Business model of advanced production system – the case of Pangasius production in the Mekong Delta, Vietnam

Assoc. Prof. Dr. Le Nguyen Doan Khoi
Department of Scientific Research Affairs, Can Tho University

Abstract: **This article aimed to analyze the gaps between advanced production system and small-scale farmers production system in Pangasius industry. Moreover, it considers which measures can be taken to close the gaps and improve quality control at farm level. A financial analysis of the relationship between farming parameters and financial outcomes was presented by conducting a profitability assessment. The result assessed the economic implications of and the reasons for adopting advanced farming practices.**

Keywords: **business model, advanced farming system, profitability assessment**

I. INTRODUCTION

At the current time, by using a advanced farming system, it considers which measures can be taken to close the gaps and improve quality control at farm level. The analysis showed differences in farming practices between the small-scale farmers and the advanced farming model regarding the use of fingerlings, feeds, and veterinary drugs for fish disease treatment; and waste-water treatment pond. Advanced farming sysem fulfilled the quality requirements such as usage of certified fingerlings, certified industrial feeds, waste-water treatment pond and proper disease treatment belonging to an advanced farming system. These quality requirements constitute a challenge for small-scale farmers who are willing to access the export market. A financial analysis of the relationship between farming parameters and financial outcomes was presented by conducting a profitability assessment. The result assessed the economic implications of and the reasons for adopting advanced farming practices.

II. RELATIONSHIP BETWEEN FARMING PARAMETERS AND FINANCIAL OUTCOMES

This one presents a profitability assessment of Pangasius farming investment and operations. The purpose of this section is to develop a business model to assess the profitability of small-scale Pangasius farming. It is important for small-scale farmers to understand how to calculate and clarify the profitability of fish business. Moreover, the operations have to be able to return the capital with profit. It is foreseen that the business model will be a useful management tool for fish farmers to facilitate more market-driven production.

As a test case, small-scale Pangasius farming in the MRD is used. We set up a business model for small-scale Pangasius pond production For determining the costs, a farm of 5000m^2 was considered as a budgetary unit for a period of one year. Sensitivity analyses were done by varying fingerling prices, feed prices, costs of veterinary drugs, stocking density, survival rate, weight of fish, sale prices, and other variables. By doing this, it was possible to study the impact of changing one parameter at the time. The business model was used to calculate financial indicators such as total benefit/year, total cost/year, benefit/cost ratio, and profit/year. These indicators are important in evaluating the profitability of the project.

The case of traditional production system

We assume that the traditional production system (base case) has a pond of 5,000m^2, two crops per year, and no waste-water treatment pond. The main variables in the business model are: pond size, stocking density, survival rate, average weight per fish, crop per year, crop output, selling price, fingerlings price, the FCR, feed price, veterinary cost, and the fraction of the feed cost which farmers have to finance. Based on the data results, the business model profitability is calculated in Table 1

Table 1: The profitability calculations for traditional small-scale production system

Profitability calculations	Case 1a (Base case)	Case 1b	Case 1c	Case 1d	Case 1e	Case 1f
Total benefit/year (VND)	4,308,258,874	4,308,258,874	2,533,549,963	4,483,321,920	4,308,258,874	4,347,256,320
Total cost/year (VND)	3,829,923,489	3,922,555,067	2,302,976,836	4,037,803,874	3,849,471,264	3,849,471,264
Benefit/cost	1.12	1.10	1.10	1.11	1.12	1.13

Cost per kg (break even price) (VND)	11,982	12,271	12,251	12,139	12,043	12,043
Profit per year (VND)	478,335,385	385,703,807	230,573,126	445,518,046	458,787,610	497,785,056

Source: own calculation, 2009

Note:

- Case 1a: Base case for traditional production system
- Case 1b: Base case + use of certified fingerlings
- Case 1c: Base case + use of certified fingerlings + low stocking density
- Case 1d: Base case + use of certified industrial feeds + feeds are financed by low interest rate.
- Case 1e: Base case + use waste-water treatment pond
- Case 1f: Base case + use waste-water treatment pond and higher sale price.

We conducted the changes of one main variable such as certified fingerlings, lower stocking density, industrial feeds and finances, waste-water treatment pond, and sale price in order to study to what degree the smallholder is vulnerable to the actual pattern of farming.

Based on the analysis, we can see that the benefit/cost and profit per year is reduced for all cases except case 1f (with higher sale price) compared with the base case. The same is true for the cost per kg of fish. These results reveal that small-scale farmers have no financial incentive to change their farming practices because this has a negative effect to their profit and unit cost of fish production. The profit and production cost per year are the main problem in this sensitivity analysis. However, with regard to the production costs in case 1c it is reduced with nearly 40% compared with the base case. Feed rations are related to the stocking density and survival rate; as a result, lower stocking density leads to lower feeds used. This confirms that if farmers focus on advanced practices (use of certified fingerlings and lower stocking density) they can reduce costs and the risks of disease outbreak. Costs of feeds are higher than any other item in production. Therefore, the finance for feeds is the most important issue for farmers. A lower price of feeds encourages fish farmers to produce more fish (see case 1d).

Case 1e shows that small-scale farmers are not interested in a waste-water treatment pond because it lowers the profit. If construction of a waste-water treatment pond is combined with an higher the sale price (assumption as 13,600 VND/kg of fish), farmers will consider investing in waste-water treatment pond (in case 1f the profit is greater than in the base case).

However, farmers usually face fluctuations of the sale prices. As the sale price is lower than 11,982 VND/kg of fish, small-scale farmers will loose money (in the case of May, July and August, 2008). Therefore, they will be unwilling to invest in advanced production system.

The advanced production system

This section presents the comparison between the traditional production system and the advanced system which is the advanced production model. Table 2 presents the profitability calculations of the advanced production system.

Table 2 The profitability of the advanced production system

Profitability calculations	Case 1a (Base case)	Case 1g (advanced farming case)
Total benefit/year	4,308,258,874	3,129,840,000
Total cost/year	3,829,923,489	2,425,759,694
Benefit/cost (B/C ratio)	1.12	1.30
Cost per kg (break even price)	11,982	12,301
Profit per year	478,335,383	704,080,305.62

Source: own calculation, 2009.

The calculations show that the B/C ratio is 1.30 which is higher than all other cases. Although the breakeven price is still higher than the base case; however, the profit is greater due to higher selling price (16,000 VND/kg of fish comparing 13,478 VND/kg in survey, 2008) and the total cost of advanced model is lower than the base case as well because the feeds are financed with lower interest rate. However, we have to keep in mind that this only hold true, based on the assumption.

The profit was found to be highly sensitive to change in sale price and feed costs. If the sale price increases due to better quality of fish, farmers get a better profit. Therefore, small-scale farmers will only consider applying the advanced farming practices in case of higher sale price and lower production costs. They need a guarantee to purchase fish with price premium by processing firms.

In summary, small-scale farmers could get a better profit and market access if they change from traditional farming to advanced farming system. However, this takes an investment for purchasing certified feeds, certified fingerlings, certified veterinary drugs, interest rate for loan, and waste-water treatment pond.

III. CONCLUSION

Based on the analysis, we can see that the cost per kg of fish increases for all cases except case 1g comparing with the

reference case. These results reveal that small-scale farmers have no financial incentive to change their farming practices because this has a negative effect on their profit and unit cost of fish production. However, with regard to the advanced farming system, the cost per kg of fish is the lowest. Concluding that the advanced farming practice is attractive the question raises what the farmers think about this alternative

REFERENCES

[1] Binh, T.V, (2009), Analysis of Vietnam's Pangasius industry in transition (1995-2007, PhD thesis, University of Antwerp, Belgium.

[2] Bush, S.R. Khiem, N.T. and Sinh, L.X. (2009), "Governing the environmental and social dimensions of Pangasius production in Vietnam: a review", *Aquaculture Economics and Management*, Vol. 13, No. 4, pp.271-293.

[3] Flavio, C. Smith, S.F. Clausen, and J. (2007), A qualitative assessment of standards and certification schemes applicable to aquaculture in the Asia–Pacific Region, FAO

[4] Khoi, L.N.D. (2007), "Description of the Pangasius value chain in Vietnam*", CAS Discussion paper*, No. 56, Centre for International Management and Development Antwerp, University of Antwerpen, Belgium.

[5] Khoi, L.N.D. Wijngaard, J. and Lutz, C. (2008), "Farming system practices of seafood production in Vietnam: the case study of Pangasius small-scale farming in the Mekong River Delta", *Asean business case studies*, No. 27, Centre for International Management and Development Antwerp, University of Antwerp, Belgium.