

Pig productivity, efficiency and comparative advantage of pork production in the Red River Delta

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Summary

Pig production plays an important role in the household's economy in the Red River Delta. It's not only serving local consumers but also having a part for exporting. In order to evaluate productivity, efficiency of pig production at households and on farms, the study was carried out on 1080 households having pig production, 33 pig farms, 48 collectors of pigs, 72 abattoirs and 4 enterprises of pig processing for exporting belong to 4 provinces in the Red River Delta (Ha Tay, Hung Yen, Nam Dinh and Hai Phong). The results showed that, both pig productivities at households and at farms have been improving step by step. The growth rate of fattening pig and the sows' performance were lower at the households to compare with these at the farms; the productivity of exotic pigs was higher in comparison with the crossbred pigs (local and exotic breeds). There was also a difference between households and farms on the efficiency. The farms' net profit was higher in comparison with that of households (309,600 VND/100 kg of living weight at the farms and 117,200 VND for the households); conversely, the households' net profit in sow production was higher than that of the farms (662,100 VND/100 kg of piglets at the households and 586,000 VND/100 kg of piglets for the farms).

This study also evaluates pork comparative advantage in the Red River Delta during period 2003-2005 with moderate variation of some factors [5%-15% decrease in export price of cut meat (scenario 1); or decrease in import price of pig feedstuffs by 5%-15% (scenario 2); or 5%-15% improved productivity (scenario 3), other things remained constant]. The pork production in the Red River Delta had comparative advantage.

Key words: Pig production, productivity, efficiency, and comparative advantage

1. BACKGROUND

In recent years, the pig production in our country has had active changes. It is manifested not only in the annually increasing pig quantity but also in increasing pork quality, aiming at satisfying quality demands for domestic markets and export. The average growth rate in period 2000-2005 reached 6.32%, corresponding to 1,126.980 pigs (*Statistic Yearbook, 2006*).

The ratio of imported and polyhybrid pigs in the total herd increased up to 2 – 2.5%/year averagely (*T.K. Anh, N.T.Son, 2004*).

The Red River Delta (RRD) is considered as one of two zones strongly developing the pig production in the direction of intensive husbandry in the whole country. By the end of 2006, the total number of pigs in RRD reached 7.42 million heads, accounting for 27.1% of the total herd (*Statistic Yearbook, 2006*). In spite of numerous favorable conditions for commercialized pig production development, the pig husbandry in RRD is mainly concentrated in small-scaled farm households, the principal husbandry mode is still the salvaged one. Besides, the impasse of pork export, the escalation of feed prices, the difficulty in disease control,...., are always immanent and latent risks for pig producers in RRD.

The integration trend with international economy created many opportunities for the pork production of the zone. Along with making full use of available advantages, it is necessary to analyze and find out the strength and the weakness of the pig production with a view to heightening the pork production ability and competitiveness in the zone. Therefore, with the above objective our group has carried out this study.

2. RESEARCH METHODS

Our study was carried out in 4 provinces : Hai-Phong, Hai-Duong, Hung-Yen and Nam-Dinh in 2003 – 2005. Data which described the production situation of the zones were collected from reviews, journals and books and statistic documents of these provinces.

Primary data were obtained through monitoring notebooks of 1,080 households, 30 – 33 farms with small and large scale, directly interviewing 48 collector households, 72 abattoir households and 4 processing enterprises of piglets and exported sucking pigs in Hai-Duong and Hai-Phong provinces.

Using accounting methods, comparing and analyzing comparative advantages (through DRC, DRC/SER, real profits and social profits...) were studied. In order to assure the accuracy of calculation results, some calculating tables were put forward as follows :

- Official exchange rate used in the study was $OER=15,75/1US\$$
- Shade exchange rate used in the study was $SER=1,2*OER$

3. RESULTS AND DISCUSSIONS

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3.1 Situation of the pig husbandry in RRD

The agricultural production of RRD has been rapidly developed in the course of economic structure change, especially the remarkable change of livestock husbandry, in which the pig husbandry contributed a great part. The pig herd of the zone always occupied 26 – 27% of the total in the whole country. The herd structure was relatively reasonable between sows and fattening pigs. Moreover, RRD has the largest scale of sow production. Different sow races are actually raised in the zone, consisting of local sows (Mong-Cai and a little number of hybrid I), hybrid sows (F1, F2) and exotic sows (*Reports of the Ministry of Agriculture & Rural Development, 10/2002*)

Beside the meeting of people's consumption demands in RRD, the pork is processed for export.. In period 1991-1997, the pork exportation of RRD was quite strongly developed. Average growth rate reached 17% annually (*Vietnam's Head Company of Animal Production, 2001*). In 1995, pork exportation rate of RRD got nearly 76% and then decreased, but still occupied more than 50% of the total pork exportation of the whole country. Exported pork productivity reached maximally about 17,000 tons in 2001 and then, strongly reduced in 2002 and 2003 (*Tran Kim Anh, 2004*). Recently, pork export activities of RRD has met with many difficulties. Apart from product criteria, an important cause was that the exported pork from RRD was mainly frozen meat (accounting for 80%); the rest was piglet's and sucking pig's meat. This exported pork was mainly subject to preliminary treatment, so that with bad attraction and low export turn-over. These are just common difficulties of the exported pig production in the whole country.

3.2 General situation of pig producers

Pig-breeding households

Survey results at pig-breeding households showed that: Average age of householders is 45.9, there are 4.5 people/household and 2.4 effective workers/household averagely. Average housing area for pig husbandry is 25.6 m²/household, the largest housing areas belong to households of Ha-Tay province (36.5 m²) and the narrowest ones belong to Hai-Phong (20 m²/household). Average investment value of pig housing is 6.28 million VND/household; the highest value of each household in Ha-Tay is 10.1 million VND and the lowest one in Hai-Phong is 2.8 million VND. The pig husbandry at households of RRD has had considerable changes in scale and mode.

Pig-breeding farms

Average age of farm owners is 41.8, younger than that of householders. Their education level is rather high: those who have secondary education level occupy 50.8%, tertiary level – 45%, and primary level – 4.3%. Most of them issuing from farmers occupy 82.6%, from other origins – 17.4%. Average area of each farm campus is 1,507 m², in which the housing area is 95.5 m². Investment fund in housing building in the 4 studied zones reaches 42.5 million VND/farm. All the surveyed farms receive bank loan of 10.3 million VND/farm averagely.

Survey results indicated that most of farms take the raising form of fattening pigs (40%) or the combined form (55%), meanwhile, those who take only the raising form of sows occupy a very low percentage (5%). The average pig production scale at the 4 surveyed sites is 84.9 fattening pigs /farm and 13.9 sows/farm, representing the number of fattening pigs and sows frequently present in the farms.

3.3 Pig productivity

At pig-breeding households

a. Fattening pigs

In order to increase the number of annually raising phases, numerous farmers apply the overlap of phases. The pig quantity incorporated into fattening pigs fully depends on the decision and initial investment fund of households. Survey results showed that most of households raise F1 and F2 hybrid pigs, the rest of them raise pure imported pigs. Imported pigs are sold at higher weight (77.72 kg) than that of hybrid pigs (63.44 kg). Average weight gain of imported pigs is 18.55 kg/head/month, that of hybrid pigs is 16.75 kg/head/month.

b. Sows

Sow production in RRD has had stronger changes than before. Survey results showed that: the number of piglets born by an local sow is the highest (12.86 heads/farrow), that of an exotic sow is the lowest (10.27 heads/farrow) (P<0.05). The number of piglets born by a hybrid sow is 12.12 heads/litter, lower than that obtained by Vo-Trong-Hot *et al.* (1999)(12.72heads/litter), but the number of weaned piglets is higher (11.12 head/litter). The piglet weight of exotic sows is sold at 16.11 kg/head, that of hybrid sows – at 13.07 kg/head but the weight of a whole litter is nearly equivalent (148kg/litter for exotic sows and 144.46kg/litter for hybrid sows)

On pig-breeding farms

a. Fattening pigs

Fattening pig productivity is reflected in the annually sold pork weight and the monthly weight gain of the farms. These indices very much depend on breeding quality, feed quality and pig husbandry technique of the farms. Average number of pigs in the whole zone reached 175.5 heads/year on exotic pig raising farms, and 138.3 heads/year on hybrid pig raising farms. So, the annual output productivity of farms reached about 8-15 tons of live weight pork (LWP). The fattening duration varies within 60-120 days, averagely 82.7 days for exotic pigs and 86.31 days for hybrid pigs.

It is shown that the weight gain of fattening pigs on farms is much higher than that at households (14.48 kg/month for hybrid pig, and 18.74 kg/month for imported pigs – Vu-Dinh-Ton *et al.*, 2005). Improving the husbandry technique and investing in feed brought into full play the potentiality of pig races on farms.

b. Sows

For exotic sows, all the farms apply the form of earlier weaning time than average (32.24±2,87 days). The number of weaned piglets of an exotic sow (9.94±0.17 heads/litter) is higher than that reported by Doan-Xuan-Truc in 2004 on Yorkshire sow productivity in RRD (8.52±0.06 heads/litter) (Doan-Xuan-Truc *et al.* 2004a) and that of exotic sows on My-Van Breeding Farm (9.51±3.01 heads/litter) (Doan-Xuan-Truc *et al.*, 2004b). The sow productivity of farms is higher by far than that of households.

3.4 Economic efficiency of surveyed households

** Fattening pig breeding households*

Based on survey data calculation, total income and investment level of households in all the provinces didn't have much difference. Average intermediate costs of 100 kg of live weight pork (LWP) of surveyed households were 1,288,600 VND, in which feed costs accounted for nearly 70%. The average total income obtained from 100 kg of LWP was 1,512,070 VND. The pure income of fattening pig breeding households reached 192,400 VND/100 kg of LWP. Among the 4 surveyed provinces, the income obtained from fattening pig breeding in Hung-Yen was the biggest, but the intermediate costs were the highest. So, the added value was the lowest – 189,100 VND/100 kg of LWP. The highest added value was created by households of Ha-Tay – 236,600 VND/100 kg of LWP

** Sow breeding households*

Not similarly to fattening breeding households, final products of sow breeding households are piglets for sale. Their investment level and product value are much different from those of fattening breeding households. The average added value of sow breeding households of the 4 provinces occupies 38.2% of total income (662,100 VND/100 kg of LWP). The highest added value was obtained in Nam-Dinh, as most of households used numerous sources of salvaged feed, resulting in reducing the feed costs (732,400 VND/100 kg of LWP). The lowest added value was obtained by sow breeding households in Hai-Phong (567,500 VND/100 kg of LWP)

In comparison between fattening pig breeding households and sow breeding ones, the pure income of the latter was 3 times higher than that of the former.

** Fattening pig breeding farms*

In general, economic efficiency of farms is higher than that of households. The reason is that all the farms mainly raise pure exotic pigs with high quality and yield. However, the investment level in feed, housing, breeding piglet of the farms is higher than that of the households. Average pure income in the 4 provinces is 309,600 VND/100 kg of LWP, occupying 90.5% of added value, 117.200 VND/100 kg of live weight higher than that of the households.

** Sow breeding farms*

Most of sow breeding farms also raise fattening pigs. Therefore, a great part of born piglets are retained for fattening. Survey results showed that investments in breeding pigs, housing, feed and techniques on farms are much higher than that of small-scale breeding households. The average added value of 100 kg of piglets on farms in the 4 provinces reached 586,600 VND, the highest was on farms in Hai-Phong (661,400 VND/100 kg of piglets). In comparison with sow breeding households, the pure income of farms was lower (93,700 VND/100 kg of piglets).

3.5 Comparative advantages and opportunities of pork in RRD

** Comparative advantages of exported pig husbandry in RRD*

These comparative advantages are identified by the indices of domestic resource cost (DRC) and ratio DRC/SER. The values of DRC are specific for social expenses of domestic resources transferred into foreign currency through the pork exportation.

Table 6. Domestic resource costs for the production of not fully grown (NFG) pigs and exported

sucking piglets

Indices	Products	Not fully grown (NFG)pigs	Sucking piglets
1. Product value (1,000 VND/ton)		19.530,00	23.766,67
	(USD/ ton)	1.240,00	1.508,99
2. Total costs			
a. In the country (1000VND/ton)		11.278,14	15.107,04
b. In foreign countries (USD/ton)		254,37	105,58
3. DRC		11,44	10,76
4. DRC/SER		0,61	0,57
	SER	18,90	18,90

Source : Survey data of export pig processing households and bases, 2008

The coefficient of resource costs of the production and treatment of NFG pigs and exported sucking piglets is smaller than 1 (DRC/SER) (Table 6) . It shows that the 2 products have comparative advantages in production, processing and export. Otherwise, the production of NFG pigs and sucking piglets bring good efficiency in earning foreign currency through exportation. Comparative advantages of the sucking piglet production (DRC/SER=0.57) are higher than those of the NFG pig production (DRC/SER=0.61).

3.6 Scenarios of the economic world integration

Based on analyzing comparative advantages of exported pig commodity chain, in the common context of the integration process, we proposed a number of supposed scenarios as follows :

Scenario 1

Suppose the price of NFG intact pigs and exported sucking piglets decreases (FOB export prices reduce 5%, 10% and 15% of initial prices)(without changes of other factors)

Table 7. Comparative advantages of exported pig commodity chain by scenario 1

Calculating for 1 ton of LWP	NFG pigs	Sucking piglets
1. Product value (USD/ton of LWP)	1.240,00	1.508,99
2. DRC	11,44	10,76
5% decrease of export price	12,21	11,38
10% decrease of export price	13,09	12,06
15% decrease of export price	14,10	12,83
3. DRC/SER	0,61	0,57
5% decrease of export price	0,65	0,60
10% decrease of export price	0,69	0,64
15% decrease of export price	0,75	0,68

.Source : survey data

Results illustrated in Table 7 showed that with 5%, 10%, 15% decreases of exported pork prices in comparison with initial prices, the exported pork has still comparative advantages, although they are greatly reduced. Therefore, in the course of integration, with the maximal decrease of exported pork prices (15%) in comparison with current prices, we have still comparative advantages with respect to other countries exporting these commodities.

Scenario 2

Suppose the import taxes of raw materials for feed processing are fully remitted (import tax = 0) and production cost prices are reduced (with 5%, 10%, 15% decreases of raw material prices for feed processing in comparison with initial prices), resulting in decreasing average production costs (other factors remain constant).

Table 8. Comparative advantages of exported pig commodity chain by scenario 2

Calculating for 1 ton of LWP	NFG pigs	Sucking piglets
1. Product value (USD/ton of LWP)	1.240,00	1.508,99
2. DRC	11,44	10,76
Tax =0 & 5% decrease of raw material prices for feed	11,14	10,69
Tax =0 & 10% decrease of raw material prices for feed	11,03	10,64
Tax =0 & 15% decrease of raw material prices for feed	10,92	10,57
3. DRC/SER	0,61	0,57

Tax =0 & 5% decrease of raw material prices for feed	0,589	0,566
Tax =0 & 10% decrease of raw material prices for feed	0,583	0,563
Tax =0 & 15% decrease of raw material prices for feed	0,578	0,559

Source : Survey data, 2004.

As shown in Table 8, with decreases of raw materials for feed processing, the cost price of 1 ton of LWP remarkably reduces. To solve this problem, the State should encourage producers of domestic raw materials to intensify their investment, enlarge production area, improve yield and quality of main raw materials. Besides, it is necessary to priorly encourage domestic enterprises to invest in production technologies of high-tech raw materials, limiting the full investment of foreign enterprises.

Scenario 3

Suppose pig breeders increase their productivity by applying new advanced techniques to their production (other factors remain constant), what will happen to exported pig commodity chain in the studied zone ?

- %5, 10% and 15% decreases of production cost prices in comparison with initial ones owing to improve productivity.

Table 9. Comparative advantages of exported pig commodity chain by scenario 3

Calculating for 1 ton of LWP	NFG pigs	Sucking piglets
1.Product value (USD/ton of LWP)	1.240,00	1.508,99
2. DRC	11,44	10,76
5% decrease of production cost prices	10,87	10,23
10% decrease of production cost prices	10,30	9,69
15% decrease of production cost prices	9,73	9,15
3. DRC/SER	0,61	0,57
5% decrease of production cost prices	0,58	0,54
10% decrease of production cost prices	0,54	0,51
15% decrease of production cost prices	0,51	0,48

Source : Survey data,, 2004-2005.

These results show that the decreases of exported pig production cost price will very much increase comparative advantages through DRC and DRC/SER. Therefore, DRC indicates that we will lose less VND to gain a unit of foreign currency through exportation of the 2 products NFG pigs and sucking piglets.

4. CONCLUSION

Due to improve breeding techniques, invest in feed and breeding piglets, the pig breeding results were considerably ameliorated step by step at breeding households and on breeding farms of RRD. For the fattening pig herd average weight gain of exotic breeding pigs was higher than that of F1 hybrid and local pigs. As for sow herd, in spite of the much shorter weaning time of exotic sows compared with hybrid sows, the number of post-weaned piglets and the weight of finished pigs (ready for sale) of hybrid sows were often higher than those of exotic sows.

However, economic efficiency of households and farms was not similar. The pure income of fattening pig breeding farms was higher than that of households. On the contrary, the pure income of sow breeding farms was lower than that of households.

Apart from obtained results of productivity and efficiency, the pig breeding in RRD still met with some great difficulties such as high price of industrial feed, lack of invested fund, restriction of breeding techniques, small scale, lack of market information, many insufficiencies of State assistance policies...

In order to find out the competitiveness of pork in RRD, our study has proposed 3 scenarios. The results showed that with each independent scenario, pork product still has comparative advantages.

From the above-mentioned advantages and restrictions, in order to develop the pig breeding in RRD in direction of commercialized production and make good use of comparative advantages of exported pork commodity, it is necessary to strictly solve the above restrictions.

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