

VERIFICATION OF SEMI-INTENSIVE SHRIMP CULTURE TECHNIQUES: VIETNAM

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Project Site: Phulong Commune, Cathai District, Haiphong City, Vietnam

BACKGROUND

Vietnam has about 260,000 ha devoted for shrimp culture in early 1999. The total production was estimated at about 80,000 tons in 2000, so that productivity was about 300 kg/ha only. In 1990–1997, vast areas of mangroves were destroyed by many fish farmers for conversion into shrimp culture ponds. The Vietnam Government and local authorities have been trying to mobilize and educate farmers for them to refrain from destroying mangroves for shrimp culture; and at the same time promote increased shrimp productivity/ha in order to increase profit; and generate employment without necessarily destroying the mangroves.

Cathai is an island district in north Vietnam with 12 communes in two islands, Catba and Cathai. Phulong Island in Catba Island, has the largest mangrove area. Before 1990, the total mangrove area of Phulong was about 2000 ha but in 1998 only about 1200 ha remained, because about 800 ha had been converted into shrimp ponds.

However, due to lack of technology in shrimp culture especially the semi–intensive pond culture, production ranged from 200 to 300 kg/ha/crop, while in extensive ponds, production was only 50–70 kg/ha/year. Local authorities and the people of Phulong have been expecting to increase productivity from shrimp culture. Using the mangrove-friendly shrimp technology modeled by the Philippines and Thailand, the objective of the semi–intensive shrimp pond culture activity in Vietnam is to obtain 1000–1500kg/ha and to develop a model for an improved shrimp culture system.

In the Memorandum of Agreement signed between the Ministry of Fisheries and the Southeast Asian Fisheries Development Center for the implementation of the Project in Vietnam, the Research Institute for Marine Products (RIMP) in Haiphong was chosen to carry out the demonstration activity focusing on the semi–intensive mangrove-friendly shrimp culture in Phulong, Cathai District, Haiphong, Vietnam. The ponds used for the Project had a total area of about 6.0 ha. Construction of the pond facilities following the Project’s scheme was completed in December 1999.

OBJECTIVES

1. To develop a model of semi–intensive shrimp culture with a production of 1500 kg/ha/crop;
2. To demonstrate the growth, survival and production rate of shrimp in semi–intensive ponds with mangroves; and
3. To establish a culture model (target species, culture technology) that can effectively increase production from improved extensive shrimp culture in protected mangrove areas.

PROJECT ACTIVITIES

The Project involved the rehabilitation of an existing pond in the area, 2.0 ha for semi-intensive culture and 4.0 ha for improved extensive culture systems. In the two semi-intensive ponds (7500 m² and 8600 m² water surface), pond I was 3000 m² with mangroves, while pond II had no mangroves. Productivity from the semi-intensive pond was 1500 kg/ha/crop. The results of the activity are summarized as follows:

1. Shrimp Culture (2000)		
	<i>Pond I</i> (With mangroves)	<i>Pond II</i> (Without Mangroves)
A. Technical data		
Area	7500 m ² (4500 in Canal, 3500 m ² in forest)	8600 m ²
Stocking	80,000 PL 25	13,500 PL 25
Stocking day	19/6/2000	19/6/2000.
Harvest day	24-29/9/2000	24-29/9/2000.
Survival rate (%)	51.87	36.4 (55.87 including 200 kg of dead shrimps at the bottom)
ABW (g)	14.72	17.90
Biomass (kg)	610.92	878.45 (+ 200 kg = 1078 kg)
Average Price (VND)		76.696 ® 80.002 ®
Gross sale (VND)		46.885.000 ® 70.300.000 ®
B. Harvest summary		
Good	583.92	870.45 kg
Super soft shell	2.0	3.0 kg
Under size	20.0	0
Reject	5.0	5.0 kg
Dead in bottom		200 kg (Estimated)
Production/ha/crop		814.5 kg 1245.0 kg

1. Shrimp Culture (2000)

Through the Project, it was the first time for Phulong farmers to obtain shrimp production of 1245 kg/ha/crop, which was a four-time increase in the average culture productivity at the said site. However, since the intake of water is from the sea, investment was more expensive so the profit was not much; i.e.; in pond I with mangroves the profit was 754,000 VND, while in Pond II without mangroves the income was only 5962 VND, amortization not included. At one point, the culture was stopped on 20/9/2000 because the shrimps were dead in the bottom of Pond II. In fact, during harvest, many shrimps were dead in the bottom of Pond II (200 kg estimated).

Mangroves in Phulong are small trees and their growth is so dense, so shrimp could not live in 3000 m² mangroves. In the pond with mangroves, the pH was always <7.0, water quality was bad; the size of shrimp was small, selling price of shrimp from the pond without mangroves was lower. In the improved extensive pond there was lack of nutrients for a long time so the mangroves die. After the culture, the remaining trees did not grow and were still very small.



Shrimp harvest from Project in 2002. *P. monodon* (left) and *P. vannamei* (right)

2. On-Site Training (2000)

The technology has, however, been considered promising so that requests for on-site training were received. In 2000, 29 farmers participated in three on-site training courses conducted. The session on pond preparation and treatment of new ponds had 10 participants; the training on quality of post larvae, transport and stocking had 10 participants; and the training course on management and harvest technology had 9 participants.



Mangroves, in Pulong: short and dense



Semi-intensive ponds; with mangroves (right) and without mangroves (left)

3. Shrimp Culture (2001)

Stocking in 19/3/2001 was at 20 pcs/m² for semi-intensive and 5 pcs/m² in improved-extensive. Before stocking, juveniles without white spot syndrome and MBV were chosen. The juveniles developed normally until 30/4 but after 3 days, there was mass mortality. White spot started in many neighboring ponds and was believed to have transmitted to the ponds of the Project. The remaining water in the Project pond was then chlorinated at 200 ppm.

Phase II stocking was done on 10/6 at density of 15 pcs/m², depth of water was 1.2–1.5 m, 100% CP feeds was used. Shrimps were normal but suddenly mass mortality occurred from 12/8. Mortality also occurred in the improved-extensive pond then mass mortality followed 1-2 days in the semi-intensive ponds.

Climate in North Vietnam was unusual in 2001. Normal, low temperatures stopped during the end of April. In May 2001 the temperature was low and there was heavy rain. The year 2001 was the rainiest in North of Vietnam in 15 years. Almost all shrimp culture ponds around the area had water depth of below 1.0 m but the condition of the environment changed rapidly. Fry quality was bad so the shrimps died even if the project protocol for shrimp pond culture was followed. All activities in 2001 had to be terminated.

4. On-site Training (2001)

In spite of the unsuccessful run, 25 farmers participated in the on-site training courses conducted at the Project site. The training on pond treatment, repair and reconstruction had 12 participants, while the on pond treatment after white spot disease had 13 participants.

5. Shrimp culture (2002)

	Pond 1 (1000 m² mangrove)	Pond 2
A. Technical data		
Area (m ²)	7500 (1000m ² mangrove)	8600 m ²
Stocking day	June 10 th	May 24 th
Stocking	120.000	90.000
Species	<i>P.vannamei</i>	<i>P. monodon.</i>
Harvest day	October 8th	September 10 th
Culturing time	120 days	100 days
Survival rate (%)	43.8	39.51
WBV (g)	21.3	29.3
Biomass (kg)	1120.0kg	1042.0
Average Price/kg (VND)	61,000VND	65,00 VND
Gross sale (VND)	68,320,000.00	67,730,000.00
Production/ha/crop/year	1493.3	1302.50
B. Harvest summary.		
Good (kg)	1082.50	1027.20
Super soft (kg)	3.5	2.8
Under size (kg)	27.0	6.0
Reject (kg)	7.0	6.0
C. Operating cost (VND)		
Fry	4,500,000.00	3,500,000.00
Feeds	19,310,000.00	18,296,000.00
Salary, overtime fee	8,400,000.00	12,600,000.00
Chemical	1,000,000.00	1,000,000.00
Lime	350,000.00	350,000.00
Chicken manure	650,000.00	650,000.00
Fuel.	8,700,000.00	6,700.00
Amortization.	10,000,000.00	10,000,000.00
Others	2,000,000.00	-
Total	54,919,000.00	53,096,000.00
Net profit.	13,410,000.00	14,634,000.00

6. Mangrove Extensive Culture

Mangrove area: 4.0 ha as biofilter and settlement pond was stocked with 500 pc grouper.

Number of Grouper	500
Size of Fry	10 cm.
Price of Fry (VND)	10,000,000. (5,000,000.00 for 500 pc)
Number of Fish	294
Average harvest weight	518 gm
Price/kg (VND)	110,000,000
Gross sale	16,752,000.00
Other operating cost (Estimate)	5,000,000.00
Net Profit	6,752,000.00
Total net profit of Project	34,796,000.00

7. On-site Training (2002)

A total of 34 farmers were trained

- 1) First group: Training on treatment, repair and reconstruction of ponds after 2 years culture had 12 participants.
- 2) Second group training on quality of post larvae of *P. monodon* and *P. vannamei*, transportation and stocking: 11 participants.
- 3) Third training course on management of shrimp farm and white shrimp culture: 11 farmer participants

RECOMMENDATIONS

1. Although white spot caused heavy mortality on shrimps in 2001, results of 2002 and 2003 proved that the Project was successful. This technology should be promoted in order to achieve a productivity of about 1500kg/ha/crop.
2. Ponds with mangroves (dense as in Phulong) could not culture shrimp adopting the semi-intensive system with high productivity of 1500kg/ha/crop. If water is retained at 1.2-1.5 m, the trees would die. Therefore, the semi-intensive system should be adopted in areas without mangrove areas.
3. With mangroves, improved-extensive culture could be adopted but pens should be used for the free flow of water according to the tide.
4. The Project serves as a model and the Cathai District authority would like to encourage pond owners to invest in order to improve and upgrade their shrimp productivity and at the same time preserve the 1200 ha area of mangroves.
5. The successful culture of white shrimp (*P. vannamei*) confirmed the capability of the development of the culture of news species, and hence may be promoted.
6. In semi-extensive, we could culture many fishes, i.e. grouper, crab, in order to gain economic effectively and diversity of products.
7. The Project should continue organizing training courses on-site for the farmers to learn the techniques that would enable them to build, improve, culture, harvest aquatic species and at the same time preserve the mangroves.

EXPANDING THE PROJECT: (MULTIPLIER EFFECT)

Based on the results of the project, nine (9) pond owners near the Project site area and many pond owners from another commune and other rural districts have learned the protocol used in the Project. Therefore, the Government of Vietnam decided to invest 100 ha for industrial culture (productivity 4-5 tons/ha) in the area without mangroves in Phulong in order to create jobs, raise the living standard of the people and contribute in the protective use of mangroves.



Semi-intensive shrimp pond with water flowing through a pen (left) and shrimp harvest from the Project ponds in 2000 (right)