International Business Management 10 (19): 4665-4669, 2016
ISSN: 1993-5250


# Managerial Behavior Change of Marginal Pond Farmers Through Phronima "SUPPA" Field School

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**Abstract:** Since 1998, shrimp ponds in Indonesia have not been normally productive because of an outbreak of WSSV and *Vibrio harvey*. That management and technical areas do not comply with the rules of environmentally friendly farming has also contributed to the fatalities and massive harvest failure. To overcome this problem, *Phronima Suppa* (*Phronima* sp.), endemic organisms in Tasiwalie village, district of Pinrang has been developed since 2005. The research aimed to synthesize the field school learning model and analyze its impact on managerial behavior change, production increase and income of the school participants utilizing the advantages of *Phronima Suppa*. The study was conducted in Tasiwalie and Wiringtasi village from March to November 2015. The data was collected through observation and in-depth interviews. The synthesis of the field school model was obtained from 166 respondents and the impact of the school was informed by 25 people. The research outcome indicates that the learning methods go with the farmers' technology mastery level (39.68%), the material is directly demonstrated (23.81%) and discussed (21.90%) in the field, the curriculum contains acquisition of quality juveniles (45.57%), disease is prevented (53.44%), ponds are well-prepared (28.13%), the phronima stock is developed (54.63%), local resources are empowered (34.19%) and suitability for the export quality standard is maintained (37.67%). Now that those farmers have attended the school, they are already able to improve their managerial behavior quality and increase the production of tiger shrimp (244±71 kg/ha/season) and revenue (IDR 17.84±4.61 million/season) which is quite significant ($p<0.05$). This is absolutely better than what they achieved before attending the school. Their participation in the school has succeeded in changing their managerial behavior as well as increasing production and income of their marginal ponds. This proves that the field school learning model has effectively improved productivity of marginal pond areas.

**Key words:** Managerial behavior, marginal pond, tiger shrimp, *Phronima Suppa*, field school

## INTRODUCTION

Over the last 20 years, Indonesia's tiger shrimp (*Penaeus monodon* Fabricius) industry has been infected with White Spot Syndrome Virus (WSSV) and *Vibrio harvey*. The pathogen outbreak has caused a decline in the environmental carrying capacity and poor managerial behavior of shrimp farmers. The Tasiwalie shrimp farmers' poor managerial behavior has impacted on the extent of marginal ponds area and idle ponds in Pinrang (Fattah and Saenong, 2014). It is estimated that the losses due to the disease are >USD 300 million or >IDR 3 quintillion annually.

South Sulawesi has been the centre of tiger shrimp development in Indonesia with a major area in Minapolitan area in Tasiwalie and Wiringtasi village, Suppa, district of Pinrang (Fattah *et al.* 2014). In 2005, *Phronima Suppa* (*Phronima* sp) population which is endemic in waters and ponds in these 2 villages was discovered. This phronima which is a kind of micro-crustaceans originating among the phronima genus is not available outside the villages. Its existence became a preliminary indicator for farmers in Pinrang to estimate the success of tiger shrimp farming in areas being infected with WSSV viruses and *V. harvey*.

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The application of *Phronima Suppa* has successfully stimulated the production of tiger shrimp in this district. The average production of ponds that do not use this phronima is only 50.63±24.27 kg/ha/season, lower than the production of those with the application of this phronima which is 285 44±88.02 kg/ha/season. The replication of this phronima application widely requires learning process for effective and appropriate technology transfer. Land management and ponds with the application requires technical and managerial approaches (Fattah *et al*., 2015).

To accelerate the increase of sustainable production of tiger shrimp, pond farmers can learn the process at the Phronima "Suppa" Field School. This field school offers an informal learning process for the farmers to improve their knowledge and skills in recognizing and developing local potentials, the application of environmentally friendly technologies and sustainable business. This study aimed to synthesize a learning model at the school and analyze the pond farmers' changes in managerial behavior and impact of the learning on production and income of marginal ponds utilizing the advantages of *Phronima Suppa*.

**Literature review:** The concept of sustainable development is to integrate economic and ecological perspective (WCED, 1987). Sustainable development, according to FAO (1995) in the context of fisheries resources management is based on the management and conservation of natural resources as well as the orientation changes in technology and institutions in the effort to meet needs of the present generation without considering needs of next generation. In general, the main issues in aquaculture development planning are the right technology, how to minimize the environmental impact, how to maintain environment carrying capacity, how to minimize disease, how to maximize value of production and how to reduce poverty (Nautilus Consultants, 2000). Indonesia's export performance would be severely impaired if its export industries do not meet the requirements in line with increasing consumers' demand for quality assurance on fishery products marketed as the implementation of agreed global markets Hazard Analysis Critical Control Point (HACCP) which includes site selection, seed selection, procedures of production, water management, harvesting, post-harvest handling and sanitation procedures for the implementation.

Based on the assessment (scoring) result, the Tasiwalie fish farmers' score in managerial behavior was 19 (bad category) (Fattah and Saenong, 2014). The learning process was managed by the community by utilizing facilities available in it and emphasized the importance of community participation in each learning activity to meet their needs. The field school model was to get the farmers improved in line with the concept of skill-based constructivism and community-based school. This was in line with the paradigm of community-based education applying technology based on the real condition in community. The community-based education is an educational process based on people's lives.

## MATERIALS AND METHODS

**Location and time:** The study was conducted in Tasiwalie and Wiringtasi village from March-November 2015.

**Data collecting technique:** The study was conducted in two stages; the synthesis of the field school model and the analysis of the school implementation impact on farmers' managerial behavior as well as their production and income increase. The data collecting was based on observation and in-depth interviews. The respondents were purposively elected. The synthesis of the field school model was based on information from 166 respondents, while the impact of the school was informed by 25 participants.

**Data analysis:** The data was analyzed through both descriptive and quantitative approaches. Quantitative analysis was conducted to the significant test level of the field school model and the impact of the field school implementation on changes in managerial behavior, increase of production and ponds farmers' income.

**Field school model :** The analysis of teaching methods and curriculum applied the chi-square (Walpole, 1982) analysis:

$$\chi^2 = \frac{(\rho - h)^2}{H}$$

Where:
$\chi^2$ = Chi-square value
$\rho$ = Degrees of freedom
H = Half of respondents number

The chi-square analysis shows the relationship between the two variables continued with contingency test as follows:

$$C = \sqrt{\frac{\chi^2}{\chi^2 + n}}$$

Where:
C = Contigency
$\chi^2$ = Chi-square value
n = Number of samples

**Managerial behavior change:** Changes in managerial behavior were calculated based on the following equation:

$$M = a(X_1) + b(X_2) + c(X_3) + d(X_4)$$

Where:
M = Managerial behavior
$X_1$ = Target
$X_2$ = Planning
$X_3$ = Decision
$X_4$ = Control
a-d = Score any management functions

**Increase of production:** To determine the increase of production after attending the field school, these two different tests were given:

$$t = \frac{\bar{X}_{pr2} + \bar{X}_{pr1}}{s\sqrt{\frac{1}{n_2} + \frac{1}{n_1}}}$$

Where:
t = Two different test
$X_{pr1}$ = Production before attending the field school
$X_{pr2}$ = Production after attending the field school

**Increase of revenue:** To determine the increase of revenue after attending the field school, these two different tests were given:

$$t = \frac{\bar{X}_{rv2} + \bar{X}_{rv1}}{s\sqrt{\frac{1}{n_2} + \frac{1}{n_1}}}$$

Where:
t = Two different test
$X_{rv1}$ = Revenue before attending the field school
$X_{rv2}$ = Revenue after attending the field school

## RESULTS AND DISCUSSION

The respondents suggest learning methods in the field school (Table 1) and learning curriculum content (Table 2). The test results show variable statistics differ significantly ($p<0.05$). Most of the respondents (39.68%) propose that the learning method at the field school is adapted to technological mastery. Teaching material is delivered in the form of direct practice (23.81%) and discussions carried out directly in the field (21.90%). 14.60% of respondents suggested the demonstration and field practice.

Table 1: Learning method

| Description | Frequence | Percentage |
|---|---|---|
| Adapted to technology mastery | 125 | 39.68 |
| Directly practiced materials | 75 | 23.81 |
| Field discussion on the materials | 69 | 21.90 |
| Demonstration and direct practice | 46 | 14.60 |
| Total | 315 | 100.0 |

Table 2: Freight field school curriculum

| Description | Frequency | Percentage |
|---|---|---|
| Phronima stock development | 124 | 54.63 |
| Disease prevention | 140 | 53.44 |
| Quality juveniles availability | 97 | 45.57 |
| Export quality standard fulfillment | 84 | 36.67 |
| Local resources utilization | 80 | 34.19 |
| Ponds drying | 72 | 28.13 |

Data after processing

Table 2 shows recapitulation of curriculum suggested by the respondents. All variables are significantly different ($p<0.05$). Most of the respondents (54.63%) propose the development of the *Phronima Suppa* stock as a top priority in the field school curriculum. *Phronima Suppa* development is expected to become the main material studied to increase production and revenue of farmers.

Another learning material needed by farmers is related to prevention and control of diseases of tiger shrimp in marginal ponds. The main priorities of the learning materials in the field school are an ordinance of shrimp disease prevention (53.44%), the acquisition of quality juveniles (45,57%), the export quality standards fulfillment (36.67%), utilization of local resources (34.19%) and ponds drying (28.13%).

Table 3 shows the impact of the learning on marginal ponds farmers. Managerial behavior of pond farmers in 2003 was in bad category (Fattah and Saenong, 2014) and it became better 2015. Learning at the school field and internalizing personal experiences of farmers have contributed accumulated knowledge and skills to manage marginal ponds, encouraging change in managerial behavior of marginal ponds farmers. Significant advancements in managerial behavior result in the aspect of production targets. In 2003 the tiger shrimp production reached 72±7 kg/ha/season with a survival rate of 19±2%. Now, it has increased to 244±7 kg/ha/season with a survival rate of 66±19% (Fig. 1). Other managerial aspects of the planning, decision-making and control are relatively no significant changes.

Table 3: Development of managerial behavior before and after the field school attendance

| | | | | Year | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2003 | | 2015 | |
| Management functions | Factual condition 1 (2003) | Ideal condition | Quality | Score | Value | Score | Value |
| Target | Production of 72 kg/ha/season<br>Survival rate: 19% | Production of 400 kg/ha/season<br>Survival rate : 80% | 1 | 1 | 1 | 3 | 3 |
| Planning | Stocking density: 15.000 juvenile/ha<br>Partial system<br>Water not processed | Stocking density: 20.000 juvenile $ha^{-1}$<br>Integrated system<br>Water processed | 4 | 2 | 8 | 2 | 8 |
| Decision making | Drying : 5 days<br>Saponin: 100 kg $ha^{-1}$<br>Kaptan: 8 kg $ha^{-1}$<br>Urea: 100 kg $ha^{-1}$<br>TSP: 100 kg $ha^{-1}$<br>Without compost | Drying : 30 days<br>Saponin : 15 ppm<br>Kaptan: 1 ton $ha^{-1}$<br>Urea : 300 kg $ha^{-1}$<br>TSP : 150 kg $ha^{-1}$<br>With compost: 750 kg $ha^{-1}$ | 3 | 2 | 6 | 2 | 6 |
| Controling | Control system unclear | Control system clear | 4 | 1 | 4 | 1 | 4 |
| Total | | | | | 19 | | 21 |

Very good = 5; good = 4; poor = 2; very poor = 1; very developed = 40.5-50.0; developed = 20.5-40.0; bad = 10.5-20.0; very bad = <10

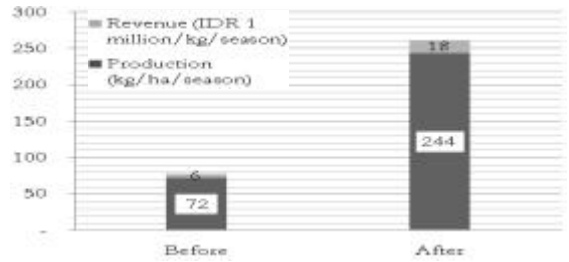


Fig. 1: Production and income before and after attending the field school

Farmers' production and revenue before and after attending the field school are presented in Fig. 1. Production before the attendance was 72±7 kg/ha/season and production after the attendance was 244±71 kg/ha/season. After the attendance, the production increased significantly ($p<0.05$), compared to that before the attendance. After the 3 months participating in the learning field school, the farmers' tiger shrimp production increased to 244±71 kg/ha/season.

Production reached by the field school participants was still lower than that reached by the demonstration pond (285.44±88.02 kg/ha/season) with 61.54±10.36% survival rate and the 39.67±0.71 tiger shrimp size with Phronima suppa application for 47.00±2.12 days (Fattah *et al*., 2014). The production of field school participants could be enhanced by the whole *Phronima Suppa* application and continuity of guidance for the farmers in the field school.

The farmers revenue increased to IDR 17.84±4.61 million/ha/season, higher than that reached before the field school attendance (IDR 6.20±1.57 million/ha/season) (Fig. 1). Income of the farmers has increased significantly ($p<0.05$), higher than what they reached before attending the field school.

The increasing production of tiger shrimp in the marginal ponds should be followed by fulfillment aspects of efficiency and competitiveness in the global market and therefore contributes directly to farmers' income increase. The learning in the field school should be conducted continuously with the materials as presented in Table 2.

## CONCLUSION

The learning methods in the field school adapted to the advanced level of technology by the farmers and the materials learned can be applied directly. The problems occuring during the production process a solution found through field days on an ongoing basis. The field school curriculum in marginal ponds prioritizes the acquisition of quality juveniles, procedures for the prevention of disease, draining ponds, *Phronima Suppa* stock development, utilization of local resources and the fulfillment of export quality standards. Participation in field school succeeds in changing the managerial behavior of farmers as well as increasing marginal ponds farmers production and revenue.

Using the field school learning model is effective in improving the productivity and revenue of farmers in marginal pond areas. The learning process in the school utilizes the facilities available in the community and emphasizes community participation and the learning output is used to respond to the problems and needs of the community.

## ACKNOWLEDGEMENTS

Researchers would like to express our further thanks to the Pinrang regent, who has provided us with research funding and facilities with this could be accomplished. Our thanks also goes to the pond farmers, who actively participated in this research and the field school.

## REFERENCES

FAO., 1995. Code of Conduct for Responsible Fisheries. FAO., Rome, pp: 41.

Fattah, M.H. and M. Saenong, 2014. Production of endemic microcrustacean *Phronima Suppa* (Phronima sp) to subtitute Artemia salina in tiger prawn cultivation. J. Aquacult. Res. Dev., Vol. 5.

Fattah, M.H., Asbar and S.R. Busaeri, 2015. Dynamics of endemic habitats microcrustacean *Phronima Suppa* (Phronima sp.) as determinants of artificial production development. J. Life Sci. Technol., 3: 26-31.

Fattah, M.H., S.R. Busaeri, T. Sabir and A.S. Atjo, 2014. Marginal pond farmers empowerment through *Phronima Suppa* (Phronima sp) development. Ministry of Marine Affairs and Fisheries Republic of Indonesia, Jakarta, pp: 13.

Nautilus Consultants, 2000. Planning for Coastal Aquaculture Development: A Training Course Handbook. Nautilus Consultants, Edinburgh, UK.

WCED., 1987. Our Common Furture. Oxford University Press, Oxford.

Walpole, R.E., 1982. Introduction to Statatistics. 3rd Edn., MacMilllan Publishing Co., Inc., New York, Pages: 510.