

Enhancing farmers' market power and income in the pig value chain; a case study in Bac Giang province, Vietnam

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Abstract

The pig sector annually contributes about 78 % of the total meat production in Vietnam. The government of Vietnam has implemented numerous policies to promote the development of the pig industry. It strongly emphasizes the production with little attention paid to marketing. Bac Giang is one of the provinces with the highest pig population in Vietnam. Pig production contributes up to 52% of the gross output of the livestock sector of the province. One of emerging problems is the majority of pig farmers are limited in market power and there is low income from pig production. This study aimed to analyse the pig value chain in Bac Giang province, identify main factors affecting farmers' market power and income in the chain, and propose relevant policy implications to enhance farmers' market power and income. It was found that pig collectors and pork retailers are the dominant players in the chain in terms of their strong influence on prices due to their coordination role in directing supply of pigs and carcass to market. Numerous factors affecting farmer's market power and income are weak collective action of farmers in production, lack of collective marketing, volatility of pig price, lack of formal contract farming, consumers' food safety concern, high price of feed and animal disease. Enhancing farmers' market power depends on farmers and public authority's involvement in the various strategies of implementation. Some policy implications focus on the improvement of farmer collective action and government actions related to supporting farmer collective action.

Key words: *farmer collective action, pig production, marketing*

Introduction

Livestock contributes about 19 % to the gross output of the agricultural sector and generates an important income source for farmers. The pig sector annually contributes about 78 % of the total meat production in Vietnam (GSO 2016). Pork is the most widely consumed meat product in Vietnam and consumer preference for fresh pork provides a degree of natural protection against imports (Tisdell et al 2009). It has created a special competitiveness for pig production in Vietnam. Presently, the pig sector has mostly operated in a small-scale of production units (Lapar et al 2011). Although the government

of Vietnam has implemented numerous policies to support, invest in, and promote the development of the pig industry, it strongly emphasizes the production with little attention paid to marketing. Therefore, smallholders still face the risk of not being able to efficiently market their products or be able to secure the market for their products (Nga et al 2014; OECD 2015).

Located in the northern midlands of Vietnam, Bac Giang is one of the provinces with the highest pig population in Vietnam. The farmers annually raise about 1240 thousand pigs, contributing up to 58% of gross output of the livestock sector in Bac Giang. The Department of Agriculture and Rural Development of Bac Giang, a key player for formulating policies in agriculture, indicates that the majority of pig farmers have limited market power, which is a concerning problem (DARDBG 2015). Market power can be seen as the ability of producers to set the sale price of their products. Being able to set the sale price above the production cost, so as to reap a profit, is essential for farmers' subsistence and development (Piggott et al 2000; MacDonald and Key 2012). Seen from a broader perspective, market power refers to the power to behave independently, to an appreciable extent, from one's competitors, customers and, finally, consumers. Strategies for increasing farmers' market power can be collective or individual. The collective strategies are market discipline aimed at managing the supply, pooling production to negotiate its sale collectively, and cooperative integration of the commodity value chain. The individual strategies entail searching for market niches and having direct access to consumers. "Collective for Food Strategy" of Belgium, a non-profit organization, suggests that strategies to improve farmers' market power include: supply management, collective marketing, contract farming, and production differentiation and shortening the supply chain. Government action plays a decisive part in the implementation and effectiveness of the mentioned strategies (Danau et al 2011). An emerging question is how to enhance of farmers' market power and income in the pig value chain, which hasn't been explored so far in Vietnam. The present study aimed to analyse the pig value chain in Bac Giang province, identify the main factors affecting farmers' market power and income in the pig value chain and propose relevant policy implications for enhancing farmers' market power and income.

Methods

To obtain the research objectives, the following methods were employed in this study.

Sampling method

Bac Giang province consists of 9 districts and 1 city. Tan Yen and Lang Giang districts were selected as study sites because their pig production presently accounts for the highest proportion of pig production value of the whole province. Two representative communes in each district were chosen as study sites. There are 3 typical types of pig farm including a small-scale farm, a small-scale commercial farm and a large-scale commercial farm. The small-scale farm normally rears about 4-10 pig heads per year for family consumption and selling a small part. The small-scale commercial farms are owned by farmers producing from 10 to 300 pig per year and are predominant. Large-scale commercial farms producing more than 300 pigs per year are managed or owned by companies such as CP, Dabaco and Jave groups. There are few large-scale commercial farms in each commune.

This study focuses on small-scale commercial farms. Therefore, 120 small-scale commercial farms were selected randomly by using the list of pig farms in the study site provided by local staff. Pig collectors, slaughter men, pork wholesalers, pork retailers and consumers were selected based on introduction from farmers and involved persons. Ha Noi capital is an important market for pig farmers in Bac Giang. Collectors not only are from Bac Giang and Ha Noi but also from neighbouring provinces. The numbers of surveyed actors in the chain are presented in Table 1.

Data collection

Table 1. Number of sample for primary data collection

Actors	Bac Giang	Ha Noi	Other provinces	Total
Farmer	120			120
Collector	5	5	3	13
Slaughter men	5	5		10
Wholesaler	5	5		10
Retailer	5	5		10

Secondary data on pig production for the period 2010-2015 in Bac Giang were provided by the Department of Agricultural and Rural Development, and the Department of Statistics of Bac Giang province. Primary data were directly collected from farmers, collectors, slaughter men, wholesalers and retailers using structured questionnaires.

Data analysis

Both quantitative and qualitative analysis methods were applied for data analysis. Financial analysis was by the quantitative analysis method to analyse the pig value chain in Bac Giang province. The M4P (2008) approach emphasizes the importance of revenue, costs and profit. FAO (2005), GTZ (2007), Cadilhon (2015) and Hoang (2015) all stress revenue, intermediate cost, added value and profit. Some indicators applied in this study can be explained as follows:

Revenue = Output x Unit price

Intermediate cost = Cost of raw material + Cost of other inputs + Cost of services

Value added= Revenue - Intermediate cost

Income (Profit) =Value added- Depreciation -Tax, interest payment - Hired labour

In addition, the qualitative analysis method was also employed to identify the main factors affecting farmers' market power and income in the pig value chain.

Results

Pig production in Bac Giang province

Pig production in Bac Giang has increased in response to the rise in consumer demand in Vietnam. In the period 2010-2015, the pig population increased significantly. Gross output of pig production accounted for about 60 % of gross output of livestock production (Table 2). As mentioned, pig production in Bac Giang comprises small-scale farms, small-scale commercial farms and large-scale commercial farms. At present, 70% of the pig population and 82 % of pork production are being produced by the small commercial scale farmers. The system of large-scale commercial farm, with high capital investment, high hygienic standards, and contract farming for production and product supply with companies (CP group, Dabaco, Java....) provides only about 18 % of pork in the market.

To promote pig production, the authorities in Bac Giang have implemented several policies relating to technical and financial support for improvement of pig breeding and prevention of disease. A policy for enhancing participation of small-scale commercial pig producers in the value chain has not generally been introduced.

Table 2. Pig production in Bac Giang province

Indicators	Unit	2010	2011	2012	2013	2014	2015	Growth rate (%)
Pig population	Head	1162349	1182649	1173120	1193608	1214541	1244151	1.36
Live weight	Tons	140308	145883.2	150396	156372	160566	164303	3.23
Gross output	Million* VND	3432205	3273102	6622464	6315473	5807741	6095570	12.27
Share in gross output of livestock production	%	60	62.3	64.4	61.4	59.1	58.1	- 0.66

* 1 USD =22765 VND in the year 2016.

Source: BGSO, 2016.

Socio-demographic analysis of farm households and production performance

The surveyed farm households have characteristics typical of the farm households of the Northern region of Vietnam, where Bac Giang is located (Table 3). Both the number of family members and available labour of the surveyed households are not much different among surveyed households. Women participate in all production activities. However, the heads of household normally are men. Men have better access to market information than women. Pig production was an important income source of farm households, accounting for about 67 % of household income. Annually household pig farms keeps about 85 pig heads. For the production system, farmers mostly decide on breeding and feeding based on their experience. Most of the pig farms are of low bio-security level and are facing many difficulties in the control of diseases.

Table 3. Socio-demographic of farm households and their pig production performance

Indicators	Unit	Average	Standard deviation
Age of household head	Year of age	42.5	8.5
Education level of household head	Years of schooling	8.4	1.6
Household head as male	%	67	-
Family size	Persons	4.5	0.8
Number of family workers	Persons	2.5	0.7
Number of pig head	Head	85	56.5
Average live weight	Kg/head	112	23
Total of live weight	Kg/year	8904	1130
Income from pig	Million VND/year	169	30
Share of income from pig on total income	%	67	-

Source: Survey, 2016.

Map of pig value chain

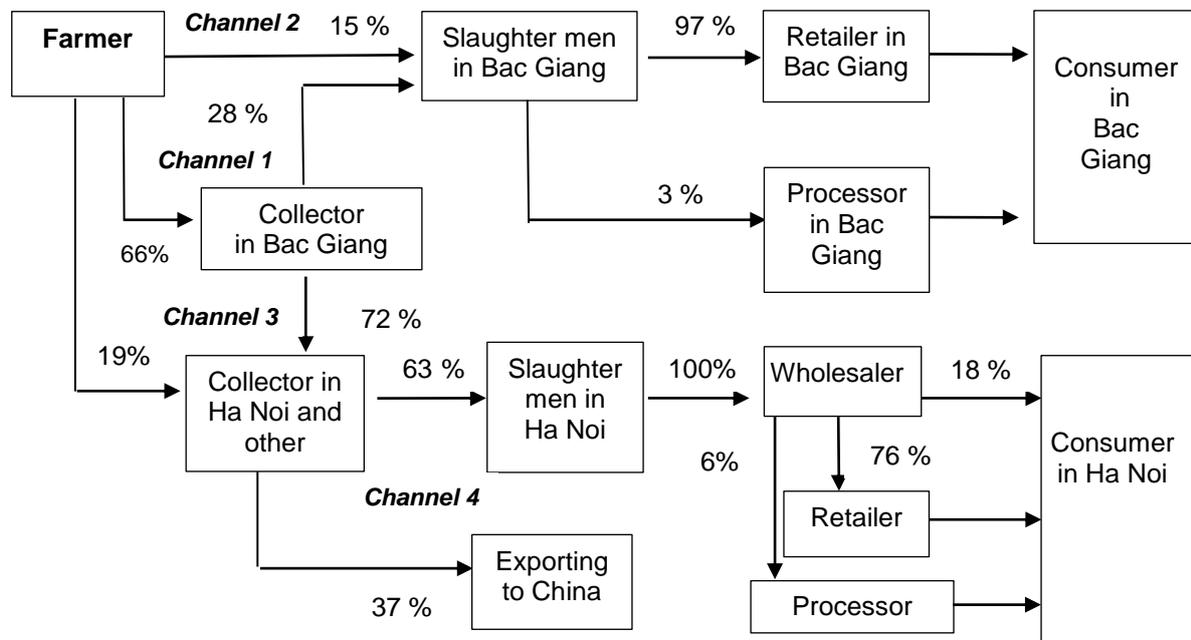


Figure 1: Map of pig value chain in Bac Giang province.

Source: Survey, 2016.

In Bac Giang province, there are typically 4 marketing channels (Figure 1): 1: Farmer - Collector in Bac Giang - Slaughter men in Bac Giang - Retailer in Bac Giang - Consumer in Bac Giang; 2: Farmer - Slaughter men in Bac Giang - Retailer in Bac Giang - Consumer in Bac Giang; 3; Farmer - Collector in Bac Giang - Collectors in Ha Noi and other provinces - Slaughter men in Ha Noi - Wholesaler -Retailer- Consumer in Ha Noi; 4: Farmer - Collector in Ha Noi and other provinces - Slaughter men in Hanoi - Wholesaler -Retailer- Consumer in Ha Noi. The channel relating to the China market is also an important. However, the data are impossible to investigate fully. Therefore, four marketing channels are focused for analysis.

Farmer

Generally, farmers directly sell their products to collectors or slaughter men. Live pigs gathered by collectors in Bac Giang occupies the biggest share (66 %). Thus, the collector in Bac Giang plays a crucial role in distribution of farmers' products to market. The price of pork and live pigs is not set systematically on the websites of Bac Giang province. Most farmers independently operate their business. They do not have many choices to sell their products at a fair price because of the insufficiency of market information. The majority of farmers individually sell their live pigs to collectors and slaughter men without any formal contract. 78 % of the surveyed farmers reported that they are unsatisfied with their selling price. Consequently, farmers generally have very limited market power such as being able to set the prices of their products ; and have weak bargaining power in dealing with buyers.

Collector

Collectors living in Bac Giang are the dominant distributor of pigs delivered from the farm gate to the market. Itinerant collectors visit farmers' homes so as to buy pigs in low numbers of two or three, then they are sold at slaughter houses in Bac Giang. Some other collectors directly contact farmers to procure pigs and then sell them to the collectors from Ha Noi or from neighboring provinces.

In the marketing system, there are many collectors who act as dominant sources of price information and also exert significant influence on the price set in the market chain. Some collectors closely cooperate with each other to reduce the price bargaining power of the farmer. Example: The collector is the first person who contacts the farmer to buy pigs at the farm gate normally offering a low price for the pigs. The next collector is informed to offer a lower price than the first person has done. Finally, the price is decided by the first person. It is noted that exporting pigs from Vietnam to China through sub-border gates and paths linking the two countries is an unofficial export because China does not include Vietnam on its list of countries and territories from which it allows importing of pigs. The collectors who are engaged in the unofficial export of pigs to China are sometimes willing to buy pigs of any quality at a high price. When the pig price skyrockets, farmers rush to raise pigs. However, the pig price then drops as China stops importing pigs from Vietnam. China's sudden closing of border gates for Vietnam's agricultural products happens almost every year. However, farmers' awareness of this problem appears to be limited. In 2016, collectors from Ha Noi and other provinces exported only 37 % of pig live weight from Bac Giang to China (Figure1). However, the pig price in Bac Giang is considerably affected by the export pig price in other provinces in the whole country to China.

Slaughter men

At present, slaughter houses in Bac Giang and in Ha Noi are mostly owned by the private sector and are manually operated with small-scale capacity, poor equipment and with low hygienic standards. In Bac Giang, the slaughter house owners also contribute greatly to the movement of pig and the risks of spreading diseases along the market supply chain because they buy pigs directly from the farmers and have poor facilities for proper slaughter of pigs. Also, there are no isolation or disinfection areas. Bac Giang authorities have

encouraged the private sector to upgrade slaughterhouses with hygiene standards, slaughtering technology and appropriate location. Presently, the slaughterhouses are not well-qualified because of the required high capital investment. In addition, it is difficult to trace the origin of pork in such slaughterhouses because pigs are supplied from many collectors.

There are some differences in performance between slaughter men in the different pig supply channels. Slaughter men in Bac Giang process only 2-5 pigs per day but slaughter men in Ha Noi operate about 5-10 pigs per day. Slaughter men in Bac Giang work more closely with farmers and consumers than slaughter men in Ha Noi because the distance from slaughter house to farmers and to consumers in Bac Giang is shorter than that in Ha Noi. This characteristic could bring benefit for both farmers and consumers in Bac Giang. However, only 15 % of pig live weight is directly supplied to slaughter men in Bac Giang according to chain 2 (Figure 1).

Wholesaler

This actor buys pork from slaughterhouses and sells to retailers, processors, restaurants kitchens of schools and factories. This actor mostly operates in the city where there are many consumers. Wholesalers sell about 65-95 kg of pig carcasses per day. Wholesalers often transport meat without packing by motorcycle. Hygienic conditions are a major concern.

Retailer

Meat is sold to ultimate consumers through some channels, including wet markets and vendors in cities, towns and villages. Most wet markets are degraded and have poor facilities. A retailer in Bac Giang sells 20-30 kg of pig carcasses per day whereas retailers in Ha Noi deliver two times this quantity per day. Since preference for fresh pork from newly slaughtered pigs is still predominant among Vietnamese consumers, the importance of traditional market outlets for supplying fresh pork will likely remain, unless policies intended to modernize the retail food sector will eventually prohibit their continued existence. Retailers have daily access to information about the market price and also understand requirements of key markets such as urban markets. Therefore, both pig collectors and pork retailers play a coordinating role in moving supply from the farm to the end market, a function that gives them relative power over the other actors in the chain.

Distribution of added value along the pig value chain

Table 4. Distribution of value added along pig value chain

Indicators	Farmer	Collector in Bac Giang	Collector in other provinces	Slaughter men	Whole- saler	Retailer	Total
Channel 1							
Revenue	50520	55820		62820		71200	
Intermediate cost	46730	52120		58620		65300	
Value added	3790	3700		4200		5900	17590
Income	1960	2360		2280		4250	10850
Share of value added	22	21		23		34	
Channel 2							
Revenue	51250			60350		71200	
Intermediate cost	46730			52300		65300	
Value added	4520			8050		5900	18470
Income	2690			6130		4250	13070
Share of value added	25			43		32	
Channel 3							
Revenue	50520	55820	61320	67450	73250	80630	
Intermediate cost	46730	52120	57240	63200	68460	74340	
Value added	3790	3700	4080	4250	4790	6290	26900
Income	1960	2360	2440	2320	3170	4740	16990
Share of value added	14	13	15	16	18	24	
Channel 4							
Revenue	50520		60560	67450	73250	80630	
Intermediate cost	46730		55320	63200	68460	74340	
Value added	3790		5240	4250	4790	6290	24360
Income	1960		3510	2320	3170	4740	15700
Share of value added	16		22	17	19	26	

Unit of share of value added is percentage (%); Remaining creations use VND/kg of live weight.

Source: Survey, 2016

Along the typical pig value chain (4) on average a farmer generates about 3790 VND/kg to 4520 VND/kg, accounting for a considerable part of total value added (14% to 25 %) in the entire value chain. Value added generated by other actors and their shares in the entire value chains differ among actors in the same market and among actors in the different markets. However, the farmer gains the lowest income and retailers generate the highest income compared to other actors. Noticeably, it takes a farmer 3-4 months to finish their pig product, while other actors have more frequent or even daily transaction between slaughter men and retailer. In the chain (2), a farmer could earn the highest income. However, few farmers can access this chain and only a small quantity of pig is able to be sold. In the study site, the marketing chain is a long chain in which pigs pass through successive market intermediaries before reaching the final consumers. The longer the chain, the higher the price the consumers take and the less market information the farmers receive.

Factors affecting farmers' market power and income

Farmers have suffered internal and external factors affecting their market power and income. Some of the main factors are as follows:

Weak collective action in production

Given the small scale of production, farmers face many diseconomies in purchasing inputs and obtaining market information. Thus, feed purchasing has been organized by small

groups with 4-5 farmers per group. Together they purchase a relative large amount of feed directly from feed processing factories to get sales promotion. About 21% farmers have engaged in this activity and received a reduction of 9% of feed cost. Despite the benefit from collective action, collective action among farmers for various activities is difficult to organize, coordinate and manage. Establishing rules to guide the operations of the groups, securing commitments on the part of the group members to abide by collectively agreed rules, monitoring and enforcing compliance with rules are some challenges. As a result, many farmers are not involved in collective groups. Collective production activities (breed purchasing, technical and veterinary service) are difficult to be implemented currently.

By better collective action, smallholders may be in a better position to reduce transaction costs of accessing inputs and outputs, to obtain the necessary market information, to secure access to new technologies, and tap in to high value markets, allowing them to compete with larger scale farmers and agribusiness (Stockbridge et al 2003). In addition, there is evidence that collective action can help smallholders reduce barriers to entry into markets by improving their bargaining power with buyers and intermediaries (Markelova et al 2009; Gya et al 2014).

Lack of collective marketing

In Bac Giang, farmers individually cannot supply sufficient volume to their buyers. The problem of asymmetry in the sales and the volume of purchases partly leads to low bargaining power. On the other hand, many buyers prefer to work with groups as these are better able than individual farmers to provide a stable supply of quality product. This finding is similar as reported by Vorley et al (2007).

Evidence from many countries shows that collective marketing reduces the cost of getting the product to the markets, improves the bargaining power of farmers and enables smallholders to access services that private sector or government would/could not provide. To improve bargaining power, smallholders need access to information about pricing structure, availability of substitutes, quality requirement and consumer preferences (Komarudin et al 2006). For collective marketing to be successful, it has to start at production level and even possibly at input procurement (Nyikahadzoi et al 2010).

Volatility of pig price

In the last few years, the pig price has fluctuated from 45000 to 52000 VND/kg. When prices are high, farmers tend to produce more and thus to create conditions of over production for the following year, this is the condition for price decreases. In addition, the price of live pigs often falls due to disease outbreak. After 2-3 months, the pig price then gradually increases. In addition, pig price in Bac Giang is also affected by the export price of pigs from other provinces in the whole country. Thus, the export of pigs to China leads to price volatility in Bac Giang. Price volatility causes the deregulation of pig markets and affects farmers' market power in other ways. Volatility is also harmful for consumers, since today's pig price increases are usually passed on to consumers, whereas price decreases are passed on to them less systematically (Kroll 2010).

Lack of contract farming

Contract farming is useful in a context of fluctuating commodity prices. In Bac Giang, only some large commercial producers have formal contracts for supply with companies such as food processing companies and supermarkets. Most farmers don't have any formal contract for their output, because most of them individually operate in small-scale with low ability to implement contract farming. On the individual level, farmers' dependence on buyers limits their bargaining power and can increase other risks. Although contract farming can reduce certain risks, the contracts themselves are a source of risks for farmers, basically because of their weak bargaining position vis-à-vis their buyers. Banding together in farmer organization to engage in collective bargaining over contracts is an important way for farmers to counter the imbalance in the two parties bargaining strength (Danau et al 2011).

Consumers' food safety concern

In the rural area of Bac Giang province, all consumers buy pork in the village market. In Bac Giang city and Ha Noi capital, a lot of potential consumers may buy pork from Bac Giang. Recently, consumers are increasingly concerned about food safety. Similar to the finding of Nga et al (2015), the main issues of concern are use of antibiotics and beta-agonist, with residues exceeding the permitted levels and unhygienic conditions at the point of sale. These issues relate to health of consumers. In the wet market, quarantine stamping of pork is quickly verified by veterinary staff, but few consumers believe in qualification of quarantine stamping because of lack of traceability of pork. The average pork price is about 11000 VND/kg. Consumers in Bac Giang city and Ha Noi capital are willing to pay for safe pork with a higher price (about 25 % over current price). Despite strong preference of fresh pork, many of them have selected imported meats in supermarkets. The consumers' concern on pork quality should be widely disseminated to the farmers to improve their production and market power in the domestic market.

High price of inputs

Farmers mainly use purchased industrial feeds accounting for about 74% of the production cost. The heavy reliance on imported ingredients by feed processing factories such as soybeans and maize, and high import taxes have been considered as the main causes leading to the high feed price. Given the higher price of complete feeds, the change in raw material input costs easily is passed on to farmers. Weak management in the locally owned feed sector also causes a high transaction cost of feed supply which increases the price of feed. Moreover, price of breeding pigs and sale price of pig have the same directional change at the same time. High input prices directly affect producers' income, especially when the pig price does not increase sufficiently to cover the increased costs.

Animal disease

In Bac Giang, common diseases frequently occur in small-scale pig farms such as foot and mouth disease, porcine reproductive and respiratory syndrome, classical swine fever, porcine high fever disease, and swine influenza. Farmers predominantly treat pig diseases by themselves and rarely use veterinary services because they try to reduce their production cost. Several government support programs for disease prevention have been

implemented. However, pig disease always threatens farmers due to lack of an appropriate practice in disease prevention, disease treatment, surveillance of both veterinary staff at the village and farmer level. The veterinary system is mainly a passive surveillance, reacting to disease problems.

Conclusions

- This study confirms that the majority of farmers in Bac Giang have limited market power and this generates lowest income for farmers in the pig value chain. Pig collectors and pork retailers are the dominant players in the chain in terms of their strong influence on prices due to their coordination role directing and supplying pigs and carcasses to markets. The main factors determining farmers' market power and income are weak collective action of farmers in production, lack of collective marketing, volatility of pig price, lack of formal contract farming, consumers' food safety concern, high price of feed and animal disease.
- Enhancing farmers' market power depends on farmers and public authorities involvement in the various strategies of implementation. Two things are primordial in this respect: namely farmers' ability to organise and the government action.
- In the current context of Bac Giang province, to improve farmers' market power and income in the pig value chain, some policy implications are proposed:
 - (i) Collective action in both production and marketing should be improved effectively; input procurement, veterinary service and planning for production should done collectively to produce a large volumes of produce with a certain guarantee of supply and facilitate product uniformity and quality control procedures; collective marketing could be implemented if collective action in production is well organized;
 - (ii) Farmers should enhance their awareness about many advantages of collective action to motivate themselves to closely work together. Farmers should be aware that the government support for improvement of the pig sector is difficult to obtain at individual farmer level, whereas it is more effectively provided to farmer groups;
 - (iii) Contract farming to facilitate contact between farmer groups and buyers;
 - (iv) The public authority should provide more supports for formulation of farmer groups, management capacity building, collective marketing and contract farming of farmer groups;
 - (v) Market information system should be organised to facilitate farmer access to information on price and consumer demand.

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