Identifying Best Practices to Improve the Giant River Prawn Industry in Thailand

Production System Design and Best Management Alternatives/Activity/09BMA06UM

Yuan Derun
Network of Aquaculture Centres in Asia-Pacific
Bangkok, Thailand

James S. Diana and Vicki Schwantes
University of Michigan
Ann Arbor, Michigan, USA

Liu Liping
Shanghai Ocean University
Shanghai, China

ABSTRACT

In 2005, the University of Michigan project conducted surveys of prawn farming in Thailand, with intent to understand the environmental impact. The end results showed that prawn farming was lucrative for farmers, but there were major concerns about eutrophication of water sources, overuse of feed, and other environmental impacts symptomatic of over-intensity of prawn production. As a follow-up to that evaluation, this August, we brought together a group of managers and farmers and planned to review the status of prawn farming and educate them on how to minimize the environmental impacts from farming practices. As the workshop progressed, we were surprised to find that prawn farming had changed dramatically over the past six years. The typical prawn farmer had significantly reduced stocking density, tended to use no exchange water systems for production, and reduced total yield while achieving a higher standard product from the grow-out systems. As a result, the concerns about eutrophication and overfeeding had largely disappeared over that six-year period.

To our surprise, prawn farmers in Thailand had willingly changed their practices to a very substantial degree. In 2005, 96% of all farmers practiced intensive monoculture. While we were unable to conduct a similar survey with statistical methodology in the 2011 workshop, reports at the workshop indicated that 80% of farmers today used polyculture instead. The common polyculture was with *Macrobrachium* (about 6 pieces per square meter) and white shrimp *(Litopenaeus vannamei)* (about 12 pieces per square meter) in fresh water. This is in comparison with monoculture of prawns, which was done at about 40 pieces per square meter; so effectively, the overall density had decreased by at least one-half. Similarly, in 2005, feeds were often handmade and were of low quality with many fine particles, while in polyculture, commercial feeds were used, which are better controlled for quality. Feeding rates are now evaluated using feeding trays. Water exchange in 2005 was about 60% per pond per week, while currently, water is exchanged at a much lower rate, and most of that water is retained. These changes have occurred in part because of the adoption of the GAP standards for shrimp and applying them to prawns, and in part because of the move by the Thai Department of Fisheries to help farmers become more environmentally aware, as well as more profitable. In the new aquaculture system, most farmers rely on freshwater culture of white shrimp at low density for their basic income, and then the culture of prawn at even lower densities of prawns for supplementing their income because of the high market value.

INTRODUCTION

Aquaculture has a major role of producing food for both export and local markets. The case of the giant river prawn *(Macrobrachium rosenbergii)* is interesting in the region of Southeast Asia, particularly Thailand. Prawns are very popular food items in this region and, as such, contribute largely to the local

economy. In 2008, the total production of prawns in Thailand was approximately 32,000 metric tons, worth about $131 million. The production of prawns has maintained itself at around 30,000 tons since 2003, while the value has increased dramatically – almost doubling during that same time period. Clearly, the quality of the crop and the value per pound has increased over that time period. Prawns grown in Thailand are entirely marketed locally, with no export reported. As such, they are not necessarily good candidates for certification or market forces driving more sustainable production for several reasons. First, Thais already understand and value aquaculture. Second, local consumption eliminates organizations, such as importers from Europe or America, having any say in the standards for growing prawn. And third, local consumers in Thailand are more concerned about price than environmental performance.

In 2005, Schwantes et al. (2009) conducted surveys of prawn farming in Thailand, with intent to understand the environmental impact. The end results showed that prawn farming was lucrative for farmers, but there were major concerns about eutrophication of water sources, overuse of feed, and other environmental impacts symptomatic of over-intensity of prawn production. As a follow-up to that evaluation, we conducted a workshop in August 2011 intending to convince prawn farmers to undertake more sustainable production practices. We brought together a group of managers and farmers, reviewed the status of prawn farming, and educated famers and outreach personnel on how to minimize the environmental impacts from farming practices.

RESULTS

The workshop was held from 8-10 August 2011 in Bangkok, Thailand. A list of participants is provided in Table 1. The meeting agenda is shown in Table 2.

As the workshop progressed, we were surprised to find that prawn farming had changed dramatically over the past six years. The typical prawn farmer had significantly reduced stocking density, tended to use no exchange water systems for production, and reduced total yield while achieving a higher standard product from the grow-out systems. As a result, the concerns about eutrophication and overfeeding had largely disappeared over that six-year period. Farmers began following the Thailand GAP (good aquaculture practices) standards for Thai shrimp. The shrimp GAP includes ten requirements that are either major (must be adhered to), minor (requires 70% compliance), or recommended (requires 60% compliance). These include major categories of: farm location, farm management, use of drugs, effluent and sediment management, energy use, farm sanitation, harvest and post-harvest handling, labor and welfare, social and environmental responsibilities, and record keeping. While the system is voluntary, GAP standards have been adopted by a large number of shrimp farmers in an effort to improve the sustainability of their operations. Prawn farmers have adopted the same practices in absence of specific prawn standards.

To our surprise, prawn farmers in Thailand had willingly changed their practices to a very substantial degree. In 2005, 96% of all farmers practiced intensive monoculture. While we were unable to conduct a similar survey with statistical methodology in the 2011 workshop, reports at the workshop indicated that 80% of farmers today used polyculture instead. The common polyculture was with *Macrobrachium* (about 6 pieces per square meter) and white shrimp (*Litopenaeus vannamei at* about 12 pieces per square meter) in fresh water. This is in comparison with monoculture of prawns, which was done at about 40 pieces per square meter in 2005; so effectively, the overall density had decreased by at least one-half. Similarly, in 2005, feeds were often handmade and were of low quality with many fine particles, while in polyculture, commercial feeds were used, which are better controlled for quality. Feeding rates are now evaluated using feeding trays, mainly focused on the shrimp crop. Water exchange in 2005 was about 60% per pond per week, while currently, water is exchanged at a much lower rate, and most of that water is retained. These changes have occurred in part because of the adoption of the GAP standards for shrimp and applying them to prawns, and in part because of the move by the Thai Department of Fisheries to help farmers become more environmentally aware, as well as more profitable.

In the new aquaculture system, most farmers rely on freshwater culture of white shrimp at low density for their basic income, and then the culture of prawn at even lower densities for supplementing their income because of the high market value. As a result, their overall production has stabilized over the past six years, while the value of their crop has increased dramatically, and the environmental impact of their growing system has decreased dramatically. Assuming the reports presented at our workshop reflect what is actually happening throughout the industry, this is a win-win situation, with prawn culture remaining more profitable, while improving its environmental performance. Perhaps the most interesting portion of this impact was the rapidity of this change; in about six years, the industry has changed dramatically from one dominated by intensive monoculture, to one using more semi-intensive polyculture. Both systems are very profitable, but the current system appears to be more so because of the lower impact of diseases and the high value of large prawns, which grow more readily in the lower density culture systems.

DISCUSSION

The results of the workshop were surprising. Yuan Derun coordinated the workshop, inviting 14 farmers, as well as 17 researchers or government managers of aquaculture systems. Because the workshop was located in Bangkok, most farmers were from Suphanburi or Ratchaburi, two provinces near Bangkok. However, their views almost certainly reflect those of the industry, as those two provinces are the major producers of prawns in Thailand.

Overall, the workshop was a success in so many ways. From the AquaFish CRSP perspective, major changes in prawn culture have occurred in Thailand as a result of increasing scrutiny for environmental performance. The aquaculture programs continue to be profitable –even more profitable than before – but at the same time, much more environmentally sustainable. Intensive efforts by the Thai Department of Fisheries, various research groups including NACA (Network of Aquaculture Centers in Asia-Pacific) and the AquaFish CRSP, and the results of our previous study led this movement toward more sustainable production. More than anything, this change demonstrates the importance of sustainability to aquaculturists in Thailand and bodes well for the future of aquaculture in that region.

LITERATURE CITED

Schwantes, V.S., J.S. Diana, and Y. Yi, 2009. Social, economic, and production characteristics of giant river prawn *Macrobrachium rosenbergii* culture in Thailand. Aquaculture, 287:120-127.

Table 1. List of participants at the prawn workshop in Bangkok.

Farmer's Name	**Farms**	**Province**
Ms. Reamgi Langpho	Hatchery	Ratchaburi
Ms. Somgi Seandu	Grow-out	Ratchaburi
Ms. Aumpong Jabgun	Grow-out	Ratchaburi
Ms. Suntong Mokejang	Hatchery	Ratchaburi
Mr Naluamol Saunkumruk	Grow-out	Ratchaburi
Ms. Somtawin Maneekham	Grow-out	Ratchaburi
Ms. Soan Kawang	Grow-out	Ratchaburi
Mr Jumloung Tonkyuthit	Grow-out	Suphanburi
Mr. Gulkitikon Bualaim	Grow-out	Suphanburi
Mr. Pratoank Mounwong	Hatchery	Suphanburi
Ms. Jumlong Sukthon	Grow-out	Suphanburi
Ms. Thanapha Kumnuanshil	Grow-out	Suphanburi
Mr. Prashit Pingeal	Grow-out	Suphanburi
Mr. Kun Noksakul	Grow-out	Suphanburi

Other's Name	**Organization**
Prof. Sena De Silva	Director General, Network of Aquaculture Centres in Asia-Pacific
Prof. James S. Diana	School of Natural Resources and Environment, University of Michigan, USA
Prof. Chadag V. Mohan	Research and Development Manager, Network of Aquaculture Centres in Asia-Pacific
Dr. Pakorn Unprasert	Director, Division of Fisheries Information, DoF, Thailand
Dr. Putth Songsangjinda	Director, Marine Shrimp Culture Research Institute, DoF, Thailand
Mr. Suntipan Phasugdee	Fisheries Biologist, Bureau of Inland Fisheries Research and Development, DoF, Thailand
Dr. Vicki Schwantes	Management and Program Analyst, NOAA Budget Outreach and Communications, U.S. Department of Commerce
Dr. Donghuo Jiang	Vice President, CPF, Thailand
Mr. Yuan Derun	Education and Training Programme Coordinator, Network of Aquaculture Centres in Asia-Pacific
Prof. C. Kwei Lin	Asian Institute of Technology
Mr Thavone Jirasophonrak	Fisheries officer, Suphanburi, DoF, Thailand
Mr. Wiwiththanon Boonyung	Fisheries officer, Ratchaburi, DoF, Thailand
Ms. Vasana Srathonglomg	Fisheries officer, Kanchanaburi, DoF, Thailand
Ms. Viphavan Phaujin	Fisheries officer, Kanchanaburi, DoF, Thailand
Ms. Maliwan Punsritom	Researcher, CPF, Thailand
Ms. Pornthip Chansaeng	Researcher, CPF, Thailand
Ms. Patchararut Ponglumyai	Administrative staff, Network of Aquaculture Centres in Asia-Pacific
Interpreter	Translation Lab Associate
Interpreter	Translation Lab Associate

Table 2. The agenda for the workshop on prawn aquaculture in Thailand.

Time	Activity	Lead
	August 8	
08:30 - 09:00	Registration/arrival of participants	
09:00 - 09:10	Welcome address	DoF DG; NACA DG
09:10 - 09:20	Remarks from the project PI	Prof. James S Diana
09:20 - 09:45	Presentation- Introduction to the workshop	Mr. Yuan Derun
09:45 - 10:00	V. Participants introduction	
10:00-10:30	GROUP PHOTO, Coffee/Tea Break	
	Plenary Session: Status review – Chair: Profs. Sena De Silva and C. V. Mohan	
10:30 – 11:30	Technology development in Improving Sustainability and Reducing Environmental Impacts of Aquaculture Systems	Prof. James S Diana
11:30 – 12:30	International principles for responsible aquaculture practice, BMPS and farmer clusters development	Prof. C. V. Mohan
13:30 – 14:30	Thai GAP and CoC	Dr. Putth Songsangjinda
14:30 - 15:30	Thailand Prawn production – 2005 survey report	Dr. Vicki S. Schwantes
	August 9 – Thematic Groups	
08:30 – 09:00	Thematic groups: Assignments of group members, leaders, rapporteurs and materials	Mr. Yuan Derun
09:00 – 12:30	Group work	Group leaders
13:30 – 15:00	Group presentations	Group leaders
	Working Group Synthesis	
15:30 – 17:00	Drafting the fact sheet on Better Management Practices for Prawn Hatchery and Grow-out Production	Chair: Prof. James Diana Synthesis working group
	August 10 - Plenary Session II: Better Management Practices for Prawn Hatchery and Grow-out Production Chair: Dr. Putth Songsangjinda	
09:00 – 10:00	Presentations on output of synthesis working group	Prof. James Diana Mr. Yuan Derun
10:30 – 11:30	• Suggestions for modification • Issues on implementation • Suggestions to follow up	The Chair
11:30 – 12:00	Thanks and Closing	NACA DG DoF reprehensive Prof. James Diana Other guests