land use and population of Dak Nong

	Characteristics	Dak Nong
1	Total area (km <sup>2</sup> )	6,515.61
2	Agricultural land (km <sup>2</sup> )	3,194.65
3	Forest land (km <sup>2</sup> )	2,654.25
4	Population (persons)	538,034
5	Population density (persons/ km <sup>2</sup> )	82

Source: Dak Nong statistic book 2013

Land resources:

Dak Nong is also well-known as the area of basaltic soils which are suitable for coffee and pepper plantation. The area of this fertile land is only limited to some districts, such as Dak Mil and Dak Song. An estimate of about 35% of total land area in Dak Nong is basaltic soil<sup>9</sup> but only small areas in Dak Mil and some small area in other district were suitable for coffee; the rest of the land are mainly of poor soils and not very good for agriculture. In Dak Nong forest land is only 45%, in which only 32% is natural forest that have a good capacity for land covering.

Population:

In 2012, total population in Dak Nong is 538,034 people (table 27). Originally, the provinces used to be mainly inhabited by M'ngong and Ede populations. The provinces nowadays host 40 different ethnic groups: Kinh, Nung, Muong, Tay, Thai, Dao, H'mong people; Kinh people make up approximately 60% of the total population.

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<sup>9</sup> **Phạm Thế Trinh, 2012**, NGHIÊN CỨU ĐẶC ĐIỂM SỬ DỤNG ĐẤT ĐỎ BAZAN (FERRALSOLS) TỈNH ĐẮK LẮK

J. Sci. & Devel., Vol. 10, No. 7: 1024-1031, Tạp chí Khoa học và Phát triển 2012. Tập 10, số 7: 1024-1031

[www.hua.edu.vn](http://www.hua.edu.vn) 1024

Table 27: Administration in Dak Nong

	District	Population (person)
1	Gia Nghia (capital of the province)	41.8
2	Dak Lap	74.1
3	Dak Song	56.8
4	Dak Mil	87.8
5	Dak Glong	39.1
6	Tuy Duc	38.7
7	Krong No	56.8
8	Cu Jut	88.3

Source: Dak Nong statistic book 2013

#### Economic development

Dak Nong has a low industrialization level; apart from agro-industry. Its economy is still mainly based on agriculture. The economic structure of Dak Nong in 2012 includes agriculture at 60.36%, industry and construction at 11.97%<sup>10</sup>, and service at 15.27%, Animal production only contributed 5.1% in. The GDP per capita in 2012 was USD 1,309.<sup>11</sup> The poor household rate was 26% in 2012<sup>12</sup> and 23.35% in 2013<sup>13</sup>.

#### Animal production

Animal production accounts for a very low share in total GDP in Dak Nong; it's share was only 5.1% in 2012, but it was still very important for the poor households and in places where the land resources is poor and difficult for cropping. Livestock and fish farming was also known to provide cash income and contribute to improving nutrition through increased consumption of protein by consumers in poor rural areas.

Pig production was the most important among all animal production activities in Dak Nong in terms of animal numbers (table 28). Pig production contributes about 80% of total meat produced in the areas.

<sup>10</sup> Tỷ lệ hộ nghèo tại Đắk Lắk giảm xuống còn 11,99%,  
<http://www.daibieunhandan.vn/default.aspx?tabid=82&NewsId=301299>

<sup>11</sup> Statistic book Dak Nong 2013

<sup>12</sup> Đắk nông triển khai các biện pháp giảm nghèo bền vững, [http://chuongtrinh135.vn/tin-tuc-su-kien/hoat-dong-cua-dia-phuong/Dak-nong-trien-khai-cac-bien-phap-giam-ngheo-ben-vung\\_81\\_1902\\_3.aspx](http://chuongtrinh135.vn/tin-tuc-su-kien/hoat-dong-cua-dia-phuong/Dak-nong-trien-khai-cac-bien-phap-giam-ngheo-ben-vung_81_1902_3.aspx)

<sup>13</sup> Dak nong people committee internet portal, **The Task team of the Central economic Committee works with Dak Nong Provincial Party Committee.**  
<http://eng.daknong.gov.vn/News/News/Lists/Posts/Post.aspx?CategoryId=3&ItemID=86&PublishedDate=2013-08-30T10:40:00Z>

Table 28. Number of animals raised in Dak Nong 2012 (thousand heads)

	Animal production	Number of animals
1	Buffalo (,000head)	7.82
2	Cattle (,000head)	17.48
3	Pigs (,000head)	146.72
4	Chicken (,000head)	1,090
5	Area of aquaculture (ha)	1,091

Source: statistic book, year 2013

Pig production increased from 2009 to 2011, and then declined in 2012 (table 29). During the discussion with farmers and stakeholders, the local actors in the district said that the household production tendency to increase or reduce the herd size was mainly based on the price of pig and the epidemic diseases. In Krong No there were no epidemic diseases reported in the last 5 years, so price is the most likely driver of observed trend in pig production numbers. The traders in Krong No indicated that at the end 2010 and during 2011 prices of pigs was quite high (e.g., VND 50,000 – 54,000/kg live weight) but prices slightly went down in early 2012 (VND 44,000-48,000/kg).

Table 29. Pigs production of Dak Nong from 2009 – 2012 (,000 heads)

Year	Number of pigs in Dak Nong (,000 heads)	Growth rate
2005	124.85	
2009	131.43	
2010	133.01	1.2
2011	149.59	12.5
2012	146.72	-1.9
2013 (estimate)		

Source: Dak Nong statistic book, June 2013

### Overview of Krong No district

Krong No is a district in Dak Nong province. Total area is 81366 ha in which agricultural production land is 43.062 ha, and forest land is 31,486 ha. The economic development is based on agriculture and forestry. Krong No is the district having the highest rice and maize production in Dak Nong. Animal production comprises only a very small share in total agricultural GDP; it was estimated at only about 5% in 2012 (Dak Nong statistical yearbook 2013).

Human population is 67283 people, with density at 82 persons/km<sup>2</sup>; about 40% of the population is ethnic minority, and mainly indigenous ethnic groups like E De and M'Nong, and other are migrants from the northern mountains, e.g., Thai, Nung, Tay.

Pig was the main source of animal liveweight production in the district; it accounts for 96% of total live weight of all meats produced from pig, buffalo and cattle production in the area (table 30).

Table 30. Animal production in Dak Nong, 2012

	Animal	Number (heads)	Meat production
1	Buffalo	920	22
2	Cattle	3,090	127
3	Pig	20,280	4058
4	Chicken	200,000	-
5	Aquaculture (ha)	116	-

Source: Dak Nong statistic book 2013

Pig production was very unstable in the last 5 years (table 31). According to interviews with pig producers from farmer group discussion and also interviews with authorities in the district, main reasons for observed unstable trend was the price of pigs in these years. Small scale producers were always starting or increase the herd of pigs when prices increase high enough to generate some profits, and stop or reduce the herd when prices go down. Hence, they are exposed to risk of having to invest when prices are high and then having to sell pigs when prices are low, giving them negative returns on their investment.

Table 31. Pig production development (2005 – 2012)

Year	Numbers (Heads)	Development rate
2009	32260	
2010	31870	-1.21
2011	31950	0.25
2012	20280	-36.53
2013		

Source: Dak Nong statistic book 2013

## Livelihood analysis and gender analysis

Table 32. Livelihood activity and importance ranking in Krong No

	Livelihood activities	Num NDir		Dak Dro		Nam Da		General
		M	W	M	W	M	W	
1	Rice	1	1	3	1	2	1	1
2	Coffee	2	4	1	4	1	2	2
3	Pig	4	2	4	3	4	3	3
4	Maize	3	3	2	2	7	5	4
5	Cassava	5	5	6	6	8	7	5
6	Cattle	8	7	8	8	3	4	6
7	Pepper	6	6	7	7	5	8	7
8	Goat	-		12	12	11	11	8
9	Buffalo	10	10	11	10	6	6	9
10	Chicken	9	9	10	11	9	9	10
11	Selling labor	12	12	9	9	10	10	11
12	Rubber	11	11	-		-	-	
13	Cashew	7	8	3	5			

Source of data: From the producer groups discussion

### Seasonal calendar

#### Cropping calendar

The calendar of four important crops is shown in the table 33.

**Coffee production:** In Krong No most of land was not suitable for coffee plantation and farmers have to incur high labor cost but generate yields that are still lower than that in other places. Coffee production during the year requires labor at the time of watering and harvesting. Watering season is from January to April and harvesting season from November to December.

**Maize production:** Almost all farmers in group discussions were producing two crops of maize per year, the first crop from May to August, the second from September to January. For the second crop, only a few farmers plant maize and in only a small area because the yield is much dependent on wet season rains which, if not enough, may require water from irrigation. Mainly, maize was sold to feed companies after harvesting, and farmers only leave quantities enough for pig production.

Rice production: almost all farmers in the district practice rice production, and mainly paddy rice. Rice production is not only used for the family consumption but it is also sold for cash income and for feeding animals.

Cassava production: In some communes, cassava was ranked as an important crop; cassava root was sold for income mainly and only a small portion of produce is stored for pig production.

Table 33. Crop seasonal calendar

Crop	Month												
	1	2	3	4	5	6	7	8	9	10	11	12	
Coffee													
Maize					—————			—————					
Rice	—————				—————								
Cassava	—————				—————								
Seasonal	Dry season				Wet season							Dry season	

Income and expenditure calendar

In Krong No, The income of farmers is mainly from four types of crops (table 34).

- Rice crop: On average the paddy field of rice is 2000m<sup>2</sup>, it ranges from 500 m<sup>2</sup> to 5000m<sup>2</sup>. Rice production is mainly used for the family’s consumption and only a small amount is sold for cash income. The time rice is available to sell is usually in March, after harvesting the first crop.
- Maize crop: There were two crops of maize per year, maize was mainly sold for cash income; only the maize harvested from the first crop was sold in August, the second crop was almost used for feeding animals.
- Coffee: Coffee production was the main source of income of almost all the households in the group discussion; coffee is generally harvested and sold in November and December.
- Cassava: Cassava was also an important cash income for farmers but only a small part of households in Num Ndir raise cassava; in some other communes, farmers grow cassava to sell.
- Pigs: pigs were considered very important for cash income by farmers; farmers were selling pigs at 4 – 5 times per year. The income was used for reinvestment in pig production and to pay for consumption expenses by the family.

Table 34. Income seasonal

	1	2	3	4	5	6	7	8	9	10	11	12
Level of Income	**	**	**	**	*	*	*	***	*	*	***	***
Income from	Cassava,		rice					maize			coffee	
Level expenditure	**	**	**	***	***	*	*	*	**	*	***	***
Expenditure for	TET	Coffee irrigation		Invest for annual crops				Children go to school			Loan payment	
<ul style="list-style-type: none"> <li>• Lowest, ** middle, *** high level of income and expenditure</li> </ul>												

### Gender and decision making

In this study, the gender analysis and decision making was conducted by group discussions in separate groups of men and women. The gender roles in household and social activities were assessed by using activity clock tools. The results of discussions are described in figures 5a-c below:

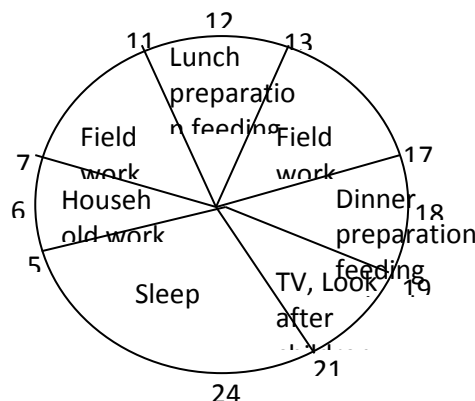


Figure 5a. Typical day work of women in Krong No

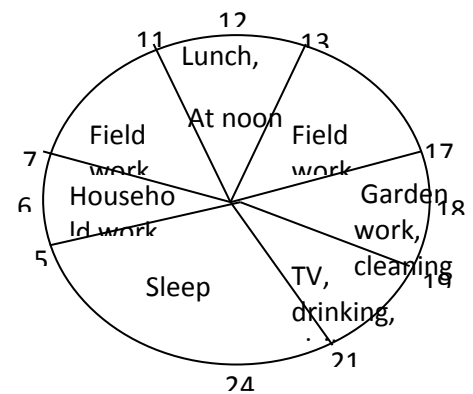


Figure 5b. Typical day work of men in Krong No

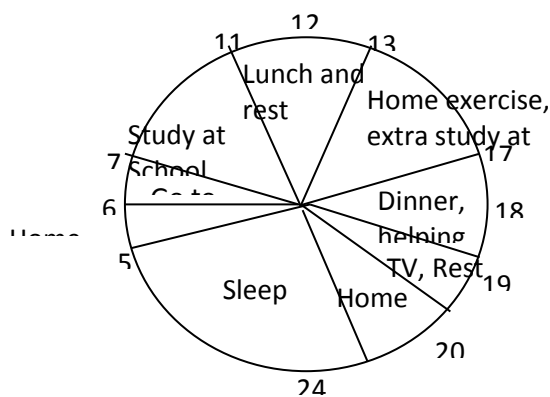


Figure 5c. Typical day work of children in Krong No

Both men and women work in the field in the morning and afternoon. The men are usually doing land preparation and watering coffee, while the women mainly look after pigs and chicken raised in household farm and plant vegetables. The women generally spend a longer time than men for house work and in looking after children. The children spend almost all their time during the day studying and only spend a small amount of time for helping in household work.

### Decision making

In terms of decision making, men and women generally make joint decisions in most of pig production activities, such as starting pig production, buying an animal, selecting breed for pig production and when selling animals (see table 35).

Table 35. Decision making

	Starting pig production	Buy a pig for fattening	When sell a fattened pig	Select breed for raising
Man	Joint/men*	Joint/women**	Joint	Joint/men
Women	Joint/men	Joint/women	Joint	Joint/men

\*Join/men: Join discussion but the men in the role of decision

\*\* Join/ women: Join discussion but the women in the role of decision

### Task allocation in pig production, by gender

Table 36. Task allocation in pig production, by gender

Items				
	men		women	
	Number	%	Number	%
Participation	24		24	
Look after animal	10	42	24	100
Buying pig for fattening	5	21	24	100
Selling pig	20	83	24	100
Buying feed	24	100	24	100
Access credit	12	50	2	8
Access to training	13	54	6	25
Treatment disease pig	5	21	0	0

The women are involved with most of pig production activities; 100% of women are involved with buying pigs, looking after pigs, buying feed, and selling pigs. On the other hand, only a



small proportion of women are involved in accessing credit and participating in training for pig production. None of the women participants have undertaken tasks for treating pig diseases, while about a fourth of men participants have done so.

## **Pig production systems**

### **Purpose of pig production**

From discussions among pig producers, pig production has two main purposes, namely as a source of family income, and as a source of manure for crop production.

### **Types of production system**

The participants classified pig production into two main systems:

#### **Semi-intensive system**

This system is characterized by presence of household production with 5 – 50 heads. In this system, farmers mainly use the “crossbreeds”, and concentrate feeds combined with other locally available feed. The purpose of pig production in this system was for improving the livelihoods of the household. Based on estimates from farmer groups discussions and interviews with authorities of the district, about 30% of total households in the district belong to this system.

#### **Extensive system**

Extensive system mainly refers to producers who keep local pigs and wild pigs. For this type of production, pigs usually are free grazing in the village garden or around a fenced area; others also try to keep pigs in pig pens. Feeds for this type of system only come from the household waste from family food and locally available feeds. The main diet of this type of pigs is usually vegetables and forages. In free grazing system, the natural feed that pigs can find for themselves are very important. The indigenous ethnic minority groups are the main producers in this system. The local pigs are traditionally and closely associated with their cultures.

## Pig value chain mapping

### Pig value chain for crossbreeds and exotic breeds

The pig value chain map for crossbreed and exotics pigs in Dak Nong are shown in figure 6.

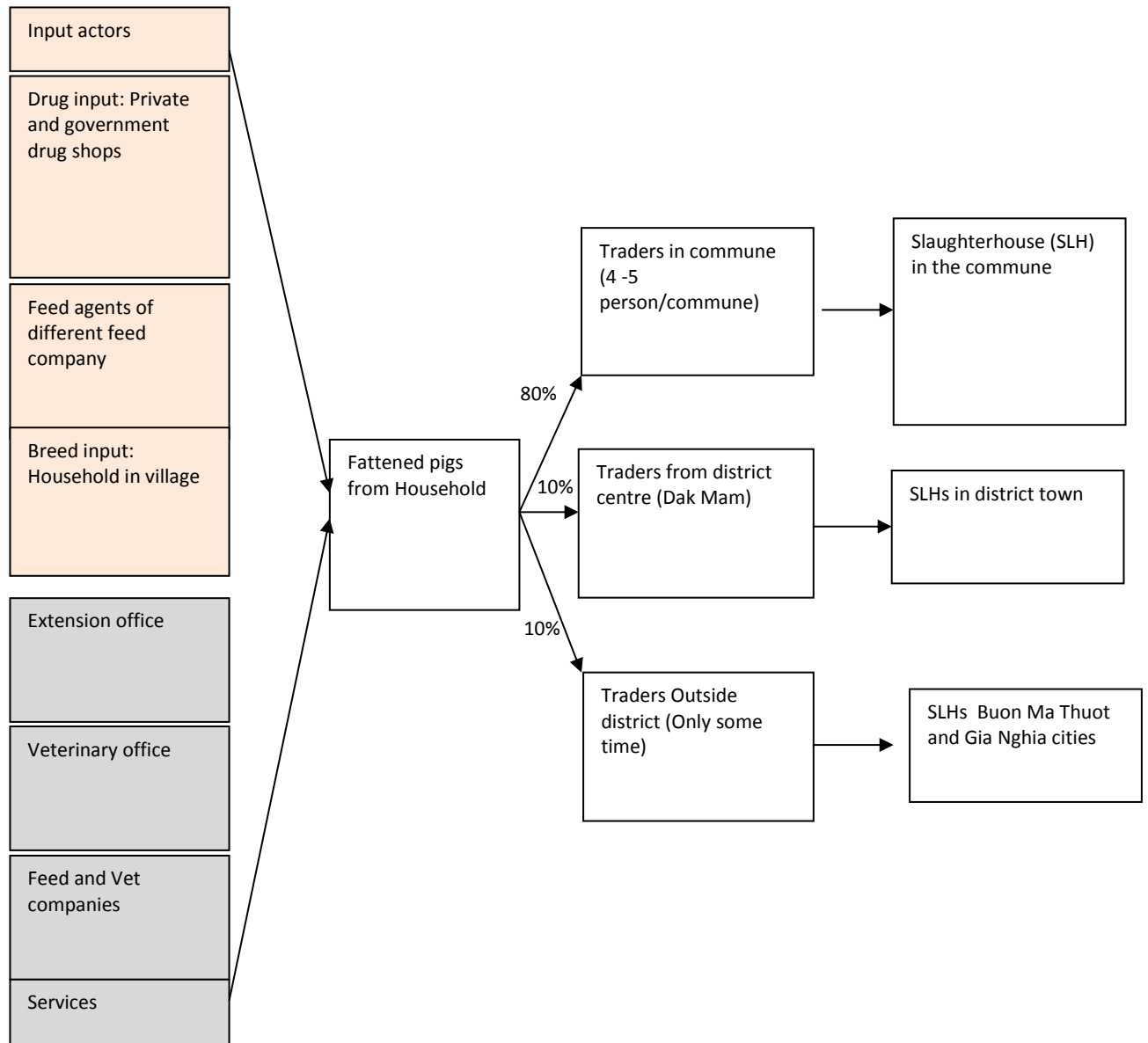


Figure 6. Exotic and crossbred pig value chain in Krong No

Figure 7 shows the pig breeding system in Dak Nong.

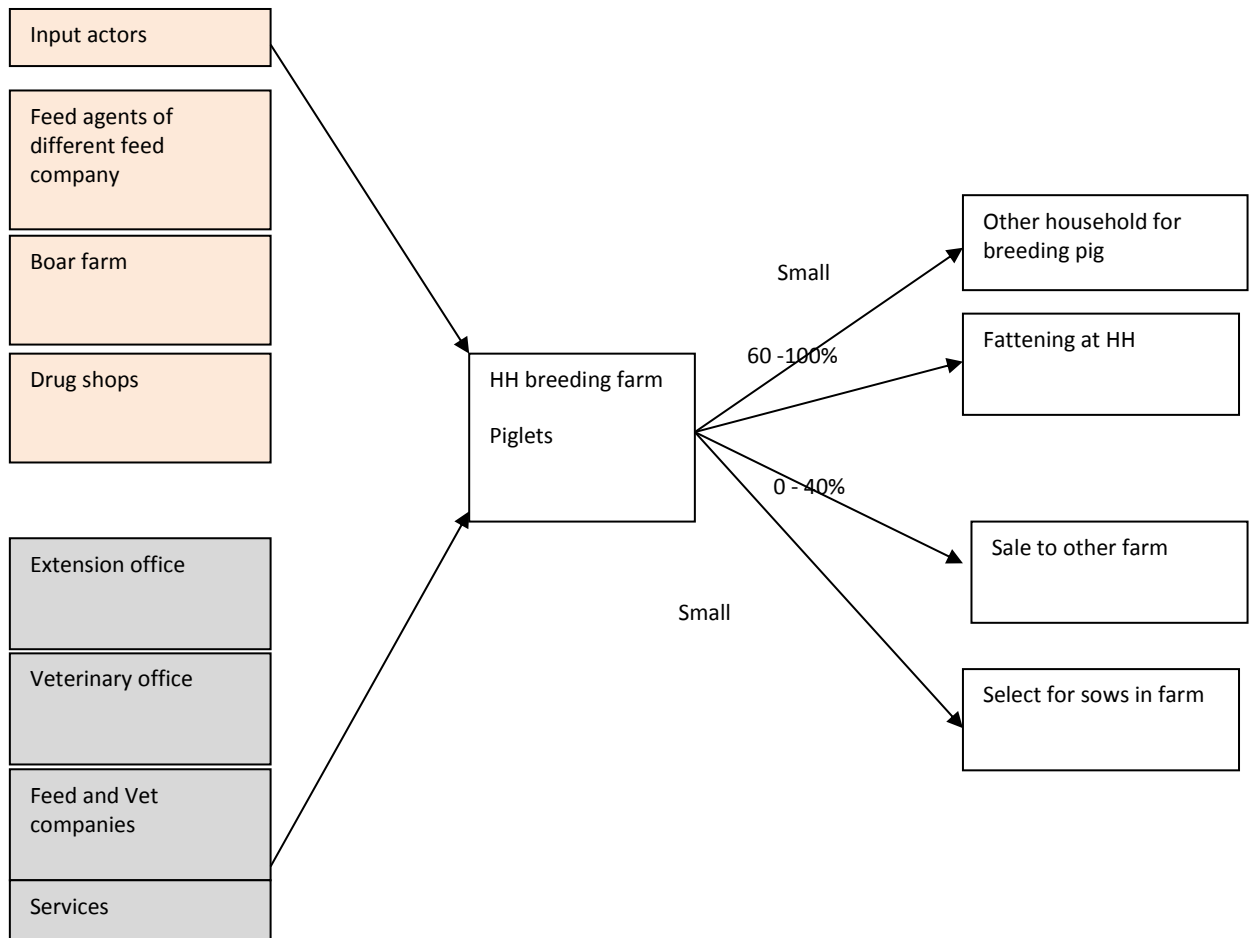


Figure 7: Value chain map of breeding system In Krong No

## Actors in pig value chain for crossbreeds and exotic pigs

- Table 7 summarizes the types of value chain actors and their respective functions in the pig value chain in Dak Nong.

Table 37. Actors in the pig value chain in Đắk Nông

Input & service	Producers	Traders	Processor/ Slaughter house	Retailer	Consumers
Drug seller, Feed seller, Extensionists, Veterinary workers, Feed and vet companies.	farmers	Broker, Traders in district	Slaughterhouse points (in communes), HH abattoir	Retailers at town markets, Outlet and rural markets	Urban consumers, Rural consumers

### Products

The main existing products from pig production in Krong No were:

- Live pigs of which there were three types, namely, lean pigs, fat pigs and local pig,
- Piglets: there were no breeding farms that only produced and sell piglets. Almost all piglets are sourced from households. Households produced piglets for their own fattening, while the piglets sold in the market are sold only from farm to farm.
- Manure as a by-product from pig production.

### Existing markets:

Most fattened pigs are traded in the district, and only a small number (about 10%) are sold outside the district, specifically to Buon Ma Thuot city.

### Potential markets

The indication from traders and farmers group suggests the potential markets are Buon Ma Thuot and Gia Nghia cities.

### Market demand trend

Quantity demanded: The reflection from traders show that the demand has always been higher than supply. The price fluctuations just reflect the supply and availability of pigs. In some time of the year, traders from Krong No have to import pigs from other areas to sell to slaughterhouses in Krong No, especial during Tet holiday and coffee harvesting time.

#### Quality demand trend

Most of the pigs were consumed in the districts, the domestic markets accepted all types of pigs (fat, lean and local pigs) but the trend was referring the lean pigs.

#### Input actors: Feed provider

The feed providers in Krong No were mainly the small feed agents from different feed companies such as CP group, Cargill, etc. The main type of feed sold for pigs was concentrate feeds. Farmers buy concentrate feeds then mix them with the locally available feeds (mainly energy feed such as maize, rice bran, and cassava meal) following the guidelines on the bags for feeding their pig.

#### Input actors: Drug providers

The main sources for veterinary drugs used for treating diseases in pigs were commune veterinary shops and veterinary officer's shop (table 38). These types of shops were not only selling drugs but also providing the services for treating and for vaccinating animals.

Table 38. Vet input providers in Krong No

Types of Drug provider	Type organization	Number of shop	Roles
District shop	Veterinary office (government)	1	Selling drugs, treatment, providing training
Commune shop	Private	Every commune	Selling drugs, treatment,
Company	Private	0	Delivering drugs for drug shops

#### Input actors: Service providers

Service provision in pig production mainly includes providing training courses on pig production and veterinary inputs (table 39). The providers are mainly from extension and veterinary offices, projects, and companies.

Table 39. Service providers

Types of service	providers	volumes	content
Training	Extensionists	Depend on government programs	Pig production technologies  Feed ration and feeding pig
	Veterinary officers,	Depend on government programs	Vaccination, Treating disease pig Veterinary hygiene...
	Companies	a few courses per year	Introduce feeds  Feeding animal  Introduce drug
Demonstration	Extension	Every year	Lean meat pig production

#### Producers

The main producers were farmers in household pig production, accounting for about 30% of total households in the villages keeping pigs. Most of them were in the semi-intensive system.

#### Traders

The trader network was quite simple; the traders were also abattoir operators who slaughter pigs in communes, with only some trading pigs from the village to slaughterhouse.

#### Brokers

The brokers for pig trading was defined as the people supplying information about where the pigs are, who have fattened pigs for sale, when they sell, and in some cases even the prices offered by the traders to farmers. Brokers are paid by traders; the prices paid are almost the same among the traders, at about VND15,000 – VND25,000 per head. This price depends on the availability of pigs; during times when pigs are in short supply, the fees charged per head were usually higher.

### Abattoirs

There were 6 slaughterhouses in Krong No and they are located in 6 communes. There were 4 – 5 abattoirs using the slaughterhouses for slaughtering their pigs. The slaughter houses are responsible for providing slaughter facilities, organizing veterinary inspection, etc. On average, one slaughterhouse slaughtered 15 pigs/day; the slaughterhouse operator revealed that during coffee harvesting, the number of pigs slaughtered may increase to 25 pigs/day.

### Retailers

The research group worked with two types of retailers in the district, namely retailers in the town market and retailers in the rural markets.

The retailers classified pork into three types, with each type being at different prices. These are the first class cuts including leg, shoulder, tender loin meat; the second class cuts including the belly meat; and the third class cuts include the bone and internal organs. The price of meat did not vary much between the district town and rural markets; only a small difference in price between bone and internal organs of pigs was observed. The price in the rural area was higher than the town. The retailers explained that consumption habits between consumers in district town and communes in Krong No did not vary much because the town is small and main customers were the farmers. Only people in remote areas are likely to be more interested to eat the internal organs of pigs.

Table 40. Volume and price of pork sold by retailers in Krong No

Retailer	Leg, shoulder and tenderloin (kg/day)	Belly meat (kg/day)	Bone * and internals (kg/day)
Volume of sale per retailer in town market	18	12	12
Volume of sale per retailer outlets and commune markets	10	5	5
Price of pork in town	85.000	71.000	63.000
Price of pork in rural	85.000	71.000	65.000

Source of data: from interviewing of retailers

\*Mix bone and meat, and internals

### Consumers

The share of pork in total meat consumption in the family was estimated by farmer groups to be about 70 - 80%, chicken and duck about 15 – 20%, and beef is only used in some special cases because it is very expensive. Most of farmers said they want to eat belly meat, because of its good taste and it is cheap. The lean meat is also preferred but it is quite expensive compared to belly meat.

### Processors

The main processors in Krong No districts were producing lean pork paste and fluffy dry meat (Pemmican). These processors buy the lean pork from slaughterhouse for processing into pork products. These pork products are found in traditional dishes of Vietnamese cuisine that are often served in parties. There were only a few processors in the districts,

and they are mainly producing in the towns and distributing to the rural markets. The volume produced depends on demand during holiday seasons like Tet holiday, wedding season, etc.

### Pig value chain for local breeds

The local breed value chain in Krong No was similar to that in Ea Kar; the main pig producers were the ethnic minority groups. The customers and consumers were mainly in the districts. Only a small number of pigs were traded through pig traders to the customers in town or restaurants.

## Feeds and feeding system

The main feeds used in pig production in Krong No are similar to that in Ea Kar. They are complete concentrate feeds, non- complete concentrate feeds, and locally available feeds. Farmers only used complete concentrate for the piglets after weaning, while other types of pigs use mainly the non-complete concentrate feed mix with locally available feeds.

The local pigs were fed mainly the low nutrient value feeds such as vegetables, grasses, and available energy feeds from household production or bought in the local markets.

## Pig breed and breeding strategies

The breeds used in Krong No include:

- Crossbred pig (heo lai): all households in the survey used only this type of pig in their farms. Most farmers do not know the breed of their pigs. The growth rate of crossbred pigs is quite good, about 4 to 5 month from date of birth the pig can achieve a body weight of 70 – 80 kg/head.
- Local breed: a breed that has been widely domesticated by indigenous ethnic minority people in the central highlands, called “heo soc” with small body size, low growth rate, and high scavenging ability to look for feed in natural conditions; the meat from this breed is highly appreciated by consumers.

## Constraints and opportunities

### Constraints

The main constraints for pig production in Krong No were:

- Market price fluctuation which creates market risks and exposes farmers to risks of losses in their pig production investments. What usually happens is that farmers would start to expand pig numbers when prices increase, however, with price volatility, prices quickly change, so by the time pigs are ready for sale, prices will have changed, e.g., dropped, resulting in low sale prices for their outputs.
- The cost of pig production in smallholders was high because the pig breed was poor and poor quality feed results low yield per unit of feeding used.
- Poor quality of breed because of poor quality of the boars; the district have only 1 breed farm supplying semen for AI and the farm only has 3 boars. The boars have no breed profiles, and the farmers do not know what breeds they have. In each



commune only 1 boar is available for direct service so the inbreeding was often happening.

- Poor reproduction of the sows,
- Concentrate feeds have high price, while farmers do not have enough knowledge to make the formulation and mix complete concentrate feed.
- Local pig breed is very low in both reproduction and growing rate; no interventions or programs or projects exist to improve the situation of the breed.
- Inbreeding in local pig production as a factor for reducing the productivity of local breed.
- Local pigs generally achieve good sales at the end the year during Tet holiday celebration; while farmers have to keep them and feed them throughout the year.
- Very poor linkage between producers and traders in the study areas
- Very few research on technologies for local pig production.
- Air and water pollution from pig production are also identified as the main constraints for pig production.
- The capacity and skills of veterinary and extension workers at village and commune levels are still low.

#### Potential opportunities for improving the pig production in the areas

- For breed issues:
  1. Set up a breed improvement program for managing/controlling the quality of the boars in order to improve quality of pig breeds in the district.
  2. Improve capacity of farmers in selecting female pigs for sows.
    - Study on improving the production capacities of local breed on reproduction and growing rate.
    - Building pig breed centre/farm in the areas.
- Feed and feeding systems
  1. Improving knowledge and skills of local extension and development workers and pig keepers on animal nutrition, and knowledge and skills for complete concentrate production using locally available feeds for different types of pigs.
  2. Feeding fattening pigs, breeding pigs in different stages.
  3. Study of factor affecting to low yield of reproduction of the sow in area, increasing the yield of sows through improving feeding systems.
  4. Study on feed and feeding systems, pig management of local pig breed to meet the demand of different markets and increase efficiency of production.

- Marketing and Economy
  1. Improving knowledge and skills of pig keepers, extension officers, development workers on market oriented production.
  2. Value chain study and market development for local pig, identify potential markets, market volume demand and market criteria of products, building the development strategy of local pig breed.
  3. Improve linkage among actors in the value chain.
  4. Improve linkage between producers through forming farmer groups or cooperatives
  5. Improve market information systems
  6. Planning for a pig farm
- Veterinary
  1. Improve awareness and knowledge of pig keepers on animal diseases and how to prevent diseases.
  2. Improve knowledge and skill of veterinary grass roots at commune and village levels
- Environment: Study on reducing environment pollution from pig production

# Comparison of pig value chains in two sites in the Central Highlands

## Highlights of key similarities and differences

From the different of site selection criteria were the access to markets, while Ea Kar district was selected as high access to market, Krong No was selected as the low access to market, this is the main reason leading to different of characteristics of pig production in the areas.

The key similarities between two pig market value chain were:

- Pig production was ranked as one of four most important activities for farmers' livelihood; a significant number of householders (30 – 40%) in the villages were keeping pig as the key cash income for family. In Ea Kar, the pig production were ranking from 1st – 4th and in Krong No from 2nd - 4th. This ranking indicates that pig production has an important in the household production, the improving this system will have a significantly for household livelihood of communities.
- Household pig production contributed the main pig productivity in community, in Ea Kar was about 60%, and in Krong No only household production. Even in Ea Kar, the larger scale pig production has developed with more than 50 “Trang trai” and 150 “Gia trai” but the number of pig produced in the district still much higher that the large scale. In krong No almost all the pigs produced were from household production.
- The household pig production in both districts have has similarly problems on pig breed and feeding systems. Most of small householders, who were keeping pig in both districts, don't know clearly what breeds they are keeping; all of them called “heo lai” (crossbred pig). The crossbred were kept in both districts has similar problems: the growing rate lower than exotic pigs, feed conversion higher, and most of them were classified as the fat pig when selling. All farmers using non complete concentrate feed mixing with available energy feeds for their pigs both the sow and fattening pigs, most of them don't following the guideline that producing factory direction on the bags of concentrate feed because they want to reduce the cost of feeds. This may be also the causes for result of fat pig.
- The small household pig production was the most sensitive with the epidemic diseases and fluctuation of pig price. Most of them are the poor or small capital fro production, many householders have to stop pig production after a epidemic disease. The cost production in household pig production were higher compared to in large farm; most of farmers weighting for the price increasing (until VND44,000/kg) to starting the production or expanding the herd, many of them lost the investment if the price going down when the selling pigs.
- The local pig production, as the traditional activity of ethnic minority groups, is in front of loss from agricultural production, because the change of pig management from free grazing to confining, while the market demand having a sign of potential for development. If keeping pig in pen, farmers have to investment for buying feeds but the growing rate of pig was low and the fat rate in the fattened pig is high because of using higher energy feeds and may the characteristic of the breed.
- The linkage and cooperation between the producer and producer was poor, there were no farmer groups or cooperatives on pig production formed in both district.

- The environment issues are the serious consideration of producers and other involvement stakeholders.

The key differences between two pig market value chains were:

- Difference on production systems: in Ea Kar the production was more development; “Trang trai” and “gia trai” were developing in the last 5 years. The production in these systems was commercial and market orientation, while in Krong no was only existing in household production with small scale.
- Difference on trading systems: while in Ea Kar, most of pigs produced were sold to other districts and provinces, the pigs produced in Krong No almost consumed in the district. The traders come to buy pig in Ea Kar from different provinces, transport to different markets but in Krong No traders only in the districts.
- Different in the input and service actors: In Ea Kar were presenting of a large numbers of feed and drug companies to provide feeds and drug and services, in Krong No these system were very few.
- The linkage among market value chain actors: In Ea Kar, especial in the commercial pig farms, the linkages between the producers and input companies, traders were quite strong, the feed supply for the farm was mainly though the contract and payment after selling pigs. In Krong No these linkages were still very poor.

## Gaps and areas for future research

Through the scoping study showed that the area of household pig production, including semi-intensive and extensive production, are still have many issues that constraint for household pig production that should be researching and enhancing knowledge and skills to improve the systems. The question researches are:

- 1) How to improve the efficiency of household pig production?
  - a. Breed issues:
    - What is the technology/breed program that can be improving the production capacity of the pig breed has used in household production, at present?
    - What other breeds may be suitable to replace the poor production capacity of crossbred has used in the communities?
    - What are the breed factors that effect to the low reproduction of the sow in household production? And how can overcome the issues?
  - b. Feed and feeding issues:
    - What are the local available feeds that can use for pig production?
    - How to sue better of the local available feeds in pig production that can be reducing the feed cost and improving the quality of fattened pigs?
    - What are the nutrition factors that effect to the low reproduction of the sow in household production? And how can overcome the issues?
  - c. Social, economical and market issues

- How to improve the market oriented production of household pig producers?
- Market information and market forecast for pig production?
- Improve linkage among the actors in the pig value chain?
- Establish suitable farmer organization (farmer group, cooperative, association...) in pig production?
- Farm planning?
- Environment issues
- Suitable technologies for reducing the water, air pollution from household pig production?
- Manure treatment and use?
- d. Capacity building
  - Need assessment, training people in different levels

## 2) Improving the local pig production system: efficiency and insitu breed conservation

- a. Breed issues
  - Conduct a survey to understand the characteristics of the breed and situation of pig management, feeding systems...
  - Breed program/management/selection to improve the production capacity of local pig?
- b. Feed and feeding systems
  - Nutrition requirement for local pig
  - Suitable feed types for local pigs? Low cost feeds that can be use for local feeds? New types of feeds (grasses, Stylo)
  - Feeding regulation
- c. Management issues
  - Suitable ways to manage local pig for producing pig to meet the requirement of markets and environment requirement?
- d. Market issues
  - Understanding of local pig: where market potential, the volume at destination markets, quality demand
  - Understand the regulation of markets: seasonal, Occasional
  - Marketing strategy

## Conclusions and recommendations

Pig production is having a significant role of livelihood activities and rural development in the rural areas of the Central Highlands of Vietnam. There were about 30% of total household in the rural are keeping and receiving from pig production as the fourth most important income sources. The main problems of pig production for household pig production are: 1) The producer are still low efficiency because of poor technologies on breed selection, feeding system and disease controlling, and access to markets; 2) The most sensitivity with the risk of epidemic diseases and fluctuant markets; and 3) Poor linkage with other stakeholders in the value chain and among the producers; 4) Air and water pollution are also the important constrain for developing household pig production.

Local pig production was the traditional production of indigenous ethnic minority which is very extensive and low productivity BUT having potential markets in both rural and urban consumers in many cases: restaurant, party, wedding, festival... as the special food

## Recommendations

The government of Vietnam has asked for different organizations, ministries to comment for making a decision to support the household animal production on March 13rd 14. The the objectives of decision are encourage farmers to develop household animal production by the way increasing productivity, reducing production cost, safety in animal health and human food. The support program includes breed, feed and feeding system, feed production, link farmers with other value chain components, production organization, environment, and sustainability.

The result from our scoping study above showed detail of things should be support farmers in those areas in Central Highlands of Vietnam. A R4D project for developing the household pig production in efficiency, sustainability and safety is needed. It is not only for improving the livelihood of famers but contributing for sustainability for crop production, women progress program, environment improvement.

A research on understanding of local pig market chain, and improving production capacity of local pig breed, feeds and feeding system, pig management to produce the pig meeting the requirement of market will be high potential to livelihood the poor and ethnic minority in the area.

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<sup>14</sup> March 2014, Đỗ Hương Khuyến khích phát triển chăn nuôi nông hộ chuyên nghiệp (policy of encourage developing household animal production) <http://baodientu.chinhphu.vn/Hoat-dong-Bo-nganh/Khuyen-khich-phat-trien-chan-nuoi-nong-ho-chuyen-nghiep/194577.vgp>

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- Dak Nong statistic book 2013

# Annex 1: Tools used in the study

## A. TOOL 1. PRODUCER GROUP DISCUSSION

### B. Component A - Livelihoods analysis

Group participants: Separate groups of men and women

### Objectives

The objective of this component session is to understand the composition of people's livelihoods (in terms of food and cash income) in the community and the role of pig production in it, and to assess whether livelihoods have changed over the years.

Question direction

1. What are the sources of for their livelihood and cash income? any activities (agriculture and none agriculture) for foods and cash incomes)
2. Make the list of livelihood activities from groups ideas.
3. Ask group to rank the sources of household livelihoods in order of importance for the group participants.
4. Discuss whether the importance of livelihood activities has changed in the past five years. What activities are new? What other changes have farmers observed in the relative importance to livelihoods? Why have these changes occurred?
5. Group present and discussion what are different and why?

### C. Component B - Seasonal calendar

#### Overview

Material needed: Large sheets of paper, pencils, at least five different types/colours of markers or beans / sticks – about 25 markers/beans of each type/colour.

Group participants: Separate groups of men and women

### Objectives

The objective is to learn about seasonality of rainfall, income from and workload for agriculture, pig production, off-farm labour, non-agricultural activities and inputs of hired labour.

### How to facilitate

Make the table with 12 months and two parts: income and expenditure

Question direction:

Guiding questions:

1. When does the household have high and low income from agricultural?
2. When does the household have high and low household income from L&F?
3. When does the household have high and low household income from other sources (include the main sources, based on the previous discussion session about livelihoods)?



4. When does the household have high and low household expenditure on agricultural activities (not L&F)?
5. When does the household have high and low household expenditure on L&F activities?
6. When does the household have high and low household expenses on other major items? Specify what the major items are.

Component C - Gender roles (activity clock)

Group participants: Separate groups of men and women

## Objectives

The objective is to understand specific roles of men, women, boys and girls in the daily activities undertaken by household members at different times of year. Also, it can help to facilitate the discussion on changes in the gender division of labour and how this is relevant to pig production.

1. Having described the example, ask the participants to produce their own clock, focussing on the activities of a typical day in this season, building up a picture of all the activities carried out at various times of day and how long they took. Plot each activity on a pie chart (to look like a clock). Activities that are carried out simultaneously, such as child care and gardening can be noted within the same spaces. Review the clock when it is complete. Anywhere where they indicate an activity they conduct for livestock, probe for the different livestock species.

**Note:** Make sure that you get the women's group to focus on their activities and those of girls below 15 (and indicate this separately in two different clocks) and ask the men to focus on their activities and those of the boys below 15 years of age.

2. When the clock is completed ask the participants, whether this is the same at other times of the year. If necessary create a second clock for another season.
3. Now ask the participants whether there have been any changes in responsibilities and time spent on different activities in the past 5 years. Describe what and why.

Crop calendar

- a. What are your specific tasks for each of the 4 main crops grown and what part of the year do you carry them out? Get the information for each crop (including production and marketing).

Crop name: _____	Months of the year											
Activity	J	F	M	A	M	J	J	A	S	O	N	D

- b. Is labour hired for any of the activities? How much are the hired labourers paid?  
Indicate payment per person per activity.
- c. Which crop are you in charge of in terms of making most of the decisions related to its production, marketing and income?.
- d. Tasks of men and women in pig production. Who relate to pig production in different tasks
  1. Buying pig for fattening?
  2. Select pig breed for keeping?
  3. Selling pigs?
  4. Buying feed for pigs?
  5. Disease treatment?

Component D - Decision making

Group participants: Separate groups of men and women

## Objectives

The objective is to identify the areas that men and women make decisions on and the control they have over the income derived from pig production.

Who make decision in following activities?

	To buy an animal for fattening?	selection of breeding	sell fattened pigs	Buying feed	Assess to training	Assess to banks
Men						
women						
Join						

### D. Component E - Group membership / collective action

Group participants: Mixed group men and women

## Objectives

Identify the types of formal and informal groups that are active in the community and whether there are any boundaries for men / women or other sub-groups to belong to and participate in these groups.

Discuss the questions listed below and record them on the recording sheet provided.

1. Are there any ways in which people collaborate with each other in the village?
2. What kind of groups are these? (formal/ informal, based on production activity / family-ties, geographical location etc.). Are they formally organized?
3. Why do you belong to the group(s)?
4. What are the challenges to the continued activities of these groups?
5. What are the reasons that people would NOT be interested to join a group? (record reasons by gender)

## E. Component F –Purposes for and systems of L&F production

### Overview

Material needed: recording sheet

Time: 1 hour

Group participants: Mixed group men and women

### Objectives

To identify the production systems in which the target L&F species are produced and the main purposes for which households keep the target L&F species.

### How to facilitate

Facilitate a discussion around the questions below. Record the responses on the data recording sheet provided.

1. What are the three main purposes for keeping L&F? (List purposes for men and women)
2. For these three main purposes, have you been successful in achieving them in the last two years? Separate hand count for men and women for separate lists (include total number present)
3. What are the indicators of success in meeting each purpose? (List indicators for men and women separately)
4. What has made it difficult for you to achieve these purposes? List the constraints and ask participants to identify the two key constraints for each of the purposes for men and women separately.
5. What type of L&F production system do people in the community practice? (For example: Pig: breeding, fattening, other; Dairy: primarily beef, primarily dairy; Small ruminants: occasional sale, fattening for sale; Fish: pond / cage / tank; monoculture / polyculture - integrated / non-integrated). For fish also ask which fish species are kept.
6. From their point of view, what **number of L&F would they consider a farmer who** is a smallholder, medium-holder and large holder: (*record minimum and maximum per category*). Adapt to L&F specie.
7. In your community, what proportions of farmers belong to each group? (group exercise giving 100 beans to each group, for them to allocate to the different groups)
8. Have the numbers of people in the community who practice the different systems (and producing each fish species) been increasing or decreasing over the last 5 years? What are the reasons for the increases and decreases?

## F. Component G - Value chain mapping

### Overview

Material needed: Large sheets of paper

Time: 2 hours

Group participants: separate groups of men and women

## Objectives

To examine:

- the composition of the value chain, including the main actors, services, and enablers, the main market channels and their relative importance and requirements, and geographical spread, to visualize linkages and demonstrate interdependencies in the chain
- the major sources of inputs and services and their accessibility to different types of producers
- the relative access to and control over the different market channels and services by men and women respectively
- major constraints in selling products and buying inputs and accessing services

## How to facilitate

Tape six flipchart pages to the floor to allow sketching of actors and transaction linkages. This is a discussion focused on the place of the producer in the L&F value chain and uses an interactive diagram-based process, which successively:

- sketches the actors buying from and selling to producers
- identifies and characterizes marketing channels
- describes the transactions and relations between buyers, sellers, and others
- tests awareness and enthusiasm surrounding potential interventions, including collective action and hub-type arrangements
- provides checks/triangulations for research investigations for specific domains (feeds, breeding and animal health)

The outputs are a map of the value chain and discussion notes recorded in the recording sheet.

Use the following guiding questions for discussion:

### Market map

1. Ask the participants to draw themselves on the sheet of paper
2. Who was buying their fatted pig? Where they come from?
3. Then, ask them to identify and draw the sales channels (buyers from the producer). Indicate this for each product type separately (include also home processed product types).
4. How many buyers are there in each channel? Indicate this on the map
5. To whom do these buyers sell onwards to? Draw the next product destination(s)
6. Who are the final consumers? Are they in urban or rural places? Draw on the map
7. Identify the channels through which producers buy animals for fattening and/or breeding / purchase fry / fingerlings
8. Identify and draw purchase channels for feed and other inputs (indicate which inputs)
9. Identify and draw credit sources available
10. Discuss whether sales to these channels/locations vary during the year, due to fluctuations in demand or supply

For each of the product sales channels now indicate:

11. Proportions of men and women selling into / buying from each of the channel/location (indicate on the map whether men or women dominate a market channel or whether they have equal access)
12. Do men and women have any particular roles in selling?
13. Proportion of sales into each channel, by season. Indicate on the map.

Based on the diagram now discuss the following

About product prices

14. What are the prices TODAY in each channel?
15. What is the unit used (per head or per kg/other, per litre)?
16. Are prices any different when paid to/by a man or woman?
17. When do the seasonal high and low prices occur in each channel? What were the high and low prices during the last 12 months?
18. Why do prices vary between channels for each product?

About product quality:

19. Which quality attributes do buyers look for? Do buyers inform you about product quality? How is this communicated?
20. For the product you are selling are quality grades in place? (List)
21. What are the grades? (record discussion)
22. For which channels are these in use? (record for each attribute and each channel)
23. Do buyers in any channel pay a price premium for good quality?
24. Do buyers in any channel pay lower prices for poor quality?
25. Do buyers test the product for any quality attribute?
26. Are you able to meet the quality requirements of your buyer?"

(This to some extent duplicates the SFFF material, but is best addressed all together - so should be retained here as well).

About payment:

27. What is the payment mechanism in each channel?
28. Do buyers in any channel offer advance payment or advances of inputs?
29. Are check-off arrangements available in any channel? (when inputs are advanced to a producer and the costs later deducted from the buyers price this is called check-off)
30. How long does it take to receive payment after sales for each channel?
31. Are there long term relationships with particular buyers? Specify that relationship?
32. Are there long term relationships with particular sellers of inputs? Is this the same for men and women?
33. Are formal or informal agreements or contracts (of any kind written, verbal, customary) used for sales or purchases? In which channel and for which product? Is this the same for men and women?

About transport:

34. Who pays for transport to the market/buyer in each channel?
35. If you pay for the transport what is the mode of transport? What is the average cost of transport per unit (define unit) for each channel? How much time does it take to get the product to market (return trip) each time product is sold?
36. Does transport affect product quality or result in losses or death?
37. What your transportation related constraints? (*record separately by gender*)

About other issues:

38. Is packaging required by the buyer?
39. Once you have made the decision to sell, how long does it take you to find a buyer?
40. Are the proceeds from sales of product allocated to particular uses? Does this differ by men and women?

### Animal health product and service provision

Direct the attention back to the market map drawn by the participants. Confirm with them the channels/locations/kind of products or services provided related to animal health. Adjust the map as required. Then discuss the following.

41. Designate public or private providers. Indicate on the map.
42. Discuss with the producers which animal health services they require.
43. Are you able to get these services, and if so, through which channels?
44. If not, why not?
45. Is this the same for men and women?
46. Are the products of good and reliable quality? Are they affordable?
  - Drugs (which ones?)
  - Vaccines (which ones?)
  - Chemical treatments (which ones?)
47. For livestock: Are you vaccinating a larger or smaller proportion of your animals than you did 5 years ago? / For fish: Has your usage of chemicals and other treatments changed in the past 5 years and how?
48. Is a reliable service provided?
49. What do you do when drugs and/or services are not available?

### Feed

Direct the attention back to the market map drawn by the participants. Confirm with them the channels/locations/kind of products or services provided related to feed. Designate public or private providers. Adjust the map as required. Then discuss the following.

50. Designate public or private providers. Indicate on the map.
51. Is each of these channels equally accessible to men and women?
52. How many producers buy feeds(for L&F) / fertilizers (for fish) / chemicals(for fish) from each channel/type of seller?
53. At what locations are the various sellers of feeds / other inputs operating? How far is this from the village?
54. What are the prices TODAY in each channel for each type of feed/feed product / other inputs?
55. Are there any differences in quality of inputs provided by each of the channels?
56. What is the unit used (per kg/bag/bale)?
57. Are prices any different when paid to/by a man or woman?

58. What are payment terms for feeds / other inputs bought? (cash / credit)
59. When do the seasonal high and low feed / other input prices occur in each channel?  
What were the high and low prices during the last 12 months?
60. Why do prices vary in each channel for each feed products / other inputs?
61. Would you pay a price premium for high quality feed / other inputs?

#### Animal breeding inputs and services

Direct the attention back to the market map drawn by the participants. Confirm with them the channels/locations/kind of products or services provided related to animal breeding. Adjust the map as required. Then discuss the following.

62. Is each of these channels equally accessible to men and women?
63. What are the prices TODAY in each channel for breeding services?
64. Are there any differences in quality of inputs provided by each of the channels?
65. What is the unit used (per straw/service/animal purchase)?
66. Are prices any different when paid to/by a man or woman?
67. Do prices vary between channels/providers for breeding services?

#### Credit provision services

Direct the attention back to the market map drawn by the participants. Confirm with them the channels/locations/kind of products or services that are providing credit. Make sure to include all types of credit both formal and informal and credit provided in kind (e.g. product buyers, informal credit sources and record these sources). Adjust the map as required. Then discuss the following.

68. Designate public or private providers. Indicate on the map.
69. Are sources of credit equally accessible to men and women?
70. How many in the group get credit from each channel?
71. What is the credit for?
72. Which channel is the preferred source of credit? Why?
73. What interest rates are charged TODAY in each channel? (Define terms and conditions of loan).
74. Do you have difficulties in getting credit? Why?

#### Information and extension services

Direct the attention back to the market map drawn by the participants. Confirm with them the channels/locations from which you receive market or technical information and extension services. Adjust the map as required. Then discuss the following.

75. Designate public or private providers. Indicate on the map.
76. Where do you find market information? (Price, quality, quantities demanded and location of buyers). Does this differ between women and men? Is the available information reliable?
77. Where do you find information about breeds? Does this differ between women and men? Is the available information reliable?
78. Where do you find information about feeds? Does this differ between women and men? Is the available information reliable?
79. Where do you find information about animal health? Does this differ between women and men? Is the available information reliable?
80. Who provides extension services? Are they also sellers of farm/animal/fish inputs?
81. Is the service of good quality?

- 82. Last year, how many times did you receive advice from an extension agent?
- 83. What subject was the advice on?
- 84. How was extension delivered (e.g. demonstration plot, farm visit, training course)?
- 85. On which topics do you need (more) training and/or extension?

### Constraints and solutions

For each product:

- 86. What prevents you selling more?
- 87. What prevents you achieving better quality?
- 88. What prevents you achieving better prices?

For each input or service:

- 89. What prevents you using more?
- 90. What prevents you using better quality inputs?

## **G. Component H - Feeds and feeding**

Group participants: Mixed group of men and women

### **Objectives**

The objective of this component is to learn about feeding and watering systems, the different feeds used and their availability, and related aspects of animal husbandry.

1. How many men and women in the group are using each feeding system?
  - a. Is this representative of pig producers in the community as a whole?
  - b. If it is NOT representative, try to ascertain roughly what proportions of pig producers in the community use each feeding system.
2. How has your feeding system changed in the past 5 years?
3. How do the feeding systems used vary throughout the year?
4. For the feeding systems that are used in this community, what are the advantages and disadvantages of each?
5. Which strategies/coping strategies are available during times of feed shortage?
6. Are feed analytical services available?
  - a. If yes, who provides it?
  - b. If yes, is it affordable?

## **H. Component I - Breeding**

### **Objectives**

The objective of this component is to understand the different breeds that are kept, their characteristics and sources of breeding stock, and any changes in breeds in the past five years.



## How to facilitate

Discuss the questions listed below. Note that there are separate questions for fish and livestock.

1. Which pig breeds are kept by producers in this community?
2. How has this changed in the last 5 years? Why?
3. What mechanism did you use to change breeds? (e.g. AI, purchase of dams, purchase/rent of sires, change in breed of piglets purchased for fattening etc.)
4. Would you like to change breeds now?
  - a. If yes, to which breeds?
  - b. What stops you doing this?
5. Did any organisations support breed changes in the last 5 years? If so, which ones?
6. For each of the main breeds, list the production and marketing characteristics. Indicate both positive and negative characteristics.
7. List the most important traits of a breeding or lactating livestock female.
8. List the most important traits of a growing animal for sale.
9. Rate the breeds listed above according to these trait criteria (1= best; 5=worst)
10. What is your source of sires?
11. What is your source of dams?
12. Do you practice controlled mating to influence seasonal patterns of production?
  - a. If yes, what is the main influence (e.g. price fluctuations, seasonal feed supply, age of animals, avoiding in-breeding, time after last parturition)
  - b. Does your controlled mating procedure differ between breeds?
13. Do you keep records on performance and productivity?
  - a. If yes, which records?
  - b. Is this different between men and women?

### I. Component J - Constraints and solutions

#### Overview

#### Objectives

The objective of this plenary session is to identify opportunities for improving local L&F production systems, to review and rank the constraints previously identified, and to identify potential ways of addressing these constraints.

1. Can you identify any opportunities for enhancing your livelihood and incomes through improvements to your L&F production system? List the opportunities that are mentioned and determine the top three that are supported by the majority of group members
2. For each of the top three opportunities, ask if anyone has tried to take advantage of the opportunity and how.
  - a. Was it successful?
  - b. If yes, what were the benefits that accrued to men and women, rich and poor, producer and trader etc?
  - c. What were some of the negative consequences for men or women, rich or poor, producer or trader etc.?
  - d. If it was not successful, why not?

3. Present the list of constraints (see above instructions for compiling the list) to the participants and let them review the list to identify any gaps.
  4. Discuss each of the constraints to determine whether they are related to land and water, labour, capital, policy, information and knowledge, or other constraining factors. The purpose of this discussion is to help elaborate each constraint and to get a clear understanding of the factors that cause it. For example, "shortage of land" might be related to a lack of capital with which to purchase land, or it might be related to a policy that prevents some people from accessing land.
  5. For each solution:
    - a. Was it successful?
    - b. If yes, what were the benefits that accrued to men and women, rich and poor, producer and trader etc.
    - c. What were some of the negative consequences for men or women, rich or poor, producer or trader etc.?
    - d. If it was not successful, why not?
    - e. What other solutions do you suggest for overcoming these constraints?
- Consumers: Interview participant in producer groups
    1. Separate group men and women discuss on what types of animal product that they used in the family: List the types of product use in the families? Sources of products? Ranking in the quantity of use in the family? Estimate percentage of each type of product?
    2. In pock use, discuss
      - a. How often they use the pock?
      - b. What type of pock they are most often to use?
      - c. On average how much use per capita per day/month?
      - d. Is the pock use in every day? Or only some special cases?
      - e. When they use more pock? Why?
      - f. Where they buy the pock?
      - g. Is pock supplying enough for the demand?
      - h. The characteristics of pocks that you selected when buying?

TOOL 2. INDIVIDUAL INTERVIEW TRADERS

Name \_\_\_\_\_ Sex \_\_\_\_\_.

Address \_\_\_\_\_

Direction questions

- 1) How long did you work as the pig traders?
- 2) Did you change the place of trading pig in last 5 years? Why?
- 3) Ask traders to check the value chain mapping that drew by producers and then ask Do they agree? If not, where need to change? Why? How to change?
- 4) What channels of markets on the map that he involving?
- 5) What types of pig product do you trade in Ea Kar?
- 6) What type of producers that you prefer to buy this type of product?
- 7) Where did you sell the products? To whom?
- 8) Volume of products that you buy in last year? What this compared to the year before?
- 9) Do you prefer to buy pig from mall household production (nong ho) or larger scale production (trang trai)?
- 10) Percentage of buying from “Nong Ho” and “trang trai”?
- 11) What different of pig quality of pig from trang trai or nong ho?
- 12) What different price (farm gate price) of pig from trang trai and nong ho?
- 13) What are the main channels that you sold the pig from trang trai? From Nong Ho? Why?
- 14) Where did you sell the pig to?
- 15) Who are the buyer of your pigs?
- 16) Can you estimate fattened pig from Ea Kar/Krong No sold to different cannels?
- 17) Can you estimate number of traders in different cannels?
- 18) Can you provide pig price in different cannels (VND/kg)

Types of pig	At farm gate	Market 1	Market 2	Market 3	Market 4
Lean pigs					
Fated pigs					
Local pig					

- 19) How did you pay when buying pig from farmers
- 20) How the buyer pay to you when you sale the pig?
- 21) Can you provide the price of transport to different markets

	Market 1	Market 2	Market 3	Market 4
Farm gate				

- 22) How did you find the pig viability for sale to buy?
- 23) How did you classify of lean pig and fated pig?
- 24) Did you link with local informers (broker) to look for pig sources?
- 25) Can you tell us the roles of broker? Who pay for broker? How much?
- 26) What are the disease control transport pigs from place to place? Did you have to pay any cost for that? How much?
- 27) How many brokers work with you in Ea Kar/Krong No
- 28) What are problems for trading pig in the area?
- 29) How do you suggest for improving the systems?
- 30) What are the characteristics of pig that you want to buy from producers?
- 31) What are the changes in your business in last five years?
- 32) What are the changes of your business in last 5 years?

### TOOL 3. INDIVIDUAL INTERVIEW WITH ABATTOIR

- 1) How long did you work as the Abattoir?
- 2) Can you describe the slaughterhouse system in the district? District slaughterhouse? Slaughter points in communes? Slaughter in household? How many of each one?
- 3) The volume of slaughtering in your own?
- 4) What type of pig do you prefer to slaughter in you slaughterhouse? (lean or fat pig? Weight?...)
- 5) How did you classify the pock in each type of the same price?
- 6) Where did you deliver the pock to different markets?
- 7) How did you deliver?
- 8) What types of pock to what markets (rural and urban)?
- 9) Can you estimate the detail of pock and other products from slaughtering?
- 10) What are the changes of your business in last 5 years?

Types of products	weight (kg)	Price sell to retailer (VND/kg)	Price sell to consumer (VND/kg)
Live weight			
Grade 1: (part of meat)			
Grade 2			
Grade 3			

### DETAIL OF MEAT DELIVERING

Type of pock	Town market retailers	Rural retailers	Consumer
Grade 1:			
Grade 2			
Grade 3			
other			

#### TOOL 4. INDIVIDUAL INTERVIEW WITH PROCESSOR

- 1) How long did you work on processing?
  - 2) What types of products did you produce in last year?
  - 3) How much each type of the products did you produced per day/month?
  - 4) Could you summary the process of production?
  - 5) Who were the buyers of the products? Restaurant? Consumers? Retailers? Traders?...
  - 6) How have your volume sold to buyers changed in the last 5 years?
  - 7) Is the volume of products consumption change in the years? If yes, what time was good, average and low consumption?
  - 8) What are the changes of your business in last 5 years?
  - 9) What are the problems and opportunities for over come problems?
- -

#### TOOL 5. INDIVIDUAL INTERVIEW WITH RETAILER

- 1) How long did you work on retailer?
- 2) What types of meat that you selling?
- 3) Where did you buy the meat for selling?
- 4) Who are the main customers? Women or men? Rural people or urban?
- 5) How different interest of products of different of customers?
- 6) Percentage of meat (pock, beef, chicken, fish...) did you sell perday?
- 7) Volume of selling per day?
- 8) How is the change of selling in last 5 year (price, volume, customers....)? or different time of the year and why?
- 9) What types of pock the customers in rural like best? And how for the urban? And the men and women? Season?
- 10) What are the changes of your business in last 5 years?
- 11) What are the problems and opportunities for over come problems?

## Annex 2: People attending producer group discussions

Ea Kar district		
Communes	Full name	Sex
1. Ea Kmut		
1	Pham van Hong	Man
2	Pham Xuan Thuc	Man
3	Ngo Van truong	Man
4	Nguyen The Lieu	Man
5	Nguyen Thanh Tinh	Man
6	Nguyen Duy Cuong	Man
7	Ngo Duy Ninh	Man
8	Do Dinh Tieu	Man
9	Ngo Van an	Man
10	Pham Van Phe	Man
11	Nguyen Thi lam	Women
12	Nguyen Thi Thuyen	Women
13	Nguyen Thi Huong	Women
14	Nguyen Thi Hong	Women
15	Phan Thi Hoi	Women
16	Nguyen Thi Anh	Women
17	Nguyen Thi Tinh	Women
18	Nguyen Thi lam	Women
19	Vo thi hoa	Women
20	Le Thi Van	Women
2. Cu Hue		
1	Mai Trung Mao	Man
2	Vi van Sanh	Man
3	Pham Chi Cong	Man
4	Hoang van Phu	Man
5	Luong van Duong	Man
6	Nong Duc Hua	Man
7	I blam	Man
8	Y Thu	Man
9	Y Son	Man
10	Y Yang	Man
11	H Hin	Women
12	H Ton	Women
13	Y Djung	Women
14	Nguyen Thi Thue	Women
15	Nguyen Thi Loan	Women

16	Duong Thi Luyen	Women
17	Pham Thij Van	Women
18	Vu Thi Deo	Women
19	Nguyen Thi Nga	Women
20	Chu Thi Vinh	Women
21	Pham Thi Loan	Women
3. Ea Tyl		
1	Nguyen Thi Ut	Women
2	Do Thij Vinh	Women
3	Vu Thi Dinh	Women
4	Chu Thi Hien	Women
5	Nguyen Thi Hop	Women
6	Vu Thi La	Women
7	Le Thi Hien	Women
8	Nguyñ Thi Ty	Women
9	Khuc thi Thao	Women
10	Khuc Thi Huy	Women
11	Dao Van Sy	Man
12	Nguyen Van Tuan	Man
13	Le Huy Vang	Man
14	Dang dinh lap	Man
15	Nguyen van Thang	Man
16	Nguyen Van Tu	Man
17	Do Doang phuong	Man
18	Pham Huu Tuan	Man
19	Khuc Van Thien	Man
20	Nguyen Van Quyet	Man
21	Nguyen Van Luyen	Man
Krong No District		
4. Nam Da		
1	Nguyen Thi Kha	Women
2	Nguyen Thi Ba	Women
3	Nguyen Thi Duyen	Women
4	Le Thi Khuong	Women
5	Truong Thi Dong	Women
6	Luong Thi Nha	Women
7	Le Thuy Hanh	Women
8	Bui Thi Buom	Women
9	Ho Thi Man	Women
10	Pham Thi Van	Women
11	Nguyen Duwc Tuong	Man
12	Phan Van Quang	Man
13	Le xao	Man



14	Truong Cong Cam	Man
15	Phan Van Minh	Man
16	Truong Cong Ba	Man
17	Huynh Minh Hanh	Man
18	Cao Thanh Long	Man
19	Do Van Khang	Man
20	Pham Trung Uyen	Man
21	Tran Duc Quang	Man
22	Pham Thi Hue	Man
23	Pham Van Phuc	Man
5. Nam Ndir		
1	Duong Van Hung	Man
2	Duong Van cuong	Man
3	Nguyen Van Ha	Man
4	Nguyen Van Quy	Man
5	Le van thu	Man
6	Vu Van Giap	Man
7	Dang Van Chung	Man
8	Pham Cong Sang	Man
9	Vu Trong Vinh	Man
10	Vu Van Phong	Man
11	Nong Thi Mo	Women
12	Nguyen Thi Bac	Women
13	Nguyen Thi Lam	Women
14	Nguyen Thi Hai	Women
15	Le Thi Thom	Women
16	Bui Thi Cuc	Women
17	Nguyen Thi Mao	Women
18	Nguyen Thi Ngoc	Women
19	Le Thi Oanh	Women
20	Nguyen Thi Loan	Women
6. Dak Dro		
1	Vu Thi Lien	Women
2	Bui Thi Dung	Women
3	Mai Thi Nguyen	Women
4	Mai Thi Vui	Women
5	Vu Thi Huong	Women
6	Tran Thi Hue	Women
7	Lai Thi Sau	Women
8	Liem Thi Hien	Women
9	Nguyen Thi Hoan	Women
10	Vu Thi Dung	Women

11	Ta cong Tham	Man
12	Nguyen van Hien	Man
13	Vu Van Phuong	Man
14	Vu Thanh Liem	Man
15	Pham Cong Khan	Man
16	Mai Van sinh	Man
17	Mai Van Toan	Man
18	Pham Dinh Luong	Man
19	Mai Xuan Liem	Man
20	Ngo Duc Loi	Man

## Annex 3: Traders, abattoirs and retailers interviewed

STT	Full name	Address	Jobs
1	Do van Thanh	Ea Tyh	Trader and transport pi to Phu Yen Province
2	Le Dinh Tai	Ninh Thanh	Trader and transport pi to Phu Yen Province
3	Le van Che	Cư Huê	Trader and transport pi to Phu Yen Province
4	Nguyen Xuan Hung	Ea Tyh	Trader and transport pi to Phu Yen Province
5	Nguyen Van Bang	Ea Tyh	Trader and transport pi to Nha Trang Province
6	Nguyen Van Chan	Gia Lai	Trader and transport pi to Nha Trang Province
7	Nguyen Van Nhan	Cư Ni	Trade pig in District
8	Nguyen van Trung	Cư Ni	Trade pig in District
9	Tran van cuong	Ea Tyh	Trade pig in District
10	Dinh van Tang	Cư Ni	Trade pig in District
11	Le Dinh Nguyen	Ea Kar Town	Trade pig in District
12	Nguyen Thanh Long	Ea Kar Town	Abattoir
13	Pham Cong Dinh	Ea Kar Town	Abattoir
14	Nguyen Thi Tra	Ea Kar Town	Retailer
15	Nguyen Thi Huong	Ea Kar Town	Retailer
16	Ly van Mon	Ea Kar Town	Broker
17	Nguyen Van Vung	Ea Tyh	Broker
1	Nguyen Hon	Nam Nir	Trader and Abattoir
2	Dinh Thi Hong Gam	Nam Nir	Trader, Abattoir, and retailer
3	Nguyen Van Toan	Nam Da	Trader and abattoir
4	Bui thi Thanh	Nam Nir	Retailer
5	Nguyen Xuan Truong	Nam da	Trader and Abattoir
6	Do van dung	Nam Nir	Trader and Abattoir
7	Hoang Thi Thanh	Nam Nir	Abattoir and retailer
8	Nguyen Van duong	Nam Nir	Trader, Abattoir, and retailer
9	Nguyen thij Lan	Ea Ngai, Buon ho	Traders of local pig