

Status of *P. Vannamei* Aquaculture in the Philippines

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1. OVERVIEW OF SHRIMP CULTURE INDUSTRY

Shrimp industry in the Philippines refers only to *P. monodon*, the only penaeid species being exported abroad. It is grown almost all over the country from Northern Luzon to Southernmost part of Mindanao. The culture of tiger prawn locally known as “sugpo” started as a secondary species since only small quantity could be harvested with milkfish. Although growing of this shrimp could be as old as milkfish, it was only in 1951 when it was considered as primary species. Dependent on seed stocks from the natural wild fry, it is on this year when the first propagation of *P. monodon* in brackishwater grow out pond was documented. Its full commercialization, however, was realized in the 1980’s where it had to wait for the hatchery technology in order to meet the national production demand. Below is the development history of the tiger prawn industry in the Philippines.

1.1 Milestones of the Shrimp (*P. monodon*) Industry in the Country

- 1960-1980 - Philippines was one of the pioneers in shrimp farming
 - Extensive method of production was introduced
 - Shrimp farming was fry dependent on the wild
 - Annual production is far below 5,000mt
- 1980-1989 - SEAFDEC AQD promoted breakthroughs on hatchery production
 - Shrimp farming became a significant industry
 - Semi-intensive and intensive farming was introduced
 - Japanese market absorbed 80% produced in Asia
- 1990-1995 - Japanese market collapsed
 - A start up or development period
 - development /import of technology (from Taiwan)
 - Production increased rapidly due to increased number of pond areas
 - rapid growth/attracted more investors
 - Government support and financing no longer a problem
- 1996-1999 - The “boom and bust” period
 - Industry stabilizes to a certain level and then declined to the extent of collapse due to outbreak of diseases
 - Shrimp production continue to decrease
- 2000 to present - verification runs on shrimp culture conducted by SEAFDEC AQD using environment-friendly protocol under different climatic conditions
 - SEAFDEC AQD started to respond to the requests of private sectors for on-farm technology transfer/demo
 - Philippine shrimp production gradually increases from 34,627 mt in 1999 to 42,390mt in 2001

1.2 Production, Yield and Export/Import

Black tiger shrimp production peaked in the 80’s and started declining in the 90’s (Fig. 1). The main culprit in the collapse of the shrimp industry in the early 90’s was the widespread occurrence of bacterial

diseases such as vibriosis, luminous bacterial (Lumbac) infections, white spot syndrome (wss) which were all attributed to environmental degradations. Because of this, prawn growers lost heavily after several failed runs.

The biggest share in tiger prawn production in aquaculture came from brackishwater fishpond. Minimal contribution was recorded for marine fish cage and marine fish pen (Table 1). The increasing trend from 1998 to 2001 was due mainly to the shifting of milkfish growers to tiger prawn culture because of its rising demand, both at domestic and foreign markets. In 2002, production however registered to a record low of 12.79 % decrease due to poor quality of post larvae resulting to high mortality rate brought about by “Lumbac” coupled with the erratic high salinity of water and hot temperature that slowed down the growth of tiger prawn presumably as an effect of the El Niño.

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The top five producing provinces for the last five years in terms of volume were Pampanga, Zamboanga del Sur/Sibugay, Lanao del Norte, Bataan and Bohol (Table 2 and Fig 2). Meanwhile the combined share of the top five producing provinces to total tiger prawn production was 78.52% in 2002 (Fig 3). From 1998 to 2002, total harvested area of tiger prawn declined from 87,872 to 77,172 ha or by an annual average of 3.2 percent primarily due to high production cost. However, in Pampanga (from 29,297 in 1998 to 30,225 in 2002) and Zamboanga del Sur/Sibugay (from 20,231 in 1998 to 24,417 in 2002), there was an increasing trend (Table 3). The other provinces (Lanao del Norte and Bohol) recorded moderate decreases of 1.03 percent an 4.55 percent, respectively in 2002 Fig 4).

From 1998 to 2001, the annual average yield per hectare of tiger prawn grew from 0.42 MT to 0.51 MT. It decreased by 9.8 percent to 0.46 percent in 2002. Pampanga, Lanao and Bataan showed increasing yields per hectare from 1998 to 2001 but declined slightly in 2002 due to poor quality of post larvae. Bohol had the highest yield of 1.0 MT/ ha from 1998 to 2000 but it decreased to 0.84 and 0.93 MT per ha in 2001 and 2002, respectively. Pampanga, which ranked number one among the top five provinces, remarkably recorded a negative growth rate of 38.57 percent in yield (Table 4 and Fig. 5).

The average farm gate price of tiger prawn at P286.51 per kilogram in 1999 was down by 4.1 percent from the 1998 price. However, farmgate price soared in 2001 and 2002 to P334.17 and P348.14, respectively. On the other hand, retail prices of tiger prawn posted an upward swing from P310.83 per kilogram in 1998 to P360.55 in 2002. The highest growth rates both at farm and retail prices were noted in 2001 at 6.21 percent and 17.12 percent, respectively. Meanwhile, farmgate-retail price margins for the last five years ranged from P12.15 in 1998 to P12.41 per kilogram in 2002. Price margins were higher in 1999 and 2002 at P31.39 to P39.30 per kilogram, respectively.

The volume of shrimps and tiger prawn exported from 1998 to 2002 exhibited an upward movement. Exports rose by about 33 percent in 2002 compared with 2001. An average growth rate of 12.83 percent was registered during the last five years. Japan, whose share to the total export was about 52 percent, reduced their purchase by less than 1.0 percent in 2002. Likewise, exports to the USA went down by about 24 percent. These decreases were more than offset by the combined exportation of shrimps and tiger prawn to Korea, Hong Kong, Guam and other countries which went up by almost 229 percent in 2002 against 2001 resulting in an overall increase of 32.6 percent (Fig. 6). Similarly, the 2002 export value of shrimps and tiger prawn grew by 12.02 percent compared with 2001. Export earnings had an annual growth rate of 2.56 percent.

The country’s importation of shrimps and tiger prawn was less than one percent of its exports in 1998 to 2001. However, the import volume and value of shrimps and tiger prawn abruptly increased in 2002 and the trend is going upward although the ratio of import to export remained low. Importation went up and augmented domestic supply. Lower world price also encouraged importation. China, the number one source of our shrimps and tiger prawn imports in 2002 sold 1,285 MT (in frozen form) to the Philippines. During the year, shrimps and prawns were also sourced from Thailand, Singapore, Taiwan, the USA and other countries. The country imported 144MT from Thailand, 44MT from Singapore, 16 MT from Taiwan and 4 MT from USA. About 85 MT were sourced from other countries.

1.3 Problems in the Industry

1.3.1. The major losses that devastated the shrimp industry were:

- Reduction of culture area from 47,776 has in 1992 to 36,658 has in 1993;
- Reduction in the number of shrimp processors and exporters from 53 in 1992 to 18 in 1995; and
- Our country that produced about 90,000MT to 100,000MT lost the 4th slot in the world producers of shrimp which means billions of pesos.

1.3.2. Other Constraints in the Shrimp Industry

- Many shrimp producers are not yet ready to invest huge amount of capital to adopt the environment-friendly shrimp culture;
- Likewise, most operators are not financially capable to adopt the said technology;
- Poor performance, growth and susceptibility of *P. monodon* diseases;
- The rapid development of *P. vannamei* in the world market makes the operators more aggressive to pressure the government lift the ban on the controversial shrimp. The white leg shrimp head-on is now in global markets and being sold also in Japan, where more than 50% of our black tiger are being exported have worried local shrimp producers;
- Lack of financing program to support the industry;
- The cheaper cost and shorter period of culturing vannamei make the shrimp growers think that it is the best alternative to our high valued monodon;
- The entry of vannamei cannot be effectively controlled for some reasons, making uncertified and uncheck fry enter the country which could be carriers of the dreaded bacterial/virus/diseases;
- Many stakeholders are already dissatisfied for the slow and sluggish recovery of the shrimp industry;
- Illegal entries/importations of vannamei were recorded, documented and apprehended.

2. POLICY ISSUES ON THE IMPORT AND CULTURE OF EXOTIC SHRIMPS

2.1 Existing Laws and Regulations

There are existing policies governing shrimp farming in the Philippines including import and export regulations and related policies to address the major problems and constraints besetting the industry:

1. The Department of Agriculture/BFAR organized the “Oplan Sagip Sugpo” on September 16, 1996 with SEAFDEC AQD Chief, Dr. Rolando R. Platon, as Chair;
2. In the early 2000, BFAR further strengthened its fight against shrimp diseases with the upgrading of its 24 regional fish health laboratories –16 of these were equipped with PCR (Polymerase Chain Reaction) that could detect the dreaded WSS virus;
3. BFAR has acquired the ELISA equipment to detect the presence of banned antibiotic residues such as nitrofurans and chloramphenicol even in minute quantities;
4. BFAR formulated FAO 207 series of 2001 which further strengthened FAO 189 series of 1993 which among others prohibit the importation of exotic shrimps;
5. A Code of Practice for Sustainable Shrimp Farming was prepared by the joint effort of BFAR, SEAFDEC and PCAMRD;
6. Implementation of Surveillance Program – SIMS–Shrimp Importation, Monitoring and Surveillance Team;
7. Organized an inter-agency Task Force – BFAR, ISAFP, BID and PNP; and
8. An ad-hoc team was created as Task Force Vannamei.

2.2 Status of Implementation and Enforcement

1. Even with the strict implementation of the above-mentioned FAO 207 and strict surveillance in airports, traders are finding other ways in bringing the illegal shrimp inside the country without passing through the airports
2. SIMS spearheaded six major confiscations in late 2002 up to 2003
3. Likewise, in August 30 and September 3 of 2003, SIMS Team successfully completed operations on the illegal culture of imported shrimp conducted in two sites in Zambales. Yet there is a report that there are about 700 has farms already operating in Luzon.

3. EXPERIMENTAL CULTURE OF *P. VANNAMEI*

In August 2004, DA-BFAR and Agrifisheries World Inc., a private entity engaged in the culture of various species such as *P. vannamei*, agreed to undertake research and verification studies on the use of Specific Pathogen Free (SPF) and Specific Pathogen Resistant (SPR) *P. vannamei* for hatchery and grow-out purposes at BFAR-NIFTDC, Bonuan Binloc, Dagupan City.

The project promotes partnership between the government and the private sector towards increased shrimp production by introduction of new high-yielding species.

The premise of the agreement are as follows:

1. BFAR recognizes the need to diversify aquaculture commodities such as high value species to improve the economic productivity of available ponds and cages in the Philippines.
2. There is a need to promote competitiveness through broadening the base of the shrimp industry with the promotion of tiger prawn and *P. vannamei* within the requirements for a free market environment.
3. There have been major advances in aquaculture genetics which includes the production of Specific Pathogen free (SPF) and Specific Pathogen Resistant (SPR) strains of *P. vannamei* notable available in Hawaii and other Asian countries.
4. There is a need to ensure that no adverse impact could result in the culture of *P. vannamei* before recommending the use of the species to farmers for nationwide commercial use.
5. There is a need to conduct a comprehensive research to study the issues and problems related to the introduction of *P. vannamei* in the Philippines.

The main objective of the project is to analyze the acceptability and verify the efficiency of SPF and SPR *P. vannamei* as a product for hatchery and grow-out production. Emphasis is given on safety measures to prevent introduction of new shrimp pathogens in the Philippines.

The project has two main components, namely:

Component 1: Pilot hatchery production of *P. vannamei* post larvae at BFAR-NIFTDC, Dagupan City.

Component 2: Pilot grow-out production of *P. vannamei* in NIFTDC earthen ponds and accredited farms in Luzon.

ACTIVITIES UNDERTAKEN

September–December 23, 2004

1. Improvement of facilities

Old finfish hatchery facility was improved to suit the needs of the project. It includes a hatchery building with canvass and concrete tanks.

Electric lines was upgraded, water supply lines were improved, a portion of the hatchery were fenced and covered, and new set of blower was installed.

2. Testing for diseases of *P. vannamei* breeders in the US prior to shipment to the Philippines.

Tissues were sent to Prof. D.V. Lightner of University of Arizona for detection of the White Spot Syndrome Virus (wssv), Hepatopancreatic Parvo-like Virus (HPV), Baculovirus Penaei (BP), Infectious Hypodermal and Hematopoietic Necrosis Virus (IHHNV), Yellow Head Virus (YHV) and Taura Syndrome Virus (TSV). Arrival date in UA was November 29, 2004.

Results of PCR tests conducted by Prof. Lightner of Aquaculture Pathology Office of the University of Arizona, Tucson, USA found the samples free of wssv, HPV, BP, IHHNV, YHV and TSV.

3. Conduct of Workshop prior to arrival of *P. vannamei* breeders

A workshop was conducted on December 1, 2004, on quarantine protocol for *P. vannamei* participated by technical staff of BFAR-NFFTC, BFAR-IFAD and BFAR-NIFTDC. The following references were used:

- Health management and biosecurity maintenance in white shrimp (*Peneaus vannamei*) hatcheries in Latin America. FAO Fisheries Technical Paper 450. Food and Agriculture Organization of the United Nations Rome, 2003
- Manual on Risk Analysis for the safe movement of aquatic animals (FWG/01/2002). Network of Aquaculture Centers in Asia-Pacific

4. Shipment and arrival of *P. vannamei* breeders

1,100 SPR *P. vannamei* breeders (550 males, 550 females) was shipped from Hawaii, USA on December 22, 2004 to BFAR-NIFTDC, Philippines. Arrival date was December 24, 2004.

December 24–February 1, 2005

5. Arrival and maintenance of *P. vannamei* breeders

P. vannamei breeders arrived about 10:00AM at NAIA, Manila and 8:00PM at BFAR-NIFTDC, Dagupan City.

The breeders were acclimatized in two wooden trough before finally stocking them in three 16 ton capacity canvass tanks. Male and female breeders were separated. Salinity was maintained at 22 ppt and temperature between 26-28°C. The breeders were fed with mixed oysters and squid. Cleaning and changing of water was done once a day.

From December 24 to February 1, 2005, the total number of dead breeders was counted at 145 pcs (80 males and 65 females).

January 4–February 22, 2005

6. Health Monitoring

Samples of *P. vannamei* breeders and larvae were submitted to BFAR and SEAFDEC for testing on the following dates:

Date	Samples	
January 4, 2005	6 pcs of breeders (frozen)	BFAR Fish Health Section
January 6, 2005	1 kg breeders (frozen)	BFAR Fish Health Section
February 1, 2005	10 pcs breeders (live)	BFAR Fish Health Section
February 11, 2005	400 pcs PL 8	SEAFDEC
February 17, 2005	5 pairs breeders (live)	SEAFDEC
February 22, 2005	3 pairs breeders (live)	SEAFDEC

Accreditation of *P. vannamei* grow-out operators

1. Implementing Guidelines on Accreditation of *P. vannamei* growers.

A workshop was conducted with SEAFDEC to lay down the guidelines on Accreditation of *P. vannamei* growers.

2. Creation of an Ad-hoc Task Force Vannamei

Fisheries Administrative Order 031 S-2005 was issued by BFAR Director creating an Ad-hoc team named Task Force Vannamei composed of the following:

Team Leader	:	BFAR-NIFTDC Chief
Asst. Team Leader	:	BFAR-IFAD Chief
Members	:	BFAR-NFFTC Chief IRA-TF Team Leader Agrifisheries World Representative BFAR Regional Office Representative SEAFDEC-AQD Representatives

The functions and responsibilities of the Task Force Vannamei are the following:

- a. Preparation of criteria and implementation of guidelines for the accreditation of private and government owned farms who will be recipient of F1 certified SPF *P. vannamei* larvae and broodstocks for the commercial breeding and grow-out farming.
 - b. Monitoring, evaluation and rendering of technical advisory services to all accredited farmers through on the spot visits and consultation/orientation meetings.
 - c. Conduct of regular meetings to review/assess the present conditions and status of *P. vannamei* farming to formulate policy guidelines.
- #### 3. Conducted evaluation of proposed sites of accredited farmers:
- a. Technical considerations:
 - The farm should be accessible to any kind of land transportation.
 - The farm should have strong dikes and gates that are free from leaks.
 - The farm should have clean and sufficient brackishwater supply throughout the year.
 - The farm should have access to electricity.
 - The farm should be free from flooding.
 - The following basic equipment and facilities should be available in the farm:
 - Equipment (refractometer, thermometer)
 - Facilities (water pump, aeration facilities as required, bag net–fine mesh, installation at the drainage canal)
 - b. The applicant should have at least one (1) year experience in shrimp farming
 - c. The applicant should be willing to undergo an orientation seminar on the culture of *P. vannamei*.
 - d. The selected applicant shall sign a MOA with BFAR on the operation of the *P. vannamei* farm.

The proposed sites that were visited are farms located at Western Pangasinan and Zambales. Individual pond areas were measured. Samples of water and soil were collected. Samples of any crustaceans in the sites were gathered and preserved for disease analysis. Pictures of the farm were taken for reference purposes.

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