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COST, RETURN ANALYSIS AND CONSTRAINTS IN LIVESTOCK PRODUCTION AND MARKETING IN HAI DUONG, VIETNAM

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Abstract

The study, using the survey data from 145 livestock production households, showed that livestock contributed significant parts to the households' income. Given a production unit, the high investment in inputs and the considerable experience in production and marketing created higher income for the livestock-based group than that for the non livestock-based group. However, the farmers perceived some constraints relating to both production and marketing. The result from the Garrett's ranking technique presented the ranking position of constraints, respectively included the livestock disease, the limited credit access, the high and rapid increase in feed price, the high volatility of output price, and the insufficiency of market information and weak bargaining power.

Key words: Livestock, Constraints, Garrett's ranking technique.

1. Introduction

Livestock production is predominantly operated in small-scale production units. Presently, the small producers supply the majority of meat in the market. About 80% of poor households in Vietnam raise livestock and 30% of total agricultural income of households is generated from livestock production (Lapar et al., 2003). Hai Duong has the potential for livestock production as it is located near Hanoi capital, where the demand for meat and fish by consumers has gradually increased. The agricultural labor currently accounts for 64.2% of the total labor in Hai Duong (GSO, 2012). Livestock production not only generates more income for farmers but also reduces the migration flow from the rural area to the urban area. However, recently livestock producers have confronted with some unfavorable factors (DARDHD, 2010). With the important role in livestock production, the improvement in livestock production and marketing is very crucial to create a stable income for farmers. The paper is to analyze cost and return of livestock production, and to explore some main constraints related to production and marketing by the small livestock producers.

2. Material and methods

Data collection: The primary data were collected from the household survey, which was made using both stratified and random selection. 145 farm households engaged in livestock production were selected for data collection.

Data analysis: SPSS software was used for data processing using descriptive statistics and analysis of variance. In addition, the Garret's ranking technique was employed for the relative assessment of constraints associated with livestock production and marketing. The respondents were asked to rank

their constraints. The individual's ranking was converted into percentage position for each of the assigned ranks by using the formula given below (Garret and Woodworth, 1971).

$$\text{Percent position} = \frac{100 (R_{ij} - 0.5)}{N}$$

where: R_{ij} = Rank assigned for the i th category by the j th individual; and N = Number of constraints ranked by the j th individual.

The percentage position of each rank was converted into scores, referring to the table given by Garrett. For each constraint, the scores of individual respondents were added together and divided by the total number of respondents for whom scores were added. These mean scores for all the constraints were arranged in descending order and the most relevant constraints were identified.

3. Results and Discussions

The general profile of surveyed households

Based on the contribution of the annual livestock income to the total income, the surveyed households were classified into the livestock-based group and the non livestock-based group. Referring to the main characteristics of the surveyed households, the household heads in the non livestock-based group were older than those in the livestock-based group. They also had lower levels of education than those in the livestock-based group. Generally, the older farmers have lower levels of education than the younger ones. In addition, the farmers with the low levels of education likely perceive more limited access to the economic and social information than the others with the high levels of education. Both groups owned a small crop land area due to the high density population in Hai Duong. Most of the surveyed households simultaneously engaged in production of chicken, fattening pig and piglet. Selecting the diversification in livestock production, the farmers expected to reduce their risks. The number of livestock heads and the fish pond area of the livestock-based group were considerably higher than those of the non livestock-based group. Compared to the commercial farms, the livestock herd sizes of the surveyed households were considerably small because of their limited financial capital and land.

Table 1. Characteristics of surveyed households

Indicator	Livestock-based group (n=58)		Non livestock-based group (n=87)		P-value
	Mean	SD	Mean	SD	
Age of household head (Years old)	45	7.5	46	9.3	0.79
Education of household head (School years)	7.7	1.3	7.0	1.1	0.55
Area of crop land (1000 m ²)	2.2	0.9	2.6	1.1	0.06
Area of fish pond (1000 m ²)	3.5	2.4	1.4	1.2	0.000
Number of chicken (head)	223	76	183	70	0.005
Number of fattening pigs (head)	22.2	12.6	8.6	3.3	0.000
Number of piglets (head)	21.0	5.3	16.5	6.4	0.000

Source: Household survey, 2011.

Cost and return analysis of livestock production

Regarding fattening, the volume of live pig of the livestock-based group and the non livestock-based group were 2404 and 805 kilos, respectively. The production cost of the livestock-based group was relatively higher than that of the non livestock-based group. The total production cost of

the livestock-based group per a ton of live pig was 3527 Vietnamese Dong (VND), of which the variable cost occupied 97.6 %. Similarly, the non livestock-based group mainly invested variable inputs in pig production (98.5%). Of the total variable cost, the feed cost accounted for a main part, which was about 79 % for both groups.

Table 2. Production cost and return per 1 ton of live pig (Unit: 1000 VND)¹

	Livestock-based group		Non livestock-based group		P-value
	Mean	SD	Mean	SD	
Variable cost	3527	318	3115	139	0.000
Fixed cost	84	48	47	36	0.000
Total cost	3611	330	3162	152	0.000
Gross output	4431	336	3886	280	0.000
Return to family labor	820	268	724	278	0.081

Source: Household survey, 2011.

Note: ¹ 1000 VND was equivalent to 0.05 USD in the year 2011; ²The variable cost excluded the family labor cost.

The fixed cost included the interest payment and depreciation. The livestock-based group borrowed the higher amount of money for feed purchasing and had the higher investments in pig shelter than the non livestock-based group did. Therefore, the fixed cost of the livestock-based group was higher than that of the non livestock-based group. On the other hand, the gross output of the livestock-based group was statistically higher than that of the non livestock-based group. The livestock-based group likely had a better knowledge of marketing than the non livestock-based group, which enabled the livestock-based group to sell their pig at a higher price. On average, the livestock-based group sold their pigs at 44.3 thousand VND per kilo whereas the non livestock-based group reached 38.8 thousand VND per kilo. Given a production unit, the livestock-based group generated a higher income than the non livestock-based group did, resulting from the higher input investment and the better experience in production and marketing of the livestock-based group.

Table 3. Production cost and return per 100 heads of chicken (Unit: 1000 VND)

	Livestock-based group		Non livestock-based group		P-value
	Mean	SD	Mean	SD	
Variable cost	8598	569	8498	521	0.286
Fixed cost	383	150	176	169	0.000
Total cost	8981	573	8674	568	0.002
Gross output	12325	1523	11040	1091	0.000
Return to family labor	3344	1504	2366	1063	0.000

Source: Household survey, 2011.

Like the pig production, the variable cost of chicken production occupied a dominant part of the total cost. The feed cost was the major element of variable cost. The livestock-based group had a considerably higher input expenditure and obtained a relatively higher gross output than the non livestock-based did. As a result, they generated a significantly higher return to family labor than the non livestock-based group received. Although both groups were familiar with chicken production, the differences in chicken production cost and economic return existed between the two groups. The reasons could be explained similarly as the pig production. In addition, the chicken weight of the livestock-based group and the non livestock-based group were 469 and 359 kilos, in turn. The average selling price of chicken was 59 thousand VND per kilo for the livestock-based group and 56 thousand VND per kilo for the non livestock-based group.

Contribution of livestock production to the income of surveyed households

The income from livestock production of the livestock-based group was 32.7 million VND, accounting for 36.3 % of the total income. The fish production also created an important income source of the livestock-based group, which accounted for 28 % in the total income. The crop production and non-farm activities played a less important role in income generation of the livestock-based group than livestock and fish production. The income from livestock production of the non livestock-based group was 10.5 million VND, contributing 19.6 % to the total income. The income from crop production (48%) and non-farm activities (30.7 %) accounted for dominant parts of the total income of the non-livestock group. However, this group earned low benefit from those activities. It should be highlighted that the farmers in the non livestock-based group are mainly unskilled workers and dominantly engage in unregistered employments, which are not expected to create a stable income. On average, the monthly income per capita of the livestock-based group and the non livestock-based group were 1.68 million VND and 1.02 million VND, respectively. Notably, 60 % of surveyed households had lower monthly income than the average monthly income per capita of Hai Duong province in the year 2010 (1.30 million VND). Therefore, the improvement and expansion of livestock production would increase income for both groups due to the limited opportunities of increasing income from other activities.

Main constraints of production and marketing

The farmers perceived some main constraints related to both production and marketing. The ranking results showed that the livestock disease, the limited credit access, and the high and rapid increase in feed price were three leading problems. Following, the high volatility of output price and the insufficiency of market information and weak bargaining power were considered as the fourth and fifth problems. The main constraints negatively affected livestock production income in the surveyed year. Furthermore, it will impede livestock production in the next years.

Table 4. Garret's ranking of constraints

Constraints	Mean score	Ranking position
Livestock diseases	69.3	I
Limited credit access	48.1	II
High and rapid increase in feed price	44.6	III
High volatility of output price	19.3	IV
Insufficiency of market information and weak bargaining power	16.5	V

Source: Household survey, 2011.

It was found that the poor disease prevention of farmers and the weak capability of the veterinary system in terms of veterinary service, disease detection and surveillance were the main reasons for the livestock disease. Although many farmers had participated in the technical training class, their knowledge of disease prevention was still limited. The portion of farmers, who did not apply pig vaccination, was 15 % for the livestock-based group and 35 % for the non livestock-based group. In addition, the epidemic outspreading was worsened because some farmers tended to sell their sick or dead livestock to recover a part of their capital. Concerning the veterinary system, it had a network from the provincial and district level to communal levels. At the grass-root level, the private veterinary workers who worked as veterinary shopkeepers mainly provided veterinary services to farmers. However, most of them had low training levels. In addition, they commonly provided vaccines kept in the poor condition to farmers. The veterinary system was mainly a passive surveillance, reacting to disease problems. Notably, the smuggled chickens from China were also a

serious problem leading to occurrence and the outbreak of disease. The bad management of the veterinary system partly caused the existence of the smuggling of chickens.

Regarding credit access, the formal sector, which mainly provided credit for the agricultural production, did not meet the credit needs of livestock producers. Vietnam Bank for Agriculture and Rural Development (VBARD) and People Credit Funds (PCFs), two commercial banks, basically supplied credit on the requirement of physical collateral. Despite having credit need for feed purchasing, 47.6 % of surveyed households did not apply for borrowing money from commercial banks due to being afraid of being refused, being afraid of risk, lack of physical collateral and high interest rate. Of the surveyed households, for 13.8 % was approved the full required amount of loans, for 28.3 % was approved a part of required amount of loan and for 10.3 % was rejected the loan request. The credit policy was promulgated so that VBARD was responsible for supplying a loan of less than 10 million VND without the requirement of physical collateral. Practically, it did not operate efficiently. Many farmers still had a limited access to information on the credit programs. Consequently, many farmers without physical collaterals did obtain credit from neither VBARD nor PCFs. Furthermore, the stronger credit needs of farmers were more rationed by VBARD and PCFs. Due to a limited access to credit, the credit constrained households accounted for 71.7 % of surveyed households. It revealed that a large demand for credit of livestock producers exists.

On the other hand, the farmers had gradually replaced the traditional feed from crop with the industrial feed for their livestock. Thus, the industrial feed was mainly used for livestock production. The surveyed data from households showed that from January 2010 to December 2011 the pig and chicken industrial feed prices increased by 37.5% and 41 %, respectively. It was reported that Vietnam imported 90-95 % of dried soybean cakes and fish powder, 50% of corn, 80% of premixes and 100 % of minerals and vitamins (SBOV, 2012). In the last few years, there has been a sharp increase in the price of many raw materials used in livestock feed production. The heavy dependence on imported raw material ingredients and high imported taxes has caused a high and rapid increasing in feed price. It would seem that the changes in costs of raw material inputs were passed to the livestock producers (Phuong et al., 2010).

About 81 % of the surveyed farmers reported that market price fluctuation was one of the main negative factors affecting their livestock production income. From the beginning of 2010 to the end of 2011, the chicken price and pig price varied from 50 to 71 thousand VND per kilo and 32 to 65 thousand VND per kilo, respectively. Notably, both chicken and pig prices had monthly volatility. The smuggling of chicken from China was one of the main reasons for sudden reduction in chicken price. In addition, in the first months of 2010, the price of live pig sharply went down due to the pig disease outbreak. After 2-3 months, the pig price gradually increased. While pig price did not show a strong pattern, the pig feed price increased continuously.

A lack of an organized livestock marketplace infrastructure means that farmers usually dealt with buyers on an individual basis (Alejandro et al., 2003). In the study site, the collectors living in or outside the villages of farmers generally provided market information to the farmers. The market information network was not organized systematically. Many surveyed farmers did not have many choices to sell their livestock at a fair price because of the insufficiency of market information. All surveyed farmers individually sold their livestock to collectors at the farm gate. 78 % of surveyed farmers reported that they were not satisfied with their selling price. The lack of cooperation among livestock producers in both production and marketing was detected as a dominant reason for a weak bargaining power of the individual farmer.

Some scenarios related to changes in pig feed price and pig price were taken to examine the influence of the increasing feed price and reducing pig price on the income of producers (Table 5).

It was assumed that the feed price increased by 5 % and 10 % for the first and second scenarios, respectively. The return to family labor of the first and second scenarios consequently, decreased by 15.4 % and 30.8 %, in turn. The third and fourth assumptions were that the price of pig reduced by 5% and 10%. As a result, the return to family labor of the third and fourth cases declined by 29.8% and 55.5 %, respectively. Obviously, the small increase in feed price or the small reduction in pig price caused a high reduction in economic return to family labor.

Table 5. A simulation with cost and return per 1 ton of live pig for the livestock-based group (Unit: 1000 VND)

Scenarios	Gross output	Feed cost	Return to family labor
Based (average of 2010)	4429	2674	866
Increase in feed price by 5%	4429	2807	732
Increase in feed price by 10%	4429	2941	599
Reduction in pig price by 5%	4204	2674	607
Reduction in pig price by 10%	3986	2674	385

Source: Household survey, 2011.

4. Conclusions

Empirically, the study showed that livestock production contributed significant parts to the household income for both the livestock-based group and the non livestock-based group. The high investment of inputs and the considerable experience in production and marketing created a higher income for the livestock-based group than that of the non livestock-based group. Five main constraints of production and marketing, perceived by farmers, were respectively ranked as the livestock disease, the limited credit access, the high and rapid increase in feed price, the high volatility of output price, and the insufficiency of market information and weak bargaining power. To enhance livestock production and marketing by farmers, the disease prevention and the veterinary system should be improved to avoid a passive surveillance and to reduce risk related to livestock production. In addition, the information on credit programs should be provided to farmers efficiently. The credit supply from the formal sector needs to increase for a better credit access of livestock producers. Besides, the government's role in facilitating the domestic supply of feed raw materials should be strengthened to create a stable feed price. Moreover, the livestock producers should work together in groups to overcome both production and marketing constraints.

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