CHAPTER 8

CONCLUSION AND RECOMMENDATION

8.1 Conclusion

Shrimp aquaculture has played an important role in the fishery economic structure of some shrimp producing countries of which Vietnam is considered as a typical representative. Considering the increasing importance of shrimp aquaculture, the Vietnamese Government has established itself as a potentially important shrimp producer in the world. As a result, Vietnam is now among the leading shrimp producing countries.

This study has tried to evaluate and compare economic performance of the two shrimp aquacultural systems, semi-intensive and intensive, in Thua Thien Hue province, Vietnam. The data used in this study consist of two types, which were primary and secondary data. The primary data were collected by interviewing farmers in Phu Vang district. The sample size was 118 observations comprising 68 and 50 observations from the semi-intensive aquacultural system (SSAS) and the intensive shrimp aquacultural system (ISAS), respectively. The cross sectional data for the second crop of the year 2002 were obtained through field survey. The survey was conducted in shrimp aquacultural farms throughout the entire district. Secondary data were collected from the Department of Agriculture and Statistics of Phu Vang district, from the Department of Fisheries of Thua Thien Hue province, and from other official information resources.

To evaluate and compare the systems' performance, the selected performance criteria employed were profitability performance, productivity performance, technical and allocative efficiencies (TE and AE).

The research methods used for achieving the objectives of the study were descriptive statistics, budgeting analysis, and stochastic production frontier.

As regards inputs of shrimp farms, the results revealed that there was not much difference between the human resource characteristics of the farms within the two shrimp aquacultural systems; i.e., education, experience, members of farm households, and farm laborers. On the contrary, there were significant differences between the production inputs and management skills such as training attendance, disease prevention application, stocking density, aquacultural time, water-reserved ponds, feed and fuel. Finally, inputs that could be considered as costs were analyzed and compared. The results showed that (i) feed cost accounted for nearly a half of total cost (49.8%), followed by labor cost, seed cost, pond preparation cost, machine depreciation, pond depreciation, and fuel cost etc. And (ii) all cost items of the ISAS were higher than those of the SSAS.

Total gross return, gross margin and net return were the three selected criteria of profitability performance. The results indicated that the ISAS performed better than the SSAS.

On the topic of productivity performance, there were 8 selected criteria for analysis and comparision: gross total factor productivity (GTFP), net total factor productivity (NTFP), net returns on post larva (NR/PL), net returns on feed (NR/Feed), net returns on labor (NR/Labor), net returns on fuel (NR/Fuel), shrimp yield and FCR. Every criterion was calculated per sao. After testing the significant difference between the means of every criterion, the results reveal that net return on post larva (NR/PL) of the SSAS was better than that of the ISAS while shrimp yield and FCR of the ISAS was better than those of the SSAS. Other criteria were not statistically different.

The relationship between shrimp yield and all inputs used was also analyzed with the support of production frontier. The estimation of the production frontier of the ISAS showed that pond preparation cost and feed play important roles in

explaining the variation of shrimp yield. On the other hand, in the SSAS, the important factors explaining the variation of the yield were fuel, disease prevention cost, feed, density and the distance from the lagoon to the shrimp aquacultural ponds.

There was high variation in technical efficiency within the ISAS as compared to the SSAS. In the ISAS, the distribution of TE for the farms within the system was closely clustered in the group of very high TE (0.8001 to 1.0000). However, for farms within the SSAS, the distribution was rather equally clustered for three groups of medium (0.4001 to 0.6000), high (0.6001 to 0.8000), and very high (0.8001 to 1.000) TE with 25%, 28% and 38.2%, correspondingly. It implied that there was more variation in TE within farms in the ISAS than in the SSAS. The average mean of the TE of the ISAS (79.48%) was higher than that of the SSAS (69.67%) owing to the high percentage (60%) of the very high TE group (0.8001 to 1.0000) of the ISAS.

Shrimp pond area had significant positive influence on TE of the ISAS indicating that farms with a larger area tend to be more technically efficient (reflecting economics of size). Experience and education also had significant positive influences on TE of shrimp farms within the SSAS and the farms with higher educated heads are more technically efficient in shrimp aquaculture.

Finally, allocative efficiency analysis was applied. The results of analysis showed that no variable input was allocated efficiently. All variables inputs were either under- or over-used by farmers of the two shrimp aquacultural systems. Particularly, fuel, feed, seed and disease prevention in the SSAS were under-used. Similarly, fuel, feed, and materials pond preparation in the ISAS were under-used, too. In contrast, labor and materials for pond preparation in the SSAS, seed, labor and materials for disease prevention in the ISAS were over-used. The reasons for under-utilization can be: (1) In shrimp aquaculture, aquaculturists know that risk to shrimp is higher as compared to other products (diseases, floods, storms, etc.). Consequently, farmers do not dare to invest much. Or (2) Farmers consider input prices relatively high, so they could not afford sufficient quantities. As a result, that input is not used to the optimal point. In terms of input over-utilization, the reasons could be: (1)

Farmers do not understand clearly the aquacultural techniques, characteristics of each development stage of shrimp, characteristics of inputs and so forth. Thus, they invest more than the optimal level. (2) Farmers are optimistic and they could think that "to invest more is to gain more". Accordingly, inputs can be used over the optimal level.

In addition, the findings of analyzing the shrimp aquacultural systems showed that in the ISAS, disease was more severe than in the SSAS. The conflicts between aquaculture and aquaculture, aquaculture and agriculture, aquaculture and fishery, and aquaculture and environment were the problems in the lagoon region.

8.2 Recommendation

From the findings, farmers should be made aware that intensive shrimp aquaculture is more profitable than semi-intensive shrimp aquaculture. However, intensive shrimp aquaculture needs higher investment. Additionally, shrimps reared in the ISAS are more prone to disease infection as compared to the SSAS. Consequently, that can lead to significant loss for the farmers. Hence, if farmers are risk takers, have enough money and good knowledge of shrimp aquaculture, they can choose intensive shrimp aquaculture.

To reduce technical inefficiency of the SSAS, it is recommended that education and experience of the farmers should be enhanced. In addition, the technical inefficiency of the ISAS can be reduced by increasing the pond area.

In order to maximize profit at prevailing prices, on the average, the farmers within the two shrimp aquacultural systems need to use inputs efficiently and allocatively. Regarding the SSAS, to obtain allocative efficiency and to enhance the shrimp yield per sao ($500m^2$), aquaculturists are encouraged to use more fuel, feed, seed and disease prevention materials. On the contrary, it is suggested that labor and materials for pond preparation should be reduced. Concerning the ISAS, over utilization of seed, labor and disease prevention and under utilization of fuel, feed and pond preparation led to allocative inefficiency. Hence, shrimp aquacultural farmers

should be advised to reduce seed, labor and cost of disease prevention and in contrast, to use more fuel, feed and spend more money on pond preparation. However, in the future when output and input prices change, extension officers should consider new optimal levels before they recommend to aquaculturists.

8.3 Further research recommended

The findings of the study help understand that distance significantly affect shrimp yield. The two shrimp aquacultural systems in the lagoon, traditional extensive and improved extensive, are recommended to be reorganized soon if disease contamination from farm to farm is found (further research is needed).

As discussed in the methodology of the study, there are a lot of performances of the systems mentioned by McConnell and Dillon (1997). Among those systems' performances, environmental compatibility, sustainability, stability and others are also very important to study. However, this study has merely focused on economic performance of the systems. That is why the studies of other performances would be highly recommended.