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

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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 system 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 5000m² 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 5,000m², 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

<table>
<thead>
<tr>
<th>Profitability calculations</th>
<th>Case 1a (Base case)</th>
<th>Case 1b</th>
<th>Case 1c</th>
<th>Case 1d</th>
<th>Case 1e</th>
<th>Case 1f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total benefit/year (VND)</td>
<td>4,308,258,874</td>
<td>4,308,258,874</td>
<td>2,533,549,963</td>
<td>4,483,321,920</td>
<td>4,308,258,874</td>
<td>4,347,256,320</td>
</tr>
<tr>
<td>Total cost/year (VND)</td>
<td>3,829,293,489</td>
<td>3,922,555,067</td>
<td>2,302,976,836</td>
<td>4,037,803,874</td>
<td>3,849,471,264</td>
<td>3,849,471,264</td>
</tr>
<tr>
<td>Benefit/cost</td>
<td>1.12</td>
<td>1.10</td>
<td>1.10</td>
<td>1.11</td>
<td>1.12</td>
<td>1.13</td>
</tr>
</tbody>
</table>
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 problems 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 lose 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>
<thead>
<tr>
<th>Profitability calculations</th>
<th>Case 1a (Base case)</th>
<th>Case 1g (advanced farming case)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total benefit/year</td>
<td>4,308,258,874</td>
<td>3,129,840,000</td>
</tr>
<tr>
<td>Total cost/year</td>
<td>3,829,923,489</td>
<td>2,425,759,694</td>
</tr>
<tr>
<td>Benefit/cost (B/C ratio)</td>
<td>1.12</td>
<td>1.30</td>
</tr>
<tr>
<td>Cost per kg (break even price)</td>
<td>11,982</td>
<td>12,301</td>
</tr>
<tr>
<td>Profit per year</td>
<td>478,335,383</td>
<td>704,080,305.62</td>
</tr>
</tbody>
</table>


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


