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The role of farmer organisations and researcher support in the inclusion of smallholders in quality pork supply chains in Vietnam

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ABSTRACT

Increased foreign investment and changes in consumption and distribution patterns are prompting growth of the pork production sector in Vietnam, with the potential exclusion of small-scale farmers. Developing the collective action of farmers in the production, processing and certification of lean, safe pork products has been tested as a way to increase viability and benefits for small farmers. This development has been based on an action research initiative involving researchers, farmers and public officials, with regular monitoring of technical and economic data. The study shows the various functions devolving upon cooperatives in response to deficient access to resources and services in the area involving imported swine breeds, veterinary services, feed, training, a joint production protocol and safety certification. Available data show a positive impact on farmer incomes and trends to expand the scope of the organisations in terms of functions performed and quantities traded.

Key- words: Pork production, consumption, farmers organisation, Red River Delta, Vietnam, agriculture services, collective action, safe product, smallholders

I. INTRODUCTION

Since implementing its *Đổi Mới* or renovation policy, Vietnam has been experiencing strong economic growth. Per capita income has risen from \$ 400 in 2000 to \$ 715 in 2006. Household spending is growing, with food consumption accounting for 53.5 percent of the total per capita expenditure (General Statistics Office, 2002). There is an expanding demand for protein-rich products, pork meat in particular (Vu Trong Binh, 2002; Figuié and Bricas, 2005). The increased demand for pork involves both quantity and quality, in particular as regards the fat content and food safety. The absence of fat is a main criterion of choice for 90 percent of consumers (Ginhoux, 2001). Lean pork commonly outsells fat pork by 30 percent in urban retail markets. People in the city are willing to pay 10 percent more for

pork meat guaranteed safe (in terms of hygiene and absence of hormones) (Ginhoux, 2001). In parallel with changes in consumption patterns, food distribution has been changing with the arrival of supermarkets since 1993. Although the market share of the latter remains low (under 5 percent) in the overall food market, they are expanding rapidly and their influence in terms of increasingly strict quality standards must not be overlooked (Reardon and Timmer, 2006 ; Moustier and al, 2006). Furthermore, in the context of Vietnam's membership in the WTO, response to the quality demand is an absolute necessity if its hog producers are to position themselves to share in domestic and foreign markets.

While the new demand for lean, safe pork in cities offers a market opportunity for small-scale producers in Vietnam, it may also include a risk of exclusion, as it implies investments, in particular to change pig breeds and develop safety controls along the supply chain. Farmers are limited in their production size, which puts them at a disadvantage in terms of their ability to provide the quantities needed as well as ensure regularity of supply and product quality compared to large-scale companies or farms. Their limited access to market information makes it difficult for them to plan their production operation in a way that is truly commensurate with consumer demands.

Pig production is an essential source of income in the rural areas of Hai Duong province and without it farmers run the risk of finding themselves in poverty. The incidence of poverty in Hai Duong province stood at 17 percent in 2006 while the poverty rate in the Red River Delta was 14.96 percent in 2004 and 24 percent for the country as a whole in 2004 (27.5 percent in rural areas) (General Statistics Office data). A recent survey conducted in four provinces of the Red River Delta—Hai Duong, Ha Tay, Nam Dinh and Bac Ninh—revealed changes in pig production: the number of small-scale hog farmers producing less than 10 head of swine a year had dropped from 67 percent in 2003 to 28 percent in 2005, due to the rise in the cost of feed (Thin, 2006). This decline is benefiting small-scale market-oriented family producers

with herds of 10 to 50 head of swine, and specialised large-scale growers (over 100 head of swine a year). As production size grows, there are changes in how it is carried out: factory-made feed or nutritionally balanced preparations are replacing traditionally produced feed; hogs are vaccinated, etc.

However, the current quality of pork meat is not in keeping with the demand of the urban market. The majority of farmers are raising F1 Dai Bach x Mong Cai (F1 DxM), F1 Landrace x Mong Cai (F1 LxM) which have a low proportion of lean meat. Small-scale growers are confronted with many obstacles in meeting the market demand. *Technically*, they are not growing productive breeds with low-fat meat and are poorly informed about animal husbandry. *Financially*, boosting production requires investments but farmers do not have ready access to funds because they are unable to meet the demand of money lenders. *Politically*, government support for this production does not take into account the variance in local conditions and fails to view the process as a whole.

Hence, it is necessary to help small producers get together in an organisation in which economies of scale for supplies are made available and a set of specifications for product quality is strictly adhered to in order for small-scale producers to fit into the new markets available in urban areas. This assumption is in keeping with many references on the role of collective action to achieve economies of scale and provide collective goods, such as a reputation for quality (Olson, 2000; Bosc and al, 2001; Egg and Moustier, 2006).

The objective of the paper is to explore ways in which collective action by farmers with the support of public services can help farmers to adapt their supply to the new market demand for quality.

II. METHODOLOGY

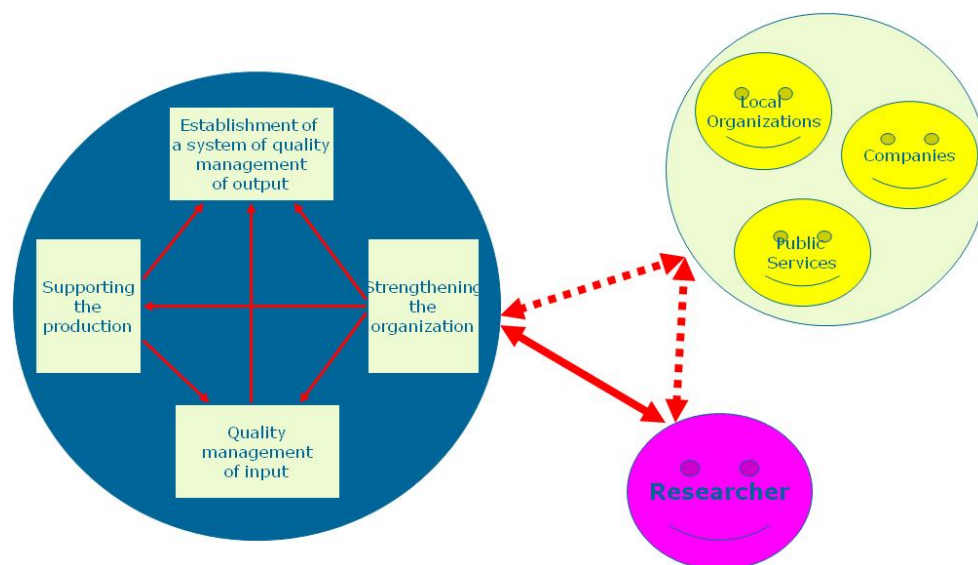
The research involved a set of technical and organisational actions: changes in techniques have to be embedded in institutional changes, in particular as regards the access to resources, e.g., credit, inputs, land, labour, technical and market information (Dorward, Kydd and Poulton, 1998). A action research approach (as defined by Hatchuel, 2000) was used to design a set of production specifications and collective actions related to the final production of lean pork meat, finalised by actual integration into the urban markets (Vu Trong Binh, 2002). We had to deal with both the construction of a new technical framework and promote the emergence of new stakeholders that are steering the production system. According to Barbier (1996), the term “experimentation” must here be understood differently from the classical meaning of technical, scientific experiments. The use of this term includes concrete actions or experiments that are innovative, exploratory (communities, self-directed groups, etc.) and that are *per se* a “form of research in action.” Among the varying circumstances in which hog producers find themselves, we deliberately selected a framework for our action research work: small-scale family market-oriented pig producers, growing less than 300 pigs per year.

The producers discussed the market information provided by researchers and possible scenarios for launching collective actions to identify points for cooperation, in other words, In what areas and in what ways can action be taken together? The action research process is truly a research initiative not just because it puts the different technical systems and quality management among producers to the test, but also because it is accompanied by a collective think tank involving organised hog producers. The knowledge base resulting from an action research initiative is therefore much more relevant to the approach rather than to the substantial output.

The different steps in starting up groups, cooperatives and subsequently a federation were documented by the researchers. The various functions taken on by the organisations have been analysed, as well as the governance modes of the organisations (standards for member selection, rules, decision-making procedures, incentives and sanctions for members in relation to compliance with the rules). We will stress the respective roles of the growers, public officials and researchers in the development of collective action.

Figure 1 shows the working mechanism between the federation of cooperatives (FC), researchers and supporting organisations. The large blue circle shows the areas of activities which are supported by researchers. Every activity in the FC is always discussed between researchers and the FC to find the most adequate solution (illustrated by a continuous arrow in the figure). Some activities need to be supported by public services and local organisations as well. For these activities researchers act as bridges (illustrated by broken arrows in the figure).

Figure 1. Public and private partnerships to develop services to farmers



Thorough research was conducted during one year in 1997 on the pig commodity chain from Hai Duong province to final markets (local and urban markets). It focused on the quality criteria which are taken into account by the different actors in the chains to determine the conditions of the transaction, especially as regards pricing and possibility of developing regular and long-term relationships. And some farm experiments were conducted on the technical performance of various pig breeds and feeds.

Finally, data on the costs and profit margins for organisation members were collected through surveys in 2007 and compared with that of producers from the same villages who were not members of the organisation in order to grasp the economic impact of the collective action (75 members, 30 non-members).

Comparing technical and economic results of farmers belonging to associations in relation to farmers outside associations may involve some biases, as some observable and non-observable characteristics may differ between members and non-members of associations, including scale of production, education and motivation. These biases may be ascertained using various econometric tests including propensity score matching (Francesconi and Ruben, 2007). These were not performed in the present study. Yet we were careful to specify the size of herds for members and non members of associations to be able to compare the results of members of equivalent size.

A sustained presence in the field of a team of four researchers, including veterinary and social scientists, from 1998 to 2005, allowed the support to the emerging organisations to be long-term and sufficiently reactive. Besides, regular linkages were developed between researchers, farmer organisations and staff of public services to facilitate the interventions of the relevant staff, including veterinary services for the control of pig health.

III. MAJOR OUTCOMES

We will first present the way organisations have emerged and are governed. The main activities which are collectively decided and carried out, such as access to feeds, races and veterinary services and access to market information, will then be presented. Finally, some indicators of the success of the action research and collective action in terms of technical and economic results will be outlined.

A) Emergence and governance of the organisations

Despite government policies conducive to the establishment and growth of farmer associations, including grower groups (1996 Code for Cooperatives, Government Decree No. 88/2003 on the Establishment of Associations), such organisations have often proven to be short-lived, as they were not based on a voluntary sharing of resources and functions among members.

The first groups of hog growers in Nam Sach district go back to 1998. These came into being in the wake of two meetings held by our group of researchers that highlighted market opportunities for lean pork in the previous years. Then the first specialised cooperative was formed in August 2002, with 20 members from three communes in the district. There are now 10 cooperatives and a total of 200 members. The average output is 120 head of swine per family per year, with quantities sold amounting to 10 tons per family per year; 59 percent of the breeds raised are imported. A federation of cooperatives (FC) was established in 2005 as an umbrella for the 10 pork cooperatives, along with one veterinary cooperative. To strengthen the competitiveness and efficiency of pig production under the FC, several collective activities were undertaken with the support of various organisations: (i) access to services supporting the industry: sources of stock of imported hog breeds, purchase of feed, veterinary care; (ii) marketing services.

The FC operates on the basis of its bylaws and financial and administrative regulations. Each cooperative also has a set of bylaws and internal regulations. The cooperative's bylaws contain the rules for financial and administrative management. This is different from other cooperatives outside of the FC which often also have bylaws. When the FC was established, it only had basic bylaws like other outside cooperatives. A generic set of bylaws hindered the smooth operation of the FC because financial management lacked transparency, the members did not trust the FC and the FC was unable to mobilise capital from its members for activities. Internal regulations were drawn up for the FC as well as for the cooperatives to resolve these limitations. The existence of such regulations is an important factor in building the trust of the members and other stakeholders interested in supporting and developing relationships with the FC, such as the Provincial Union of Cooperatives, the Agricultural Bank and food companies buying and processing pork. They provide a legal framework for the formation of independent units within the FC, allowing for such things as holding workshops on processing and forming a unit for the collective purchase of animal feed.

The conditions of entry into the cooperative are as follows: a letter of request from the pig farmer, a minimum production size (50 head per year), a pledge to follow the regulations in terms of production protocol and cooperative management. In case of non-compliance with the cooperative regulations, members receive three warnings, and may lose their membership if they do not respond appropriately. The general meeting is held once a year (or more often if required by one third of the members). The management board of the cooperative meets every month to examine the planning of production and activities of the past month and decide on the next month's plan.

Several organisations are involved in the FC's activities, such as the Veterinary Department, Public Health Department and Science and Technologies Department, the Agricultural Institute, animal food companies and also the district Women's Union. They support the FC

in two ways: state management and consultation. For example, the Provincial Public Health Department supervises compliance with health requirements in processing plants, but it supports the FC in training workers in the plant with regard to the necessary hygiene requirements.

B) Access to market information

The research results on the pig commodity chain from its source in Hai Duong province to final markets showed that rural collectors are the primary buyers of pigs which they commonly sell to urban slaughterers who in turn supply wholesalers and retailers. The main criteria determining price differences is the quality of the carcass, that is, the rate of fat relative to the rate of lean meat. Collectors complain of the inconsistency of carcass quality, which prevents them from developing stable pricing and purchasing strategies with pig farmers.

This information was fed back to pig farmers. It was agreed that the inconsistency of carcass quality mostly relates to variations in the breed of hog raised, feed, health and veterinary care. Thus, several support activities were undertaken to address this problem.

C) Access to services

1. Access to imported breeds

Experiments conducted with the producers since 1995 showed that imported breeds of swine or animals with three quarters imported blood, with a lower level of fat, have a higher level of productivity and it is easier to find market outlets for them than for local breeds. Thus, producers are advised to raise imported swine breeds. To ensure the production of good quality piglets, producers are given support to purchase sows and boars from swine breeding companies. Consequently, the structure of pig livestock is changing rapidly in favour of pigs and sows of three quarters or of pure imported blood. Presently all producers in the FC have sows of imported breeds and the FC provides a substantial amount of piglets for its members.

Swine with half imported blood account for only a small proportion of the FC stock (table 1).

Table 1: Nature of livestock (%) in the Nam Sach FC

Year		1998	2000	2002	2007
Type					
Pigs	Local	86	47	14.0	0
	3/4; 7/8 imported blood	14	37	43.4	43.9
	Pure imported	0	16	42.6	56.1
Sows	Local	91	23	9.09	0
	F1; 3/4, 7/8 imported blood	9	48	40.9	37.7
	Pure imported	0	29	50.0	62.3

2. Feed service

Experiments were made on the impact of various feeds on the fat rate, according to various breeds. It was found that feeds that were a mixture of rice, soya or fish, and concentrate, yielded the best results for the three quarters and pure breeds. We guided the producers in mixing swine feed. The mix formulas were tested and applied by the producers. Producers were also organised into small groups for group mixing of animal feed as well as for collective purchase of feed components (maize, fish and soya). The fact that individual breeders have increased their production size and the growth of the animal feed industry in Vietnam has changed the practices of small-scale producers. The latter no longer mix pig feed but purchase it on the market collectively. In other words, the producers in each cooperative purchase animal feed from a feed company. After the establishment of the FC, pig feed is purchased collectively at the FC level.

3. Veterinary services

In Nam Sach, swine are often prone to epidemics, especially imported breeds. The incidence of cholera outbreaks is 21.8 percent in the summer and 17.79 percent in winter. To minimise the risk of epidemic, farmers have to comply strictly with the principles of disease prevention. Farmers also need advice and services from veterinarians.

In 1999, we supported the group of farmers growing imported swine in drawing up a contract with a private agent for the provision of veterinary services (Nguyen Van Thinh and al, 2002). He would make a weekly visit to inspect the herds of the group members and check on the health of the animals, make records and provide advice on care and treatment in the case of infected animals. These practices yielded good results for the farmers over a two-year period (table 3).

Table 3. Comparison of results between farmers under the veterinary service contract and those not under it (monitored from March 2000 to March 2001)

Indicators	Farmers without contract	Farmers with contract
Number of hogs under surveillance (head)	1,317	1,421
Cases of disease (head)	266	191
Number of hogs that died of epidemic (head)	106	35
Rate of contamination (%)	20.2	13.4
Cost of veterinary service/head/month (VND)	4,934	2,741
Loss/head (VND)	35,359	17,285

To further develop the provision of services to farmers, the Veterinary Services Co-op was formed on February 18, 2005 with 14 veterinarians from 8 communes in Nam Sach. Its terms of reference are to provide the following veterinary services to members:

- Supply medication, vaccines and veterinary equipment: this enables co-op members to get quality services at preferential prices.
- Twice yearly vaccination of the farmers' herds in the locality.
- Keep local farmers abreast of veterinary news, types of diseases, treatments and possible epidemic outbreaks.
- Provide treatment in the event of domestic animal disease outbreak.
- Provide intangible services to farmers through training sessions, inspections of buildings used for animal husbandry, etc.

Since the Veterinary Services Co-op was set up, 100 percent of the animals of co-op members have been vaccinated. The cost for veterinary services has dropped from 38,000 dong/head to 19,000 dong/head between 2005 and 2006.

D) Development of a set of specifications for quality

A production protocol common to all members of the cooperative and enabling the production of lean meat was developed through a series of meetings (from 2000 to 2005) with the co-op members and researchers. The common characteristics of the final output are: pigs between 80 and 120 kg; less than 25 mm of fat; vaccinated against four diseases; regularly inspected by veterinary services.

In 2006, to meet the consumer requirement for health quality, the FC decided to set up a system of internal quality management for the hog growing operations as well as for the meat and processed products. As food safety is still not one of the criteria considered by collectors for pricing conditions, the farmer organisation has to develop direct connections with consumers and urban retailers to promote their efforts in terms of food safety.

In the area of state management, the government of Vietnam enacted a set of regulations on farms which spell out the standards for farms to be deemed free of swine diseases, i.e. the conditions farms must meet in order to be certified free of swine diseases. However, the perception of safe pork meat from the standpoint of consumers goes beyond swine diseases and covers other health-related factors such as hormone, pesticide or borax residues, and the like. As far as the FC is concerned, for a farm to be certified as producing safe pork, it has to comply with the government's regulations as well as the market demands concerning health quality. The FC requires that a safe farm meet both sets of standards. It uses 11 criteria as a basis for the internal regulation governing the procedures and commitments that a farm must comply with.

As for processed products, consumers are mainly concerned with the use of borax in the processing operation. The use of borax is prohibited, but this chemical is still widely used by processors. Thus, if pork meat products are processed without the use of borax and certified by the public service, they are in a position to meet the market requirement and compete on the market, in particular the urban market. Based on the results of this study undertaken by the FC, pork meat products must be processed without borax. One member of the federation is specialised in managing the processing unit. Capital is raised from several internal sources (co-operative, household members) and external sources (non-member households) and benefits are gleaned from the experience of members in processing activities.

Sanitary conditions in the processing plant (buildings, equipment, workers) are complied with based on public standards and are certified by the Public Health Department. The processing operation for each product is based on the government rules found in the plant's internal regulations, one of which prohibits the use of borax. The Public Health Department tested the plant's products and issued certification for these products as free of prohibited chemicals.

With the Health Department's certification, products made under the FC umbrella were given digital codes, which is a prerequisite for putting these products on the market. The FC name and logo, certification information from the Health Department (borax free, no prohibited substances), the digital code and, most importantly, the name of the scientific consulting institution included in the brand of each product, are helping to build consumer confidence in FC products. The products are therefore very popular in trade fairs, a sign that they are trusted by consumers.

To guarantee the certified product quality, an internal supervisory system has been implemented in addition to government supervisory visits. The FC supervises compliance with the processing operations stipulated in the plant's internal regulations.

The plant is patronised by individual consumers and entities that place large orders. The plant has only been operating since 2007, but the results look promising. The following table shows the plant's results on a monthly basis.

Table 4. Results of the Nam Sach FC Processing Plant

Month	Volume (kg)	Turnover (VND 000's)	Total production costs	Profit
January 2007	1,910	83,610	81,539	2,071
February 2007	2,081	95,018	89,019	5,999

Although the processing output is still small (average of 70 kg/day) and therefore the profit margin also quite low, the plant's operation is promising because the quality of its products is recognised by rural and urban consumers as well as by the supermarkets. This is something that will promote expansion of the market for FC products.

E) Economic impact of the organisation

The statement given below was compiled for 2007. It takes into account collective actions in terms of the production and sale of lean pork rather than actions to obtain health certification and processing.

The findings of our survey made in 2007 summarized in Table 1 show clearly that growers who are members enjoy a higher level of technical efficiency than growers who are not members. On the average, a hog raised by members has a daily weight gain of 0.75 kg compared to 0.63 kg for non-members. As for feed, to achieve an increase of 1 kg of live pork, co-op members use only 2.2 kg of feed, whereas non-member producers use 2.9 kg. In other words, the technical efficiency achieved by member producers in use of feed to produce 1 kg of live pork is 24 percent higher than for non-member producers. That means that the cost for the production of 1 kg of live pork for members is only VND 10,926 compared to VND 13,045 for non-members (18 percent higher than the cost for members).

Table 5. Technical efficiency in hog raising

Type of producer	Size of operation	Weight of piglet (kg)	Weight of pig sold (kg)	Weight gain (kg per day)	Feed used for 1 kg gain, grown (kg)	Cost for 1 kg gain, grown (VND)
Outside Federation	Less than 30 head	16.5	77.5	0.63	2.9	13,045
In Federation	Less than 30 head	14.4	83.4	0.74	2.2	12,272
	From 31 to 60 head	15.3	72.92	0.67	2.3	10,872
	Over 60 head	10.8	91.04	0.82	2.2	12,047
	Mean	15.13	82.57	0.75	2.2	10,962

Source: RUDEC survey, 2007. Hog growers, 30 not co-op members and 75 co-op members

The group purchase of animal feed enables a reduction of transaction costs and a gain in economies of scale, resulting in an increased market capability in negotiations with animal feed companies. The result of this collective action is that the FC is in a position to purchase animal feed from companies at a price equivalent to that granted to large company agents. Member producers are therefore able to pay a price lower than the market price. On the average, group purchases of feed enables members to pay a price that is 6 percent lower than the price paid by the animal feed agent. This results in a feed cost saving for members of VND 20,000 to 30,000 per hog (Thin and al, 2003).

Given that the breeds of hog raised by members are largely purebred imported or of 7/8 imported blood, the price paid for pork from the cooperatives is 3.7 percent higher on the average (VND 16,550 compared to VND 15,952) than that obtained by non-member growers for their pork, as illustrated in Table 6.

The greater technical efficiency and lower feed cost mean that the unit production cost per kilo of live pork for members is 9.7 percent lower than that of non-member growers. It is clear that the lower unit production cost and higher selling price results in a higher unit profit margin for members compared to that of non-members. As shown in Table 6, the average unit profit margin for members is twice as high as for non-members.

Table 6. Economic efficiency of raising hogs in the Federation

Type of producer	Size of operation (herd)	Weight of hog sold (kg)	Selling price (VND/kg)	Unit cost (VND/kg)	Unit profit (VND/kg)
Outside Federation	Less than 30 head	78	15,952	14,066	1,886
In Federation	Less than 30 head	83	16,611	11,737	4,874
	From 31 to 60 head	73	15,824	13,127	2,697
	Over 60 head	91	17,139	13,301	3,838
	Mean	83	16,550	12,704	3,845

Source: RUDEC survey, 2007. Hog growers, 30 not co-op members and 75 co-op members

Table 7 shows that the annual profit per operation for members is much higher than for non-members. This is due to the fact that the unit profit margin is higher (Table 6) and the average number of hogs raised by members is much higher than for non-members.

Table 7. Total profit from pig raising comparing Federation members and non-members in 2006

Type of producer	Number of pigs in 2006	Total return (000's VND)	Total cost (000's VND)	Total profit (000's VND)
Outside Federation	25	33,607	27,349	6,258
In Federation	118	163,534	126,203	37,331

Source: RUDEC survey, 2007. Hog growers, 30 not co-op members and 75 co-op members

4. DISCUSSION AND CONCLUSION

The actions described in our paper results from a deliberate choice of targeting small-scale family farmers in the development of quality pig meat, rather than large-scale industrial farmers, out of concern for local development and employment. This line of action implies then the stimulation of collective action, enabling economies of scale in access to technical and market information, inputs and services, which would be too costly for individual

farmers. Collective action is also necessary to build collective production protocols ensuring quality criteria. The reputation for quality is indeed a collective good which imply specific governance structures in terms of inclusion and exclusion mechanisms (Olson, 2000 edition).

The Nam Sach cooperative and federation is a good example of interlinkages of functions supplied to co-op members which not only helps overcome their constraints in gaining access to various resources (training, veterinary services, market information, safety certification, processing), but also strengthens their incentive to abide by collective rules (Bardhan, 1989). It is also a good illustration of successful partnerships between researchers, farmers and local authorities for enabling access to services and combining public and private enforcement of rules.

Thanks to their inclusion in the organisation, small-scale farmers have found ways of increasing their incomes and diversifying their commodity and market outlets.

A further step in the generation of collective added value is the integration by farmer cooperatives of various stages of marketing, an aspect presently being investigated through in-depth institutional and financial evaluation of various marketing strategies.

As regards research, it would be useful to compare various indicators of efficiency and competitiveness between farmer organisations and industrial farms. The assessment of the indirect effects of income generated by hog production on livelihoods in the investigated area, especially the poor, would also be helpful to confirm the present and potential role of farmer organisation on poverty alleviation.

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