



Network of Aquaculture Centres in Asia-Pacific

**Evaluation of the impact of the Indian Ocean tsunami
and US anti-dumping duties on the shrimp farming
sector of South and South-East Asia**

*Case studies in
Vietnam, Indonesia and Bangladesh*



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October 2006

First version posted on 6th November 2006
Revised version posted on 29th November 2006

Acknowledgements

We wish to thank all the people who supported the implementation of this study, especially the farmers, traders, processors and exporters in Vietnam, Indonesia and Bangladesh for sharing information during the surveys and local and national authorities in the 3 case countries for providing assistance and information throughout the study. We would like to thank also the staff of the USAID-funded ATDP Shrimp Seal of Quality project for sharing pricing data and information. We are also grateful to the people providing feedback to the study team during the finalization of the report.

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Executive summary

The aim of this study was to assess the impact of the 2004 Indian Ocean tsunami and of the introduction of anti-dumping duties on the shrimp farming sectors of countries in the Asian region, with special focus on the effect that these unusual events had on shrimp prices and stakeholders' livelihoods.

Three countries, Vietnam, Indonesia and Bangladesh, were selected for this study as representatives for countries affected by the anti-dumping duties, the tsunami, and neither event respectively. The study covered a wide range of stakeholders in the selected countries, including a total of 384 farmers, 105 traders and 27 processors/exporters.

Primary data were collected with questionnaires and, where possible, actual records of sales of shrimp transactions. To allow a valid comparison between case countries, the questionnaires used in the 3 countries were almost identical, with only some minor variations to cope with country-specific differences. Data collection focused on the period between January 2004 and December 2005, although data as early as the year 2000 and as late as August 2006 were also collected. The project was implemented from April to September 2006.

Both negative and positive effects of the tsunami and the US anti-dumping were recorded in the 3 countries.

In Vietnam there was a trend among farmers to reduce the investment level, especially stocking density and other major production costs. Consequently, both the total production of shrimp harvested per year and shrimp yield per crop decreased over the period examined (2004-2005).

Interviewees complained that US duties imposed on imports of Vietnamese frozen shrimp resulted in a decrease in fresh shrimp prices. Anti-dumping duties were also said to have had a negative impact on 69.0%, 73.7% and 100.0% of the surveyed farmers, shrimp traders and processors/exporters respectively. In general, all the shrimp farmers, traders and processors/exporters who were impacted by the US anti-dumping duties had tried to find strategies to mitigate these negative impacts. The most important solutions were: (1) to reduce production and marketing costs, (2) to improve shrimp quality, and (3) to increase the proportion of value added products for export.

The negative impacts experienced are believed to have declined through devoting efforts to improve the links between different stakeholders, as well as circulating better market information and expanding all stakeholders' understanding of international trade requirements.

In Indonesia, over the past few years, a number of significant changes could be detected. The yield of the first crop declined remarkably in 2005 compared with 2004. Although Tiger shrimp (*Penaeus monodon*) remained the most important traded commodity, the traded amounts of both this species and white shrimp other than *Penaeus vannamei* decreased over time, while *P. vannamei* trading appeared to be on the rise.

Fresh shrimp prices for most count sizes and for most stakeholder groups decreased over the study period. The main reasons reported for decreasing prices faced by farmers was exploitation of farmers by traders and processors. Prices faced by traders and processors were reported to be decreasing mainly because of increased competition.

As expected, the overwhelming majority of Indonesian farmers, traders and processors knew about the occurrence of the tsunami on December 2004, but only 24.8% of farmers and 37.3% of traders said that the event impacted their business. Over 98% of the processors, however, said that their business had been affected. The decrease in availability of fresh shrimp and the almost simultaneous introduction of anti-dumping duties in a range of countries allegedly led to the illegal importation of shrimp from affected countries, further contributing to lowering fresh shrimp prices.

In Bangladesh, over the past few years no major change could be seen in terms of total culture area, number of ponds, land area, types of farming, labour use patterns, and stocking density, although the use of home made feed increased while that of medicine appeared to have declined. The yield of the first crop remained unchanged and the marketing of shrimp products was reported to have improved.

Volumes of shrimp traded were reported to be on the rise. Shrimp prices faced by most stakeholder groups appeared to have increased over the past few years. Existence of high international prices for frozen shrimp, quality improvement, and improved hygienic conditions were the three most important reasons for this price increase. No stakeholders were reported to have been adversely affected due to these price changes.

Only the processors had heard of the introduction of US anti-dumping duties to some shrimp farming countries, while the overwhelming majority of farmers, traders and depots had never heard of either the tsunami or US anti-dumping duties.

In general, the shrimp industry in Bangladesh appeared to be experiencing a relatively good period. Some of the unusual events of 2004 and 2005 were reported not to have had negative impacts on the sector. On the contrary, the US anti-dumping duties imposed on other Asian countries were reported to have benefited Bangladesh by opening opportunities to sell products on the US market.

In conclusion, the tsunami and the US anti-dumping duties brought challenges but also opened new opportunities for the shrimp sectors of both affected and non-affected countries.

Indonesia is one of the countries most seriously affected by the Indian Ocean tsunami. This event brought huge devastation and losses. As Indonesia is recovering thanks also to international support, the opportunity to restructure and re-plan the shrimp aquaculture areas is also opening, therefore increasing the long term sustainability of the sector. This will probably also allow the improvement of the image of Indonesian shrimp, which may lead to a competitive advantage in the future. This process, however, will require a great deal of efforts from all stakeholder groups, from grassroots to local and national authorities.

In Vietnam, the US anti-dumping duties had a relatively more modest impact than the tsunami in Indonesia, especially because it was not associated with huge human losses. Nevertheless, the US anti-dumping case resulted in an overall drop of fresh shrimp prices and a drop in frozen shrimp export quantity and value to the US. However, the Vietnamese shrimp industry appeared to gradually have recovered from the negative impacts associated with the introduction of duties and was capable of maintaining a stable growth in frozen shrimp exports despite a drop in US market share. Among the solutions that Vietnam adopted to cope with the event, the widening of existing export markets (like the EU) to attain a stable export growth played a key role. Besides, new markets in Latin American and Africa were also developed. In this sense, the US duties gave the opportunity to strengthen the industry through market diversification.

Among the 3 countries under study, Bangladesh seemed to have the "healthier" shrimp sector, with generally increasing prices and expanded opportunities to export into the US. However, this relative advantage appeared to be short-lived as a number of concerns related to the quality of shrimp harvests are threatening the sustainability of the sector.

Although this study was limited to comparing the shrimp industries in only 3 countries, it generated a great deal of information that gave an insight on the impact of the Indian Ocean tsunami and US anti-dumping. This study also highlighted the need for continuous collection of price data, not only from processors and concerning exported commodities, but also from traders and farmers so that a thorough evaluation of the health of the industry could be conducted and interventions to increase the sustainability of the sector implemented.

Abbreviations

BDT	Bangladesh Taka
BTO	Butterfly, Tail-On Shrimp
CFNA	China Chamber of Commerce for Import and Export of Foodstuffs, Native Produce & Animal By-Products
DGAF	Directorate General of Aquaculture Fisheries
DGCF	Directorate General of Capture Fisheries
DOC	Department of Commerce (US)
FAO	Food and Agriculture Organization
HLSO	Headless and Shell on
HOSO	Head on and Shell on
IDR	Indonesia Rupee
IE	Improved Extensive
IQF	Individual Quick Frozen
ITC	International Trade Commission (US)
I/SI	Intensive/ Semi-intensive
MOFI	Ministry of Fisheries
MOMAF	Ministry of Marine Affairs and Fisheries
NACA	Network of Aquaculture Centres in Asia – Pacific
PUD	Peeled and Undevained
RIA1	Research Institute for Aquaculture Number 1
SD	Standard Deviation
STREAM	Support to Regional Aquatic Resources Management
VND	Vietnamese Dong

1. General Introduction

1.1. A rapidly growing sector

Aquaculture is the fastest growing animal based food-producing sector. Over the past 20 years aquaculture production experienced an average annual growth of almost 10% and in 2003, it reached 55 million tonnes, with a farm gate value of USD 57 billion (FAO/NACA/UNEP/WB/WWF 2006). This outstanding growth was fuelled by the increasing demand for fisheries products and stagnating wild fish stocks. Booming population growth and rapid urbanization globally will most likely result in an increase in the demand for fisheries products (NACA/Stream/RIA1, 2004) and it is extremely unlikely that this demand will be met by capture fisheries. Over the last 20 years, capture fisheries showed an average growth of only 1% per year, and actually fell by 2% since 2000 (see Figure 1).

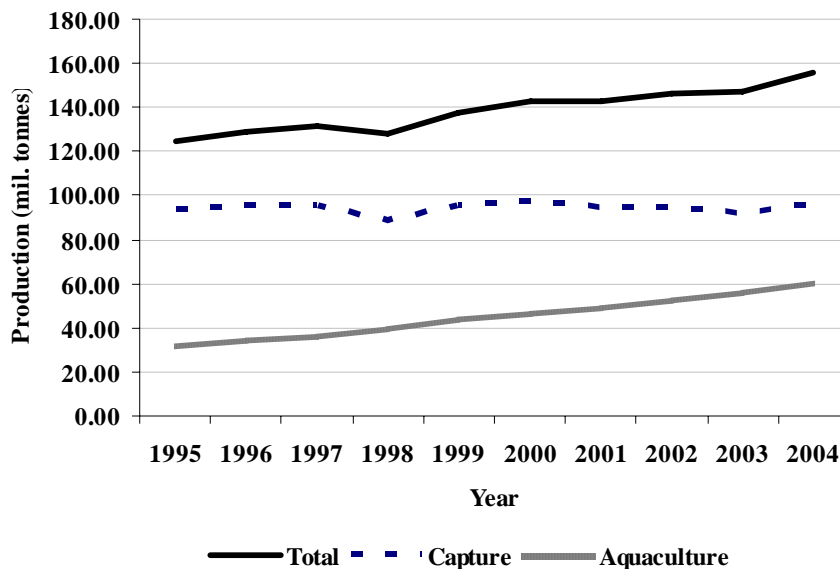


Figure 1 Global production of fisheries products (FAO FISHSTAT Plus, 2006)

The importance of the aquaculture sector is not simply a supply-demand issue. Developing countries dominate aquaculture production and trade, contributing in 2003 over 80% of global production in weight (FAO 2004). Within those countries, aquaculture is often conducted by small scale farmers making the aquaculture sector of paramount importance from the point of view of poverty alleviation and food security.

Shrimp farming is a major player in the overall growth and importance of aquaculture worldwide. Global shrimp production in 2003 amounted to more than 1.8 million tonnes, which translated into a total farm-gate value of nearly 9 billion U.S. dollars (FAO, 2006a). Following an even more pronounced trend than the overall aquaculture sector, shrimp aquaculture grew over the last 20 years at an annual average rate of 14%, and now accounts for about 25% of total shrimp production. Aggregate figures however conceal trends in countries like Vietnam and China, where the total shrimp production increased more than 5 times over the 5 year period between 1999 and 2004. In fact, about 75% of the world production of farmed shrimp comes from Asian countries, with China leading, followed by Thailand, Vietnam, Indonesia and India. The remaining 25% is produced in

the western hemisphere, where South-American countries (Brazil, Ecuador, and Mexico) dominate (Table 1).

Table 1 World production of cultured shrimp by country (FAO, 2006a)

Region	Country	Production in 1,000 tonnes, rounded																			
		1985	86	87	88	89	90	91	92	93	94	95	96	97	98	99	2000	01	02	03	04
Asia	China	41	83	153	199	186	185	220	207	88	64	78	89	103	143	171	218	304	384	493	935
	Thailand	16	18	24	56	93	120	162	185	226	266	261	240	228	253	276	310	280	172	298	390
	Vietnam	8	13	19	27	28	33	36	37	39	45	55	46	45	52	55	90	150	181	232	276
	Indonesia	38	42	59	78	98	107	140	142	139	135	147	152	167	118	141	138	149	160	191	239
	India	13	14	15	20	28	35	40	47	62	83	70	70	67	83	79	97	103	115	113	113
	Bangladesh	11	15	15	17	18	19	20	21	29	29	32	42	48	56	58	59	55	56	57	58
	Philippines	30	31	36	45	48	54	51	78	96	93	90	78	41	38	39	42	42	37	37	38
	Malaysia	0	0	1	1	2	2	3	3	4	6	7	8	10	10	12	16	27	26	26	31
	Myanmar	0	0	0	0	0	0	0	0	0	0	1	2	2	2	5	5	5	7	19	30
Americas	Brazil	0	0	1	1	1	2	2	2	2	2	3	4	7	16	25	40	60	90	76	
	Ecuador	30	44	69	74	70	76	105	113	83	89	106	108	133	144	120	50	45	47	57	56
	Mexico	0	0	0	1	3	4	5	8	12	13	16	13	17	24	29	33	48	46	46	62
	Honduras	0	1	2	3	3	3	4	6	8	9	7	10	9	7	7	8	11	13	17	18
	Colombia	0	0	1	1	3	6	7	9	7	9	8	5	7	7	9	11	12	14	17	18
	Venezuela	0	0	0	0	0	0	1	1	1	2	3	4	5	5	6	9	11	12	14	17
	Belize	0	0	0	0	1	0	0	0	1	1	1	1	1	2	3	4	4	4	10	11
Africa	All	0	0	0	0	0	0	0	0	1	1	2	3	3	4	5	6	8	9	8	
Oceania	All	0	0	0	1	1	1	2	2	2	2	3	3	3	4	5	5	6	5	6	

1.2. Threats to the sustainability of the shrimp farming sector

Although shrimp farming can offer significant employment opportunities, therefore contributing to poverty alleviation among coastal communities, it has also become quite controversial.

In the 1980s, shrimp farming promised high profits. The investments required for extensive farms were low, especially in regions with low land prices and wages. Due to the high market prices for shrimp, many tropical countries, especially those with poorer economies, benefited from shrimp farming, which provided significant foreign currency earnings. However, in the 1990s a number of events began crippling the development of the sector. Rapid uncontrolled expansion in the number of farms, coupled with poor technical knowledge and services, led to disease outbreaks that continue to play a major role in hampering the sustainability of the sector. A series of viral diseases began claiming huge proportions of shrimp yields. White Spot Disease (WSD) was the worst of these. This disease first appeared in China in 1992-3 and quickly moved across the Asian region so that, by the middle 1990s, it had affected shrimp production in Thailand, India, Vietnam and others. In the late 1990s WSD made its first appearance in the western hemisphere in central and south America with severe impacts on Ecuador's shrimp industry, which was once the leading shrimp producer in the continent. By 1999 the disease had claimed an estimated 130,000 jobs in Ecuador alone (Globefish, 2004).

Production data from countries like China and Ecuador clearly show the huge impact of the WSD pandemic (Table 1). Shrimp production in China declined from 207 to 88 thousand tonnes over a single year (from 1992 to 1993). Ecuadorian production followed a similar pattern over the period 1999-2000, with yields declining from 120 to 50 thousand tonnes, stabilizing at levels far below those experienced in the pre-WSD years.

In spite of these difficulties, the increasing number of countries farming shrimp and the increasing land areas being farmed led to an increase in global supplies of farmed shrimp. Increasing supplies and, consequently, increasing competition between producing countries led shrimp unit values and prices to experience declines or at best sharp fluctuations (Globefish 2004). This situation had a particularly negative effect on small scale farmers. Because of the paucity of effective farmers' organizations, farmers had, and continue to have, little negotiating power so that farmers who escaped disease outbreak made only marginal profits.

To ensure the profitability of shrimp farming activities in a background of decreasing prices and marketing difficulties made disease control compelling and led many farmers to turn to the use of drugs and chemicals. The application of antibiotics and other substances intended to improve shrimp survival and the quality of the harvested products unfortunately resulted in an increase in rejections by importing countries due to the presence of unacceptable levels of residues in shrimp products. The situation was further exacerbated by the difficulties faced by regulatory agencies in controlling the use of those substances by a large and growing number of farmers. Rejected batches of shrimp added to the overall cost of production, further reducing profits across the supply chain.

The increased risks due to disease outbreaks and decreased profits caused by falling prices meant that farmers' livelihoods became increasingly more vulnerable.

1.3. Facing unexpected challenges

Although diseases and harvest yields arguably are under the control of farmers and could be achieved through proper management, there are several events that negatively impact farmer's livelihoods, over which they have little or no control.

Natural disasters (floods, storms or tsunamis), for example, can happen suddenly and result in huge crop losses. Trade barriers placed on imports are also outside the control of farmers, whose livelihoods can be greatly affected by such interventions without their being able to influence them.

Both of these scenarios caused significant impacts on shrimp farmers during the period between December 2004 and January 2005 as a result of the Indian Ocean tsunami and the imposition of anti-dumping tariffs on several Asian and Latin American producers by the United States.

The introduction of anti-dumping duties

Throughout the year 2004 the Department of Commerce of the United States reviewed dumping charges filed against China, Vietnam, Thailand, India, Brazil and Ecuador by the Southern Shrimp Alliance (SSA), an organization of shrimp processors and fishermen from eight south-eastern states of the US (Shrimp News, 2005). The SSA alleged that their businesses were suffering due to unfair price competition from imported shrimp which were being dumped into the US market at prices below cost. The US Department of Commerce found in their favour and, in December 2004, imposed anti-dumping tariffs on exporters from all 6 countries (Table 2) (NACA, 2004). The tariffs imposed ranged from 0% for some individual exporters to 113% in the case of China. In addition, through the

introduction of a bond, on shrimp imports anti-dumping duties were to be paid in advance for the whole year (US ITC 2005)

The US is a major market for shrimp products, receiving about 50% of shrimp exports from China (CFNA statistics) and, in 2003, shrimp valued at almost USD 1 billion from Thailand alone.

The imposition of the anti-dumping duties had a huge impact on this trade. Between 2003 and 2005 US imports of shrimp from China declined by more than 50% in value, dropping from USD 434 to 202 million (US ITC Database). The same downward trend was seen in other Asian countries, especially India and Vietnam, whose exports to the US decreased by 25% in value over the same period.

Such huge trade impacts and the need to identify alternative markets for shrimp produced in the affected countries had a huge effect on shrimp farmers and other stakeholders in the shrimp supply chain. However, to date no detailed analysis of the impact of these events has been available.

Table 2 Chronology of events associated with the anti-dumping lawsuit (US ITC 2005; US DOC 2005)

Date	Action
December 31, 2003	Petition filed with Commerce and the Commission; institution of Commission investigations
January 27, 2004	Commerce's notice of initiation
February 17, 2004	Commission's preliminary determinations for all countries
July 16, 2004	Commerce's preliminary determinations for China and Vietnam <i>China: 0% to 112%</i> <i>Vietnam: 12% to 93%</i>
August 4, 2004	Commerce's preliminary determinations for Brazil, Ecuador, India, and Thailand <i>Brazil: 0% to 67.80 %</i> <i>Ecuador: 6.08% to 9.35 %</i> <i>India: 3.56% to 27.49 %</i> <i>Thailand: 5.56% to 10.25%</i>
August 19, 2004	Commission's scheduling of final phase investigations
November 29, 2004	Commerce's final determinations for China and Vietnam <i>China: 0.07% to 112.81%</i> <i>Vietnam: 4.13% to 25.76%</i>
December 1, 2004	Commission's hearing
December 8, 2004	The final determinations were taken into effect for China and Vietnam.
December 17, 2004	Commerce's final determinations for Brazil, Ecuador, India, and Thailand <i>Brazil: 9.69% to 67.8%</i> <i>Ecuador: 2.35% to 4.48%</i> <i>India: 5.02% to 13.42%</i> <i>Thailand: 5.79% to 6.82%</i>
December 23, 2004	The final determinations were taken into effect for Brazil, Ecuador, India, and Thailand.
January 6, 2005	Commission's vote
January 21, 2005	Transmittal of Commission's determinations to Commerce
February 1, 2005	Amended Final Determinations and Issuance of Anti-dumping Duty Orders <i>China: 0.07% to 112.81%</i> <i>Vietnam: 4.30% to 25.76%</i> <i>Brazil: 4.97% to 67.80 %</i> <i>Ecuador: 1.97% to 4.42 %</i> <i>India: 4.94% to 15.36 %</i> <i>Thailand: 5.29% to 6.82%</i>

The Indian Ocean tsunami

In addition to the introduction of anti-dumping duties, shrimp farmers in several Asian countries experienced an even more traumatic and tragic event. On 26th December 2004 a massive tsunami devastated coastal communities across the Indian Ocean, causing huge loss of life. As well as the human loss, livelihoods were also affected with great damage to coastal communities and farmland. The tsunami impacted several Asian countries (Table 3) taking over 300,000 lives and making 2 million people homeless (World Bank, 2005). Rural communities were the most severely impacted, adding a huge strain on their already challenged livelihood. At the time when the tsunami hit, 27% of the rural population of Sri Lanka was below the poverty line, while Aceh was home to an estimated 1.2 million poor people (WFC 2005).

In the FAO report “Building back better livelihoods in tsunami-affected countries” (FAO, 2005a), rapid assessments immediately after the tsunami confirmed that the fisheries sector was the worst hit by the disaster. Coastal fisheries and aquaculture communities in Indonesia and Sri Lanka especially suffered extreme losses from this event. The occurrence of the tsunami most likely also had a number of indirect impacts. However, little information is currently available on the extent to which this devastating event affected the shrimp farming sector as a whole.

Table 3 Country-wise estimation of the impact of the 26th December 2004 Indian Ocean tsunami (WFC 2005 and UN 2005)

Country	Location	Human toll		Damages/ Losses in the fisheries sector
		Fatalities	Missing ¹	
India	States of Tamil Nadu, Pondicherry, Andhra Pradesh, and Kerala and Andaman and Nicobar archipelago	12,405	5,640	Estimated total cost for repair and rehabilitation for damages for fisheries industry amounts to about USD 25 million.
Indonesia	Aceh, North Sumatra	130,736	37,000	Total damage to the capture fisheries sector estimated at IDR 478 billion (USD 52 million). Direct financial damage to brackish water production systems estimated at IDR 466 billion (USD 51 million). About USD 8 million of damages to hatcheries and government facilities.
Malaysia	States of Kedah, Perlis and Penang	69	6	About 5,200 fishers with an estimated loss of RM 29.3 million (USD 8 million); 155 fish farmers with an estimated loss of RM23.9 million (USD 6.5 million).
Maldives	Most of the country	82	26	Estimated total cost for repair and rehabilitation of the fisheries sector about USD 25 million.
Myanmar	Most of the country	61	-	Direct financial losses estimated at USD 180,000 – 250,000
Sri Lanka	Most of the country	35,322	-	Cost of short-term rehabilitation of the fisheries sector about LKR 4715 million (USD 37 million)
Thailand	Andaman coast	8,212	-	Damages to the fisheries sector amounting to USD 16.6 million

¹ Some countries did not report separate statistics for fatalities and missing

There is no question that both the U.S. anti-dumping measures and the tsunami disrupted shrimp production in certain countries. What has been less clear is to what extent those events affected the different stakeholders in the supply chain (i.e. farmers, traders, exporters, etc.). In particular, little information is available on how those events affected fresh shrimp prices and farmers' livelihoods and perceptions.

This study was intended to investigate this in more detail and collect the necessary information in order to develop strategies that can help to mitigate the impact of similar events on the livelihoods of vulnerable farming communities.

Objectives of the study

The objective of this study was to assess the impact of the 2004 Indian Ocean tsunami and of the introduction of anti-dumping duties on the shrimp farming sectors of countries in the Asia-Pacific region, with special focus on the effect these unusual events had on shrimp prices and stakeholders' livelihoods.

The study was aimed at investigating mainly the indirect impacts of these events on the overall shrimp farming sector in selected countries, more than the direct effects of the events, which although large have been reasonably well documented.

2. General Methodology

2.1. Partners

This study was conducted by NACA under the supervision of Dr. Flavio Corsin (Flavio.Corsin@gmail.com), Dr. Michael Phillips (Michael.Phillips@enaca.org) and Ms Nguyen Hai Ha (HaiHa@enaca.org) and was implemented in partnership with institutions in Vietnam (Dr. Le Xuan Sinh, Can Tho University), Indonesia (Dr. Sonny Koeshandrajana, Central Research Institute for Marine and Fisheries Socio-Economics, Department of Marine Affairs and Fisheries) and Bangladesh (Mr. Humayun Kabir, PMTC Bangladesh Ltd).

2.2. Country Comparisons

The impact of the tsunami and anti-dumping tariffs on shrimp prices and farmers' livelihoods was assessed on a selected sample of countries. Study countries were selected on the basis of whether they were affected by (1) the tsunami, (2) the anti-dumping duties, or (3) neither event.

Owing to limited resources, only one country in each category was selected. The selected country was chosen as the country most representative of its category in terms of annual shrimp production (Table 4).

Table 4 Criteria used for the selection of the countries used as case-study (FAO, 2006a; US ITC, 2005 and FAO, 2006b)

ID	Countries	Cultured shrimp production in 2004 (tonnes)	Affected by anti-dumping	Affected by tsunami
1	China	935,944	Yes	No
2	Vietnam	275,569	Yes	No
3	<i>India</i>	<i>113,020</i>	<i>Yes</i>	<i>Yes</i>
4	<i>Thailand</i>	<i>390,000</i>	<i>Yes</i>	<i>Yes</i>
5	Indonesia	238,576	No	Yes
6	Myanmar	30,000	No	Yes
7	Sri Lanka	2,380	No	Yes
8	Bangladesh	58,044	No	No
9	Philippines	37,947	No	No

The average annual production in the 4 Asian countries affected by the anti-dumping duties was 428,633 tonnes (2004). Among the 5 countries most affected by the tsunami the average production was 154,795 tonnes (2004). Thailand and India were not selected because they were affected by both events. For this reason Vietnam (275,569 tonnes) and Indonesia (238,576 tonnes) were selected as being most representative of the 2 categories. Bangladesh was selected as the "control" country because it was the Asian country that resembled most the non-affected countries in terms of annual shrimp production.

2.3. Study sites

In order to select the study sites within each country, information on production from different shrimp culturing systems of varying degree of intensity and in different shrimp producing areas in each country under study were collected. A minimum of 3 different areas per country were selected.

Identification of communities in the 3 selected areas for conducting the survey was performed in consultation with local authorities and other stakeholders involved with

shrimp farming in the study countries. The selected sites were considered representative in terms of the culturing system and production for the selected area.

2.4. Data collection and analysis

Data on shrimp prices and their impact on shrimp farmers' income in the region during the period between 1 January 2004 and December 2005 were collected from published literature (e.g. annual reports produced by government agencies in the 3 case countries, Globefish website, etc.) and field studies. Where possible, data were also collected for some portion of 2006. This time frame covered the period approximately 1 year before and after the introduction of US anti-dumping duties and the tsunami.

The detailed methods used for data collection and analysis methodology are presented in the case studies.

Briefly, structured questionnaires (Annex 49) were developed for each stakeholder in the supply chain. These were farmers, traders (for Vietnam collectors, wholesalers and trading companies; for Indonesia traders; for Bangladesh traders, depots, agents) and processors/exporters

Questionnaires were designed to collect information on:

- a. General socio-economic status of the interviewee, including education.
- b. Business ownership and capital invested.
- c. Significant changes in management over the previous 3 years.
- d. Specific management information for the years 2004 and 2005, including who were the partners in shrimp transactions and what incentives they provided.
- e. Type and volume of different fisheries commodities traded at least over the period 2003-2005, with more extended periods being adopted in some case countries. Priority was given to collecting data on *Penaeus monodon* (black tiger or "tiger" shrimp), as this was a major traded species in all the three countries. Data on *P. vannamei* (white leg shrimp), other white shrimp² and freshwater prawns (*Macrobrachium rosenbergii*) were also collected in countries where these were important traded commodities.
- f. For the main shrimp species traded, and for different shrimp sizes, prices of fresh shrimp bought or sold over the period 1st January 2004 – 31st December 2005, and where possible also for 2006. Shrimp size data were collected using typical size categories used in the normal course of business in each case country.
- g. Perception of the impact of the Indian Ocean tsunami and anti-dumping duties on different stakeholders.

Written records were generally available for individual shrimp purchase and sale transactions at the trader and exporter levels. Price information was generated by analyzing individual transactions and summarizing the data into monthly records for each shrimp species and size category. When the number of transactions in a single month was excessive, a representative (random) sub-sample of transactions was reviewed to minimize the effect of aberrational observations. Farmers usually lacked written records of sales transactions.

² Unless otherwise specified, the term "white shrimp" refers to shrimp other than *P. monodon* and *P. vannamei*

Questionnaires were harmonized to the maximum extent possible between the 3 countries. Pre-testing of questionnaires with local stakeholders was always conducted before initiating data collection.

All possible efforts were made to verify the consistency of the collected data to ensure data accuracy.

Raw price data for every link in the supply chain were summarized using simple linear regression. Linear regression was also utilized to analyze price trends and to calculate the most likely prices at any point in time, allowing also short-term (i.e. over a few months) predictions to be made. Linear regression was selected for its ability to summarize complex datasets by providing easily interpreted results, a characteristic which made this method a well established tool across several disciplines (e.g. socio-economics, biology, etc.). Linear regression uses the raw data to calculate the equation of the line which would most likely represent the data by minimizing the difference between each raw data point and the calculated regression line (for a more detailed explanation see Kirkwood 1998). The average of all the values used to build a regression line will be equal to the average of all the values obtained by using the regression equation.

Regression equations to calculate prices have the following general form:

$$P = aT + b$$

where, **P** is the price for a specific species and size; **T** is the time; and *a* and *b* are constants to be calculated. Calculation of these constants, and therefore the development of the regression equations, was done using Microsoft Excel. After calculating the coefficients *a* and *b*, the calculation of the price (**P**) for a specific species and size at a specific point in time was done by replacing **T** with a specific date.

For simplicity, dates were defined using the numbering system used in Microsoft Excel and considering the start of the scale on the 1st January 1900 (**T** = 1). Therefore the 1st January 2004 was **T** = 37,987, the 1st January 2005 **T** = 38,353 and the 1st January 2006 **T** = 38,718.

2.5. Comparative analysis

The comparative analysis focused on analysing differences among the 3 case countries in terms of actual values and changes over the period 2004-2006. Variables examined in the comparative analysis were: fresh shrimp prices at different levels in the supply chain, and volumes traded. To fulfil the objective of the study, particular attention was given to examining trends in relation to the events taken into consideration (i.e. Indian Ocean tsunami and US anti-dumping duties). However, other factors like international price changes and their impact on the shrimp price trends of the countries under study were also analysed. Because the EU is often the largest import market for shrimp products and because of the unavailability of import price data from other markets, import prices in the EU were used as indicators of international price trend.

The species used for the comparative analysis was *P. monodon* since this was the only shrimp species produced in large volumes in all the three countries, and also the one most affected by the events under consideration.

Although the 3 case countries often used different size classifications, and that data on specific sizes were not always available for all 3 countries, an attempt was made to perform country comparisons of fresh shrimp prices and price trends. A comparison between farmer sale prices was conducted using size 26-30 for Indonesia and Bangladesh

and size 26-35 for Vietnam. Comparisons between processor procurement prices were made even more difficult by the fact that, unlike the other 2 countries which used HOSO (Head-On; Shell On) for procurement, procurement prices in Vietnam were expressed as Headless; Shell On (HLSO)/kg purchased for HLSO/pound sizes. HLSO/pound sizes had therefore to be converted into HLSO/kg sizes (by dividing the values by 0.453) and the prices (originally for HLSO/kg) converted to HOSO by dividing by 1.5. For example, shrimp in the 20 HLSO/pound category were considered as 29.4 HOSO/kg (i.e. $20/0.453/1.5$) and if the price was VND 150,000 HLSO/kg it would be converted into VND 100,000 HOSO/kg.

This conversion process was recommended by the processors and was used only for the comparative analysis. After conversion, the processor procurement prices in the 3 case countries were compared using HOSO sizes 16-20, 26-30, 41-50 for Indonesia and Bangladesh and 19-22, 23-30, 38-44 for Vietnam.

The price trends in the 3 countries were compared in the original currency and in USD using exchange rates generated by Oanda (www.oanda.com) and in the same time line with the prices. This was done to identify as accurately as possible the price trends also in USD.

The differences in trends between the prices in the national currencies and in USD were also investigated to identify any potential apparent effects due to fluctuating exchange rates.

2.6. Time schedule

The data for this study were collected over the period from April 2006 to September 2006.

3. Vietnam case study

Executive Summary

The aim of this study was to look at the shrimp industry in Vietnam over the period 2000-2005, focusing particularly on unusual events within that period such as the US imposition of anti-dumping duties on Vietnam, the Indian Ocean tsunami and the subsequent impact of these events on the business and livelihoods of the main stakeholders involved in this sector.

The survey included a total of 88 shrimp farmers, 38 shrimp traders and 12 processors/exporters from the 4 provinces with the largest shrimp production in the Mekong Delta. Primary data were collected using questionnaires.

The shrimp farmers were quite experienced with an average time farming shrimp ranging from 5.1 years (I/SI farmers) to 10.7 years (IE farmers) while the shrimp trading experience of traders and processors averaged 10 and 13 years respectively. The educational level of shrimp traders was higher than that of shrimp farmers with 52.7% of the shrimp traders having finished secondary school or having achieved higher level education compared to 27.3% of farmers. A significant proportion of shrimp farmers (over 25%) had only an elementary school education. Higher educational level was observed with processing/export companies. More than 40% of shrimp farmers, traders and processors were involved also with other occupations.

The average shrimp culture area was 2.61 ha per farmer, varying from 0.20 to 25.0 ha. Most commonly farmers carried out one crop/year and most of the shrimp were harvested after 4-5 months from April to August, leading to a seasonal supply of both inputs for farming and raw materials for trading and processing activities. 60% of shrimp farmers practised monoculture of tiger shrimp while only 40% stocked tiger shrimp in integrated or rotational modes. Shrimp seed originated from hatcheries.

There was a trend among farmers to reduce the investment level, especially through reducing the stocking density and other major production costs. Consequently, both the total production of shrimp harvested per year and shrimp yield per crop decreased over the period examined (2004-2005).

A decreasing trend in volume traded was observed with all types of traders and processors from 2003 to 2005, which was generally caused by the fluctuation in shrimp prices and greater competition in the global market. These changes resulted in an increase in total costs and a reduction in net returns of these stakeholders.

The typical shrimp market chain observed was ***farmers-collectors-wholesalers-private companies-processors***. Shrimp farmers, especially intensive and semi-intensive, tended to sell shrimp directly to the private trading companies and processors/exporters.

There appear to be two major trends in shrimp prices in the Mekong Delta, a monthly change due to the tidal cycle, and a yearly fluctuation. Fifty-eight percent of the processors/exporters reported decreasing shrimp prices over time, while fluctuating prices were reported by 80.2% of the farmers and 81.6% of the traders.

The survey results showed that most of the respondents knew about the tsunami at the end of 2004. This event, however, was not believed to have had much influence on the shrimp industry in the Mekong Delta and Vietnam because it did not directly affect the Vietnamese coastline.

The imposition of US anti-dumping duties on Vietnamese shrimp was known to 84.7%, 97.4% and 100% of the surveyed farmers, shrimp traders and processors/exporters respectively. Interviewees complained that these duties resulted in a decrease in shrimp prices. Anti-dumping duties were also said to have had a negative impact on 69.0%, 73.7% and 100.0% of the respondents of these groups, respectively. In general, all the shrimp farmers, traders and processors/exporters who were impacted by the US anti-dumping duties have tried to find strategies to mitigate these negative impacts. The most important solutions were: (1) reduce production and marketing costs, (2) improve shrimp quality, and (3) increase the proportion of value added products for export.

The negative impacts experienced during this period are believed to have declined as a result of efforts to improve the links between different stakeholders, as well as better circulation of market information and improving all stakeholders' understanding of international trade requirements. It is also necessary to conduct studies of the impacts of anti-dumping on retail frozen shrimp prices, as well as consumers' behaviour within the US.

3.1. Introduction

The fishery sector plays an important role in the economy of Vietnam. For many years the development of the sector has depended on capture fisheries, although the contribution of aquaculture to the sector has become increasingly important. In 2005, from the total production of 3.432 million tonnes of aquatic products, aquaculture contributed 1.437 million tonnes (Figure 2).

The shrimp industry has developed mainly over the last decade and is believed to be the most economically important sector of Vietnamese aquaculture.

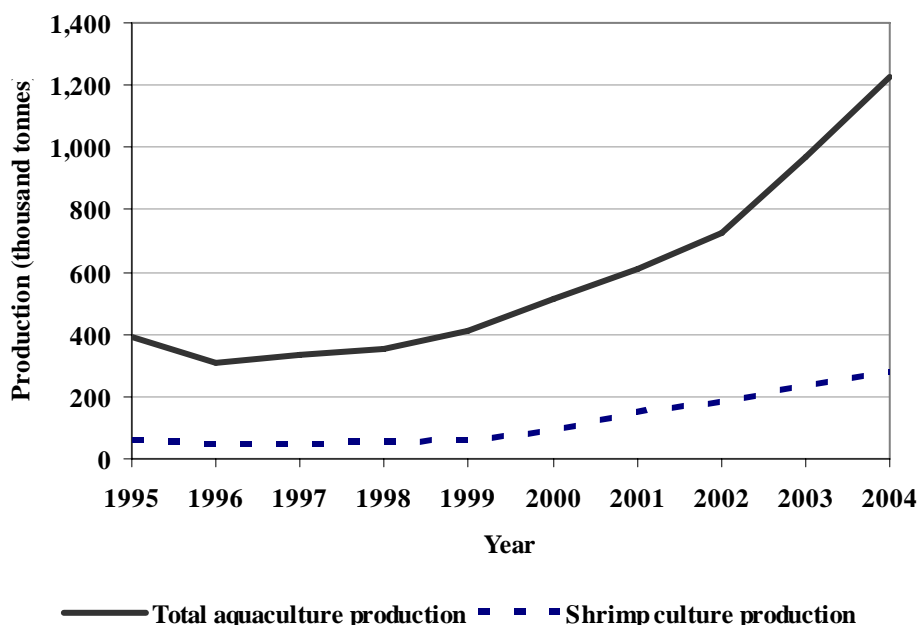


Figure 2 Shrimp culture production vs aquaculture production, Vietnam (FAO FISHSTAT Plus, 2006)

In 2005, Vietnam had approximately 540,000 ha of shrimp culture area and produced 330,200 tonnes of shrimp, contributing more than USD1.3 billion out of the total USD2.62 billion value of aquatic species exported from the country. The Mekong Delta is by far the largest shrimp producing area in Vietnam, the 8 coastal provinces having a total of 498,234 ha of shrimp farms and a production of 259,477 tonnes. Because more than 80% of the total shrimp production is exported, international markets have become increasingly important to the Vietnamese shrimp industry. However, a number of issues have limited development of the shrimp industry in Vietnam, among which the application of US anti-dumping duties on frozen shrimp imports from Vietnam has played an important role (MOFI, 2005).

The trend of shrimp farming in Vietnam and the Mekong Delta from 1990-2005 is shown in Figure 3 (MOFI, 2005). It is important to note that the area used for intensive (I) and semi-intensive (SI) shrimp farming in 2005 was about 10% of the total cultured area in the Mekong Delta, most of the production being conducted in improved extensive (IE) systems³.

³ Classification of farming systems was done following the definition of the Government of Vietnam which states that I, SI and IE systems have an expected productivity of 3, 1.5-3 and below 1.5/tons/ha/crop respectively (MOFI 2006)

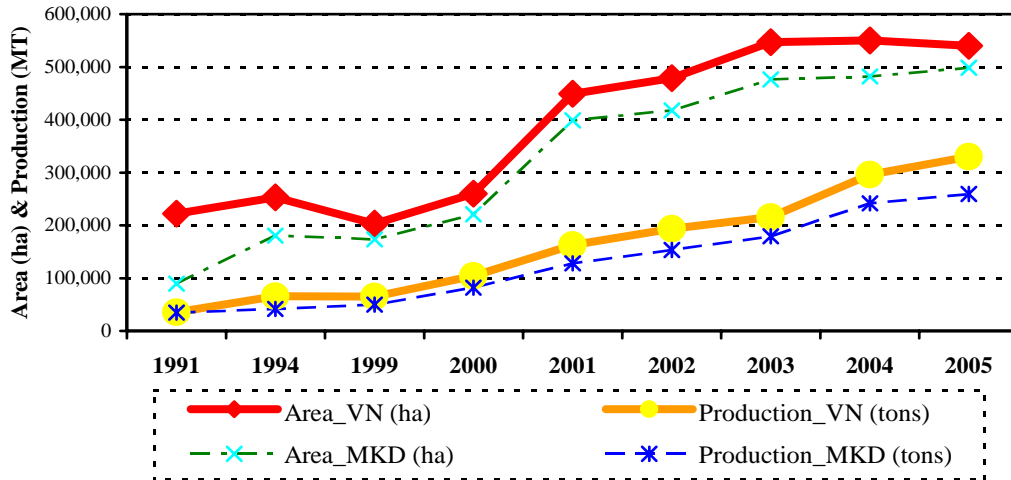


Figure 3 Culture area & production of coastal shrimp in Viet Nam & the Mekong Delta (MOFI, 1999-2005)

3.2. Methodology

Because of the overwhelming importance of the Mekong Delta which contributes more than 60% of total shrimp production and about 80% of the total shrimp production for export (MOFI, 2005), the survey was limited to the 4 biggest shrimp farming provinces in the Mekong delta, namely Ca Mau, Soc Trang, Bac Lieu and Ben Tre (Figure 4).

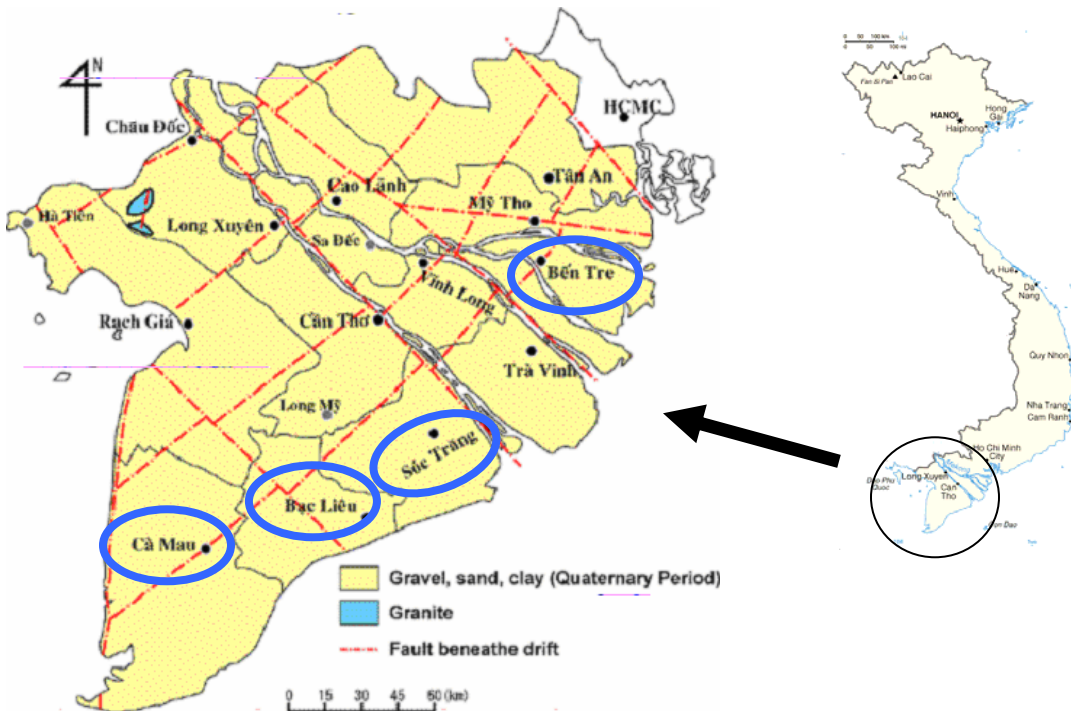


Figure 4 Map of study areas in the Mekong River Delta, Vietnam. From left to right these are Ca Mau, Bac Lieu, Soc Trang and Ben Tre (blue circles)

Primary data were collected from 3 groups of respondents in these provinces. The total sample size for the study was 138, including 12 processors/exporters, 38 shrimp traders, and 88 shrimp farmers of shrimp products. The shrimp traders

included 3 sub-groups. Collectors are individuals who generally collect small amounts of shrimp at the pond side. Wholesalers often have a shop where farmers bring their shrimp to sell them. Private trading companies have one or more shops and operate on a larger scale than wholesalers and collectors. Because of differences in the farming practices between semi-intensive (SI) or intensive (I) farmers when compared with improved extensive (IE) farmers, and in spite of the sector being overwhelmingly dominated by small scale IE producers, both groups were sampled in approximately equal proportions to obtain representative samples from both groups. The details of the interviewees are provided in Annex 1 to Annex 4.

Data were collected using questionnaires developed for each of the 3 stakeholder groups. Questionnaires were pre-tested before being used for data collection. Data on prices and quantity traded for the period 2003-2006 were taken from actual records maintained by the stakeholders, with the exception of farmers, who provided responses on socio-economic characteristics, incentive mechanisms, shrimp price trends and their effects, opinions on the effects of the tsunami and US anti-dumping and other business information mainly based on their memory.

Although it was intended to collect price information for a wide range of sizes, it was clear from questionnaire pre-testing that most interviewees were inclined to report only prices for the most popular count sizes. For this reason, information was often limited to the following sizes: 16-25 pieces/kg; 26-35 pieces/kg; 36-45 pieces/kg. The processors provided more detailed count sizes which were expressed in number of Head-Less Shell-On (HLSO) per pound although prices were expressed in HLSO/kg.

The data were processed using MS Access, Excel and SPSS for statistical analysis. Raw price data for every link in the supply chain were summarized using simple linear regression. Linear regression was also used to analyze price trends and to calculate the most likely prices at any point in time. (For more details on linear regression see General Methodology.)

Analyses were conducted only when the number of observations for a specific size and species allowed the analysis of that information to be done in a meaningful manner.

To support the results of the field study, relevant information on the profits of shrimp farmers in the Mekong River Delta before the imposition of US anti-dumping duties and on the value chain of tiger shrimp in Tra Vinh province was provided by Can Tho University.

3.3. Results and discussion

3.3.1. Socio-economic characteristics of the stakeholders

a. Farmers

The age of shrimp farmers varied from 25 to 75 years with an average of 45.8 years. More than 90% of the shrimp farmers were male. On average, the farmers had 8.1 years of shrimp farming experience.

On average, households consisted of 5.7 persons, comparable to the common household size of the farmers in the rest of the Delta (average 5.4 people/household) (MRD 2003).

Educational level was relatively low with more than one quarter of the shrimp farmers having stopped formal education at elementary school level and 27.3% having obtained high school or higher degrees. Lower education was particularly evident among IE farmers, with only 15% of farmers having reached high school degrees or higher.

Farmers' aquaculture technical knowledge was derived mainly from two sources: self-learning (66.7% of farmers), and short training courses offered by different types of institutions (60.7%). Only a small proportion of farmers (2.4%) attended professional programs from vocational schools and/or universities (Annex 5).

Shrimp farming was the occupation ranking first among the surveyed farmers. Trading was ranked second and third was crop cultivation. Working as hired labour was also considered an important source of income by about 4.5% of farmers.

The average total land area for I/SI farms was 3.9 ha, ranging from 0.24 to 25.0 ha. Within the total land area, the area under shrimp culture was 2.61 ha with an average of 6.5 ponds/ farm. The average land area of improved-extensive farms was 2.99 ha of which about 2.53 ha were used for shrimp farming with an average of 2.2 ponds/farm. On average, 85.4% and 23.4% of I/SI and IE farmers respectively had a sedimentation pond. Nursery ponds were used by 4.9% and 21.3% of I/SI and IE farmers respectively.

The majority of farmers (94.3%) were single owners of their farm and 4.5% had the farm shared with 2-4 others.

The most common cropping practice was a single annual crop with 63.4% of I/SI farmers and 55.3% IE farmers adopting this strategy. This probably reflects the effect that environmental conditions and disease occurrence has on shrimp culture and that was translated into the "one-crop-per-year" policy recommended by the Government of Vietnam. However, a significant proportion of farmers conducted two crops per year (29.3% of I/SI farmers and 34.0% of IE farmers). The remaining SI/I farmers completed 1.5 crops/year, while the remaining IE farmers conducted 3 crops per year. The average stocking density of I/SI and IE farms was 20.2 and 3.9 postlarvae/m²/crop respectively. Shrimp seed originated from hatcheries. In the absence of serious problems, the crop is harvested 4-5 months after stocking. Most of the stocked shrimp were harvested from April to August resulting in a very clear seasonal supply of both farming inputs and raw materials for trading and processing activities.

b. Traders

The age of shrimp traders varied from 24 to 52 years with an average of 40.7 years. The average experience in trading shrimp was 10.3 years, being shorter for collectors and longer for the owners of private trading companies.

The gender distribution among respondent traders was more even than for farmers with 63.2% male and 36.8% female. Educational level of shrimp traders seemed to be higher than that of shrimp farmers, with 52.7% of the shrimp traders having finished secondary school or higher level education.

About 60.5% of shrimp traders obtained their shrimp trading knowledge from short training courses while 34.2% learned the profession through personal experience with the remainder gathering trading knowledge during their University studies.

Among the surveyed traders, 65.8% traded only shrimp whilst 7.9% of them also traded feed and medicines for shrimp culture. Other occupations were generally minor. Most traders operated the business by themselves, only 5.3% working with others (2-4 owners/business).

c. Processors

The average age of the owners of the processing/export companies was 44.2 years (Annex 5) and the majority (91.7%) were male. These owners/managers had

generally a high level of education with 91.7% having a bachelors degree and 8.3% holding a masters.

The average experience in shrimp trading/processing among the respondents was 13.3 years. The knowledge and skills in trading shrimp were gathered from different sources: short training courses (55.6% of respondents), self-learning (33.3%), and from university studies (22.2%). The knowledge and skills in processing of aquatic products had also been obtained by different sources such as short training courses (50.0% of respondents), self-learning (41.7%) and from university studies (25.0%).

Among 12 companies, 5 had invested in their own shrimp farms and 1 also had fishing activities. There is a trend for the processors/exporters to want to develop their own farms to improve product quality and obtain a more consistent supply of shrimp.

Detailed information on the socio-economic characteristics of the farmers, traders and processors is provided in Annex 5. Information on the investment of the farmers can be found in Annex 6.

3.3.2. Volume changes of commodities traded

The average volume of aquatic products traded by 3 sub-groups of traders from 2003 to 2005 is provided (Figure 5). Among 38 shrimp traders, 18 traded white shrimp and 15 traded *P. merguensis* shrimp and one trader who reported trading *P. vannamei* (500 tonnes). *P. monodon* shrimp represented the major proportion of the total volume of all aquatic products traded. In 2005, it represented 53%, 55% and 79% of shrimp quantity traded by collectors, wholesalers and private companies respectively. For processors, *P. monodon* was 68% of the total shrimp volume processed.

The volume of shrimp traded by collectors seemed to increase during the period 2003-2005. For the wholesalers, the procurement volume decreased due to higher competition within this group. However, procurement volume of the private trading companies was rather stable, with a slight increase of tiger shrimp traded. The processors' procurement volume of the three shrimp species (*P. monodon*, *P. merguensis* and other white shrimp), however, increased during 2003-2005 although the contribution of tiger shrimp was reported to have decreased, being 76%, 67% and 68% of the total quantity of raw material traded in 2003, 2004 and 2005 respectively. More than half of the total number of shrimp traders (57.4%) had insufficient supplies of fresh shrimp for trading, and the proportion of processors/exporters reporting this issue was even higher (66.7%). The main perceived reasons for this were the low rate of success among farmers and increased competition.

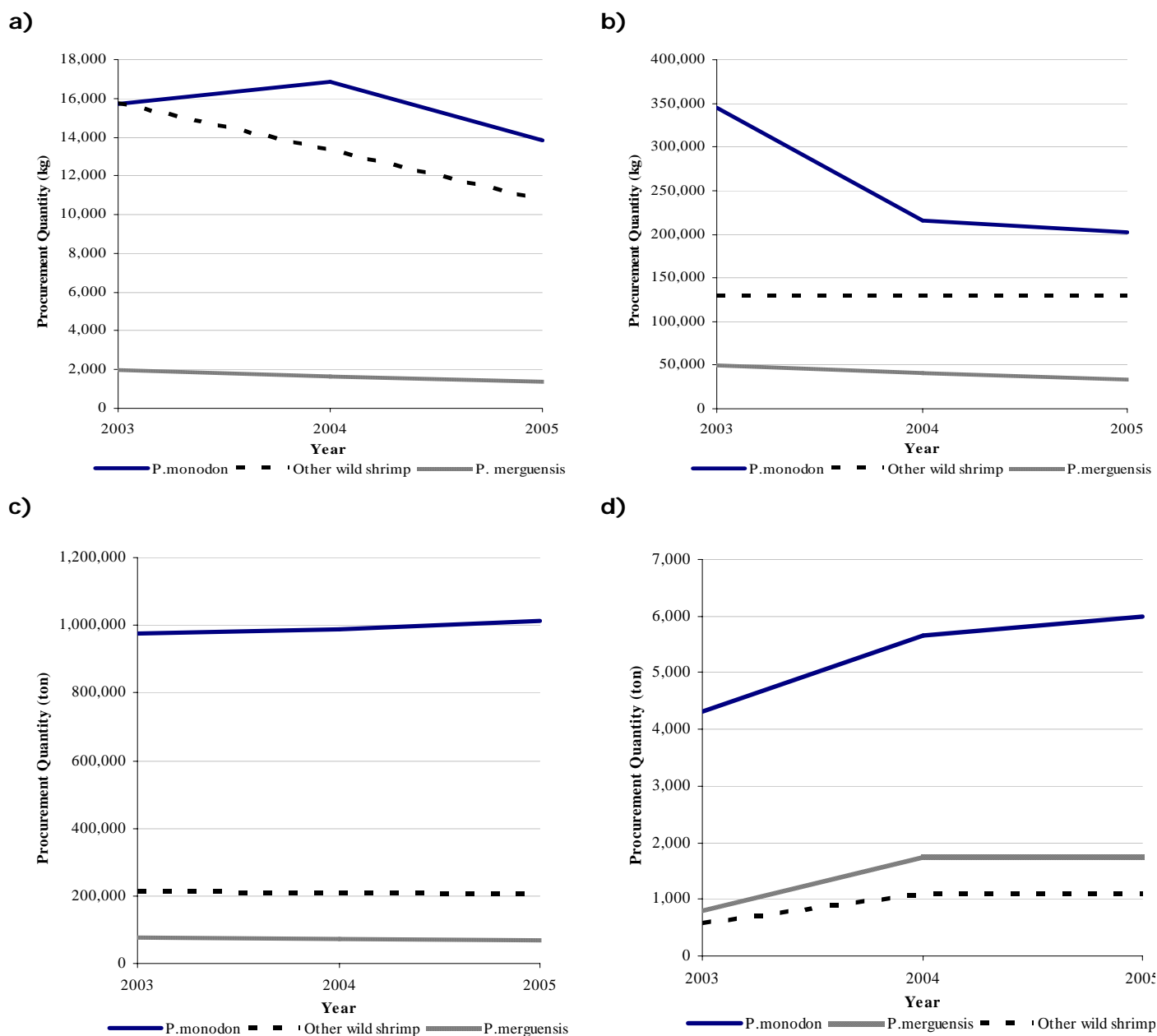


Figure 5 Average procurement quantity of the collectors (a), wholesalers (b), private trading companies (c) and processors (d), Vietnam

The details of shrimp volume traded by collectors, wholesalers, private companies and processors during the period 2003-2005 are provided in Annex 7.

3.3.3. Changes taking place between 2004 and 2005

a. Overall changes

Most of the farmers did not change the total area used for shrimp farming but about 6.3% and 34.1% of the farmers reduced their level of investment and production costs respectively. However, this was offset by an almost equal proportion of farmers who increased investment and production costs (10.1% and 28.4% respectively). Some farmers (11.8%) reduced the number of crops per year, possibly due to a higher risk of failure in the second crop. More farmers reported stocking postlarvae earlier than before (15.6%) than those who delayed stocking (5.2%), and 36.3% of farmers changed the number of days from stocking to harvesting (8.8% making it

shorter). Reasons given for changing the length of the crop cycle were slower shrimp growth, falling shrimp prices and the occurrence of shrimp diseases. Thirty-four percent of the farmers decreased stocking density while 15% of them reported increasing it. A relatively high proportion (32.4%) of farmers reporting a change in their seed supplier was also observed. There were 14.8% of the farmers who decreased the use of feed while 17.1% increased it. This was mainly due to changes in stocking density, stocking times and survival rates. More than 20% of farmers reduced the amount of drugs/chemicals used while 13.6% applied more on their crop.

The harvested shrimp were sold to different types of traders. However, I/SI farmers tended to sell shrimp directly to the private trading companies and processors/exporters, while IE farmers sold mainly to collectors and wholesalers

The share of net profit from shrimp culture out of the farmer households' total profit decreased slightly, going from 77% in 2004 to 70% in 2005. This change reflected a decrease in net profit from shrimp farming activities. An impressive decrease in the savings of the shrimp farming households could be observed from 2004 to 2005. Savings went from VND133.7 million/ household/ year to VND65.3 million/ household/ year in I/SI farms. The reduction in savings of IE farmers was even more significant, going from VND22.7 million to VND9.6 million.

The perception of the changes reported by the interviewees is shown in Annex 8.

b. Description and evaluation of the 1st production cycles in 2004 and 2005

There was hardly any change in farmed species or farm management between 2004 and 2005. Most of the farmers stocked the first crop during January to March. There was not much change in time of stocking for each farmer in 2004 and 2005.

A total of 21.6% of farmers reported a decreased average stocking density in the 1st crop while 20.5% of them said that stocking density had been increased. Hatcheries were the only source of shrimp PL for the shrimp farmers in both years examined. Forty-one percent of the shrimp farmers reported that the yield of tiger shrimp harvested from crop 1 in 2004 was slightly higher than that in 2005 while 43% said that they had better harvest in 2005 with the remainder reporting no difference between the two years.

Harvesting took place during March through August for most of the farmers although some of them harvested in other months depending on the stocking time, weather and shrimp health. Most (58%) farmers harvested their crop once a year. Higher numbers of harvests were also reported for various, ranging from 2 times to as high as 24 times in 1 case. This was due to the use of a strategy of multiple partial harvests during a single crop by some farmers (mainly IE ones). The survey indicated a small reduction in the production cost/crop in 2005 compared with 2004. However, there was a high variability (SD) in the amounts spent. The details of variable costs can be observed in Annex 9.

A decrease in the total net return generated from shrimp farming between 2004 and 2005 could be observed. This was most likely due to the fact that the reduced production cost could not balance the reduced shrimp yield between the 2 years.

3.3.4. Shrimp price trend analysis

The monthly price of all sizes of shrimp fluctuated over time, the price being low when there was no or very little harvesting activity. However, the lowest prices were observed during the first months of the application of anti-dumping duties.

Farmers

In general, the prices obtained by farmers were stable during 2004-2005 with a slightly increasing trend for the 36-45 size (Figure 6).

a)

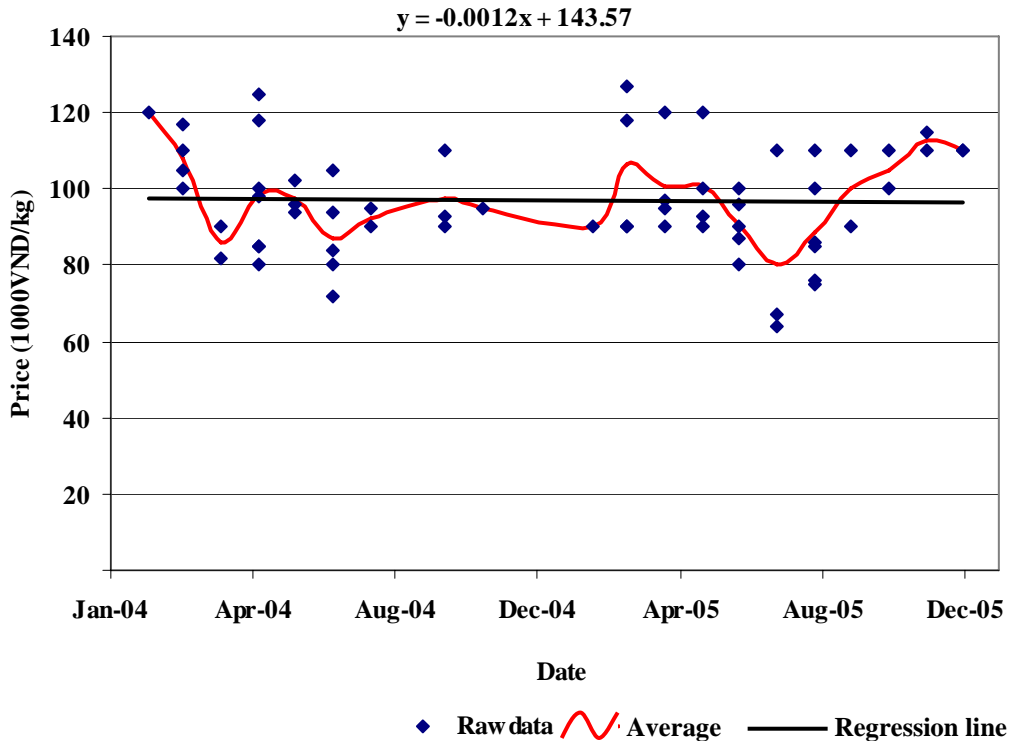


Figure 6 Scatters of actual sale prices of *P. monodon* for farmers, size 26-35 (a), Vietnam

b)

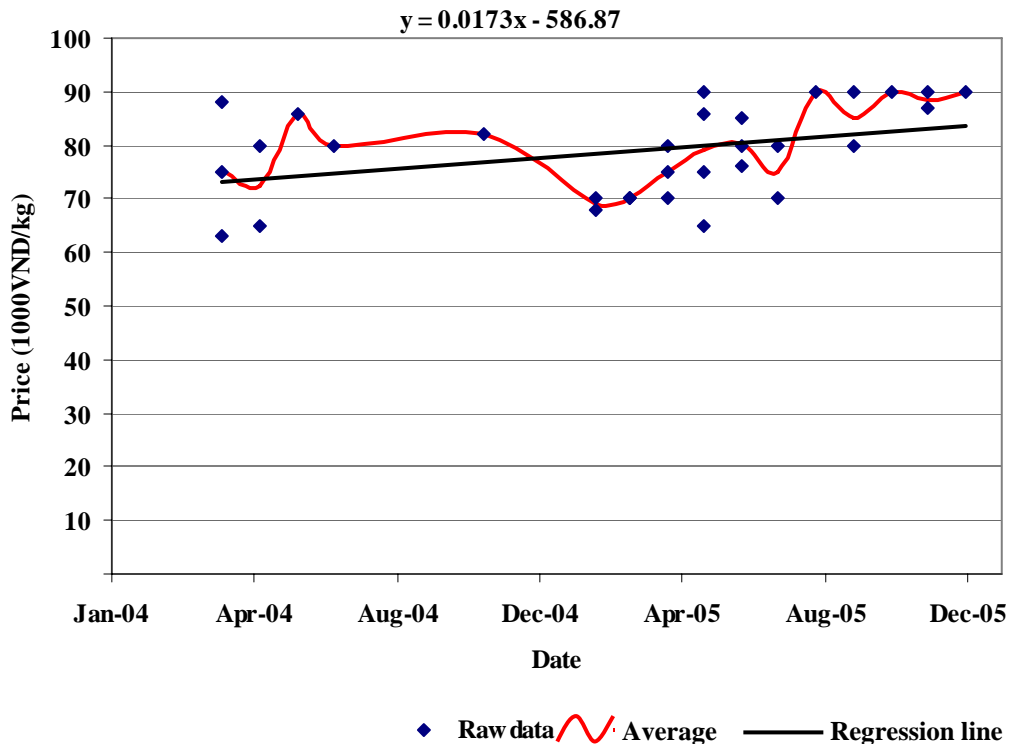
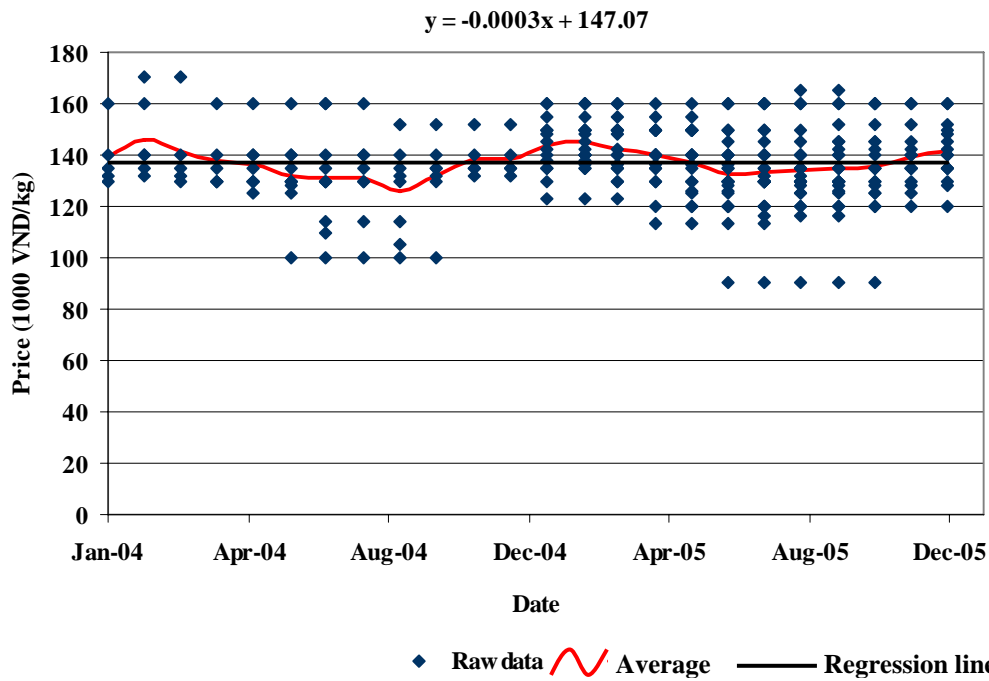


Figure 6 Scatters of actual sale prices of *P. monodon* for farmers, size 36-45 (b), Vietnam

Traders

The trend in buying and selling prices by traders for the 3 most typical sizes (16-25 pieces/kg, 26-35 pieces/kg and 36-45 pieces/kg) can be observed in Figure 7. The monthly price for all sizes of shrimp fluctuated over time and the lowest prices were reported during the first months of anti-dumping duties. Except for size 16-25, a generally decreasing trend can be seen.

a)



b)

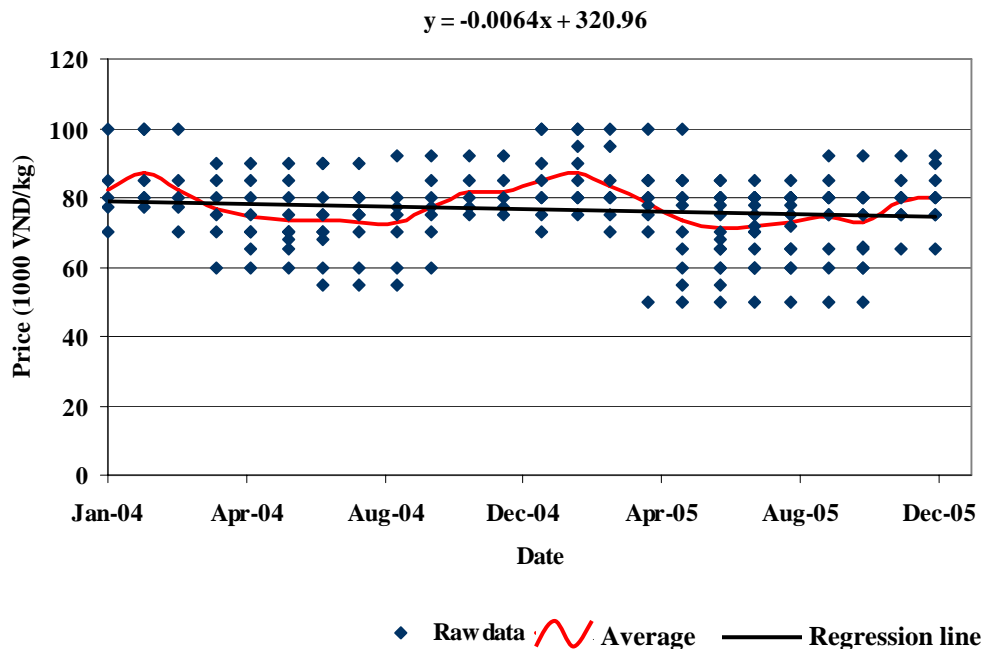


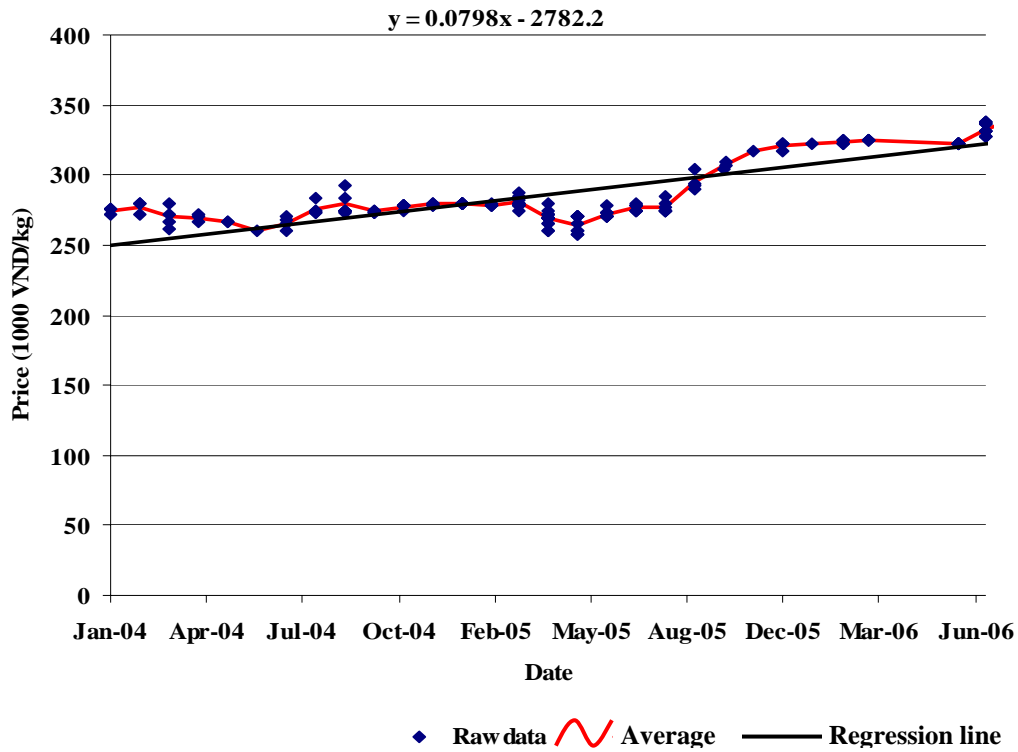
Figure 7 Scatters of actual procurement prices of *P. monodon* for traders, size 16-25 (a) and size 36-45 (b), Vietnam

Processors

After purchase, the shrimp were re-classified into the following HLSO sizes (measured in pieces per pound): up to 8 (U8), 8-12, 13-15, 16-20, 21-25, 26-30, 31-40, 41-50, 51-60, 61-70, and 71-90. Unlike the prices received by the farmers

and paid by the middlemen, the procurement prices reported by the processors show an increasing trend for most sizes, with bigger sizes facing steeper increases (Figure 8).

a)



b)

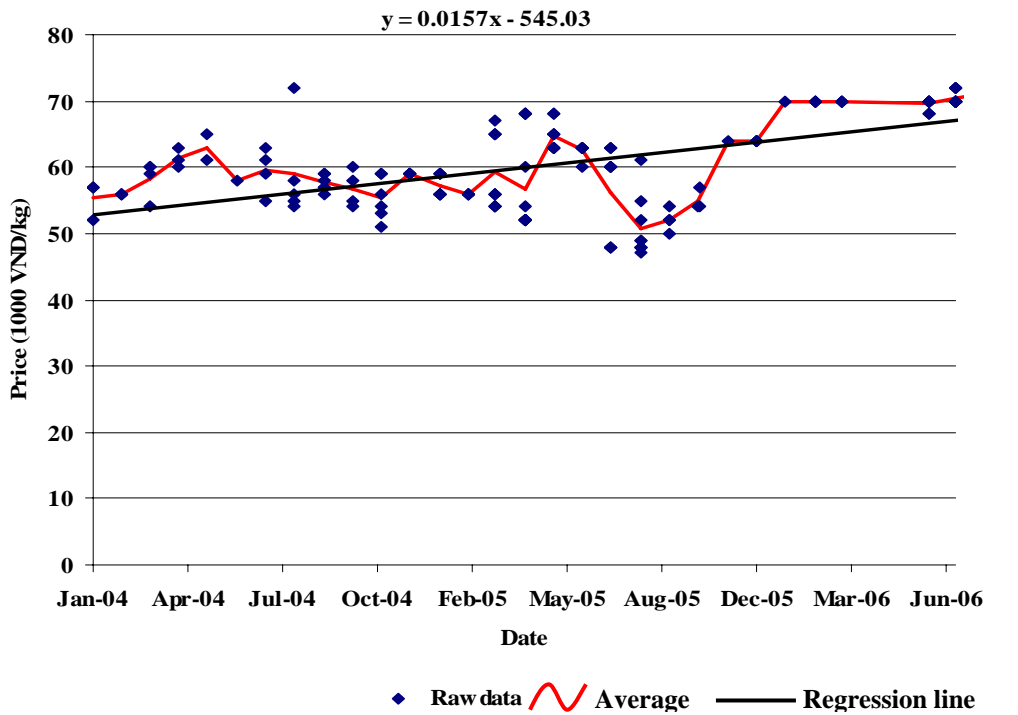


Figure 8 Scatters of actual procurement prices of *P. monodon* for processors, size U8 (a) and size 61-70 (b), Vietnam

Seasonal fluctuation in prices could also be observed. A remarkable drop in shrimp prices during the first months of the anti-dumping duties (from February to August 2005) was noted, with the biggest negative impact on smaller-sized shrimp. Table 5 summarizes the trends of prices for the stakeholders in Vietnam. For more information on monthly average prices, see Annexes 10 to 12.

Table 5 Price trends of stakeholders in Vietnam

Unit: 1000 VND/kg

Stakeholders	Size	Slope	Intercept	Jan-04	Jan-06
Farmers	26-35	-0.0012	143.57	97.52	96.64
	36-45	0.0173	-586.87	71.51	84.18
Traders	16-25	-0.0003	147.07	137.09	136.90
	26-35	-0.0071	370.95	99.98	94.77
	36-45	-0.0064	320.96	79.06	74.41
Processors	U8	0.0798	-2782.23	249.35	307.69
	8-12	0.0590	-2036.10	204.80	247.92
	13-15	0.0130	-292.75	199.56	209.04
	16-20	-0.0018	220.58	153.61	152.32
	21-25	0.0050	-69.00	120.21	123.85
	26-30	0.0080	-198.41	104.90	110.74
	31-40	0.0241	-839.42	76.14	93.76
	41-50	0.0241	-849.50	64.44	82.02
	51-60	0.0231	-820.61	55.66	72.53
	61-70	0.0157	-545.03	52.84	64.34
	71-90	0.0174	-613.29	46.27	58.96

Perceived reasons and impact of price trends

About 3/4 (72.7%) of farmers who reported changes in shrimp prices since 2004 said that the prices were decreasing. There were some differences in the perception of price changes between the I/SI farmers and the IE farmers. Almost 25% of the I/SI farmers reported decreasing prices compared to only 8.9% of IE farmers. The proportion of traders who reported a decreasing trend in shrimp prices was 62.5%. Differences in perception of price trends were also found among the different groups of traders: 18.2% of collectors said that prices decreased over time compared to 33.3% and 11.1% for wholesalers and trading companies, respectively. The percentage of processors/exporters reporting decreasing prices was 80.0%. The remaining farmers, traders and processors/exporters commented that the shrimp prices had been fluctuating greatly since 2004.

All of the stakeholder groups considered that seasonality of production was the most important reason for the changes of shrimp prices in the Mekong Delta, with a relative lack of raw materials (shrimp) in November-May and a relative lack of processing capacity during the peak harvest season from June to October. In addition, different groups highlighted other factors as playing a role. Farmers and traders emphasized the uncertainty in harvested shrimp quality. Farmers also mentioned fluctuation in international markets and traders' behaviour as important reasons. Traders were concerned with higher competition between each other, and processors/exporters said that more competition in the international markets, higher costs and increased difficulties in payment and liquidation were their main problems. The US anti-dumping duties were perceived as being a major factor influencing prices after the middle of 2004, i.e. 6 months before the duties officially took effect for Vietnam.

The changes in shrimp prices had different effects on different stakeholder groups (Table 6). These effects were reported to be mostly negative, although positive

effects. Examples of positive effects were perceived lower prices paid by consumers and importers, although the actual short term effects on consumers has yet to be investigated. On the contrary, perceived negative effects were reported for lower links in the supply chain. The processors were the first link being negatively affected by price changes, reporting increased difficulties in payment and liquidation causing higher costs for shrimp exporting, which most likely resulted in lower export revenues. Lower profits induced processors to decrease the cost associated with hiring labour, possibly indicating a reduction in the number of people hired or decreased salaries. Wholesalers and collectors were also negatively affected by changing prices. However, both the traders and processors commented that they have been trying to find out the ways to keep their marginal profit unchanged by adjusting the buying price to follow the fluctuation of reselling price of the final products. This invariably had an effect on the shrimp farmers, who were reported to be the most negatively impacted link in the supply chain being squeezed between increasing input costs on the one hand and reduced prices on the other.

Table 6 Stakeholder groups perceived as being affected by the changes in shrimp prices in Vietnam

Affected stakeholders		Respondent categories					
		Farmers	Traders	Pro/Exp	Farmers	Traders	Pro/Exp
		Negative impacts			Positive impacts		
Number of respondents	n	75	35	12	47	9	10
Farmers	%	100.0	85.7	100.0			
Collectors	%	4.0	25.7	16.7	72.3	33.3	
Wholesalers	%		31.4	8.3	59.6	33.3	
Private trading companies	%		14.3	8.3	31.9	22.2	
Processors/Exporters	%	4.0	8.6	50.0	34.0	100.0	
Labours in the processing Com.	%			33.3			
Input suppliers	%	1.3		50.0			
Tax-carried countries	%			16.7			
Small scale importers	%			8.3			
Big import countries	%	1.3			6.4		50.0
End consumers	%			50.0			40.0
US shrimp Association	%						10.0

3.3.5. Supply chain analysis

Overall, the harvested shrimp were sold by the farmers involved in the survey as follows: 44.1% to the collectors; 40.0% to the wholesalers; 7.3% to the private trading companies; 8.3% to the processors/exporters; and the remaining 0.3% to the local markets or super markets (Figure 9).

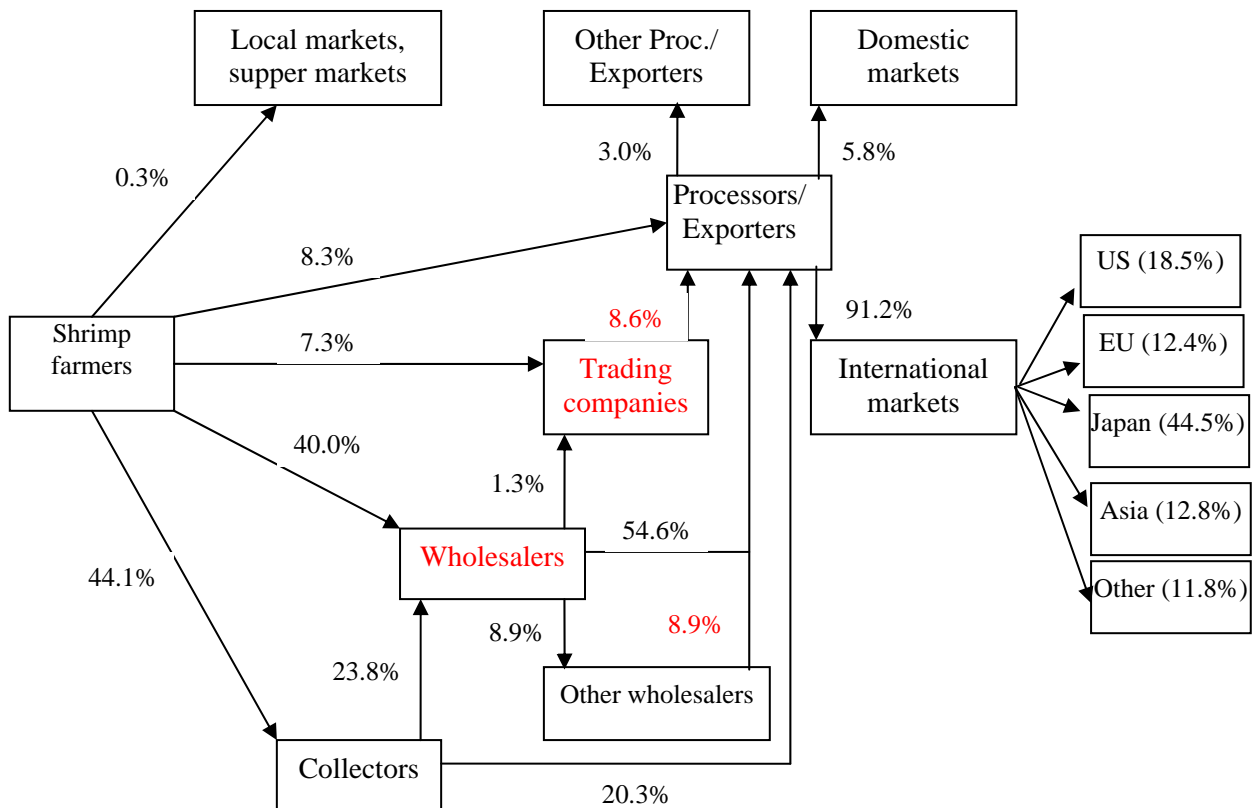


Figure 9 Marketing channels of *P. monodon* shrimp in the Mekong Delta

(1.3% lost by trading companies and 1.0% lost by the wholesalers)

However, it should be borne in mind that there was a significant difference in the trading patterns between the I/SI and IE farmers. The I/SI farmers sold more shrimp to big-scale traders (wholesalers, private trading companies, processors/exporters) while, with multi-harvests and smaller amount of shrimp per harvest, the IE farmers sold all of their shrimp to collectors and wholesalers.

It is clear that most of the raw tiger shrimp for processors/exporters in the Mekong Delta were supplied via the network of wholesalers (62.5% of the total volume of raw shrimp). Raw shrimp were also bought and resold between wholesalers. About 1.0% of the total amount of raw shrimp traded via the wholesalers was lost, while the proportion of shrimp lost by private trading companies was 1.3%. Raw materials might have been lost because of quality degradation and for the grading of shrimp during the transportation and pre-processing procedures. Due to the seasonality of the supply of raw shrimp and seasonal participation in shrimp processing of some fish/clam-based processors/exporters, about 3% of the total volume of raw shrimp was traded between processors. Finally, 95.7% of the total amount of traded raw tiger shrimp were processed and exported to the international markets, especially to Japan, US and European countries (Table 7). Since the anti-dumping duties were introduced a significant market expansion to European and Asian countries was observed while the share to the US was reduced.

Table 7 Composition of the total exported amount of shrimp products by the markets and type of products

	2004	2005	% of change
By the markets % of the total amount exported	100.0	100.0	
+ US	21.8	18.5	-15.1
+ EU	9.7	12.4	27.8
+ Japan	46.1	44.5	-3.5
+ Asia	10.8	12.8	18.5
+ Others	11.7	11.8	0.9
By the type of products % of the total amount exported	100.0	100.0	
+ HOSO	10.2	13.5	32.4
+ HLSO	43.5	40.4	-7.1
+ PUD	20.8	20.8	0.0
+ BTO cooked	15.9	15.6	-1.9
+ Others	9.7	9.7	0.0
By the type of packaging % of the total amount exported	100.0	100.0	
+ BLOCK	53.6	49.3	-8.0
+ IQF	29.8	32.9	10.4
+ Semi-IQF	10.7	10.3	-3.7
+ Others	6.0	7.5	25.0

The Vietnamese incentive system was rather complex. There were 84/88 shrimp farmers, 17/38 shrimp traders and 8/12 processors/exporters receiving incentives from the other stakeholders. The incentives received consisted mainly of: administrative support, loans, technical advice/training, food safety knowledge, market information, shrimp seed, feed, and chemicals/medicines. The processors were major players in this incentive system. The incentives included: loans or capital (77.8%), technical advices (55.6%), ice and transportation (33.3%), shrimp seed (22.2%), feed (22.2%), chemicals/medicines (11.1%), and training on food safety (11.1%). The incentives encouraged the supply of shrimp from both wholesaler and farmers.

Wholesalers benefited not only from processors' support, but also from farmers in terms of information of shrimp harvest, of shrimp quality and quantity, and priority in shrimp procurement.

The proportion of stakeholders who provided and received incentives is presented in Figure 10 and Annex 13.

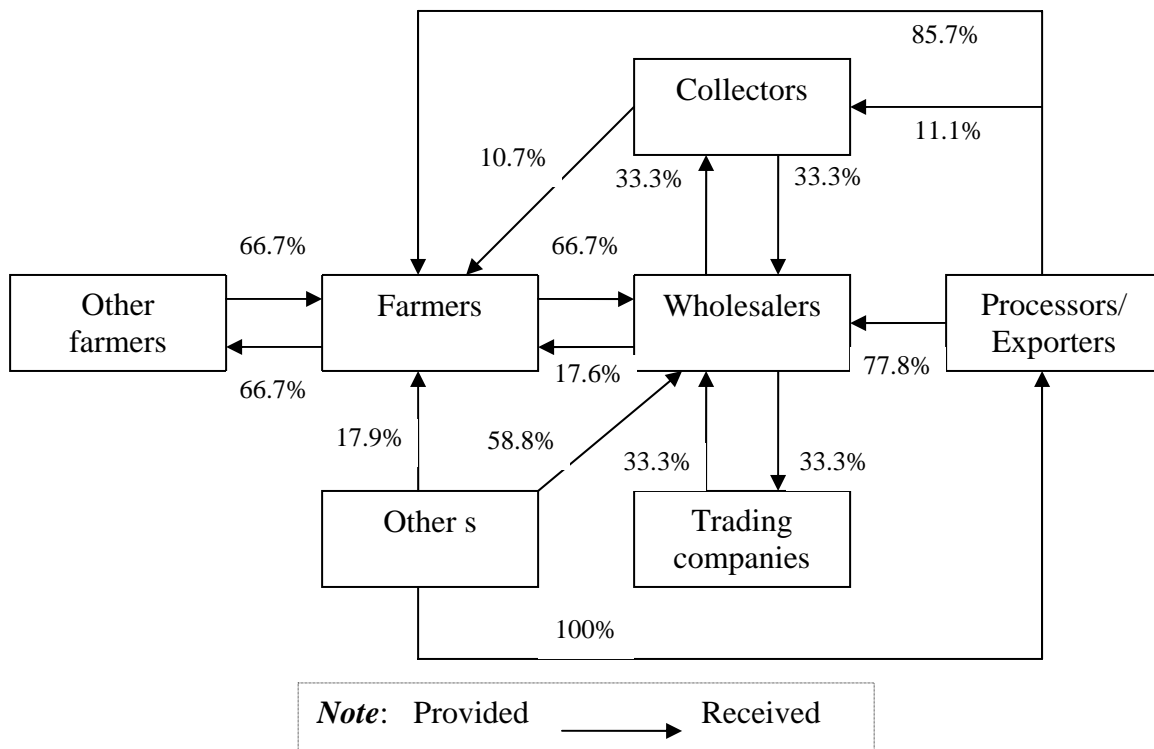


Figure 10 Proportion of the number of stakeholders who provided and received the incentives from the others, Vietnam

3.3.6. Impact of tsunami and US anti-dumping or other events

a. Tsunami

There were 81%, 86.8% and 91.7% of the surveyed farmers, shrimp traders and processors/exporters, respectively who knew about the Indian Ocean tsunami. However, the impacts of the tsunami on the Vietnamese stakeholders appeared minimal as only 7 of 88 farmers, 3 of 38 traders and 5 of 12 processors/exporters perceived themselves as having been affected (Annex 14).

Farmers perceiving that they were affected worried about the impact of the tsunami on the environment which could result in human diseases (4 people) or led them to a reduction in investment (2 people) or complained of an increase in the price of common goods (1 person).

Affected traders identified effects such as the reduction in investment and tourism, a lack of raw shrimp, and an increase in the price of common goods.

Processors/exporters that indicated the greatest level of impact from the tsunami were those who pointed to a decline in availability of ocean caught shrimp (40.0%).

b. US anti-dumping duties

A total of 84.7%, 97.4% and 100.0% of the surveyed farmers, shrimp traders and processors/exporters respectively were aware of the US anti-dumping case in 2004 (Annex 14).

In general, as a result of US anti-dumping duties, all the groups of respondents were concerned with a decrease in shrimp prices, an increase in trade barriers, greater competition for international markets and more intense price fluctuations. Anti-dumping duties were said to have a negative impact on 69.0%, 73.7% and 100.0%

of shrimp farmers, traders and processors/exporters who participated in the survey respectively.

Almost all the affected farmers (96.4%) emphasized the decrease in shrimp prices. Similarly, the most important impact reported by traders was a decrease in shrimp prices (71.4%), a strong reduction in profits which led farmers to reduce production, resulting in insufficient supplies of raw shrimp (21.5%) and the fear of greater competition in shrimp trading (4.3%) (Annex 15).

Allegedly, immediately after the US anti-dumping, 33.3% of interviewed processors/exporters had to stop exporting their shrimp products to the US market for about half a year. A total of 58.3% of the processors/exporters said that greater competition in the marketing of shrimp products was their most important concern. They also considered other important impacts of the US anti-dumping such as the request for payment of bond since the middle of 2005, which led to higher transaction costs (33.3%), a decrease of shrimp prices internationally (25.0%), an increase in international trade barriers (16.7%), and more difficult payment and liquidation (16.7%) (Annex 15). They also mentioned a need to improve their knowledge on international trade (25.0%),

When asked to rank potential solutions to mitigate the impacts of the US anti-dumping duties, farmers focused on identifying ways to help them reduce production costs (70%), produce better quality shrimp (25.0%) and improve the farmer-trader relationship (25.0%).

About 20% of the traders identified 3 potential solutions, including a reduction in trading costs, improving the quality of shrimp traded, and waiting for an increase in shrimp prices. Traders also reported having adjusted their buying prices in order to keep the same level of net returns.

More potential solutions were proposed by the third group of interviewees. About 50% of the processors/exporters emphasized the importance of a higher capability to compete in the market. Forty percent said that they needed to focus on market penetration and expansion. Upgrading of processing techniques and improvement in quality management were also considered potential solutions (30%). Other strategies consisted of increasing savings from processing and export, better seller-buyer relationship, improvement in the technical skills of their employees, as well as trading shrimp of larger sizes and improving their knowledge of international trade rules.

About 91.7% of the total number of processors/exporters reported other international trade issues affecting some Asian countries, both positively and negatively, since 2004. Livestock and poultry diseases brought more opportunities for aquatic products (60.0%). However, greater competition on the international market, fluctuation of exchange rates, as well as higher fuel prices, and a higher interest rate on loans also appeared to play a role (37.5%; 37.5%; 25.0% and 20.0%, respectively). These international trade issues were said to have an effect on about 66.7% of the total number of processors/exporters.

The details of proposed solutions to mitigate the impacts of the US anti-dumping case can be found in Annex 16.

3.3.7. Additional secondary information

A survey conducted by Sinh, et al. (2005) before the imposition of the US anti-dumping duties on Vietnamese shrimp reported that about 25-30% of the total number of shrimp farmers in the Delta reported an economic loss showing that the shrimp farming sector was facing difficulties even before the introduction of the duties.

Sinh and Phuong (2006) also conducted a detailed value chain study of tiger shrimp in Tra Vinh province (also in the Mekong Delta), identifying the following factors in order of importance: (1) production and technology, (2) supply of the major inputs, (3) finance and investment, (4) infrastructure, (5) processing and development of products, (6) marketing and promotion, (7) policies and regulations, (8) organisation, management and linkages. It is believed that these factors should be properly addressed to achieve the sustainable development of the sector.

3.4. Conclusions and recommendations

The Vietnamese shrimp industry has been developing very rapidly over the past decade. This growth has, however, led to a number of constraints that have threatened the sustainability of the sector. In addition to environmental pollution, diseases and quality issues, economic factors such as fluctuating shrimp prices are playing an increasing role.

This study identified 2 major trends of shrimp prices in the Mekong Delta, one is a monthly change due to the tides, which influenced the IE farmers' harvesting activities, and the other is an annual price fluctuation due to the seasonality of shrimp culture, especially in I/SI farming systems. The price of shrimp was reported to decrease over time by more than half the number of processors/exporters, 30% of traders and more than 20% of farmers. Other respondents reported a fluctuation in prices.

The tsunami at the end of 2004 was known by most of the respondents. This unusual event, however, was said to have little direct influence on the shrimp industry in the Mekong Delta and Vietnam. However, there was some concern about the environmental and market impacts caused by this event at the regional level.

As expected, many surveyed farmers, shrimp traders and processors/exporters knew about the US anti-dumping case in 2004. This was blamed for decreased shrimp prices and was said to have had impacts even before the official application of anti-dumping duties. Negative impacts affected all the stakeholder groups involved in the shrimp supply chain. However, the industry appeared to have recovered from those initial negative effects, perhaps as a consequence of the market expansion to other countries, which was partly possible because of an increased consumption of fisheries products in importing countries as substitute for poultry during the 2004-2005 Avian Influenza outbreaks.

Stakeholders have been trying to determine ways that will help them to mitigate the impacts of the anti-dumping duties. The most important solutions identified are: (1) reducing production and marketing costs, (2) improving the quality of shrimp, and (3) increasing the proportion of value added products for export.

All the impacts of the US anti-dumping case and solutions proposed by the different stakeholders need to be given consideration. These solutions will be effective only if the links between the stakeholders are improved along with stronger government support to provide market information and a better understanding of international trade. Study of the impacts of US anti-dumping duties on the retail price of frozen shrimp and on consumers' behaviour in the US would also appear to be important to fully understand the short term and long term effects of these trade measures. In addition, more studies on international trade and marketing of shrimp would be useful.

4. Indonesia case study

Executive Summary

This study examined the shrimp farming sector of Indonesia over the past 5 years (2000-2005), focusing particularly on the potential effect of the unusual events occurring between 2004 and 2005, such as the Indian Ocean tsunami and the US anti-dumping duties.

A total of 190 stakeholders comprising 160 farmers, 23 traders and 7 processors from 6 districts of 3 provinces of Indonesia were interviewed. Primary data were collected using questionnaires and, where possible, actual records of sales of shrimp transactions.

The average age of the selected groups of stakeholders ranged from 41 to 46 years. The processors were the youngest group followed by the traders and the farmers. Nevertheless, the processors were the most experienced in their business. The average experience in the shrimp business ranged between 11.7 (farmers) and 17.5 (processors) years. The farmers were also of lowest educational level. All of the processors (processing mill owners) surveyed were university/college graduated (100%). Traders and farmers had supplementary occupations but the processors were solely dedicated to the processing/exporting business.

Tiger shrimp was the main species produced by the surveyed farmers. Most of the surveyed farmers stocked shrimp in polyculture with milkfish (*Chanos chanos*). Harvesting of shrimp took place throughout the year. Three quarters of the farmers sold their products to collectors and, to a limited extent, to wholesalers and processors, with farmers in East Java being more likely to sell directly to wholesalers and processors compared with farmers in other provinces.

Over the past few years, a number of significant changes could be detected. The yield of the first crop declined remarkably in 2005 compared with 2004. Although Tiger shrimp remained the most important traded commodity, the traded amounts of both this species and white shrimp other than *P. vannamei* decreased over time, while *P. vannamei* trading appeared to be on the rise.

Shrimp prices for most count sizes and for most stakeholder groups decreased over the study period. The main reasons alleged by farmers for decreasing farm gate prices were exploitation of farmers by traders and processors. Procurement prices of fresh shrimp paid by traders and processors to farmers were reported by them to be decreasing mainly because of increased competition for raw materials.

As expected, the overwhelming majority of farmers and traders knew about the occurrence of the tsunami on December 2004 but only 24.8% of farmers and 37.3% of traders said that the event impacted their business. Over 98% of the processors, however, said that their business had been affected. The decreased availability of fresh shrimp and the almost simultaneous introduction of anti-dumping duties by the US on several neighbouring countries allegedly led to the import and re-export of shrimp from affected countries by processors, further contributing to lowering shrimp prices.

In general, Indonesian shrimp appeared to be facing several problems, not simply associated with these unusual events but also due to a limited capacity to supply international markets requesting quality products.

4.1. Introduction

Indonesia is currently the ninth largest fish producer in the world. Data from DGCF and DGAF indicate that from 1994-2003, fish production increased by an average of 5% per year, from 3.82 million tonnes (t) in 1994 to an estimated 5.92 million tonnes in 2003, about 80% of which comes from capture fisheries, the remainder being produced through aquaculture and inland water capture fisheries.

Total aquaculture production followed the trend of many other Asian countries, with a rapid increase in production from 703,522 tonnes in 1994 to 1.47 million tonnes in 2004 (FAO FISHSTAT Plus, 2006). This growth was a result of technological innovations, aquaculture area expansion, and availability of suitable quality and quantity of fish seed. Aquaculture in Indonesia is carried out in marine, brackish and freshwater ponds, fixed or floating cages in coastal or marine areas, and in freshwater lakes, rivers, and reservoirs, as well as in rice paddies.

Freshwater aquaculture is dominated by the farming of carps, tilapia, catfishes, gourami and prawns (*Macrobrachium rosenbergii*), while the main marine species cultures are grouper and seaweed. However, farming in brackishwater environments is by far the most important form of aquaculture in Indonesia, with shrimp playing a key role in the sector, in addition to pond culture of milkfish (*Chanos chanos*). In fact, brackishwater aquaculture contributes 38% of the total Indonesian aquaculture production in quantity and almost 3/4 (71.5%) in value (Cholik *et al.*, 2005).

Until recently, shrimp farming in Indonesia was dominated by tiger shrimp (*P. monodon*) and to a lesser extent Asian 'white' shrimps (*P. indicus* and *P. merguensis*). The culture of tiger shrimp began in the late 1970s, and grew rapidly during the 1980s and 1990s (Figure 11). Since the mid 1990s, however, a number of constraints have emerged such as diseases, environmental degradation, low quality of seed, increased price of feed and declining shrimp prices. These factors have been instrumental in the increased farming of the exotic shrimp species, *P. vannamei*, since this species is believed to perform better than local species in terms of growth, survival and Feed Conversion Ratio (Table 8), although prices are generally lower. Since *P. vannamei* was introduced into Indonesia in 2001, the proportion of this species in the national shrimp production has increased from 29.3% in 2002 to 44.7% in 2004, and 66.7% in 2005. This conversion has led to an increase in overall shrimp aquaculture production, which rose from 121 thousand tonnes in 1999 to 218 thousand tonnes in 2004 (FAO FISHSTAT Plus, 2006)

Table 8 Performance of *P. monodon* and *P. vannamei* in brackishwater pond in Indonesia, 2005 (Akiyama, 2004 in Cholik *et al.*, 2005)

Category	<i>P. monodon</i>	<i>P. vannamei</i>
Production (t/ha)	3 – 5	10 – 20
Growth (g/day)	0.15 – 0.20	0.15 – 0.18
Survival (%)	30 – 50	80 - 90
Feed Conversion Ratio	1.8 – 2.2	1.2 -1.4

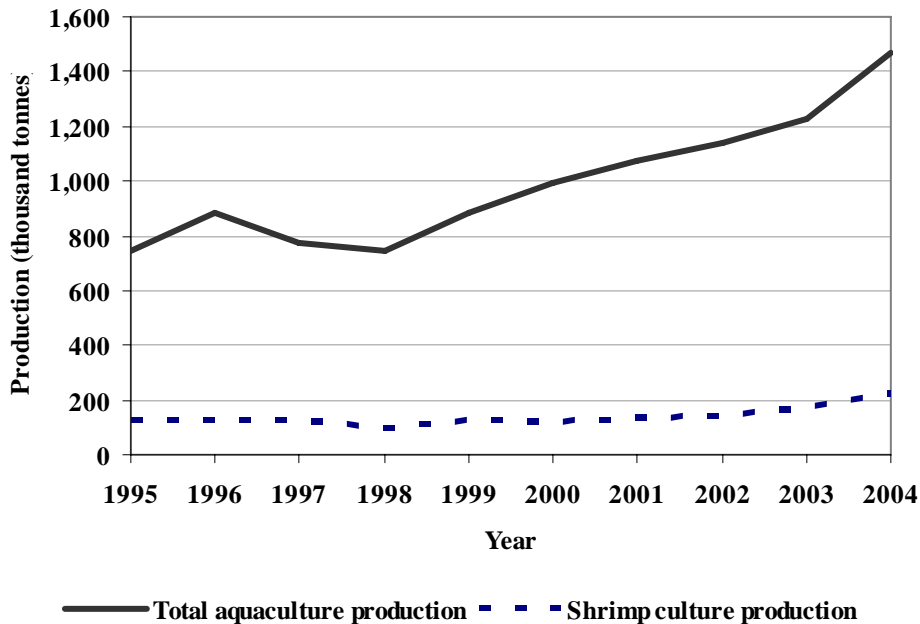


Figure 11 Indonesia - Shrimp culture production versus aquaculture production (FAO FISH STAT Plus, 2006)

Shrimp production in Indonesia has now spread throughout the islands of Sumatra, Java, Kalimantan, NUS Tenggara and Sulawesi. Each region has relatively unique characteristics in terms of scale of production, level of intensity applied and shrimp species used for culture. In general, production in Nanggroe Aceh Darussalam and North Sumatra is characterized by small to large scale shrimp farms which apply traditional (extensive) to semi-intensive culture. No farmers under the survey conducted intensive shrimp farming. Most farmers in these areas prefer to grow tiger shrimp. In the southern part of Sumatra (e.g. Lampung) shrimp farming is dominated by large industrial shrimp farms, often originating as part of large transmigration projects conducted with the support of the Government of Indonesia. These farms culture both tiger shrimp and *P. vannamei*. In most of the north coast of Java, shrimp farmers adopt small to medium-scale production strategies culturing both tiger shrimp and *P. vannamei* and both monoculture and polyculture (shrimp and milkfish) are practiced. In Kalimantan, shrimp production is characterized by large scale production using traditional and semi-intensive culture methods. A similar strategy is also used in NUS Tenggara. Sulawesi, mainly its southern part, is characterized by traditional to semi-intensive production systems. Farmers here also conduct both monoculture and polyculture of shrimp and milkfish and both tiger shrimp and *P. vannamei* are cultured.

4.2. Methodology

The General Methodology reported above was followed throughout the study. As indicated by the National Aquaculture and Fisheries Statistics for the year 2004, major shrimp producing provinces in Indonesia are North Sumatra (21,873 t), West Java (20,969 t), Lampung (19,942t) and East Java (18,869 t), in addition to South Sulawesi, South Sumatra and others. Since the production in Lampung is dominated by large vertically integrated farms, it was decided to focus the study on North Sumatra, East Java and West Java and, within those, in the sites of Medan and Langkat (North Sumatra), Indramayu and Karawang (West Java province) and Pasuruan and Gresik (East Java) (Figure 12). The omission of the larger Lampung

farms may have resulted in slightly biased estimates, although obtaining a more accurate representation of the impact of the tsunami and other unusual events on smaller scale stakeholders was considered a priority. In view of the fact that Aceh was the Indonesian province most affected by the Indian Ocean tsunami, the inclusion of this site in the study was also considered. However, because of the huge devastation experienced throughout the province, it was decided that Aceh would have been poorly indicative of the indirect impact of the tsunami on the Indonesian shrimp farming sector as a whole.



Figure 12 Map of studied areas in Indonesia. From left to right these are North Sumatra, West Java and East Java (blue circles)

To get a true representation of the Indonesian shrimp supply chain, data were collected from 3 groups of stakeholders, namely farmers, traders (both collectors and wholesalers) and processors/exporters. The number of people selected in each stakeholder group was based on the size of each group in the selected site. Data were collected from a total of 160 farmers, 23 traders and 7 processors (see Annex 17 to Annex 20).

Questionnaires were developed for each stakeholder group to collect information on socio-economical status, occurrence and impact of any major changes, management practices in 2004 and 2005, quantity of shrimp produced or traded over the previous few years (2 for farmers and 5 for traders and processors), procurement and resale prices for different shrimp sizes and over the period between January 2004 and the present. Particular attention was paid to collect information on changes related to the occurrence of the Indian Ocean tsunami and the imposition on several Asian countries of anti-dumping duties by the US. Questionnaires were pre-tested before being delivered to the selected stakeholders.

Although price trends were considered important indicators of impact in the present study, several difficulties were encountered while collecting this information. Farmers did not keep written records of shrimp sales and prices were presented for several different sizes, making comparisons between different farmers difficult. Unfortunately, traders and processors were not prepared to share this information with the research team and, in 1 case, a processor was prepared to share this information only by phone and only for a very limited number of months over the study period.

Primary data were compiled and analyzed using Microsoft Excel and SPSS. Data were analysed using graphs and descriptive statistics. Trends in shrimp prices for different sizes were analysed for all the stakeholder groups (i.e. farmers, traders and processors) using linear regression analysis as described in the General Methodology.

The sizes used in analysis were 26-30, 31-40, 45-50, 45-66 and 67-100 pieces/kg for farmers, size 45-50 for traders and U20, 21-30, 31-44, 45-66 and 67-80 pieces/kg for processors. Owing to the limited number of data-points, only raw data were reported in scatter plots, as plotting averages would have added little to data interpretation.

In addition to primary data, relevant information was also collected through focus groups discussion (FGD) and by interviewing key informants. This information was used mainly for validation purposes, although some of the information gathered is presented in the "Additional secondary information" section to compensate for the limited primary data.

4.3. Results and Discussion

4.3.1. Socio-economic characteristics of the stakeholders

a. Farmers

Almost all the farmers interviewed were male (98.8%) with an average age of 46.1 years, varying from 29 to 70 years. This was the oldest group but had less experience in the shrimp business compared with the traders and processors.

The average length of farmers' experience in shrimp culture was 11.8 years, varying from 3 to 25 years. On average, households were composed of 4.6 people, of which 1.1 people on average were involved in the family's labour force. The majority of them were male labourers. Besides the family members, the farmers also hired 3.8 workers in average to work on their farms.

The educational level of shrimp farmers was mostly up to elementary school (46.3%). Some farmers only attended primary school (21.9%). Fewer of them attended high school (23.8%). Only 4.4% of the farmers obtained a diploma and 3.8% graduated from colleges or universities.

Shrimp farming was the first occupation or livelihood for the farmers. However, 57.5% of them were also involved in other businesses like trading (23.1%), agriculture (16.3%). Many farmers were employed with second jobs

Most of the farmers conducted shrimp farming based on their own experiences (49.4%). Only 1.3% of the farmers attended vocational school. However, it was interesting to notice that there were over 40% of the farmers had received some sort of training.

Detail of the social and economic background of shrimp farmers can be found in Annex 21. Information on the investment made by farmers is reported in Annex 22.

b. Traders, depots and agents

The average age of traders was slightly lower than that of the farmers (45.6). Their average experience in trading shrimp was 13.6 years. The number of male traders was very high (87.0%), although there were more women involved in this business than in shrimp farming (13.0%). The average size of the traders' family was 4.2 people, of which more than 2 people working as family labourers. Shrimp trading also provided jobs for more than 4 people per trader household.

The traders were often involved in other occupations (69.6%), with most traders also involved in shrimp farming (47.8%), although shrimp trading was their main occupation.

Traders were also better educated than farmers. Most traders attended high school (65.2%) and 17.4% graduated from universities and colleges.

Although traders' educational level was relatively high, their business was operated mainly using personal experience (78.3%) and just 17.4% of them reported that they had been receiving training in trading.

Further details on the socio-economic characteristics of traders can be found in Annex 21.

c. Processors

The processors were the youngest stakeholder group interviewed. Their average age was 40.5. Nevertheless, their experience in processing/exporting was the highest and averaged at 17 years. Processors' educational level was also the highest, and all of them were university/college graduates. Males were the majority also in this category (85.7%). Technical knowledge was derived mainly (76%) through training and from college/university.

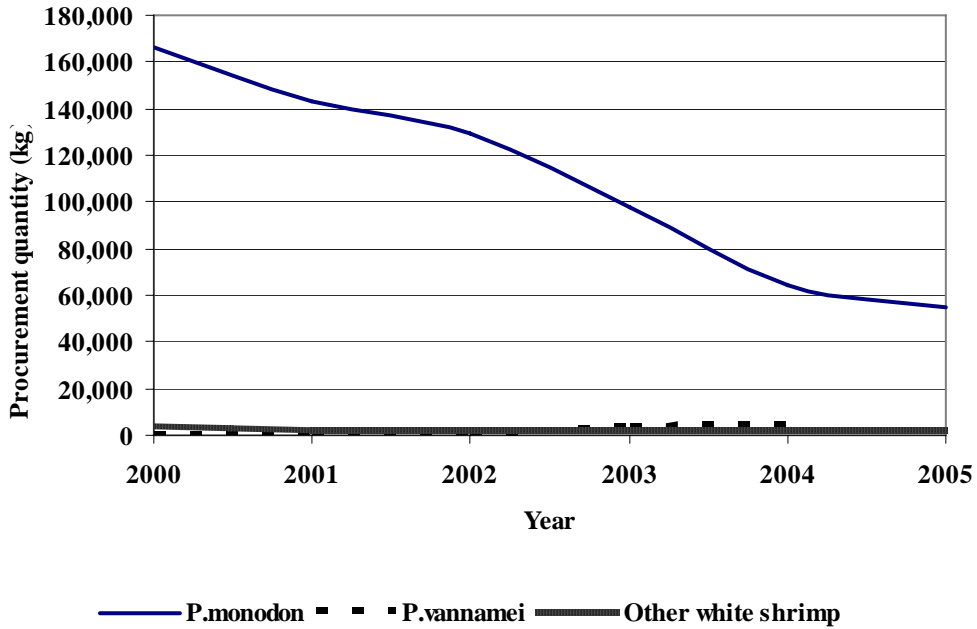
The processors reported that processing was their sole occupation.

Further details on the socio-economic characteristics of the stakeholders interviewed can be found in Annex 21.

4.3.2. Volume changes of commodities traded

The quantities of *P. monodon*, *P. vannamei* and other white shrimp traded in Indonesia by traders and processors in the period 2000-2005 can be seen in Figure 13. The details of the quantities traded are presented in Annex 23. Generally, the amount of tiger shrimp and white shrimp other than *P. vannamei* traded decreased over time, while *P. vannamei* trade appeared to be on the rise. Nevertheless, total quantities traded by both traders and processors show a general downward trend. This pattern was reported to be due mainly to the lack of raw material and increased competition among traders.

a)



b)

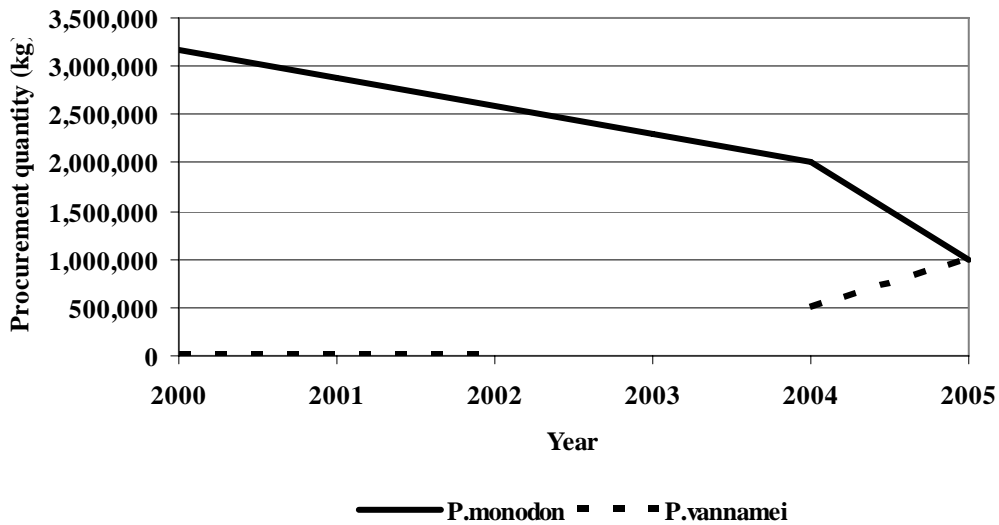


Figure 13 Average quantity of procurement of traders (a) and processors (b), Indonesia

4.3.3. Changes taking place between 2004 and 2005

a. Overall changes

There was no big change in the culture area or number of ponds of most farmers. Only 6.88% of the farmers reduced and less than 2% increased the farming areas. No farmer changed either the nursing pond or settlement pond areas.

Land ownership also remained unchanged. The investment was rather stable during the observed period though 21.3% of the farmers reported that their investment had increased. Labour use, however, did not change much although 12.2% of the farmers said that they used fewer labourers than before.

Twenty-eight per cent of the farmers reduced the stocking density which partially resulted in reduced feed as well as drug/chemical use. However, 61.3% of the farmers reported that shrimp productivity decreased significantly.

The average cost of shrimp farming was reported to have increased significantly and 52.5% of farmers reported that average profits had decreased.

The perception of the changes in shrimp farming is described in detail in Annex 24.

b. Description and evaluation of the 1st production cycles in 2004 and 2005

When comparing the management practices adopted in the years 2004 and 2005 a number of significant differences could be detected. The average pond area under production per farmer decreased from 3.03 to 2.85ha in 2004 and 2005 respectively. This reduction was not associated with a change in production systems. In fact, *P. monodon* was the preferred species cultured in both years, with 94% farmers culturing only this species of shrimp, 5% culturing both, although in different ponds and only 1 farmer conducting vannamei farming only. *P. monodon* was cultured mainly in polyculture with milkfish (70% of farmers) with only 30% conducting monoculture. Monoculture was most common in North Sumatra. No change in the proportion of farms operating polyculture or in the average number of milkfish stocked could be detected between the 2 years.

Farmers generally conducted only 1 crop per year (60%), although 1/3 of farmers conducted 2 crops and the remainder managed a 3rd crop. Stocking of the first crop of *P. monodon* occurred most commonly in January-March (74% and 66% of the farmers in 2004 and 2005 respectively) with a smaller proportion (about 18%) stocking their first crop in August-Sept. Seed originated mostly from hatcheries, only 1% of the farms reporting seed supply from nurseries. The average stocking density decreased from 8.1 to 6.1 shrimp/m² between 2004 and 2005.

Shrimp harvesting appeared to take place throughout the year. When examining the average performance of *P. monodon* farms between 2004 and 2005 a remarkable reduction in yields per unit area could be detected, with 61.3% of farmers reporting a lower production in 2005 when compared to 2004 (Annex 24). Variable costs associated with production can be found in Annex 25.

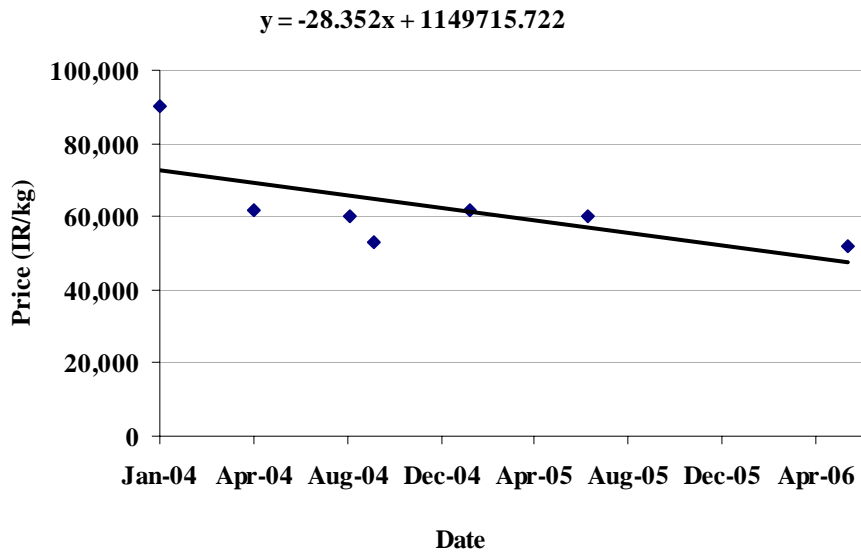
4.3.4. Shrimp price trend analysis

Farmers

In spite of the limited availability of farmers' data on prices for different shrimp sizes, the data showed a high degree of consistency (see Figure 14). A downward trend in *P. monodon* prices could be detected for all the sizes examined. Although the small number of observations makes comparing slopes of the regression lines difficult, it appears clear that the downward trend was quite dramatic. The association with the unusual events occurring at the end of 2004 could not be assessed. However, it is possible that prices decreased because of increased competition with products

allegedly imported from countries affected by the US anti-dumping measures, and re-exported by processors.

a)



b)

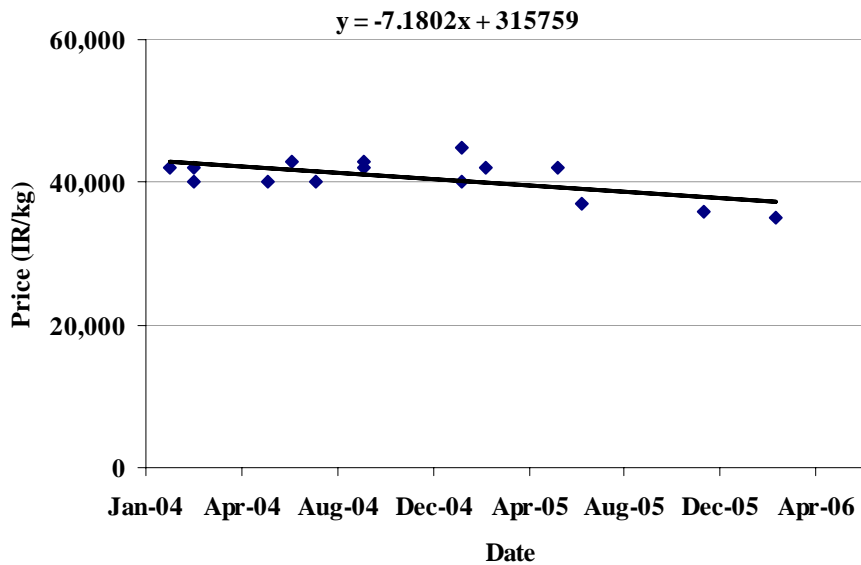
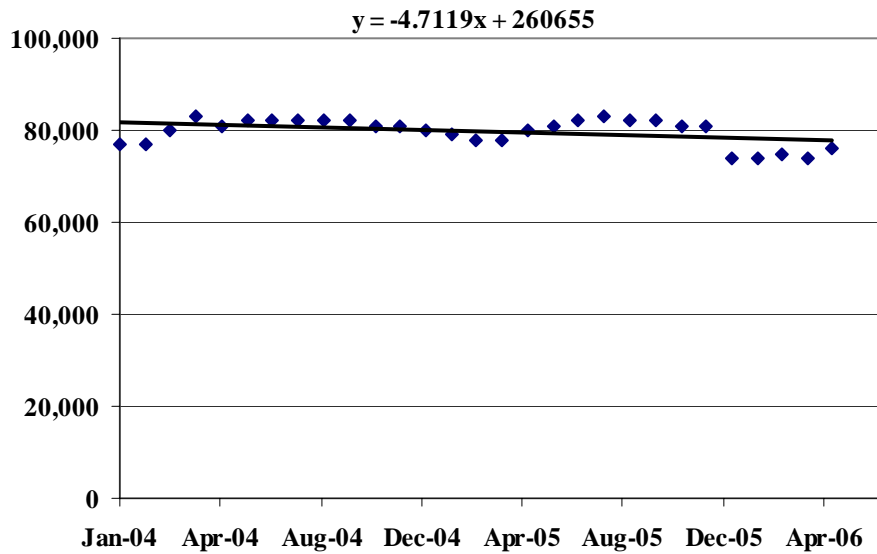


Figure 14 Scatters of actual sale prices of *P. monodon* for farmers, size 26-30 (a) and size 45-66 (b), Indonesia

Traders

Although enough data were available to examine only price trends for shrimp of size 45-50, prices paid by collectors and wholesalers also appeared to be slightly decreasing over time, therefore confirming the observations reported by farmers (Figure 15).

a)



b)

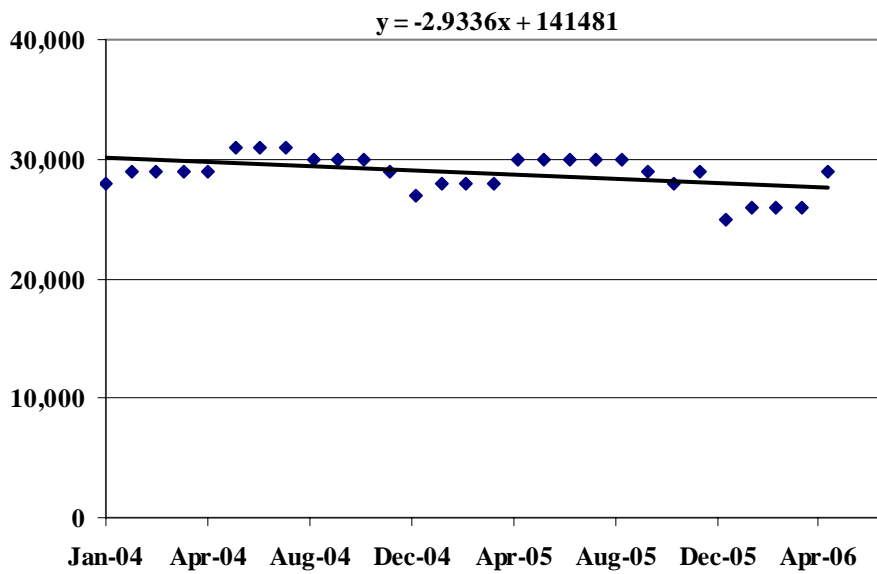


Figure 16 Scatters of actual procurement prices of *P. monodon* for processors, size U20 (a) and size 45-66 (b), Indonesia

Table 9 summarizes the shrimp price trends of the Indonesian stakeholders. For detailed information on monthly average prices, see Annexes 26 to 28.

Table 9 Price trends of stakeholders in Indonesia

Unit: IDR/kg

Stakeholders	Size	Slope	Intercept	Jan-04	Jan-06
Farmers	30	-28.3523	1,149,715.72	72,698.33	51,972.83
	40	-19.9302	813,790.37	56,703.20	42,134.25
	45-66	-7.1802	315,758.50	43,002.51	37,753.75
	67-100	-6.9447	288,940.53	25,133.21	20,056.65
Traders	45-50	-1.1391	89,570.25	46,301.02	45,468.37
Processors	20	-4.7119	260,654.63	81,662.29	78,217.87
	30	-4.5631	230,728.88	57,391.98	54,056.39
	44	-2.4620	138,573.90	45,048.74	43,249.00
	66	-2.9336	141,480.69	30,042.71	27,898.26
	80	-2.8995	137,206.34	27,062.68	24,943.14

Perceived reasons and impact of price trends

According to 95% of the farmers, shrimp prices have been either decreasing or fluctuating over the past 5 years, with only 4% of the farmers declaring that prices did not change and 1% stating that prices actually increased. Most of the farmers did not know exactly when the prices began changing, and the answers provided by the ones that did answer this question did not seem to converge. Some farmers also recognized the fact that prices tend to increase when supplies are lower.

Farmers gave a wide range of answers for changing prices. The main reasons stated were over-exploitation of farmers by traders and processors, who were free to set the prices leaving limited options to farmers; the lack of government control to ensure that farmers get a fair price for their shrimp; the occurrence of shrimp importation and re-exportation (although this practice has been made illegal); poor shrimp quality because of antibiotic use; over-supply of shrimp on the international market. The occurrence of the 2001 terrorist attacks was also blamed.

All the traders reported that shrimp prices were changing, either decreasing or fluctuating. Among the reasons given were unstable supplies, sometimes because of disease outbreaks; the role of processors in playing a key role in setting sometimes unfair prices to the lower links in the supply chain; the illegal importation and re-export of shrimp from countries affected by the US anti-dumping measures; poor post-harvest handling; unstable exchange rates.

Most processors recognized that prices have been decreasing or at best fluctuating over the past few years. One of the main reasons for these price changes was unstable supplies and the difficulties faced by the processors to keep viable businesses, forcing processors to set lower prices and to identify strategies to add value to the exported products. Exporters also recognized that Indonesian shrimp face lower market prices because of allegedly poorer quality. Fluctuating exchange rates were also blamed.

All stakeholder groups agreed that decreasing and fluctuating prices led to a negative impact throughout the supply chain because of lower margins, which often leads to bankruptcy. Most farmers believe that there are few or no benefits in farming shrimp because of the rising production costs over the years and the decreasing prices.

The details of perception of the stakeholders on the unusual events are provided in Annex 29.

4.3.5. Supply Chain Analysis

The data generated through this survey revealed that around 75% of the shrimp harvests are sold to collectors. A smaller proportion of farmers (20%) sold their harvests to wholesalers and only 5% farmers sold directly to the processors. Farmers in East Java were more likely to sell directly to wholesalers and processors compared with farmers in other provinces. About 80% of the collectors sold their products directly to the processors, while the remainder sold their product to wholesalers, who then sold it to the processors. The general marketing channels of tiger shrimp is provided in Figure 17.

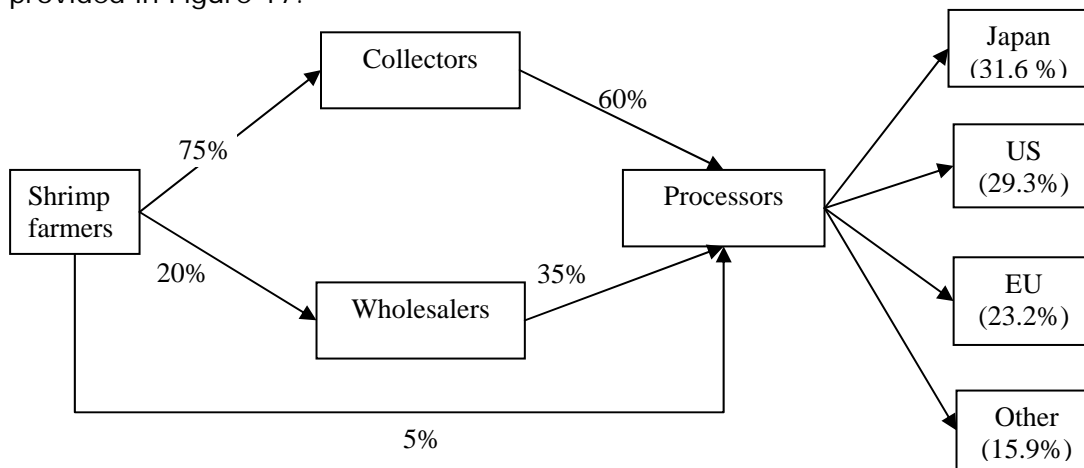


Figure 17 Marketing channels of *P. monodon* shrimp

As it can be seen in Table 10, most of the exported shrimp were sold to the Japanese and US markets (32 and 29% respectively), with smaller proportions being exported to the EU (23%) or elsewhere (16%) in 2005.

Table 10 Composition of the total exported amount of shrimp products by the markets and type of products

	2004	2005	% of change
By the markets % of the total amount exported	100.0	100.0	
+ US	23.5	29.3	24.7
+ EU	17.4	23.2	33.3
+ Japan	40.7	31.6	-22.4
+ Asia	8.2	10.8	31.7
+ Others	10.2	5.1	-50.0
By the type of products % of the total amount exported	100.0	100.0	
+ HOSO	23.7	21.5	-9.3
+ HLSO	34.5	37.4	8.4
+ PUD	18.3	19.8	8.2
+ BTO cooked	13.6	17.3	27.2
+ Others	9.9	4.0	-59.6

	2004	2005	% of change
By the type of packaging % of the total amount exported	100.0	100.0	
+ BLOCK	57.3	42.8	-25.3
+ IQF	25.2	37.9	50.4
+ Semi-IQF	11.7	17.3	47.9
+ Others	5.8	2.0	-65.5

None of the respondents mentioned selling products to local markets, although it is believed that a small proportion of shrimp would also be consumed domestically.

4.3.6. Impact of Tsunami and US Anti-Dumping or other events

a. Tsunami

There were 90.6%, 94.8% and 100% of the surveyed farmers, shrimp traders and processors/exporters who knew about the occurrence of the tsunami in December 2004, respectively (Annex 29). However, the impacts of the tsunami appeared to be limited among the respondents, with 24.8% of farmers, 37.3% of traders and 98.1% of processors/exporters reporting that their farm or business had been affected (Annex 30).

Farmers worried most commonly about the impact on shrimp price, with a quarter of the farmers (24.8%) of the farmers believing that it led to reduced prices.

Similarly, traders were also concerned about abnormal fluctuation in shrimp prices. Some traders (17.4%) also believed that the tsunami made Indonesian shrimp less competitive because of the negative image associated with the high levels of casualties and the potential for contamination with human pathogens.

All of the processors believed that the tsunami affected the image of Indonesian shrimp because of the high levels of human casualties. Most processors (87.5%) mentioned difficulties in processing/exporting the shrimp because of the tsunami due to infrastructure damages and reduction in national shrimp production. The tsunami was also reported to have decreased shrimp prices and reduced competitive advantage. Nine out of ten exporters also recognized the need for stricter quality control.

b. US anti-dumping duties

There were 2.1%, 10.6% and 100.0% of the surveyed farmers, shrimp traders and processors/exporters respectively who were aware of the US anti-dumping affecting some other Asian countries, (Annex 29). However, farmers and traders mostly did not report any impact of this event on their livelihood. On the contrary, 87.5% of processors declared that their businesses had been affected (Annex 31). Some solutions for reducing the impacts of the US anti-dumping duties were also suggested (Annex 32). The interviewees perceived that the U.S. anti-dumping duties lead to decreasing or fluctuating price, but also had positive effects such as improving access to the US market as a result of increased competitive advantage.

4.3.7. Additional secondary information

The information provided through the survey was complemented by additional information generated through focus group discussion. This revealed a large number of issues hampering the development of the shrimp farming sector, and to a great extent associated with the unusual events of 2004-2005. A few years ago, shrimp

was identified as one of the commodity priorities for North Sumatra, leading to the establishment of processing plants, cold storage and export facilities. However, at the time of the survey a large proportion of the facilities were abandoned due to a lack of shrimp raw material from both culture and capture. Since late 2003, large areas of shrimp farms were not fully operational because of environmental degradation, diseases and financial problems as a consequence of rising fuel price and shrimp feed. The problem was also compounded by social and economic conflicts, with rising evidence of theft or robbery. The occurrence of the tsunami led to a further reduction in supplies, seriously affecting the sector, especially in North Sumatra province.

In Aceh, the most important source of wild caught *P. monodon* broodstock for hatcheries throughout Indonesia, the tsunami also led to an interruption in broodstock supply, which then impacted the production of shrimp seed throughout the country (FAO 2005b). In addition, hatcheries in the province were also directly damaged, therefore reducing significantly the shrimp seed supply in the area (Table 11).

Table 11 Estimates of losses to shrimp and fish hatcheries in Aceh Province (units are number of hatcheries) (Modified from FAO 2005c)

District	Pre-Tsunami	Post Tsunami					Total	No Damages	% damage
		Level of Damages							
		Light	Moderate	Heavy	Lost				
East Coast									
Kt Banda Aceh	4	-	-	-	4	4	-	100	
Aceh Besar	10	-	-	10	-	10	-	100	
Pidie	70	-	16	46	8	70	-	100	
Bireuen	99	17	8	20	26	71	28	72	
Aceh Utara	38	-	-	38	-	38	-	100	
Kt Langsa	2	-	-	-	-	-	2	0	
West Coast	-	-	-	-	-	-	-	-	
Total	223	17	24	114	38	193	30		

At the time of the study, it was reported by several stakeholders from the private and public sector that significant volumes of raw material were imported from countries that had been affected by the imposition of US anti-dumping duties (i.e. Thailand, Vietnam, PR China and India). This can be observed in Figure 18, which shows that exports increased dramatically in 2005 in spite of reduced (or stagnant) supplies (DG of Aquaculture Fisheries, various years; Abdullah, DGAF, pers. comm.). In spite of adopting this strategy, key informants from Provincial Fisheries Services and representative of the National Fisheries Society (*Masyarakat Perikanan Nasional*, MPN) indicated that only less than 25% of the shrimp processing plants in the province were operational.

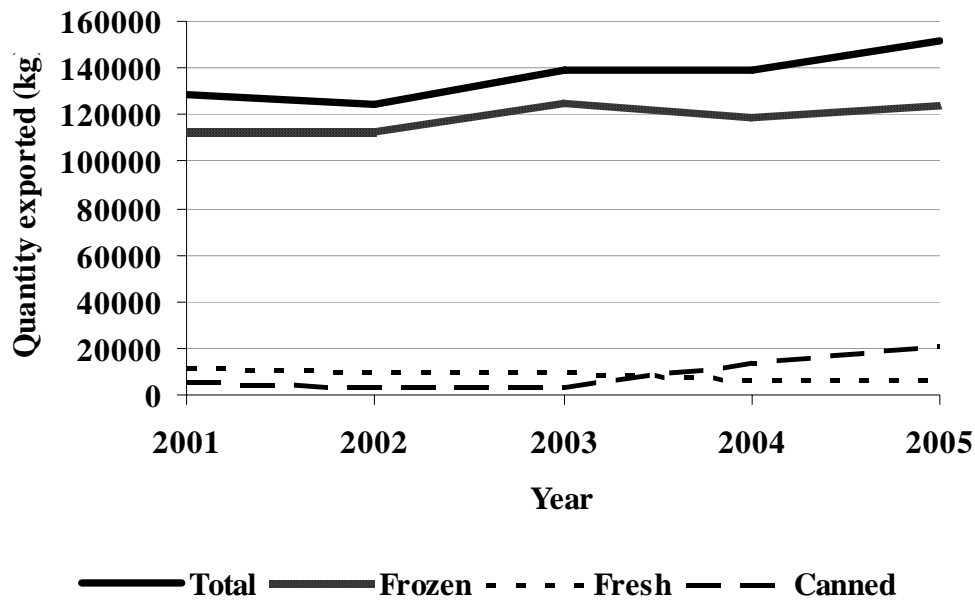


Figure 18 Exported quantity (DGAF, various years)

Although less dramatic, a similar picture was reported also from other provinces. Farmers in West Java appeared to be particularly disadvantaged because of the lack of processing plants locally and the resulting lengthening of the supply chain (often involving wholesalers) and the need to reach the plants located in Jakarta.

As it was indicated by key informants, shrimp farmers in East Java were facing increasing problems due to environmental degradation, diseases and financial problems.

Some insight into the shrimp supply chain in Aceh province was also gathered by collecting secondary information. The masterplan for re-development in Aceh (IFC 2006) showed that the ex-farm prices for shrimp harvested in Aceh are lower than the ones paid to farmers in other countries. However, prices for exported shrimp are higher than the average. A calculation to assess the margins made at each link in the supply chain revealed that higher links in the chain (e.g., processors) received increasingly larger margins.

4.4. Conclusions and recommendations

The Indonesian shrimp industry has experienced an increasing number of difficulties over the past few years. This study identified that the decline in shrimp prices and yields as well as the increase in investment in shrimp farming in Indonesia were all the result of the Indian Ocean tsunami, although other internal and external factors also played a major role. Among others, major factors affecting the sector were shrimp quality; low prices paid by traders and processors; increased competition among traders; the suspected occurrence of shrimp importation and re-exportation; poor shrimp quality, chemical residues; over-supply of shrimp on the international market and the unstable political environment of the country. Although the US anti-dumping duties were not imposed on Indonesia, they were said to have impacted

also Indonesia shrimp prices, mainly because of the allegedly illegal importation of shrimp from countries affected by the US duties.

Better planning for the sector, better shrimp quality and improving the overall image of Indonesian shrimp appeared to be potential solutions to revive the Indonesian shrimp industry. These need to be given consideration and should be targeted through the commitment of both government and stakeholders throughout the supply chain.

5. Bangladesh case study

Executive Summary

This study aimed at examining the shrimp farming sector of Bangladesh over the period 2000-2005, focusing particularly on the potential effect of the unusual events occurring between 2004 and 2005, namely the US anti-dumping duties and the Indian Ocean tsunami.

A total of 188 stakeholders comprising 136 farmers, 24 traders (in Bangladesh known as *faria*), 8 depots, 8 agents and 8 processors from 9 Upazillas⁴ of 5 major shrimp producing districts of Bangladesh were selected for this survey. Primary data were collected using questionnaires and, where possible, actual records of sales of shrimp transactions.

The average age of the selected groups of stakeholders ranged from 36 to 51 years. Traders and depots were the youngest groups among the stakeholders, while the processors were the most aged. Their average experience in the shrimp business ranged between 12 and 22 years. Farmers showed the lowest degree of literacy, while the processors had the highest educational level. Although shrimp farming/trading remained the main occupation of the stakeholders, an overwhelming majority had involvement with other occupations.

Seventy eight percent of the shrimp farms were owned by a single person. The average number of shrimp ponds per farmer was 1.4.

Over the past few years, no major change could be seen in terms of total culture area, number of ponds, land area, types of farming, labour use patterns, and stocking density although the use of home made feed increased while use of "medicines" appeared to have declined. Cropping patterns during the years 2004 and 2005 did not change and the yield of the first crop remained the same. Marketing of products was reported to have improved. Most of the surveyed farmers stocked tiger shrimp in monoculture. Harvesting of shrimp took place 2 to 3 times a year. In the Khulna region, the farmers' most preferred intermediary was the trader/*faria* and, to a limited extent, the depot. In Cox's Bazar however, farmers most often sold their products directly to agents.

The average variable costs of production per ha in 2005 showed an increase of 18% compared with 2004. As most of the surveyed farmers conducted improved extensive farming mainly with very low stocking densities, shrimp post larvae were the most important cost item accounting for 58% and 60% of variable cost in 2004 and 2005 respectively. Labour was the second most important cost item.

Tiger shrimp was the most important traded commodity, being increasingly traded over the period 2000-2005 and ranging from 71 to 98% of total shrimp by quantity in 2005.

Shrimp prices appear to have increased over the past five years. High international prices, improved shrimp quality, and improved hygienic conditions were the three

⁴ Upazilla: Sub district

most important reasons stated for this price increase. No stakeholders were reported to have been adversely affected by price improvement.

The overwhelming majority of farmers, traders and depots had never heard of either the tsunami or US anti-dumping duties. Only the processors had heard about US anti-dumping duties. When respondents reported being aware of the Indian Ocean tsunami they generally had not been affected by it.

In general, the shrimp industry in Bangladesh appeared to be experiencing a relatively good period. Some of the unusual events of 2004 and 2005 were reported to have had no negative impacts on the sector. On the contrary, the US anti-dumping duties imposed on other Asian countries were reported to have benefited Bangladesh by opening opportunities to sell products on the US market.

5.1. Introduction

The fisheries sector has played an increasingly important role in the economic development of Bangladesh. Fish and fishery products are the country's third largest export commodity contributing more than 5% of the country's exchange earnings. Total fish production in Bangladesh reached 2.1 million tonnes in 2003, of which 914,752 tonnes (43.5%) was produced by the aquaculture sector (DoF, 2005). Aquaculture production in Bangladesh increased 6–8 % per annum during the period 1991–2002 (Ahmed, 2003).

Coastal aquaculture comprises mainly of shrimp farming which extends over an area of 203,071 ha. The major shrimp producing districts are Bagherhat, Satkhira, Pirojpur, Khulna, Cox's Bazar and Chittagong, with farmers in the Bagherhat and Pirojpur districts especially having begun recently to farm shrimp in the paddy fields (FIRI, 2005). Two areas in the south, the Khulna and Satkhira-Bagherhat belt and the Chittagong-Cox's Bazar belt account for 55.5% and 22.3% of the total area of shrimp culture in the country respectively (DoF, 2002).

Coastal shrimp farms provide 5.45% of the total aquaculture production in the country (Figure 19). This is, however, only a small proportion of the total shrimp production, which in 2002-2003 contributed 72% by quantity and 89% by value of the total USD 324 million earned by the fisheries sector (DoF, 2003).

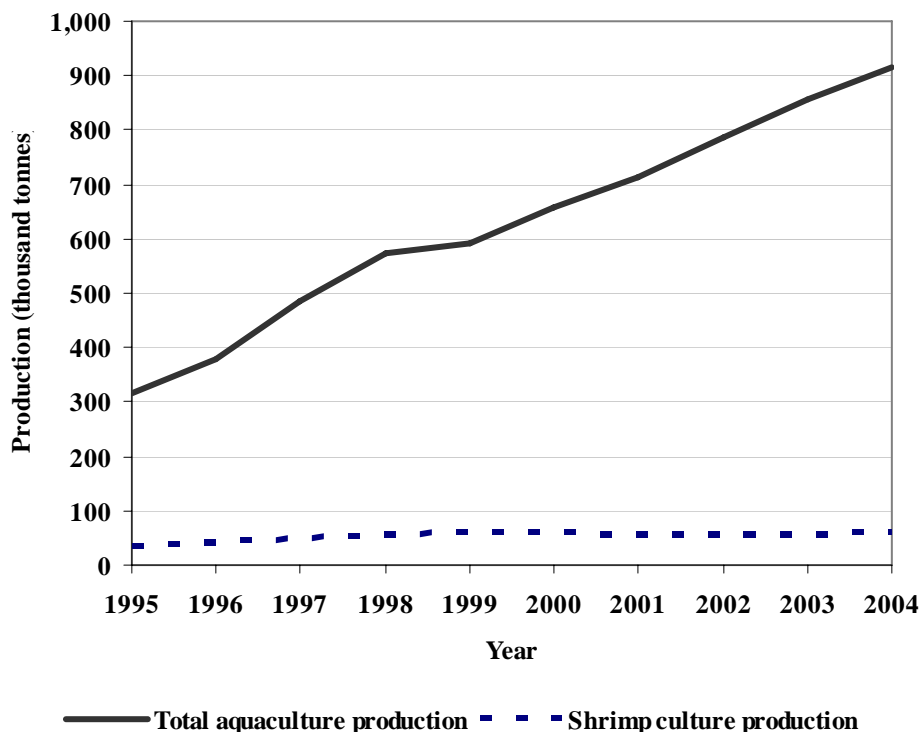


Figure 19 Bangladesh - Shrimp culture production vs aquaculture production, Bangladesh (FAO FISHSTAT Plus, 2006)

Major markets for Bangladesh shrimp are the US, UK, Belgium, Germany and Japan. The quantity of shrimp exported to the US was 26% of the total export in 2002-03, increasing to 40% in 2004-2005, resulting in a decrease in exports to other markets.

5.2. Methodology

Data were collected from the 5 main shrimp farming areas of Bangladesh, namely Khulna, Satkhira, Bagherhat, Cox's Bazar and Chittagong (Figure 20). Data from the different stakeholders were collected from 9 Upazillas of the five selected districts. Data were collected from a total of 188 stakeholders comprising 8 processors, 8 agents, 12 depots, 24 traders and 136 farmers for a total of 5 stakeholder groups. To represent the small-scale farming system of Bangladesh, 128 farmers were small scale, the remainder consisting of 8 people who sold their harvests directly to the depot (i.e. not through traders), and considered to be relatively larger-scale farmers. The details of the interviewees are provided in Annex 33 to Annex 38. In addition to the stakeholder survey, general price information was also collected from 4 officers of the Department of Fisheries and 1 additional exporter, with the aim of validating the general accuracy of the observations gathered through the survey.



Figure 20 Map of study areas in Bangladesh. From left to right these are Satkhira, Khulna, Bagherhat, Chittagong and Cox's Bazar (blue circles)

Questionnaires for each of the 5 different stakeholder groups were developed and used to collect data on socio-economic characteristics, incentive mechanisms (e.g. loans), changes over the study period and the impact of those changes. Data on prices and quantity traded over the period under study were collected from most stakeholders using actual records of sales maintained by the stakeholders themselves where possible. Very few farmers, however, kept written records and therefore the price information collected was limited to what farmers could remember.

Since data were collected mostly by fisheries officers residing in the area, no major difficulties were faced in accessing records. However, stakeholders were hesitant to share information on incentives received by other stakeholders in the shrimp supply chain (e.g. loans), although agreed to provide such information if treated as confidential.

Data were processed and analysed using MS Access, Excel and SPSS. Price trends over time were studied using simple regression analysis (for details see General Methodology).

The shrimp sizes most commonly used in Bangladesh were used where possible. These were sizes U20 (1-20 pieces/kg), 21-30 pieces/kg, 31-44 pieces/kg, 45-66 pieces/kg, 67-100 pieces/kg and PD (miscellaneous sizes and broken shrimp). However, graphs and analysis were constructed only when the number of observations for a specific size and species allowed the analysis of that information to be done in a meaningful manner.

5.3. Results and Discussion

5.3.1. Socio-economic characteristics of the stakeholders

a. Farmers

Shrimp farmers were on average 46 years old, most of whom were male (only one farmer surveyed was female). The farmers had the least number of years of experience in their business compared with traders and processors although the average time that they had been involved in shrimp farming was almost 12 years. Most farmers (45%) had gained their shrimp farming expertise mainly from their own experience, 29% from training courses and the remainder through a combination of both (Annex 39).

The household size of the farmers was 5.6 which is consistent with the average national family size of 5.56 (BBS 2005).

Farmers had the lowest education level among all the stakeholder groups. Forty percent of the farmers were illiterate. The remaining 60% went to school including 3% who graduated from either college or university.

Shrimp farming was the major occupation of the farmers although 52% were also involved in agriculture and 40% in livestock husbandry as alternative occupations.

Seventy eight percent of the shrimp farms were owned by a single person. The investment level of the farmers can be found in Annex 40.

b. Traders, depots and agents

All of the shrimp traders in the survey were male and the average age of shrimp traders, depots and agents was 36, 43 and 42 years respectively. Shrimp trading experience of the 3 groups was 12, 13 and 17.5 years respectively. Compared with shrimp farmers, this group had a higher education level, most of them (about 80%) having attended primary or secondary school and some had also received vocational education.

Shrimp trading remained the main occupation of all the traders although many of them had additional involvement with other economic activity like agriculture, business, livestock husbandry and shrimp farming.

c. Processors

The managers of the processing companies were the oldest stakeholder group, with an average age of 50.5 years. They were also the group with the longest experience, having been involved in shrimp processing on average for almost 22 years. This group had the highest education level with 100% having graduated from a college or university. About 87% of processors obtained their technical knowledge through training courses.

Although shrimp processing was their main occupation, there was one processor who was involved also with shrimp farming, and another one who dealt with an ice plant. All managers were male.

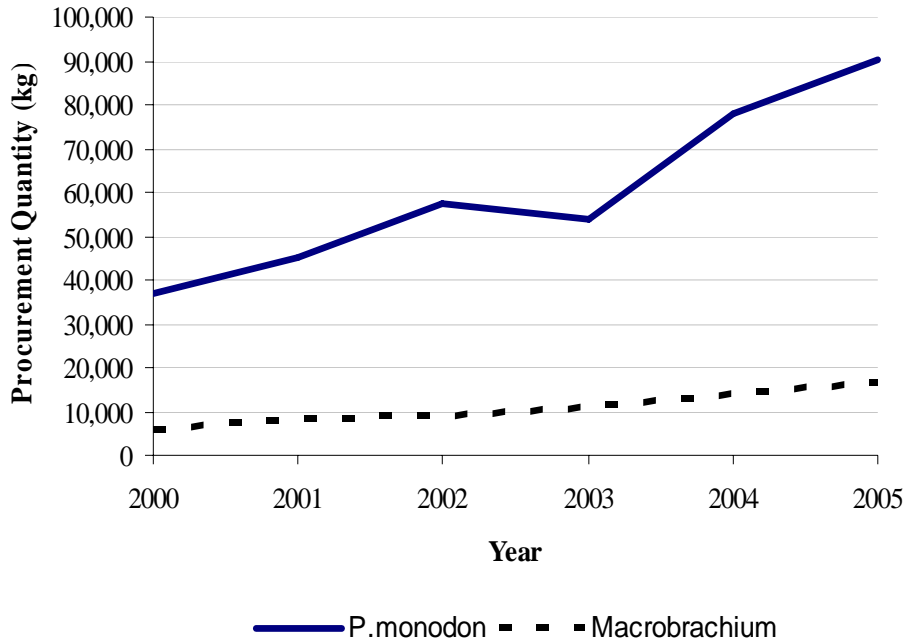
The detailed socio-economic characteristics of the stakeholders interviewed are provided in Annex 39.

5.3.2. Volume changes of commodities traded

The Figure below shows the quantity of tiger shrimp and freshwater prawns (*Macrobrachium rosenbergii*) traded in 2000-2005. Considering that these are the 2 main commodities traded, the graphs clearly indicate that tiger shrimp is the major traded item of all the stakeholders. In fact, tiger shrimp constituted about 85%, 98%, 68% and 91% of the total product traded by traders, depots, agents and processors respectively.

The volume of trade in tiger shrimp and prawns generally increased over the period (See details of quantities traded over the period 2000-2005 in Annex 41). Trade in tiger shrimp showed an upward trend except in year 2003 for traders, year 2001 for depots and agents and year 2005 for processors. While the volume of tiger shrimp trade for traders and agents increased in 2005 compared to 2004, this was not true for depots and processors possibly as a result of increased competition in these links of the supply chain.

a)



b)

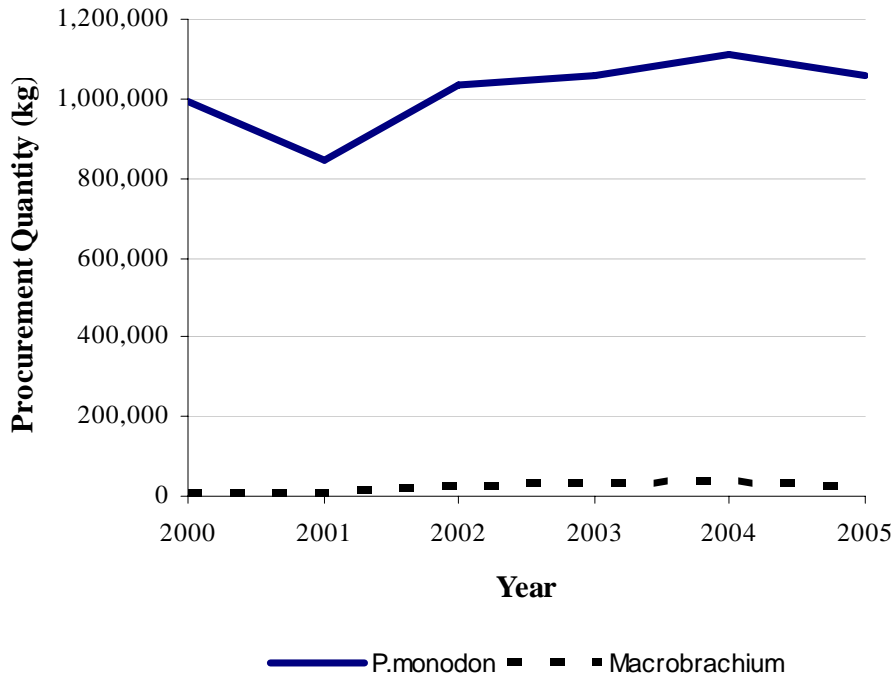
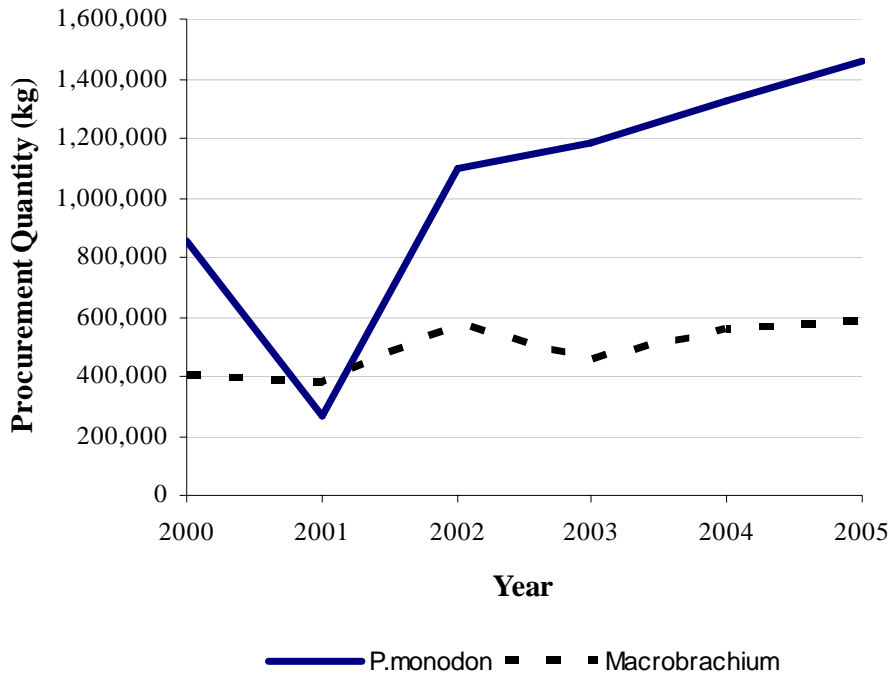


Figure 21 Average quantity of procurement of traders/faria (a), depots (b), Bangladesh

c)



d)

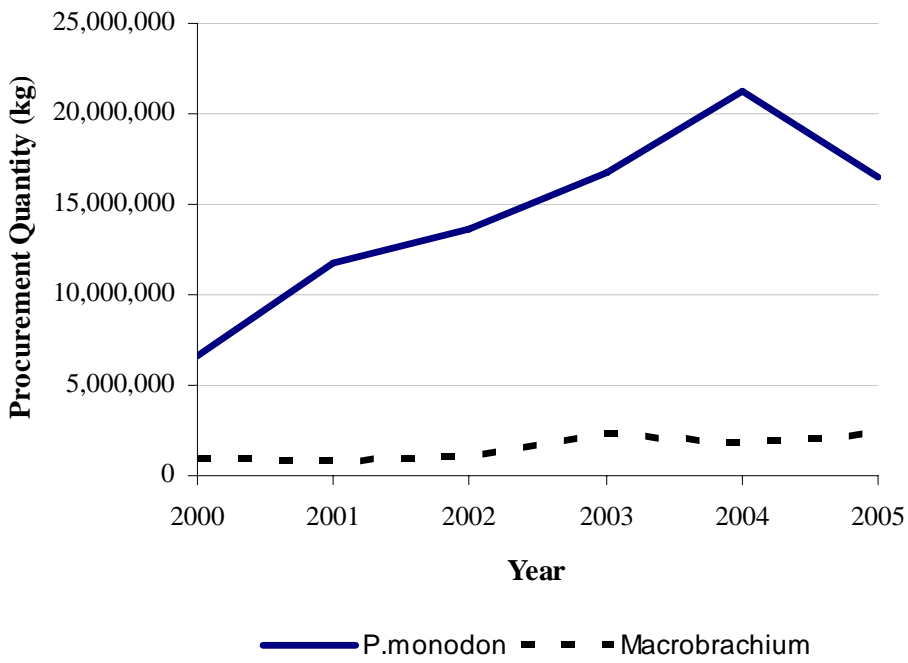


Figure 21 Average quantity of procurement of agents (c), and processors (d), Bangladesh

5.3.3 Changes taking place between 2004 and 2005

a. Overall changes

The overwhelming majority of farmers (more than 90%) reported that their status in terms of total cultured area and number of ponds remained the same over the study period although between 2 to 4% of the farmers were able to increase the total area of the farm and number of ponds. About 24% of the farmers reported that they could add a nursery pond. Interestingly, about 65% of the farmers reported an increase in their investment (including machinery like water pumps, etc.). Land ownership remained mostly unchanged.

The type of farming strategy adopted showed almost no change although some farmers reported that they diversified or intensified their production. About 15% of farmers increased the number of crops per year, while most of the remainder did not change the crop frequency. Stocking density, labour use and crop duration also did not show any notable change. Almost no change was reported concerning the use of commercial feed, although more than 60% farmers indicated an increased use of home made feed allegedly because of the lower cost. The use of medicines was reported to have been greatly reduced.

The majority of farmers (over 94%) declared that the shrimp yield of the first crop remained unchanged between 2004 and 2005, although 4% indicated that yields had improved. The marketing of the harvested shrimp was reported to be much easier in 2005 than in 2004. Although there was an increase in production costs (as reported by 92.6%), 98% of the farmers reported higher profits, mainly due to increased shrimp prices. The perception of the changes in shrimp farming is described in detail in Annex 42.

b. Description and evaluation of the 1st production cycles in 2004 and 2005

There was no remarkable change in the production cycles of 2004 and 2005, with 88% of farmers growing tiger shrimp only, 11% practicing rotation (shrimp followed by rice or salt) and only 0.8% adopting polyculture (shrimp together with white fish).

Farmers stocked the first crop from February through August. The two most important months for stocking however, were April and May, with 36% of farmers stocking the first crop in April 2004 while 33% stocked in May 2004. The pattern of stocking months for 2005 was very similar to the one observed in 2004.

The average number of tiger shrimp seed stocked showed an increase of about 10% between 2004 and 2005. On the contrary, the average stocking density of prawn (*Macrobrachium rosenbergii*) in 2005 also 20% lower than that in 2004.

Hatcheries were the main source of tiger shrimp PL in both 2004 and 2005. About 55 % of the farms in 2004 and 53% in 2005 used only hatchery-produced tiger shrimp PL. About 13% of the farms in 2004 and 8% in 2005 used wild PL while the remainder used a combination of both sources. Harvesting took place 2 to 3 times a year, starting in January and continuing through to October. May and June were the peak harvesting months, with 60% and 69% of the farmers harvesting over those two months in 2004 and 2005 respectively.

Detailed shrimp farming variable costs in 2004 and 2005 are reported in Annex 43.

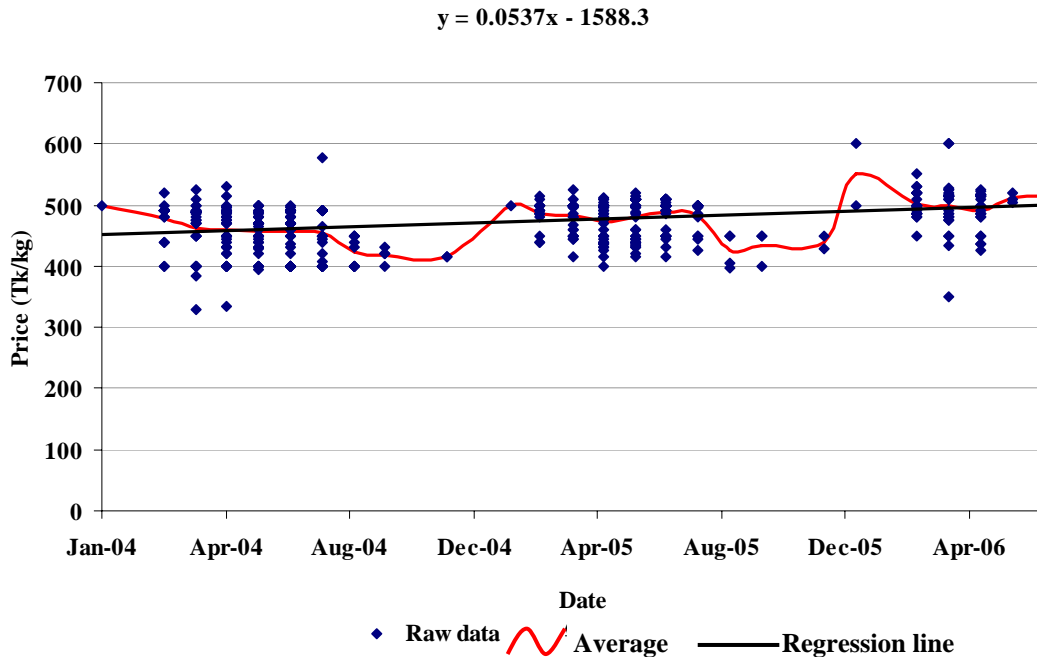
5.3.4. Shrimp price trend analysis

Farmers

Prices paid to farmers showed an upward trend for all count sizes, with larger count sizes experiencing sharper increases. It is not clear if there were sharper price

increases between 2004 and 2005 as a result of the tsunami and the introduction anti-dumping duties against other Asian countries, although average price values would seem to suggest this was the case (Figure 22).

a)



b)

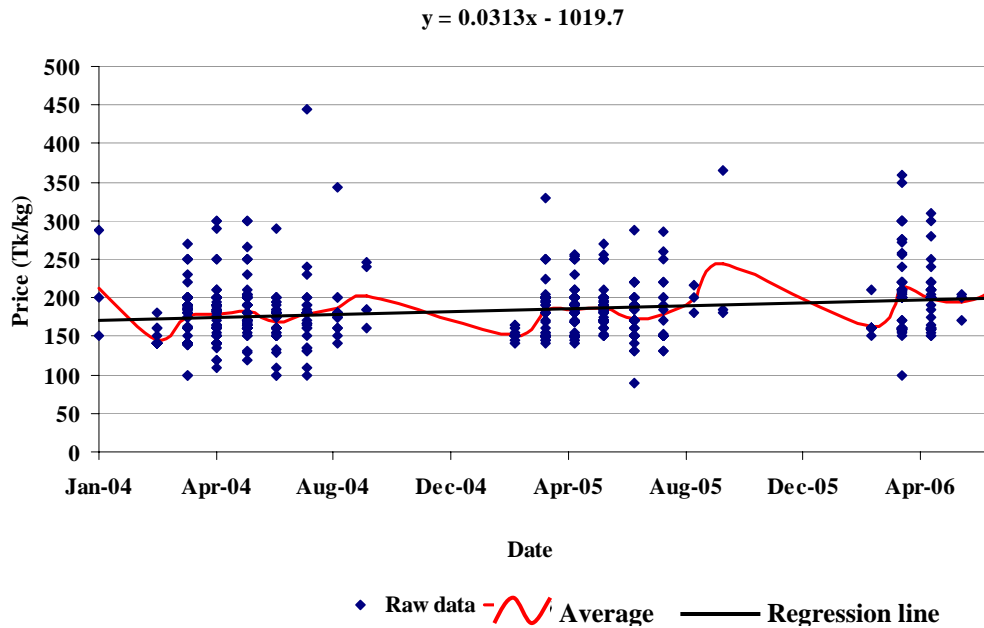
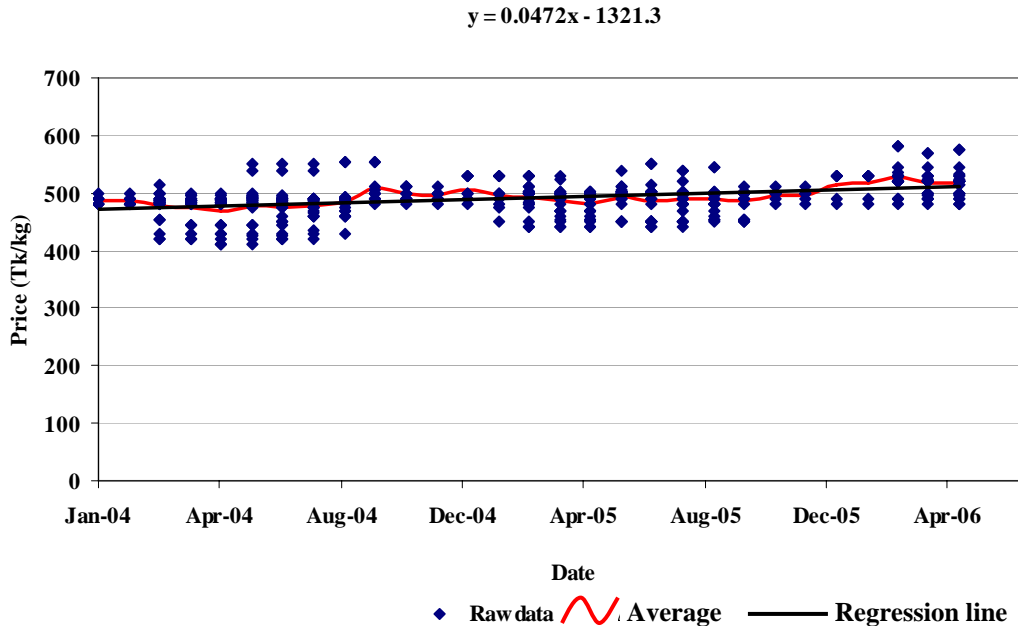


Figure 22 Scatters of actual sale prices of *P. monodon* for farmers, size U20 (a) and size 45-66 (b), Bangladesh

Traders

As with the farmers' data, shrimp prices for traders showed a gradual increase with relatively higher values at the end of the year 2004. Procurement prices for traders were also relatively higher towards the end of 2004 (Figure 23).

a)



b)

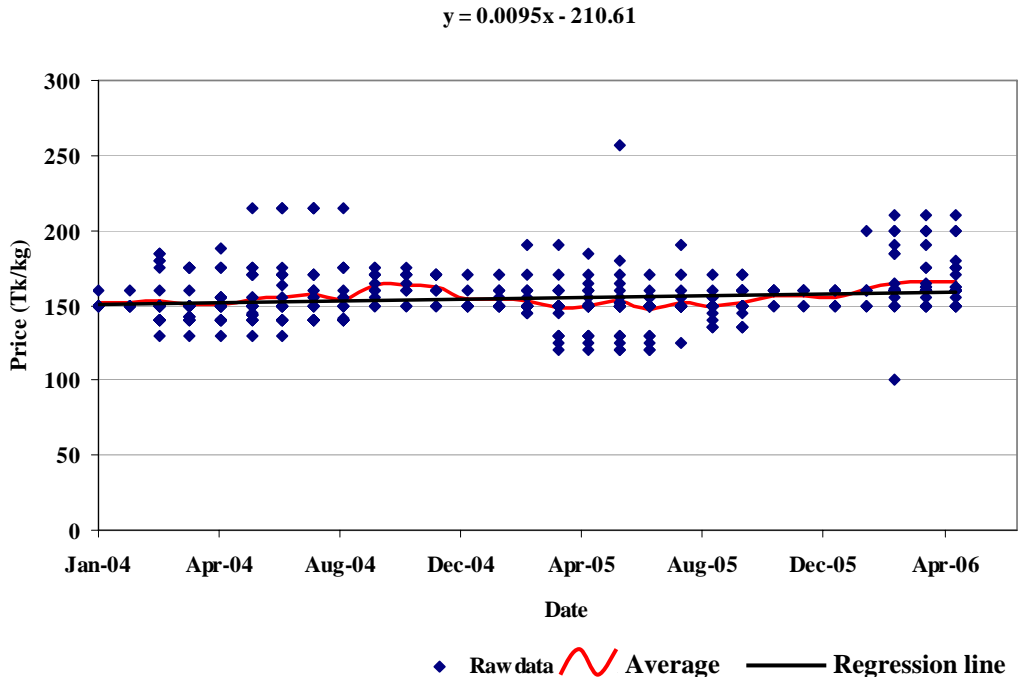
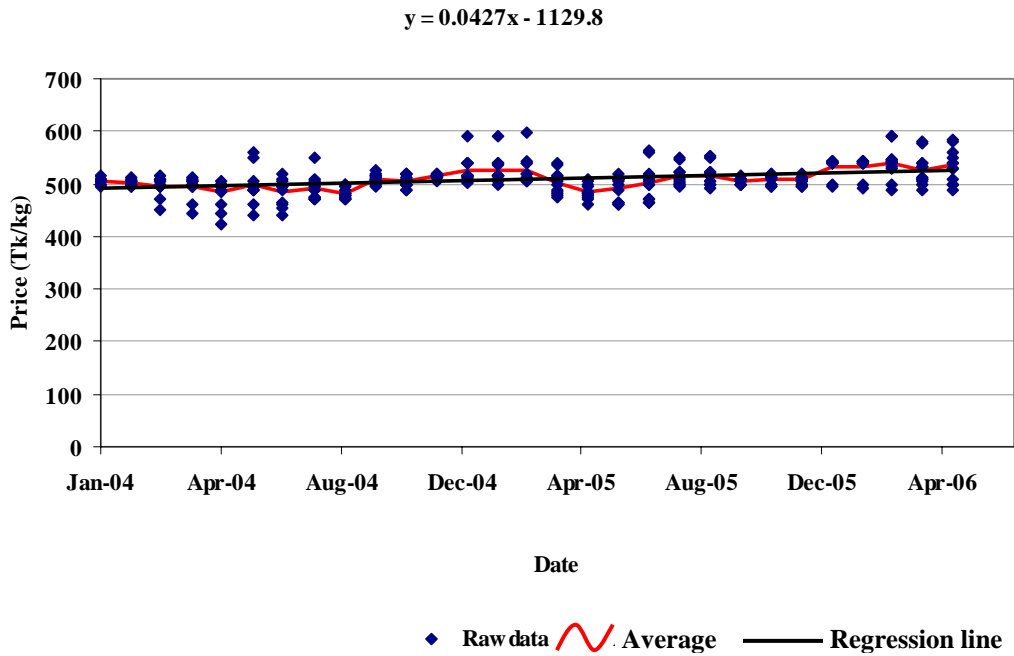


Figure 23 Scatters of actual sale prices of *P. monodon* for traders, size U20 (a) and size 45-66 (b), Bangladesh

Depots

Prices paid by depots also increased slightly, although prices were usually stable, with shrimp of size 21-30 even declining. Once again, prices for larger sizes increased more sharply (Figure 24).

a)



b)

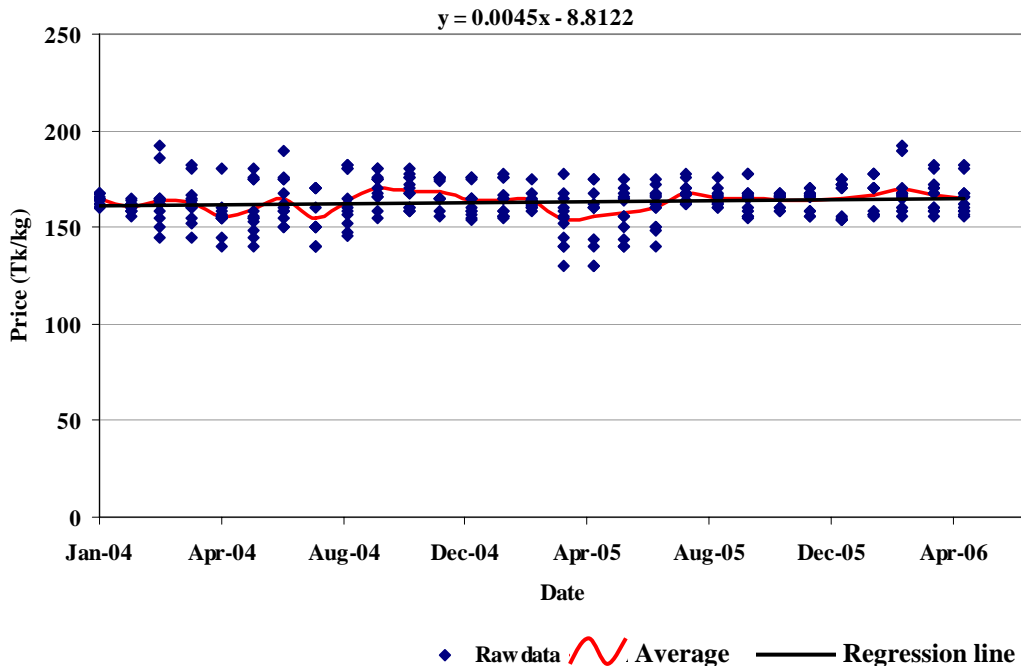
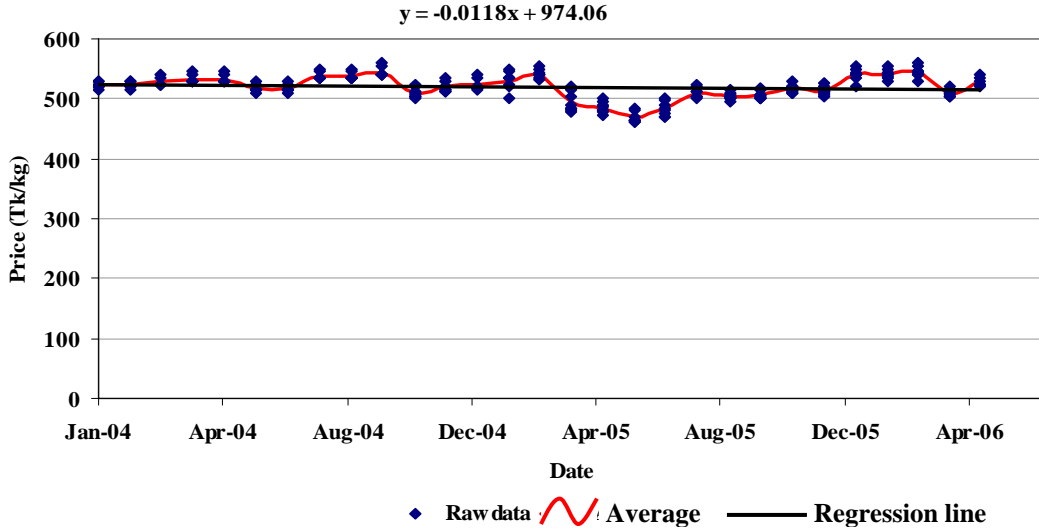


Figure 24 Scatters of actual procurement prices of *P. monodon* for depots, size U20 (a) and size 45-66 (b), Bangladesh

Agents

Unlike other stakeholders, the general price trend for agents decreased slightly and the relatively higher prices in late 2004 were less marked than for other stakeholders. This pattern appeared to begin earlier than for the other stakeholders, with relatively higher prices starting from mid-2004. The agents' price data also revealed the occurrence of consecutive months with relatively lower prices in early to middle 2005, after which prices recovered slightly (Figure 25).

a)



b)

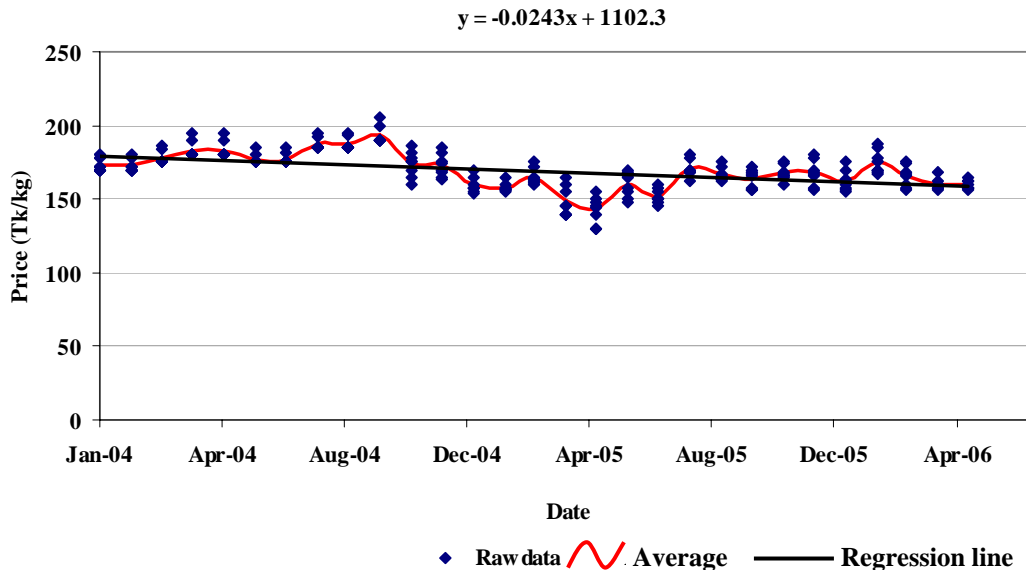
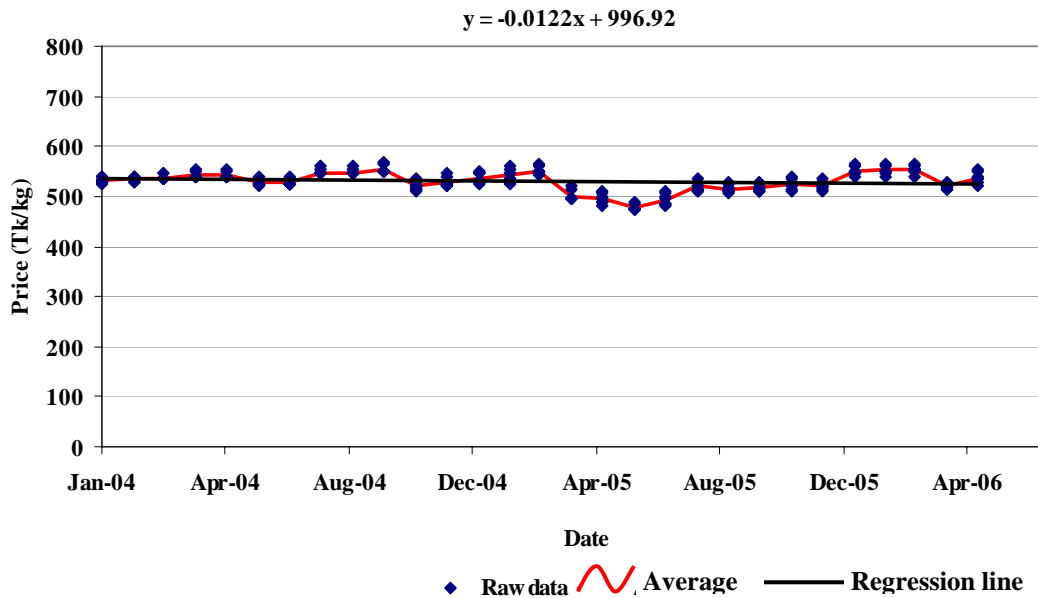


Figure 25 Scatters of actual procurement prices of *P. monodon* for agents, size U20 (a) and size 45-66 (b) Bangladesh

Processors

Procurement prices paid by processors decreased over the study period for all sizes. Prices in the first months of 2005 reached a minimum for all sizes. Differences in trend between processors and other traders may indicate an increase in the business efficiency of traders and farmers (Figure 26). Procurement price data were consistent with data collected over the 2004-2005 period as part of a USAID-funded Agrobased Industries and Technology Development Project (ATDP), therefore validating the information collected through this survey.

a)



b)

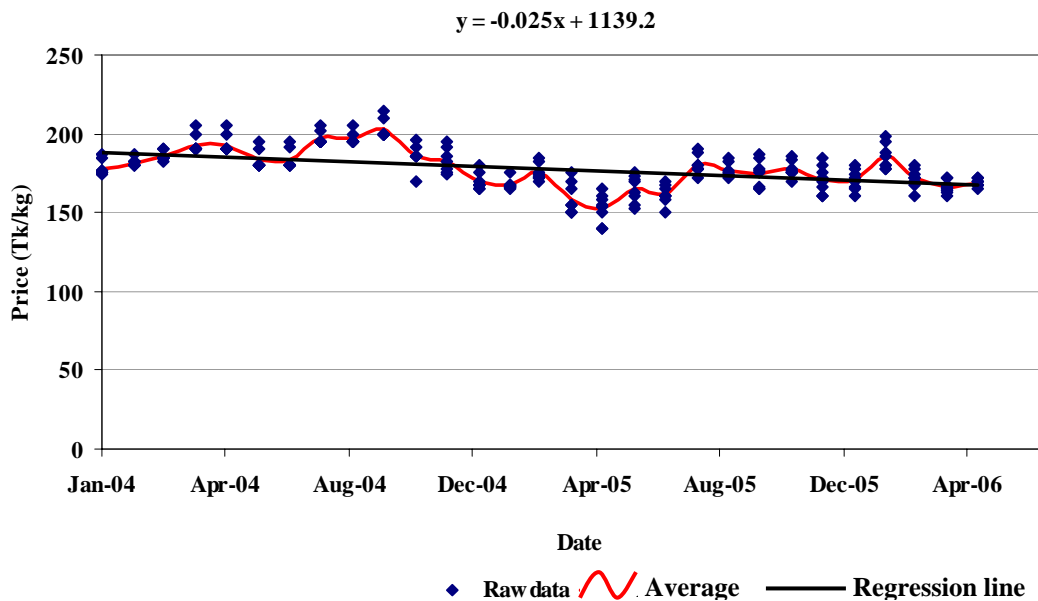


Figure 26 Scatters of actual procurement prices of *P. monodon* for processors, size U20 (a) and size 45-66 (b), Bangladesh

Table 12 summarizes the price trends faced by the different stakeholder groups in Bangladesh. Monthly average prices can be found in Annexes 44 - 46.

Table 12 Price trends of stakeholders in Bangladesh

Unit: BDT/kg

Stakeholders	Size	Slope	Intercept	Jan-04	Jan-06
Farmers	U20	0.0537	-1,588.3069	451.82	491.08
	30	0.0402	-1,182.4978	346.10	375.51
	44	0.0371	-1,152.1278	257.45	284.57
	66	0.0313	-1,019.7153	170.02	192.91
	100	0.0114	-342.0140	91.75	100.10
	PD	0.0017	-39.1979	25.10	26.33
Traders	U20	0.0472	-1,321.2726	470.99	505.48
	30	0.0187	-353.5253	357.32	371.00
	44	0.0298	-887.6709	243.70	265.47
	66	0.0095	-210.6119	150.81	157.76
	100	0.0090	-265.2351	77.84	84.44
Depots	U20	0.0427	-1,129.8396	490.49	521.68
	30	-0.0016	445.9371	385.06	383.88
	44	0.0172	-391.7649	262.76	275.36
	66	0.0045	-8.8122	161.41	164.69
	100	0.0084	-241.4709	79.48	85.66
	PD	0.0032	-73.2876	46.55	48.86
Agents	U20	-0.0118	974.0554	524.76	516.11
	30	-0.0658	2,922.5575	421.85	373.72
	44	-0.0151	858.9872	285.14	274.10
	66	-0.0243	1,102.3202	179.46	161.70
	100	0.0032	-42.6358	79.76	82.12
	PD	0.0048	-135.1601	48.22	51.75
Processors	U20	-0.0122	996.9234	534.67	525.78
	30	-0.0653	2,911.8613	431.92	384.20
	44	-0.0157	893.4019	295.25	283.74
	66	-0.0250	1,139.1939	188.55	170.25
	100	0.0018	17.5720	84.71	86.00
	PD	0.0055	-155.5065	52.28	56.28

Perceived reasons and impacts of price trends

About 75% of the farmers mentioned that the shrimp price increased over the five years although 22% indicated reported decreasing prices. Main reasons for allegedly increasing prices were high international price (63%), quality improvements (30%) and improved hygiene conditions (18%).

Increased prices had a positive effect on all the stakeholder groups including farmers, traders, processors, input suppliers, technology providers, associated labour, fishermen and transporters. Good economic health of stakeholders was believed to have been maintained by these price increases. Other positive benefits consisted of better education of children in the family, more employment, increased shrimp farm area, extension of business, better capacity utilization and so on.

5.3.5. Supply Chain Analysis

The supply chain in Bangladesh differs depending on the region. In Khulna, the main supply chain consists of farmers, trader/faria, depots, agents and processors, with most fisheries commodities flowing through this pathway although some deviations from this pattern can be observed. In fact, although a major portion (90-95%) of the farmers sells to traders/faria, 5-10% of them sell directly to depots, bypassing the traders/farias. These farmers also tend to adopt slightly more intensive farming operations. Similarly, 90-95% of traders sell shrimp to depots, although a smaller proportion (5-10%) trade directly with agents. From depots, supplies flow to agents. Agents appear to be the only stakeholder group trading with processors. The supply chain in the Cox's Bazar region, however, shows a more direct flow of shrimp from farmers to agents and processors, without any other intermediaries. This change appeared to have occurred only recently (since 2002).

Differences in the supply chain are generally due to socio-economical status, the distance between different intermediaries, market barriers (some intermediaries preventing farmers trading directly with higher links), ease of supply and convenience. Since small-scale farmers in Bangladesh seldom have a chance to interact with agents or processors, the supply chain is relatively long and similar to that observed for agricultural commodities.

The supply chain is presented in Figure 27.

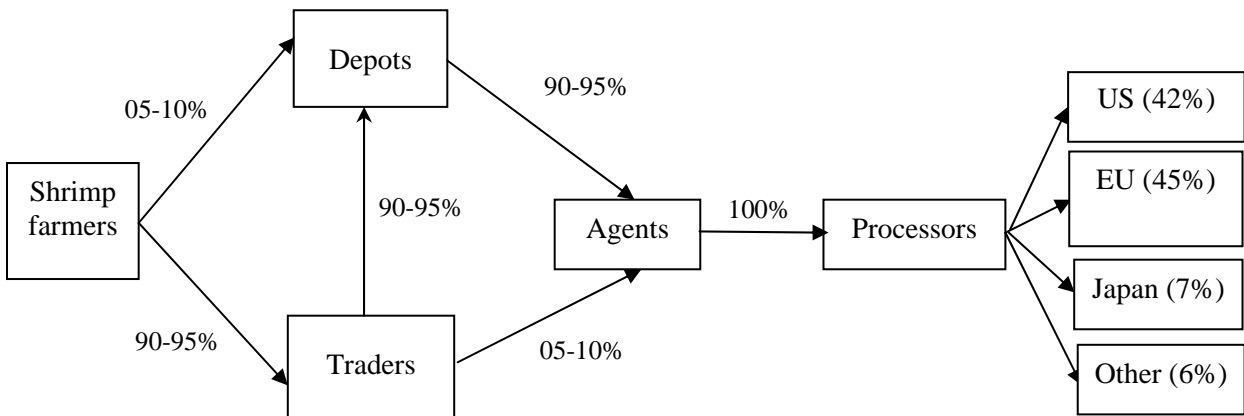


Figure 27 Marketing channels of *P. monodon* shrimp

The major markets for Bangladeshi shrimp are the US and the EU, which imported 46% and 45% of Bangladeshi shrimp in 2005 respectively (Table 13).

Table 13 Composition of the total exported amount of shrimp products by the markets and type of products

	2004	2005	% of change
By the markets % of the total amount exported	100.0	100.0	
+ US	42	46	10%
+ EU	45	45	0%
+ Japan	7	7	0%
+ Asia	2	1	-50%
+ Others	4	1	-75%
By the type of products % of the total amount exported	100.0	100.0	100.0
+ HOSO	1	1	0%
+ HLSO	90	90	0%
+ PUD	5	5	0%
+ BTO cooked	1	2	100%
+ Others	3	2	-33%
By the type of packaging % of the total amount exported	100.0	100.0	100.0
+ BLOCK	49	45	-8%
+ IQF	34	37	9%
+ Semi-IQF	11	13	18%
+ Others	6	5	-17%

The cost, price and gross profit were calculated for *P. monodon* of size 31-44, as this is the most commonly traded size. Farmers' cost to produce 1 kg of shrimp was estimated at BDT 185, while they sold to traders at a price of BDT 277. Thus, farmers gained an average gross profit of BDT 92 per kg. Similarly traders' average purchase price was BDT 251 while they sold it at a price of BDT 258 making a profit of BDT 7 per kg. It should be noted that traders buy shrimp from farmers on a per maund⁵ basis, but considering a maund of 40 kg rather than the actual 37.245 kg at which they sold the shrimp. Thus they enjoy an extra "margin" of about 2.75 kg per maund from the farmers. This partly explains the difference between the farmers' selling price and the traders' purchasing price although it may also be due to the fact that farmers and traders surveyed were not matched and that prices received by farmers in Cox's Bazar (where the supply chain is shorter) were also included. Depots made a per kg profit of BDT 11 by selling the product to the agent. Agents' cost price per kg was BDT 282 while they sold the same to the processors at a price of BDT 293 making also a per kg profit of BDT 11. Processors usually make an advance payment to agents of BDT 1300 (BDT 1000 for purchase of shrimp and BDT 300 for transportation), often adjusting it when payment to an agent is made, and in this particular case, the processor's price includes this adjustment. Processors made the highest profit per kg by selling at an average price of BDT 440. The farmer's gross profit was the second highest and agents, depots and traders enjoyed the lowest profit out of trading.

⁵ Maund: 37.245 kg

5.3.6. Impact of Tsunami and US Anti-Dumping or other events

a. Tsunami

The majority of farmers did not know about the occurrence of the Indian Ocean tsunami. Moving higher in the supply chain, the proportion of interviewees aware of this event increased gradually. Farmers, traders and depots indicated that the tsunami had no effect on their livelihood. But agents and processors indicated that there were some indirect effects from the tsunami in the form of increased exports from Bangladesh (Annex 47).

b. US anti-dumping duties

Concerning the US anti-dumping duties, all stakeholder groups except the processors were largely unaware of this event (Annex 47). Since the processors are directly involved with the export of shrimp, they were most aware of it. As with the discussion on the impact of the tsunami, farmers, traders, depots and agents reported no negative consequences from anti-dumping. Processors identified some indirect effects of anti-dumping and that the requirements of international markets' were becoming increasingly stringent requiring greater expenditure to maintain hygiene and sanitary conditions of exported products.

5.4. Conclusions and recommendations

This report shows that the shrimp industry in Bangladesh is relatively healthy. Shrimp prices have been increasing over the years while the crop performance did not show any significant changes. The Indian Ocean tsunami and the US anti-dumping case against other Asian countries did not have any negative effects and actually appeared to have benefited the Bangladesh industry by providing easier access to the US market.

However, a number of concerns associated with the increased market demand for quality products were also expressed. It is necessary for Bangladesh to pay attention to improving hygienic conditions and to avoid the use of banned chemicals. A good marketing plan should also be defined to enable the Bangladesh shrimp to benefit best from the US market. Strategies should also be put in place to limit the potential impact of natural disasters or other events that can negatively influence the shrimp farming sector.

6. Comparative analysis of impact of US anti-dumping, tsunami on the shrimp price trends and livelihoods

6.1. Role of events

Overall, Vietnam was hardly affected by the tsunami. Most stakeholders reported that the US anti-dumping duty imposed on Vietnam caused decreasing shrimp prices over the study period. These changes were reported to have the greatest impact on farmers, who experienced a dramatic decrease in household savings.

As could be expected, the tsunami dealt a serious blow to the shrimp farming sector in Indonesia, causing reduced shrimp production and, especially in the North Sumatra area, the closure of a number of businesses involved with shrimp farming. The Indonesian shrimp farming industry also faced issues associated with increased competition between traders. The decreased production and the imposition of antidumping duties by the US on other countries allegedly led to the illegal import and re-export of shrimp from countries affected by the duties, increasing competition with locally produced shrimp and potentially exposing the country to negative reactions from the US market. In addition to the above, the Indonesian shrimp sector also experienced difficulties in coping with the increasingly stringent international market requirements, therefore threatening further the sustainability of the sector.

Neither the tsunami nor the US anti-dumping duties appeared to exert any negative effect on the shrimp farming industry of Bangladesh, both in terms of prices and production. On the contrary, the relative competitiveness of the Bangladesh shrimp industry appeared to have increased as a consequence of these events.

6.2. Price trends

Owing to the limited written records kept by farmers and to the high variability in shrimp sizes at harvest only limited comparison of farm-gate prices in the 3 study countries could be conducted. Figure 28 shows the monthly average prices obtained by shrimp farmers for size 21-30. Although the limited number of data-points prevents a true comparison, it would appear that farm-gate prices over the study period were similar in Vietnam, Indonesia and Bangladesh.

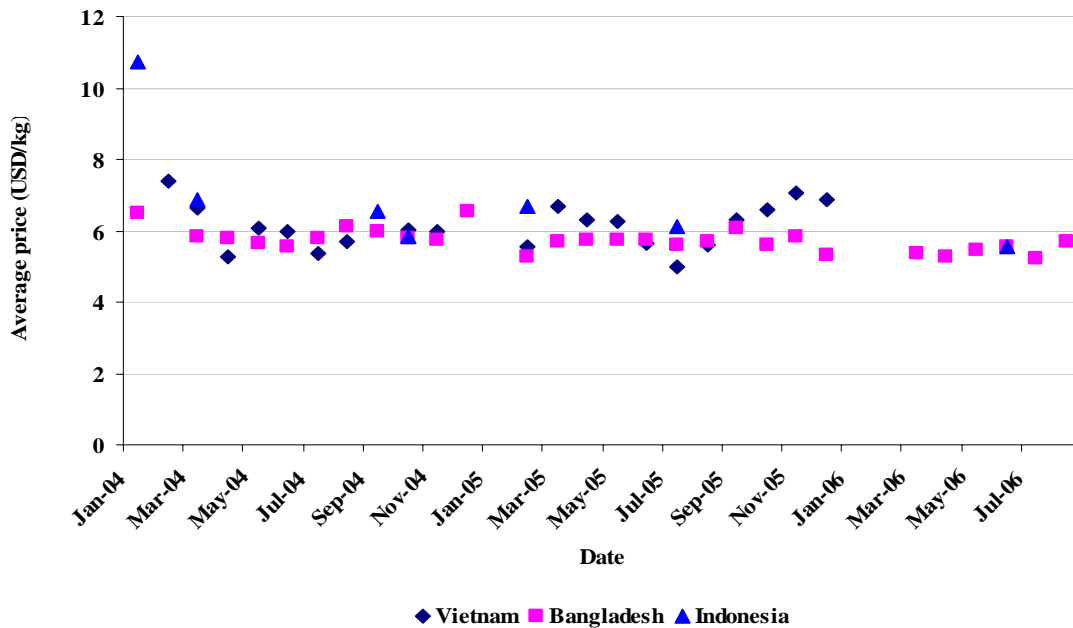


Figure 28 Monthly average selling prices of shrimp farmers (for sizes 26-35 of Vietnam, 26-30 of Indonesia and 21-30 of Bangladesh) in USD

When looking at procurement prices paid by processors and converted in USD, the average prices in Indonesia and Bangladesh showed a similar trend over the study period. This trend however did not seem to reflect the changes of shrimp prices in the international market, when the EU was taken as example, and where minimum values could be detected in the earlier months of the year (Figure 29). Vietnamese procurement prices, showed greater fluctuation compared with Bangladesh and Indonesian ones. This trend also did not appear to be explained by international market fluctuation and it was most likely due to the fluctuation in shrimp harvest. During the main harvest times, the prices of the Vietnamese shrimp, for example of size 19-22, were very close to, and sometimes even lower than the prices of size U20 of the other two countries. On the contrary, in off-season, prices were slightly higher (See Figure 30, Figure 31 and Figure 32).

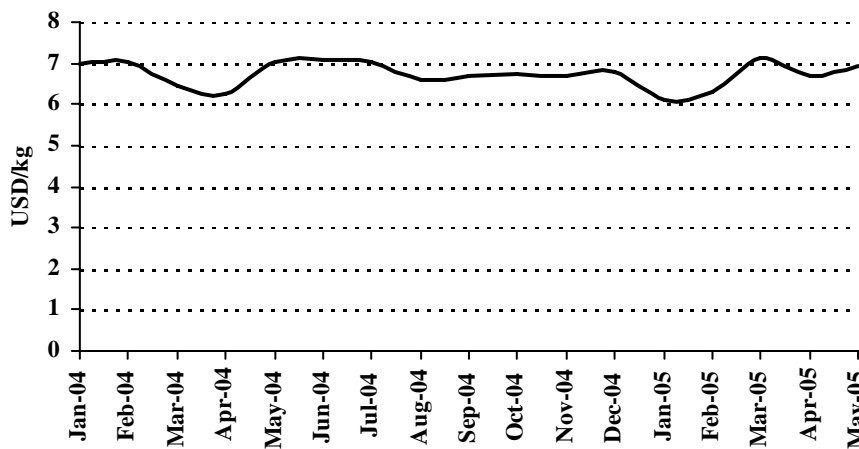


Figure 29 Import prices (average of all sizes) of frozen *Penaeus* to the EU (Eurostat)

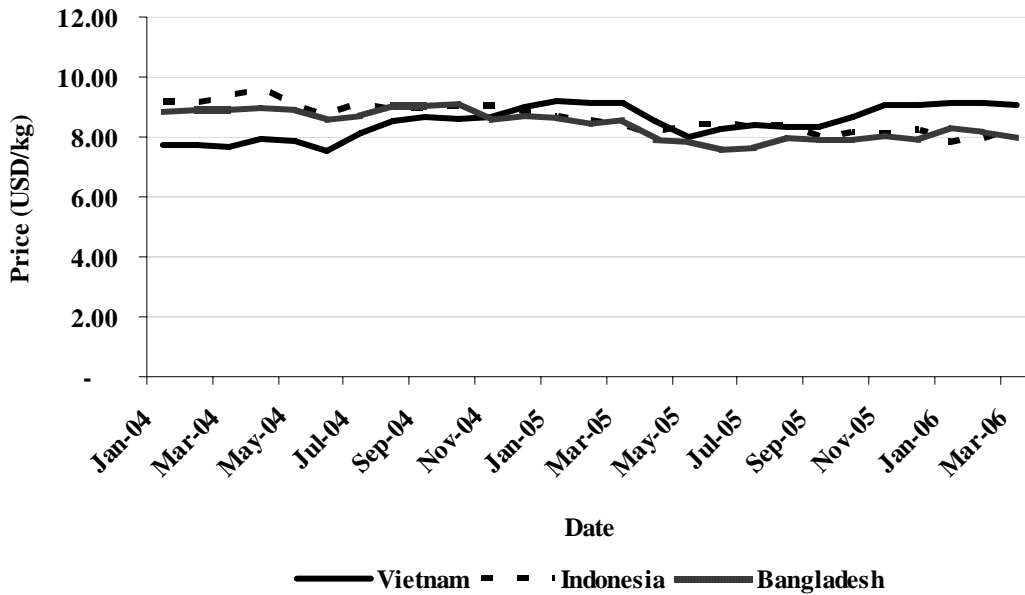


Figure 30 Monthly average USD procurement prices of processors for the sizes 19-22 of Vietnam and U20 of Indonesia and Bangladesh

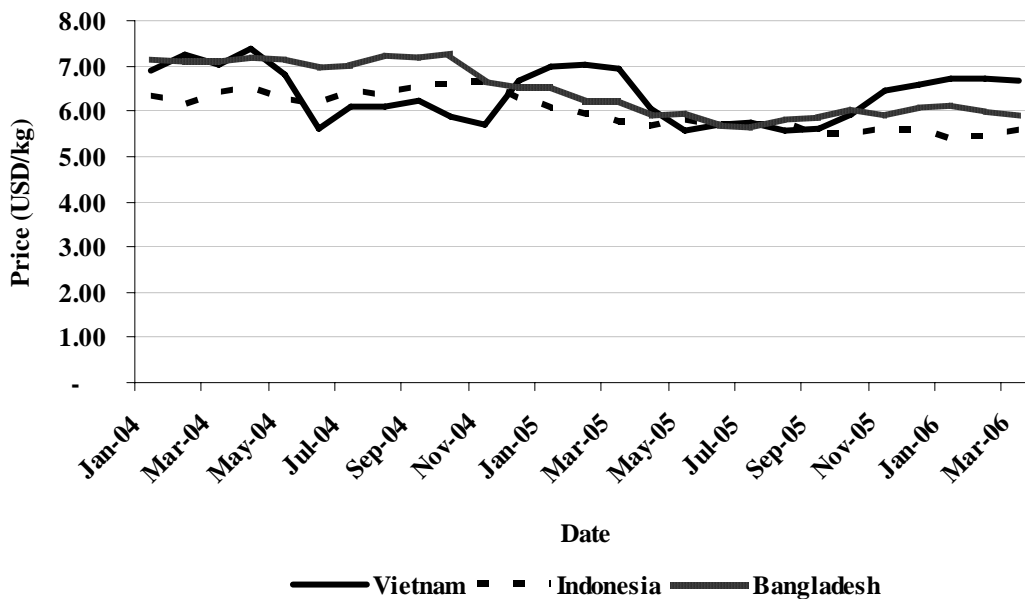


Figure 31 Monthly average USD procurement prices of processors for the sizes 23-30 of Vietnam, 26-30 of Indonesia and 21-30 of Bangladesh

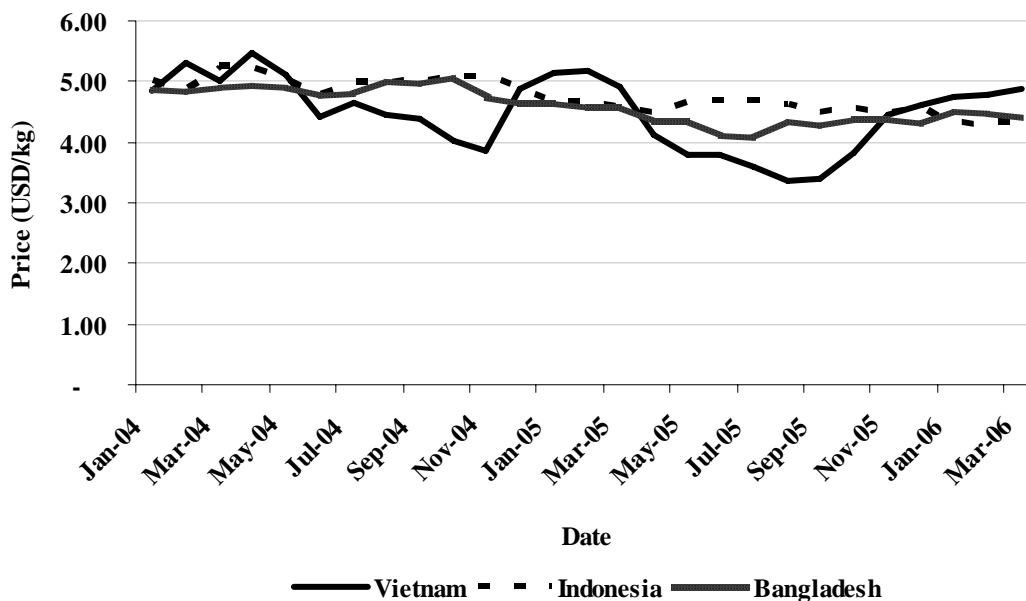


Figure 32 Monthly average USD procurement prices of processors for sizes 38-44 of Vietnam, 31-44 of Indonesia and Bangladesh

When examining trends in farm gate shrimp prices in local currencies it appears clear that prices paid to farmers in Bangladesh increased over the study period (positive slope) whereas farmers in both Vietnam and Indonesia experienced decreasing prices (Table 14). This may indicate a negative effect of the events under study (i.e. tsunami and anti-dumping duties) on the farming communities.

Table 14 Price trends of farmers (for sizes 26-35 of Vietnam, 26-30 of Indonesia and 21-30 of Bangladesh)

Country	Currency units	Slope	Intercept	Jan-04	Jan-06
Vietnam	1000 VND	-0.0012	143.5742	97.52	96.64
	USD	0.0008	-24.348	6.04	6.63
Indonesia	IDR	-28.3523	1,149,715.72	72,698.33	51,972.83
	USD	-0.004	161.74	9.79	6.87
Bangladesh	BDT	0.0402	-1,182.4978	346.10	375.51
	USD	-0.0005	24.091	5.10	4.73

Examination of the processor procurement prices in the 3 countries indicated a slightly different pattern. Prices in Indonesia and Bangladesh decreased for all sizes, although the rate of decrease varied between countries, with processor prices in Indonesia decreasing more than in Bangladesh and Vietnam (Table 15) where only size 23-30 of processor prices showed a negative trend. It is difficult to extrapolate the impact of these trends on the processors since little information could be collected on export prices fetched by processors. Decreasing procurement prices may indicate a stronger power exercised by processors, who can afford to buy fresh

shrimp at lower prices, although this may also reflect price pressure and competition in the international market forcing processors to reduce procurement prices to maintain margins.

Table 15 Price trends of shrimp processors

Country	Currency units	Slope	Intercept	Jan-04	Jan-06
<i>Sizes 19-22 (Vietnam) and U20 (Indonesia and Bangladesh)</i>					
Vietnam	1000 VND	0.0130	-292.7529	199.56	209.04
	USD	0.0003	-3.3265	8.26	8.48
Indonesia	IDR	-4.7119	260,654.6290	81,662.29	78,217.87
	USD	-0.0016	68.7395	9.24	8.10
Bangladesh	BDT	-0.0122	996.9234	534.67	525.78
	USD	-0.0017	73.6395	9.04	7.80
<i>Sizes 23-30 (Vietnam), 26-30 (Indonesia) and 21-30 (Bangladesh)</i>					
Vietnam	1000 VND	-0.0014	154.7809	101.30	100.28
	USD	-0.0002	15.7481	6.35	6.17
Indonesia	IDR	-4.5631	230,728.8812	57,391.98	54,056.39
	USD	-0.0012	52.6756	6.49	5.60
Bangladesh	BDT	-0.0653	2,911.8613	431.92	384.20
	USD	-0.0022	89.9370	7.28	5.69
<i>Sizes 38-44 (Vietnam) and 31-44 (Indonesia and Bangladesh)</i>					
Vietnam	1000 VND	0.0052	-126.5955	69.15	72.92
	USD	0.0002	-2.9057	4.34	4.48
Indonesia	IDR	-2.4620	138,573.8988	45,048.74	43,249.00
	USD	-0.0008	37.3261	5.10	4.48
Bangladesh	BDT	-0.0157	893.4019	295.25	283.74
	USD	-0.0011	45.5542	4.98	4.20

It should be noted that there was difference in the price trends in USD and national currencies. This reflects different changing patterns in the exchange rate between the 3 national currencies and USD.

The exchange rate of VND/USD during the study period showed a decreasing trend, with the VND becoming stronger (Figure 33). This decreasing trend was greater than the downwards trend of the shrimp prices, therefore resulting in a price trend in the opposite direction when analysis was conducted in VND or USD.

On the contrary, the exchange rate of BDT/USD during the study period showed an increasing trend with the BDT becoming progressively weaker against the USD (Figure 34), therefore showing a trend in the opposite direction when transactions were analysed in USD.

Opposite to Vietnam and Bangladesh, Indonesia experienced a relatively stable exchange rate (Figure 35).

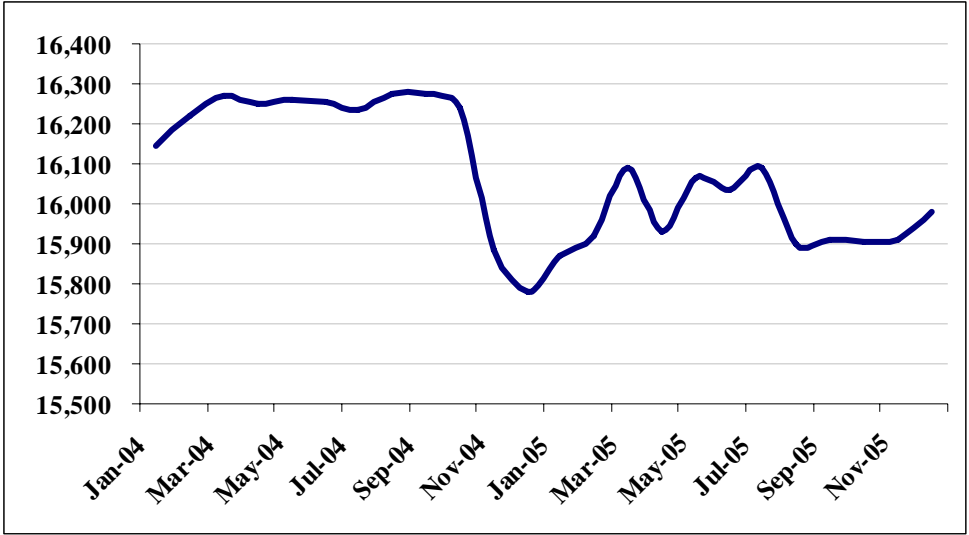


Figure 33 VND/USD monthly exchange rates during 2004-2005 (Oanda.com)

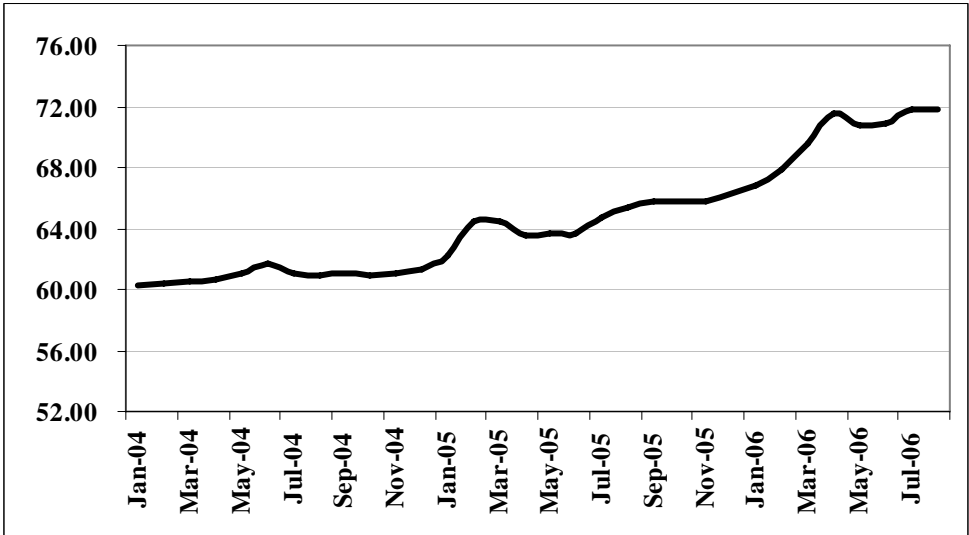


Figure 34 BDT/USD monthly exchange rates during 2004-2006 (Oanda.com)

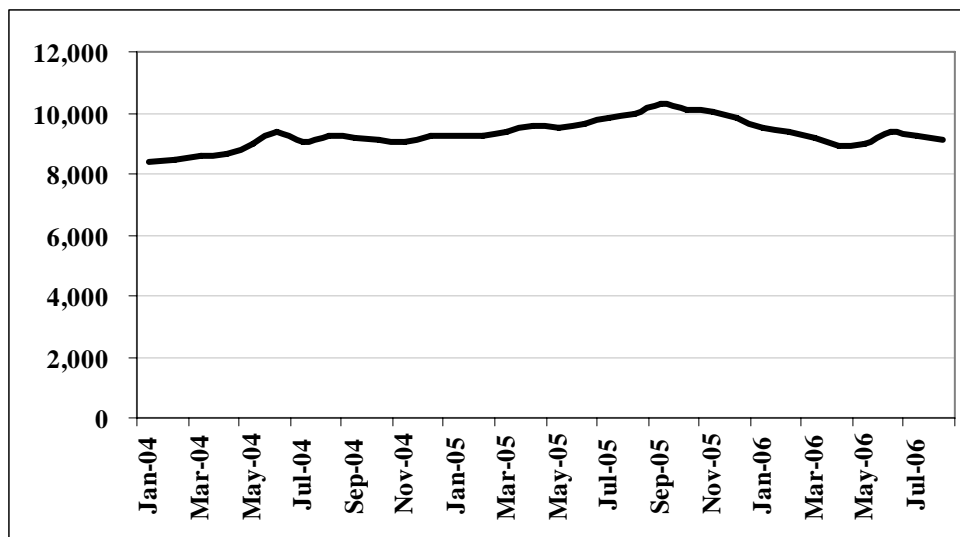


Figure 35 IDR/USD monthly exchange rates during 2004-2006 (Oanda.com)

A table of monthly exchange rates of the three currencies versus the US dollar during the period 2004-2006 can be found in Annex 48.

6.3. Volume traded

In Vietnam, there was a decreasing trend in the volume of shrimp traded throughout the supply chain with smaller Vietnamese players apparently suffering more from this downwards trend. The reason for the volume decrease appeared to be due mainly to increased competition rather than to the introduction of anti-dumping duties. However, contrary to other traders, Vietnamese processors appeared to increase the amount of shrimp traded over time.

In Indonesia, both traders and processors' procurement volume decreased sharply by nearly 65%. The Indonesian shrimp industry was heavily affected by the tsunami and this event was a major factor in decreased shrimp supplies. However, as in Vietnam, increasing competition was also one of the causes for the reduction in fresh shrimp traded over the study period.

In contrast to Vietnam and Indonesia, Bangladeshi shrimp traders and processors traded increasing volumes throughout the years confirming that, among the 3 countries, Bangladesh was the least impacted by the tsunami and anti-dumping duties.

7. Conclusions and recommendations

The Indian Ocean tsunami of the 26th December 2004 and the US anti-dumping duties imposed on 4 Asian countries had a huge impact in the Asian region both economically and socially. Although these events clearly brought challenges, they also opened opportunities for the shrimp industries of both affected and non-affected countries.

Indonesia was one of the countries most seriously affected by the Indian Ocean tsunami. Apart from the impact of loss of life, the shrimp industry was also heavily impacted in terms of production and infrastructure, resulting in a heavy demand for capital investment to allow rebuilding of infrastructure. The examination of the whole shrimp farming sector seems to reveal a wider impact associated with the decline in shrimp prices and shrimp production volume and the need for increased investments also in areas not directly affected by the event. Besides, a number of challenges also emerged from the perceived quality deterioration of the Indonesian products following the occurrence of the tsunami. Fortunately, Indonesia received a great deal of support from the international community both financially and technically in the re-building process. This also represented an opportunity to restructure and re-plan the shrimp aquaculture industry in these areas and could help improve the image of Indonesian shrimp, improving their competitive advantage in the market.

The tsunami was not the only factor impacting the Indonesian sector over the past few years. Internal events such as unfair prices paid to farmers, harsher competition among traders, the alleged importation and re-exportation of shrimp from countries affected by the US anti-dumping and poor shrimp quality also contributed to straining the sector. In addition, other external factors such as the over-supply of shrimp on the international market and the increasingly stringent market requirements most likely also played an important role in determining the evolvement of the Indonesian shrimp sector. Dealing with these events will require a great deal of effort from all stakeholders, from grassroots to local and national authorities. Improved collaboration between stakeholders would facilitate the planning and management of the sector. In this process, improved preparedness not only to natural disaster, but also to international market requirements through the development of strategies targeted at improving shrimp quality seem to play a key role. Devoting additional efforts towards the development of effective legal and institutional frameworks that ensure fair benefits throughout the supply chain and the promotion of Indonesian shrimp products on the international market should also be considered.

Vietnam was considered as representative of Asian countries affected by US anti-dumping duties. Overall, the anti-dumping duties had a relatively more modest impact than the tsunami in Indonesia, not least because it was not associated with huge human losses. Although greater competition on international markets, exchange rate fluctuation, higher fuel price and higher interest rates on loans also negatively affected the sector, the US anti-dumping measures resulted in an overall drop of shrimp prices and in quantity and value of shrimp exported to the US. While the traders and processors/exporters tried to maintain their profit margin by adjusting their shrimp procurement prices, the farmers were reported to be the stakeholder group most seriously affected by this event. This is unfortunate, since

farmers are price takers, suffering also from the high number of intermediaries in the supply chain, who will tend to share profit margins among them.

As the burden of price decreases mainly falls on the farmers, the anti-dumping duties may have had some secondary effects due to farmers' attempts to reduce costs. Reducing investment and production cost may lead farmers to use cheaper but lower quality inputs, potentially exposing themselves to increased risk of failure, reduced productivity, diseases and, consequently, further financial loss. It is therefore of paramount importance that mechanisms to give access to credit are available, especially for small-scale farmers.

Interestingly, the Vietnamese shrimp industry appeared to gradually have recovered from the negative impacts associated with the introduction of duties and maintained stable growth in exports despite the drop in their share of the US market (Figure 36). Among the solutions that Vietnam adopted to cope with anti-dumping, expansion of existing export markets such as the EU to maintain stable export growth played a key role as did the development of new markets in Latin America and Africa, opening the opportunity to strengthen the Vietnamese industry through market diversification.

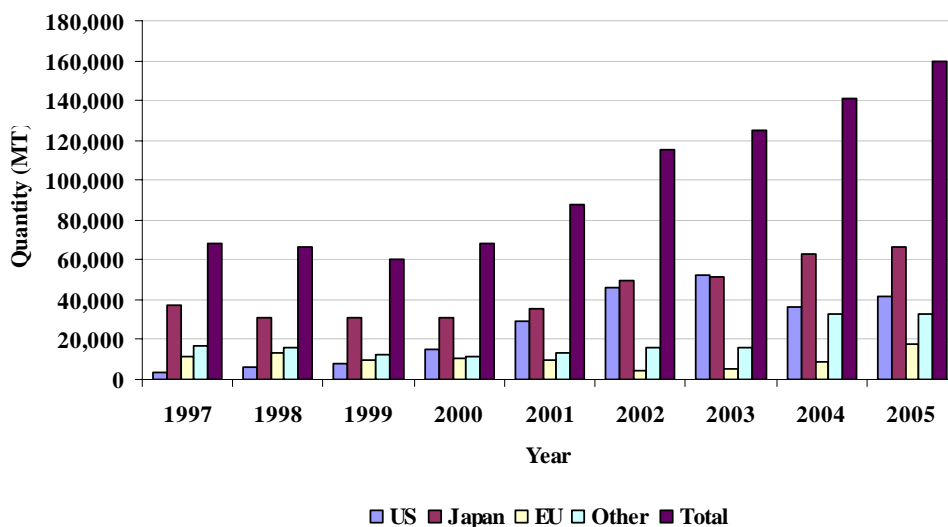


Figure 36 Export quantities of Vietnamese shrimp (VASEP)

Vietnam, as well as other countries affected by US anti-dumping duties could also export alternative aquaculture products such as molluscs, tilapia and other fish, or shrimp products not covered by the anti-dumping tariffs such as canned shrimp to the US. In this context, the development of strategies to improve the sustainability of the fisheries sector as a whole and enable the supply of aquaculture products at the required quality and quantity is compelling. Although this strategy may already have been adopted by some exporters, it should be managed in an open and transparent manner to avoid the introduction of further anti-dumping duties on these products.

Among the 3 countries under study, the Bangladesh shrimp sector seemed to have suffered the least impact with generally increasing prices and expanded opportunities to export to the US. However, this relative advantage appeared to be short-lived as a number of concerns related to the quality of shrimp harvests are threatening the

sustainability of the sector. To translate the positive development into a long-term advantage, hygienic conditions in shrimp production should be improved following the requirements of importing countries. The use of banned chemicals should be avoided and the adoption of sustainable shrimp farming practices should be encouraged. Good understanding of the targeted markets (in terms of regulations, trading practices, contracting, etc) as well as a good strategy to widen the markets should be considered. Diversification of exported commodities should also be sought to reduce the vulnerability of the sector caused by a reliance on a limited number of commodities. Lessons from the negative impacts of the tsunami and events occurring in other countries in the region should also be learnt and the preparedness to such events should be strengthened.

Although this study was limited to assessing the impact of the Indian Ocean tsunami and the US anti-dumping by looking only at 3 Asian countries, it generated a great deal of information that gave an insight into the impact of these events, although the wide regional impact of these events and the simultaneous occurrence of other events in the region made the assessment of each individual event impossible.

The study also highlighted the need to maintain regular collection of price data, not only from processors and concerning exported commodities, but also from traders and farmers to allow a more thorough evaluation of the economic status and health of all sectors of the industry and to identify interventions to increase the economic sustainability of the sector.

This study focused on the investigation of impacts of the 2004-2005 events on producing countries. To have an overview of the impacts of the events on the whole supply chain (from producers to consumers), it is believed that studies on the possible impact of these events also on the importers, retailers and consumers should also be conducted.

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Annexes

Annexes for Vietnam case study

Annex 1. Samples and locations for the study

Location \ Respondent	Ca Mau	Bac Lieu	Soc Trang	Ben Tre	Total
Shrimp farmers	34	3	19	32	88
Shrimp traders/middlemen	15	12	9	2	38
Collectors	3	4	2	2	11
Wholesalers	3	4	2		9
Trading companies	9	4	5		18
Processors/Exporters	5	2	3	2	12
Total number of respondents	54	11	26	34	117

Annex 2. List of interviewed farmers

ID	Farmer ID	Name	Address	Commune	District	Province
1	1	Lam Tu Vinh	So Tai B	Vinh Phuoc	Vinh Chau	Soc Trang
2	2	Tiep Thach	So Tai B	Vinh Phuoc	Vinh Chau	Soc Trang
3	3	Son Thiep	So Tai A	Vinh Phuoc	Vinh Chau	Soc Trang
4	4	Son Bao	So Tai B	Vinh Phuoc	Vinh Chau	Soc Trang
5	5	Lam Khien Ni	Xom Me	Vinh Phuoc	Vinh Chau	Soc Trang
6	6	Son Mat Xay	So Tai B	Vinh Phuoc	Vinh Chau	Soc Trang
7	7	Lam Cao	Ong Do	Dat Moi	Nam Can	Ca Mau
8	8	To Viet Hong	Phuoc Hoa	Thi Tran Phuoc Lo	Phuoc Long	Bac Lieu
9	9	Chau Thi Diep	Xom Moi	Tan Thanh	Gia Thanh	Bac Lieu
10	11	Ma Khanh Xil	Lo Xe	Phu Hung	Cai Nuoc	Ca Mau
11	12	Duong Van Phuong	Phuoc Thanh	Phuoc Long	Phuoc Long	Bac Lieu
12	13	Huynh van Kinh	Tay Lang	Lieu Tu	Long Phu	Soc Trang
13	14	Tran Van Um	Tong Cang	Lieu Tu	Long Phu	Soc Trang
14	15	Tran Van Khuong	Xom Tam	Hiep Thanh	Thi xa Bac Li	Bac Lieu
15	16	Tang Thai Cong	Bon	Phong Thanh A	Gia Rai	Bac Lieu
16	17	Vo Hong Ngoan	Xiem Cang	An Trach Dong	Thi xa Bac Li	Bac Lieu
17	18	Nguyen Van Sinh	Go Muong	Tan Thanh	Gia Rai	Bac Lieu
18	19	Nguyen Van Nen	Bon	Phong Thanh A	Gia Rai	Bac Lieu
19	20	Le Van Phuong	Chanh	Ly Van Lam	TP Ca Mau	Ca Mau
20	21	Chau Thanh Tam	Xom Moi	Tan Thanh	Gia Rai	Bac Lieu
21	22	Tran Van Kien	Tong Cang	Lieu Tu	Long Phu	Soc Trang
22	23	Thai van Buol	Tong Cang	Lieu Tu	Long Phu	Soc Trang
23	24	Huynh Hai Van	Tong Cang	Lieu Tu	Long Phu	Soc Trang
24	25	Dang Van Thung	Hoa Phuong	Hoa Tu 1	My Xuyen	Soc Trang
25	26	Vo Van Thang	Hoa	Hoa Tu 1	My Xuyen	Soc Trang

			Phuong			
26	27	Nguyen Van Hao	Hoa Phuong	Hoa Tu 1	My Xuyen	Soc Trang
27	28	Duong Van Ut	Hoa Phuong	Hoa Tu 1	My Xuyen	Soc Trang
28	29	Duong Minh Tu	Phuoc Thanh	TT Phuoc Long	Phuc Long	Bac Lieu
29	30	Ho Van Viet	Phuoc Hoa A	TT Phuoc Long	Phuc Long	Bac Lieu
30	31	Dao Cong Giap	Phuoc Hoa A	TT Phuoc Long	Phuc Long	Bac Lieu
31	32	Huynh Tan Khoi	Long Hoa	TT Phuoc Long	Phuc Long	Bac Lieu
32	33	Le Thi Cam	Hoa Phuong	Hoa Tu 1	My Xuyen	Soc Trang
33	34	Dinh Van On	Dai Non	Lieu Tu	Long Tu	Soc Trang
34	35	Ly Quoc Su		Phuong 2	Thi Xa Bac Li	Bac Lieu
35	36	Ho Minh Phu	Khom 8	Phuong 5	Thi Xa Bac Li	Bac Lieu
36	37	Le Van He	Giong giua	Hiep Thanh	Thi xa Bac Li	Bac Lieu
37	38	Truong Thanh Duc	Tan Tien	Tan An Tay	Ngoc Hien	Ca Mau
38	39	Ta Thi Lan	Tan Trung	Tan An Tay	Ngoc Hien	Ca Mau
39	40	Le Minh Quay	Xom Moi	Ham Rong	Nam Can	Ca Mau
40	41	Nguyen Van Ket	Chong My	Ham Rong	Nam Can	Ca Mau
41	42	Dinh Van Hung	Xom Moi	Vien An Dong	Ngoc Hien	Ca Mau
42	43	Truong Van Thong		Hang Vinh	Nam Can	Ca Mau
43	44	Huynh Van Yen		Hang Vinh	TT Nam Can	Ca Mau
44	45	Ta Kim Lam		Hang Vinh	TT Nam Can	Ca Mau
45	46	Nguyen Quoc Khanh	Ong Nhu	Tan An Tay	Ngoc Hien	Ca Mau
46	47	Truong Van Thong	Tan Tien	Tan An Tay	Ngoc Hien	Ca Mau
47	49	Le Hoang Giang	Long phuoc	Tam Giang	Nam Can	Ca Mau
48	50	Chiem Xuan Thoi	Khom 8	phuong 8	Thi xa bac Li	Bac Lieu
49	51	Vu Tan Binh	Tong Cang	Lieu Tu	Long Phu	Soc Trang
50	52	Nguyen Van Ky		Phuong 8	TX Bac Lieu	Bac Lieu
51	53	Le Minh Kiem	Khom 8	Phuong 8	Thi xa Bac Li	Bac Lieu
52	54	Le Van Vol	Kinh Lon	Tan Thanh	Gia Rai	Bac Lieu
53	55	Truong Vu Dat	Khom 8	Phuong 8	TX Bac Lieu	Bac Lieu
54	56	Nguyen Van Thang	Go Mua	Tan Thanh	Gia Rai	Bac Lieu
55	57	Duong Van Hao	Phuoc Thanh	Phuoc Long	Phuoc Long	Bac Lieu
56	58	Nguyen Thanh Trung	Long Hoa	Phuoc Long	TX Phuoc Long	Bac Lieu
57	59	Bui Thi Nhung	Kinh Te	F. Nha MAT	TX BL	Bac Lieu
58	60	Le Kim Hoa	Tac Thu	Ho Thi Ky	Thoi Binh	Ca Mau
59	61	Le VAN Ut	Tac Thu	Ho Thi Ky	Thoi Binh	Ca Mau
60	62	Le Van Ben	Tac Thu	Ho Thi Ky	Thoi Binh	Ca Mau
61	63	Vu Hoang Khiem	Bu Mat	Dat Moi	Nam Can	Ca Mau
62	64	Thach Dua	Bien Dong A	Vinh Trach Dong	Thi Xa BL	Bac Lieu
63	65	Lam Anh Tien	Song cai 1	Tham Don	My Xuyen	Soc Trang
64	66	Vo Quang Huy	Giong Phat	Lieu Tu	Long Phu	Soc Trang
65	67	Tran Huu Mai	Giong Chat	Lieu Tu	Long Phu	Soc Trang
66	68	Nguyen Van Quan	Hoa Phuong	Hoa Tu	My Xuyen	Soc Trang

67	69	Dang Hoang Minh	Hoa Phuong	Hoa Tu 1	My Xuyen	Soc Trang
68	70	Nguyen Van Thang	Hoa Phuong	Hoa Phu 1	My Xuyen	Soc Trang
69	71	Truong Van Hon	Hoa Phuong	Hoa Tu 1	My Xuyen	Soc Trang
70	72	Tiet Thi Tan	Hoa Phuong	Hoa Tu 1	My Xuyen	Soc Trang
71	73	Tran Van Be	Phuoc Hoa A	TT Phuoc Long	Phuoc Long	Bac Lieu
72	74	Nguyen Hung Thang	Khom kinh te	Phuong Nha Mat	TX Bac Lieu	Bac Lieu
73	75	Chau Van Ta	Phuoc Thanh	Phuoc Long	TT Phuoc Long	Bac Lieu
74	76	Giang Quoc Nam	4	Phong Thanh	Gia Rai	Bac Lieu
75	77	Duong Tan Bao	Tong Cang	Lieu Tu	Long Phu	Soc Trang
76	78	Nguyen Van Thuong	Ap 4	Phong Thanh A	Gia Rai	Bac Lieu
77	79	Son Thi Sina	Xom Me	Vinh Phuoc	Vinh Chau	Soc Trang
78	80	Dinh Minh Phung	Ap 8	Tan Thanh	Gia Rai	Bac Lieu
79	81	Lam Van Hon	Tong Cang	Lieu Tu	Long Phu	Soc Trang
80	82	Mai Trung Hieu	Phuoc Thanh	Phuoc Long	Phuoc Long	Bac Lieu
81	83	Vo Van Han	Ap 1	Thanh Phuoc	Binh Dai	Ben Tre
82	84	Pham Nguyen tan Nguye			TX Ben Tre	Ben Tre
83	85	Duong Minh Triet	Ap 1	Thoi Thuan	Binh Dai	Ben Tre
84	98	Lam Chi Loi	Dai Nom	Lieu Tu	Long Phu	Soc Trang
85	99	Nguyen Van A	Giong Chat	Lieu Tu	Long Phu	Soc Trang
86	100	Lam Tam Nguyen	Tong Cang	Lieu Tu	Long Phu	Soc Trang
87	101	Ta Thanh Hai	15	Vinh Hau	Vinh Loi	Bac Lieu
88	102	Nguyen Tan Thanh	Tat Thu	Ho Thi Ky	Thoi Binh	Ca Mau

Annex 3. List of interviewed traders

Trader ID	Name	Address	Commune	District	Province
1	Pham Van Thang		TT Nam Can	Nam Can	Ca Mau
2	Le Thanh Hao	Tan Trun	Tan An Tay	Ngoc Hien	Ca Mau
3	Nguyen Quan		Phuong 8	TP Ca Mau	Ca Mau
4	Nguyen Van Tro	KV1-Khom	TT Nam Can	Nam Can	Ca Mau
5	Huynh Trung Kien	Ap 2	Hang Vinh	Nam Can	Ca Mau
6	Tran Van Xia		TT Nam Can	Nam Can	Ca Mau
7	Nguyen Tien Dinh		TT Nam Can	Nam Can	Ca Mau
8	To Bich Van	178, kho	Phuong 7	TP Ca Mau	Ca Mau
9	Huynh Vinh Nghia	31 Ap 3	Tac Van	TP Ca Mau	Ca Mau
10	Trinh Ho Vu Quan	Duong Tr	Phuong 5	TP Ca Mau	Ca Mau
11	Nguyen Van Tam	Ap 3	Tac Van	TP Ca Mau	Ca Mau
12	Hua Kim Le	KV1-khom	TT Nam Can	Nam Can	Ca Mau
13	Nguyen Thanh Hun		TT Nam Can	Nam Can	Ca Mau
14	La Anh Ngoc		TT Nam Can	Nam Can	Ca Mau
15	To Van Hang	108-Phan	Phuong 7	TP Ca Mau	Ca Mau

16	Quanh Thi Loan	Thanh Th	An Trach	Dong Hai	Bac Lieu
17	Nguyen Xuan Phuo	Go Mien	Tan Thanh	Gai Rai	Bac Lieu
18	Pham Hong Hanh	Binh Tha	Phu Tay	Phuoc Long	Bac Lieu
19	Pham Van Minh	Binh Tha	Phu Tay	Phuoc Long	Bac Lieu
20	Nguy Van Vang			TX Bac Lieu	Bac Lieu
21	Ly My Khen	32-Hai B	Phuong 3	TX Bac Lieu	Bac Lieu
22	Tran Tuan Khanh		Phuong 5	TX Bac Lieu	Bac Lieu
23	Ngo Thi Bich Tra	Khom 1	Phuong 2	TX Bac Lieu	Bac Lieu
24	Pham Kieu Nuong	Tho Tien	Phuoc Long	Phuoc Long	Bac Lieu
25	Nguyen Van Tao	Phuoc Th	Phuoc Long	Phuoc Long	Bac Lieu
26	Nguyen Van Dung	Phuoc Th	Phuoc Long	Phuoc Long	Bac Lieu
27	Vo Van Hung	Long Hoa	TT Phuoc Long	Phuoc Long	Bac Lieu
28	Lam Van Trung	Khu 4	Thanh Phu	My Xuyen	Soc Trang
29	Le Thi Hong Hanh	Hoa Khoi	Hoa Dong	Vinh Chau	Soc Trang
30	Vo Cong Tri		Thanh Quoi	My Xuyen	Soc Trang
31	Lam Truong Hung	Dao Vien	Thanh Quoi	My Xuyen	Soc Trang
32	Pham Thi Nguyet		TT Vinh Chau	Vinh Chau	Soc Trang
33	Lieu Thi Ba	Khu 2	TT Vinh Chau	Vinh Chau	Soc Trang
34	Lam Thi Xieu Chi		Vinh Phuoc	Vinh Chau	Soc Trang
35	Duong Minh Phuon		Phuong 2	TX Soc Trang	Soc Trang
36	Tang Hoa Thao	Vung Dun	Tham Don	My Xuyen	Soc Trang
37	Le Thi Nhan	Ap 1	Thanh Phuoc	Binh Dai	Ben Tre
38	Ha Thi Thao	Ap 1	Thanh Phuoc	Binh Dai	Ben Tre

Annex 4. List of interviewed processors

Processor ID	Interviewee's name	Company name	Address	District	Province
1	Nguyen Thi Tuyet	CTy CP CB TS & XNK Ca Mau Camimex	333-Cao Thang	Khom 2-Phuong 8	TP Ca Mau
2	Ly Xuan Duc	Cty XNK Lam TS Ben Tre Faquimex	71-QL 60	TT Chau Thanh	Chau Thanh
3	Bui Kim Hieu	Cty CP XNK TS Ben Tre Aquatex	Ap 9	Tan Thanh	Chau Thanh
4	Tieu Cam Chau	Cty TNHH CBTS Ut Xi	Tinh Lo 8	Tai Van	My Xuyen
5	Ho Quoc Luc	Cty CP Thuc pham Saota	Km2132	QL1A	TX Soc Trang
6	Tran Van Pham	Cty CP TS Soc Trang Stapimex	119-QL1A	Phuong 7	TX Soc Trang
7	Pham Khac Linh	Cty XNK Tong Hop Gia Rai Girimex		TT Ho Phong	Gia Rai
8	Mac Minh Ky	Cty CP TS Minh Hai Sea Minhhai	16-Phan Dinh Phung		TP Ca Mau
9	Nguyen Hung Cuong	Cty CP CBXK TS Thanh Doan	01A-Truong Phung Xuan	P8	TP Ca Mau
10	Chu Van An	Cty CP CBXK TS Minh Phu		Ly Van Lam	TP Ca Mau
11	Huynh Van Vung	Cty XNK Nong san-Thuc pham Ca Mau	969-Ly Thuong Kiet	Phuong 6	TP Ca Mau

12	Ly Phuoc An	Cty TNHH CBTS&XNK Phu Cuong	454-Ly Thuong Kiet	Phuong 6	TP Ca Mau
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Annex 5. Socio-economic indicators of the sampled stakeholders

	Socio-economic characteristics	Farmer	Collector	Wholesaler	Private company	Processor
1	Age (years)	45.78	40.67	42.67	40.67	44.18
2	Experience in shrimp farming/trading/processing (years)	8.11	7.27	10.88	11.83	13.3
3	Gender					
3.1	Male (%)	90.91	48.28	55.56	72.22	91.67
3.2	Female (%)	9.09	51.72	44.44	27.78	8.33
4	Household size (no.)	5.67	4.55	6.56	5.00	
5	Number of family labourers	4.32	2.64	4.78	3.56	
5.1	Male	2.39	1.27	2.33	1.94	
5.2	Female	1.97	1.36	2.33	1.61	
6	Number of family labourers involved in shrimp farming/trading/processing	2.18	2.09	3.67	2.33	
6.1	Male	1.64	1.09	2.33	1.33	
6.2	Female	0.55	1.00	1.33	1.00	
7	Number of shrimp farming/trading/processing employees	2.56	1.00	4.78	9.00	
7.1	Male	2.49	0.55	4.67	7.44	
7.2	Female	0.07	0.45	0.11	1.56	
8	Involvement with other occupation (%)	40.91	54.55	44.44	16.67	41.67
8.1	Agriculture	13.64	-	11.11	-	-
8.2	Livestock	5.68	-	-	-	-
8.3	Business	13.64	-	11.11	5.56	-
8.4	Employment	4.55	-	-	-	-
8.5	Hotel service	1.14	-	-	-	-
8.6	Working for the government	1.14	9.09	-	-	-
8.7	Renting hatchery	1.14	-	-	-	-
8.8	shrimp farming		45.45	-	-	41.67
8.9	Hatchery owner		-	11.11	-	-
8.10	Feed and veterinary supply		9.09	11.11	5.56	-
8.11	Mortgaging service		-	-	5.56	-
8.12	Capture fisheries					8.33
9	Illiterate (%)	2.27	-	-	-	-

10	Literate (%)	97.73	100.00	100.00	100.00	100.00
10.1	Primary attended	27.27	-	11.11	-	-
10.2	Secondary school attended	43.18	81.82	55.56	16.67	-
10.3	High school attended	22.73	18.18	33.33	66.67	-
10.4	vocational education		-	-	5.56	-
10.5	College/University. attended	4.55	-	-	11.11	91.67
10.6	Master					8.33
10	Aquaculture/trading/processing technical knowledge (%):		-	-	-	
10.1	Own initiative	37.50	54.55	33.33	22.22	25.00
10.2	Training	30.68	45.45	66.67	6.67	41.67
10.3	Vocational school	1.14	-	-	-	-
10.4	college/ university	1.14	-	-	11.11	8.33
10.5	Own initiative and training	29.55	-	-	-	-
10.6	Post graduate					8.33

Annex 6. Investment made in shrimp farming

Items of investment	Average (VND 1000)	% out of the total
Construction of the system	72,727.84	59.88
Upgrading of the system	10,114.56	8.33
Machinery	28,068.18	23.11
Guard shade	3,638.64	3.00
Major equipment	6,902.32	5.68
All items	121,451.53	100.00

Annex 7. Volume of shrimp traded 2003-2005

Stakeholders	Commodity (kg)	Year		
		2003	2004	2005
Collector	<i>P.monodon</i>	15,736	16,827	13,814
	<i>P.merguensis</i>	1,915	1,615	1,315
	<i>Other white shrimp</i>	15,728	13,328	10,728
Wholesaler	<i>P.monodon</i>	345,444	215,444	202,111
	<i>P.merguensis</i>	48,800	40,800	32,800
	<i>Other white shrimp</i>	129,200	129,200	129,200
Private company	<i>P.monodon</i>	977,667	988,944	1,011,111
	<i>P.merguensis</i>	73,463	69,713	67,463
	<i>Other white shrimp</i>	212,985	206,985	203,310

Processor	<i>P. monodon</i>	4,320,000	5,651,000	5,998,182
	<i>P. merguensis</i>	800,000	1,745,000	1,755,000
	<i>Other white shrimp</i>	581,000	1,076,500	1,097,333

Annex 8. Perception of changes in shrimp farming

Indicator	Level of changes (%)			
	Decreased	Not changed	Increased	NA
Total culture area of the farm	1.14	90.91	6.82	1.14
Number of ponds	2.27	90.91	5.68	1.14
Nursing pond area	-	42.05	-	57.95
Settlement pond area	1.14	60.23	1.14	37.50
Investment (including machinery)	5.68	75.00	9.09	10.23
Ownership of land	4.55	93.18	-	2.27
	More intensive	Same	More diversified	
Shrimp farming mode	5.68	85.23	6.82	2.27
	Decreased	Not changed	Increased	
Number of shrimp crop per year	11.36	84.09	1.14	3.41
Use of labourers (family and employed)	2.27	78.41	3.41	15.91
Farmed species	2.27	94.32	2.27	1.14
	Changed	Not changed		
Seed sources	30.68	67.05		2.27
	Decreased	Not changed	Increased	
Average stocking density of 1st crop	21.59	54.55	20.45	3.41
Number of stocking times of 1st crop	5.68	85.23	2.27	6.82
Stocking duration of 1st crop	7.95	50.00	32.95	9.09
Use of feed	14.77	34.09	17.05	34.09
Use of drugs/chemicals	20.45	39.77	13.64	26.14
	Worse	Not changed	Better	
Shrimp productivity of the 1st crop (kg/1000m ²)	37.50	15.91	37.50	9.09
Marketing of shrimp	13.64	42.05	32.95	11.36
	Decreased	Not changed	Increased	
Average cost per 1000 m ² of the 1st crop	34.09	37.50	28.41	-
Average profit per 1000 m ² of the 1st crop	42.05	12.50	45.45	-

Annex 9. Per hectare shrimp farming variable cost and their percentages

Items of cost (Unit: 1000 VND/ha/crop/year)	2004		2005	
	Cost	%	Cost	%
Shrimp post larvae	5,965.17	7.32	5,729.24	7.20
Fish seed	214.77	0.26	241.10	0.30
Labour for pond preparation	2,719.99	3.34	2,452.78	3.08
Labour during production	2,405.09	2.95	2,252.16	2.83
Labour during harvesting	478.37	0.59	2,728.11	3.43
Chlorine/bleach	3,375.67	4.14	3,238.81	4.07
Lime	3,271.31	4.01	3,136.49	3.94
Chemical/drugs	8,673.78	10.64	8,776.98	11.03
Fertilizer	2,173.96	2.67	283.16	0.36
Home made feed	55.66	0.07	5.42	0.01
Commercial feed	44,210.50	54.23	41,828.99	52.56
Electricity	830.48	1.02	2,465.02	3.10
Fuels	6,536.16	8.02	5,920.44	7.44
Harvest/transportation	517.14	0.63	424.28	0.53
Others	93.14	0.11	93.14	0.12
Total	81,521.17	100.00	79,576.12	100.00

Annex 10. Monthly average sale prices for farmers for different sizes

Unit: VND/kg

Date	16-25	26-35	36-45
Jan-04			
Feb-04		120,000	
Mar-04		108,000	
Apr-04		86,000	75,333
May-04		98,714	72,500
Jun-04		97,333	86,000
Jul-04		87,000	80,000
Aug-04		92,500	
Sep-04			
Oct-04	115,500	97,667	
Nov-04		95,000	82,000
Dec-04	132,000	90,000	69,000
Jan-05			
Feb-05			

Mar-05	135,000	106,250	70,000
Apr-05		100,500	75,000
May-05	110,000	100,750	79,000
Jun-05	135,000	90,600	80,333
Jul-05		80,333	75,000
Aug-05		88,667	90,000
Sep-05		100,000	85,000
Oct-05		105,000	90,000
Nov-05	137,500	112,500	88,500
Dec-05		110,000	90,000

Annex 11. Monthly average procurement prices for middlemen for different sizes

Unit: VND/kg

Date	16-25	26-35	36-45
Jan-04	139,400	102,400	82,400
Feb-04	146,167	108,667	87,000
Mar-04	141,400	102,400	82,400
Apr-04	137,500	98,333	76,667
May-04	136,250	96,875	74,375
Jun-04	131,800	94,800	73,300
Jul-04	130,900	94,700	73,300
Aug-04	131,125	93,625	73,125
Sep-04	126,000	90,375	72,714
Oct-04	132,000	96,286	77,000
Nov-04	138,800	101,800	81,800
Dec-04	138,800	101,800	81,800
Jan-05	143,643	102,571	85,000
Feb-05	144,850	102,200	87,222
Mar-05	142,588	100,824	83,125
Apr-05	139,684	96,895	78,111
May-05	137,368	95,368	73,455
Jun-05	132,739	93,565	71,000
Jul-05	133,583	94,125	71,765
Aug-05	134,208	93,739	72,813
Sep-05	134,739	94,045	74,727
Oct-05	135,632	94,579	73,071
Nov-05	139,071	96,714	79,000
Dec-05	141,333	99,333	80,222

Annex 12. Monthly average procurement prices for processor for different sizes

Sizes are expressed in HLSO/pound, while prices are reported as HLSO/kg. Unit: 1000 VND/kg

Date	U8	8-12	13-15	16-20	21-25	26-30	31-40	41-50	51-60	61-70	71-90
Jan-04	274.7	211.7	186.7	167.0	136.7	117.3	82.3	67.3	60.3	55.3	41.3
Feb-04	277.3	211.3	188.3	176.3	147.3	129.0	90.3	73.3	62.7	56.0	49.0
Mar-04	270.0	206.8	186.8	171.3	140.8	122.3	88.8	72.8	62.3	58.3	50.8
Apr-04	269.7	217.7	194.0	180.3	150.7	133.0	102.3	80.3	66.3	61.3	53.7
May-04	267.0	210.5	192.5	166.5	138.5	125.0	91.0	76.5	66.5	63.0	58.5
Jun-04	260.0	206.0	184.0	137.0	117.0	108.0	77.0	72.0	63.0	58.0	55.0
Jul-04	265.8	209.8	198.5	148.3	122.5	113.3	84.5	74.0	62.5	59.5	52.8
Aug-04	275.8	223.8	208.0	149.4	120.0	108.6	81.8	71.6	61.2	59.0	51.6
Sep-04	279.0	229.7	212.3	152.0	118.5	107.2	82.5	70.8	60.2	57.7	51.8
Oct-04	274.0	226.0	209.3	142.8	108.8	98.0	72.0	66.8	59.5	56.8	49.8
Nov-04	277.5	226.3	206.5	136.0	106.7	92.2	69.2	64.3	60.3	55.3	51.8
Dec-04	279.0	228.0	212.5	157.5	129.5	115.3	91.0	72.0	66.3	59.0	56.0
Jan-05	280.0	229.1	218.8	166.3	137.0	122.6	95.8	73.8	61.5	57.1	53.4
Feb-05	278.5	228.5	218.5	167.8	137.8	123.8	95.8	76.0	63.0	56.0	53.0
Mar-05	280.4	235.5	220.9	167.5	136.5	118.8	96.8	78.4	66.2	59.2	54.9
Apr-05	269.0	222.5	203.4	144.6	112.9	98.6	80.5	73.4	65.5	56.6	51.1
May-05	264.3	213.9	193.2	133.7	103.0	91.6	79.8	76.8	69.6	64.8	54.8
Jun-05	272.0	218.1	198.1	137.1	102.6	91.6	77.6	74.6	66.6	62.6	52.6
Jul-05	277.1	224.1	203.0	138.3	99.1	87.0	73.0	67.1	61.4	56.3	49.6
Aug-05	277.0	227.0	199.1	133.0	94.6	80.4	65.4	59.3	55.9	50.8	47.0
Sep-05	295.0	232.5	199.3	134.3	98.3	81.0	70.3	63.3	55.5	52.0	50.0
Oct-05	307.0	237.0	206.0	141.0	107.0	91.0	80.3	72.0	60.3	55.0	52.0
Nov-05	317.0	247.0	216.0	154.0	121.0	106.0	95.0	86.0	72.0	64.0	62.0
Dec-05	320.8	250.8	217.5	157.8	127.8	110.5	99.5	87.5	73.5	64.0	62.0
Jan-06	322.0	255.0	220.0	162.0	132.0	114.0	102.0	90.0	77.0	70.0	64.0
Feb-06	323.5	257.5	221.0	163.0	133.5	115.5	102.0	90.0	78.5	70.0	64.0
Mar-06	325.0	260.0	219.0	161.0	135.8	118.3	102.8	90.8	80.0	70.0	64.0
Jun-06	322.0	256.0	205.0	159.3	139.2	125.9	108.3	91.9	79.6	69.6	63.6
Jul-06	333.3	264.4	208.7	161.8	137.2	126.1	105.5	90.4	80.5	70.5	64.5
Aug-06	340.9	269.1	211.1	160.9	137.6	129.1	105.1	91.0	81.1	71.1	65.1

Annex 13. The incentives received and given by different groups of stakeholders

	Farmers		Traders		Proc./Exp.	
	n	%	n	%	n	%
Received the incentives from others	84	100.0	17	100.0	8	100.0
Farmers	56	66.7	3	17.6		
Collectors	9	10.7				
Wholesalers	4	4.8	4	23.5		
Others	15	17.9	10	58.8	8	100.0
Provided the incentives from the others			9	100.0	9	100.0
Farmers			6	66.7	7	77.8
Collectors					1	11.1
Wholesalers			3	33.3	7	77.8
Incentives from other farmers/relatives/neighbours	56	100.0	3	100.0		
Technical knowledge	50	89.3	1	33.3		
Capital	5	8.9	1	33.3		
Seed	6	10.7	1	33.3		
Incentives from the local government	12	100.0	2	100.0	2	100.0
Administrative supports	12	100.0	2	100.0		
Technical knowledge	8	66.7			2	100.0
Information	3	25.0				
Irrigation	1	8.3				
Incentives from the extensionists	63	100.0	11	100.0		
Technical knowledge	62	98.4	11	100.0		
Capital	2	3.2				
Information	1	1.6				
Incentives from the banks	50	100.0	6	100.0	1	100.0
Capital	50	100.0	6	100.0	1	100.0
Incentives from the input suppliers	62	100.0	2	100.0		
Technical knowledge	14	22.6				
Capital	6	9.7	1	50.0		
Seed	24	38.7	1	50.0		
Feed	34	54.8	2	100.0		
Chemicals/medicines	11	17.7				
Information	2	3.2				
Incentives from the output buyers	15	100.0	8	100.0	7	100.0
Technical knowledge	2	13.3	2	25.0	6	85.7
Capital	11	73.3	6	75.0		
Market information, standards of products	1	6.7			1	14.3
Feed	2	13.3	1	12.5		
Incentives provided to the others			9	100.0	9	100.0
Technical knowledge					5	55.6
Capital			8	88.9	7	77.8
Seed					2	22.2
Feed			1	11.1	2	22.2
Chemicals/medicines					1	11.1
Tranings on the food safety					1	11.1
Ice/ Transportation					3	33.3

Annex 14. Perception of the stakeholders on the unusual events in 2004

	Farmers n=88	Traders n=38	Proc/Exporters n=12
Knew that the tsunami affected some Asian countries in 2004	81.0	86.8	91.7
Affected by the tsunami in 2004	10.7	7.9	41.7
Knew that the US anti-dumping affected some Asian countries in 2004	84.7	97.4	100.0
Affected by the US anti-dumping in 2004	69.0	73.7	100.0
Have done anything to prevent the effect of the US anti-dumping?	24.1	40.5	83.3
Aware of any other international trader that affected some Asian countries from 2004			91.7
Affected by other international trade			66.7

Annex 15. Impacts of the US anti-dumping in 2004

		Farmers	Traders	Pro/Exp
Number of respondents	n	56	28	12
Decrease in the price of shrimp	%	96.4		25.0
Stopped to export shrimp to US in 6 months	%	1.8		33.3
More trade barriers	%	5.4		16.7
Weakening the competition	%	5.4		8.3
Abnormal fluctuation of shrimp price	%	1.8		
Worse trading activities	%		71.4	
More risky, more urate of unsuccessful farmers	%		21.5	
Difficult in exporting the shrimp	%		14.3	
More and strict quality control/investigation	%		14.3	
More competition in the international markets	%		7.2	58.3
Higher costs	%			33.3
A better understanding on the international trade/laws	%			25.0
More difficult in payment and liquidation	%			16.7
More difficult to export shrimp to the US	%			8.3
Lower quality requirements	%			8.3
Lower price, traders stopped to invest to the farmers	%		7.1	
Difficult to get back the investment given to the farmers	%		3.6	

Annex 16. Solutions to mitigate the impacts of the US anti-dumping

		Farmers	Traders	Pro/Exporters
Number of respondents	n	20	15	10
Expansion of the markets, more market penetration	%	10.0		40.0
Saving of the production/trading costs	%	70.0	20.0	20.0
Upgrading of the trading/processing facilities	%		13.3	30.0
Improvement of competitive capability	%			50.0
More consultancy on the international trade/laws	%	15.0		20.0

Better relationship with input suppliers & outputs buyers	%	25.0		20.0
Better skills of the labours	%	5.0		20.0
Better quality management	%			30.0
Stop trading small size shrimp	%	5.0		20.0
Stop import raw shrimp from the other countries	%			10.0
Give more consideration to the trade barriers	%	5.0		10.0
More and better information on	%	5.0	6.7	10.0
Thinking of the seasonality of shrimp supply	%	10.0		10.0
The government should have a better international relations	%	15.0	6.7	
Application of cleaner/organic shrimp farming	%	25.0		
Reducing the stocking density & integrating with crabs	%	5.0		
Stop trading low quality shrimp	%		20.0	
Waiting for a better price of shrimp	%		20.0	
Reducing the buying price in order to keep the same profit	%		13.3	
More consideration on the domestic markets	%		6.7	
Better storage during the time of peak season	%		6.7	
Signing the contract with the good processors/Exporters	%		6.7	

Annexes for Indonesia case study

Annex 17. Samples and locations for the study

No.	Location	Respondent			Total
		East Java	West Java	North Sumatra	
1	Shrimp farmers	60	60	40	160
2	Shrimp traders/wholesalers	9	9	5	23
3	Processors/Exporters	1	1	5	7
	Total number of respondents	77	70	51	198

Annex 18. List of interviewed farmers

ID	Farmer ID	Name	Address	Village	Subdistrict/District	Province
1	1	H.Jabarsyah	Langkat	Secanggih	Secanggih	North Sumatra
2	2	M.Husni	Langkat	Secanggih	Karang Gading	North Sumatra
3	3	Cang Min	Langkat	Pasar 20	Babalan	North Sumatra
4	4	M.Sarasi	Langkat	Pasar 20	Babalan	North Sumatra
5	5	Ahmat	Langkat	Pasar 20	Babalan	North Sumatra
6	6	Awi	Langkat	Simpang kolam	Gebang	North Sumatra
7	7	Misman	Langkat	Simpang kolam	Gebang	North Sumatra
8	8	Subiyanto	Langkat	-	Pangkalan Susu	North Sumatra
9	9	H.Ibnu Hasan	Langkat	-	Pangkalan Susu	North Sumatra
10	10	Agin	Langkat	Sungai Meran	Pangkalan Susu	North Sumatra
11	11	Suparno	Langkat	Sungai Meran	Pangkalan Susu	North Sumatra
12	12	Sumarman	Langkat	Alur Cempedak	Pangkalan Susu	North Sumatra
13	13	Alung	Langkat	P.Piyo	Babalan	North Sumatra
14	14	Aswa	Langkat	Teluk Meku	Babalan	North Sumatra
15	15	Keepeng	Langkat	Paluh Sipat	Babalan	North Sumatra
16	16	Edi	Langkat	Simpang kolam	Gebang	North Sumatra
17	17	Ramlan	Langkat	Pasar 20	Babalan	North Sumatra
18	18	Alamsyah	Langkat	Seimeran	Pangkalan Susu	North Sumatra
19	19	Amron	Langkat	Alur Cempedak	Pangkalan Susu	North Sumatra
20	20	Untung Arianto	Langkat	Seimeran	Pangkalan Susu	North Sumatra
21	21	H.Saifuddin	Langkat	Beras Basah	Pangkalan Susu	North Sumatra
22	22	Toto Haryono	Langkat	Beras Basah	Pangkalan Susu	North Sumatra
23	23	Suhardono	Langkat	Alur Cempedak	Pangkalan Susu	North Sumatra
24	24	Awal Panjaitan	Langkat	Pasar 20	Babalan	North Sumatra
25	25	Yusuf	Langkat	Seimeran	Pangkalan Susu	North Sumatra
26	26	Said	Langkat	Seimeran	Pangkalan Susu	North Sumatra
27	27	Tono	Langkat	Secanggih	Secanggih	North Sumatra
28	28	Obo	Langkat	Secanggih	Karang Gading	North Sumatra
29	29	Midi	Langkat	Secanggih	Karang Gading	North Sumatra
30	30	Rosid	Langkat	Secanggih	Secanggih	North Sumatra
31	31	Hendra	Langkat	Beras Basah	Pangkalan Susu	North Sumatra
32	32	Reza	Langkat	Beras Basah	Pangkalan Susu	North Sumatra
33	33	Beni	Langkat	Alur Cempedak	Pangkalan Susu	North Sumatra
34	34	Amin	Langkat	Seimeran	Pangkalan Susu	North Sumatra
35	35	Hendra	Langkat	Seimeran	Pangkalan Susu	North Sumatra
36	36	Atan	Langkat	P.Piyo	Babalan	North Sumatra

37	37	H.Sam	Langkat	Teluk Meku	Babalan	North Sumatra
38	38	Lukman	Langkat	Paluh Sipat	Babalan	North Sumatra
39	39	H.Razab	Langkat	Simpang kolam	Gebang	North Sumatra
40	40	Ali	Langkat	Simpang kolam	Gebang	North Sumatra
41	1	Dirwa	Karawang	Karanganyar	Pasekan	West Java
42	2	Sanusi	Karawang	Karanganyar	Pasekan	West Java
43	3	Warsa	Karawang	Karanganyar	Pasekan	West Java
44	4	Kasman	Karawang	Karanganyar	Pasekan	West Java
45	5	Qodir	Karawang	Karanganyar	Pasekan	West Java
46	6	Markun	Karawang	Karanganyar	Pasekan	West Java
47	7	Sochib	Karawang	Karanganyar	Pasekan	West Java
48	8	Kadirah	Karawang	Karanganyar	Pasekan	West Java
49	9	Sudaryo	Karawang	Karanganyar	Pasekan	West Java
50	10	Roli	Karawang	Karanganyar	Pasekan	West Java
51	11	Wasman	Karawang	Karanganyar	Pasekan	West Java
52	12	Parkam	Karawang	Karanganyar	Pasekan	West Java
53	13	H.Masudi	Karawang	Karanganyar	Pasekan	West Java
54	14	Madarip	Karawang	Karangsong	Pasekan	West Java
55	15	Saprin	Karawang	Karangsong	Pasekan	West Java
56	16	H.Makpud	Karawang	Karangsong	Pasekan	West Java
57	17	Mansur Salim	Karawang	Pagirikan	Pasekan	West Java
58	18	H.Sakim	Karawang	Pagirikan	Pasekan	West Java
59	19	Banaji	Karawang	Pagirikan	Pasekan	West Java
60	20	Tarba	Karawang	Pagirikan	Pasekan	West Java
61	21	Sudin	Karawang	Balongan	Balongan	West Java
62	22	Kadiri	Karawang	Balongan	Balongan	West Java
63	23	Taryana	Karawang	Balongan	Balongan	West Java
64	24	Ato Ila	Karawang	Balongan	Balongan	West Java
65	25	Maryono	Karawang	Balongan	Balongan	West Java
66	26	Wakid	Karawang	Balongan	Balongan	West Java
67	27	H.Toni	Karawang	Kapolo	Balongan	West Java
68	28	H.Wawo	Karawang	Kapolo	Balongan	West Java
69	29	Kuwu Solkan	Karawang	Kapolo	Balongan	West Java
70	30	Eko	Karawang	Kapolo	Balongan	West Java
71	31	Tarkum S.	Karawang	Tirta Jaya	Cilebar	West Java
72	32	Endang W.	Karawang	Tirta Jaya	Cilebar	West Java
73	33	Enim	Karawang	Tirta Jaya	Cilebar	West Java
74	34	Uning	Karawang	Tirta Jaya	Cilebar	West Java
75	35	Cartim	Karawang	Tirta Jaya	Cilebar	West Java
76	36	Karman	Karawang	Tirta Jaya	Cilebar	West Java
77	37	Sair	Karawang	Tirta Jaya	Cilebar	West Java
78	38	Samin	Karawang	Tirta Jaya	Cilebar	West Java
79	39	Muhamad	Karawang	Tirta Jaya	Cilebar	West Java
80	40	Karso	Karawang	Tirta Jaya	Cilebar	West Java
81	41	Wawan	Karawang	Tirta Jaya	Cilebar	West Java
82	42	Dahri	Karawang	Tirta Jaya	Cilebar	West Java
83	43	Rahmat	Karawang	Tirta Jaya	Cilebar	West Java
84	44	Kiman	Karawang	Tirta Jaya	Cilebar	West Java
85	45	Satam	Karawang	Tirta Jaya	Cilebar	West Java
86	46	Tarlim	Karawang	Tirta Jaya	Cilebar	West Java
87	47	Karmin	Karawang	Tirta Jaya	Cilebar	West Java
88	48	Endi	Karawang	Tirta Jaya	Cilebar	West Java
89	49	Kari	Karawang	Tirta Jaya	Cilebar	West Java
90	50	Kasdi Soewaryono	Karawang	Muara Cilamaya	Cilamaya Wetan	West Java
91	51	Uci Sanusi	Karawang	Muara Cilamaya	Cilamaya Wetan	West Java
92	52	H. Naman	Karawang	Muara Cilamaya	Cilamaya Wetan	West Java

93	53	H. Dulhasan	Karawang	Muara Cilamaya	Cilamaya Wetan	West Java
94	54	H.Kartam	Karawang	Muara Cilamaya	Cilamaya Wetan	West Java
95	55	H. Usman	Karawang	Muara Cilamaya	Cilamaya Wetan	West Java
96	56	Casmin	Karawang	Muara Cilamaya	Cilamaya Wetan	West Java
97	57	Kasdi	Karawang	Muara Cilamaya	Cilamaya Wetan	West Java
98	58	Carwan	Karawang	Muara Cilamaya	Cilamaya Wetan	West Java
99	59	Wahyu	Karawang	Muara Cilamaya	Cilamaya Wetan	West Java
100	60	Ramli	Karawang	Muara Cilamaya	Cilamaya Wetan	West Java
101	1	Kartono	Gresik	Watangrejo	Ambeng/ Duduk Sampeyan	East Java
102	2	Syamsudin	Gresik	Srowo	Srowo/Sedayu	East Java
103	3	H. M. Sholikh	Gresik	Betoyo guci	Betoyo Guci/Manyar	East Java
104	4	H. Alihuda	Gresik	Tanjungwidoro	Bungah	East Java
105	5	H.samsul	Gresik	Tanggulrejo	Manyar	East Java
106	6	Robach	Gresik	Pangkalkulon	Ujungpangker	East Java
107	7	Ibu Dewi	Gresik	Duduk Sampeyan	Duduk Sampeyan	East Java
108	8	Sulam	Gresik	Racitengah	Sedayu	East Java
109	9	Ngateman	Gresik	Betoyo Guci	Manyar	East Java
110	10	Matniti	Gresik	Mojopuro Gede	Bungah	East Java
111	11	H.abdullah	Gresik	Betoyo Guci	Manyar	East Java
112	12	H.Jumadi	Gresik	Pangkal wetan	Ujungpangker	East Java
113	13	Nawawi	Gresik	Tanggulrejo	Manyar	East Java
114	14	Elly Marani	Gresik	Bedanten	Bungah	East Java
115	15	Suhari	Gresik	Karangrejo	Manyar	East Java
116	16	Ahmad Hanif	Gresik	Sukorejo	Bungah	East Java
117	17	Supriyono	Gresik	Betoyo Guci	Manyar	East Java
118	18	Jaelani	Gresik	Tanggulrejo	Manyar	East Java
119	19	H.rochmad Bawon	Gresik	Duduk Sampeyan	Duduk Sampeyan	East Java
120	20	H. Ahmad	Gresik	Betoyo guci	Manyar	East Java
121	21	Djoko	Gresik	Watangrejo	Duduksampeyan	East Java
122	22	H.Kapi	Gresik	Betoyo Guci	Manyar	East Java
123	23	H.sutikno	Gresik	Tanggulrejo	Manyar	East Java
124	24	Masduki	Gresik	Karangrejo	Manyar	East Java
125	25	H.Slamet	Gresik	Srowo	Sedayu	East Java
126	26	Dolah	Gresik	Pangkalkulon	Ujungpangker	East Java
127	27	Riyatin	Gresik	Racitengah	Sedayu	East Java
128	28	Sutrisno	Gresik	Mojopuro gede	Bungah	East Java
129	29	H. Jauhari	Gresik	Tanjungwidoro	Bungah	East Java
130	30	oedaryanto	Gresik	Pangkal Wetan	Ujungpangker	East Java
131	31	H. Mawardi		Pulokerto	Kraton	East Java
132	32	H. Salam		Pulokerto	Kraton	East Java
133	33	Sanusi		Masangan	Bangil	East Java
134	34	Pake Arifin		Masangan	Bangil	East Java
135	35	Abu Kasan		Masangan	Bangil	East Java
136	36	Nursaid Abu		Masangan	Bangil	East Java
137	37	Sintoha		Masangan	Bangil	East Java
138	38	Moch. Kusen		Masangan	Bangil	East Java
139	39	P. Kaerah		Masangan	Bangil	East Java
140	40	H. Soleh		Masangan	Bangil	East Java
141	41	Rukiyati		Masangan	Bangil	East Java
142	42	Djumadi		Masangan	Bangil	East Java
143	43	Abdul Rodjak		Masangan	Bangil	East Java
144	44	H. Abdurohman		Patuguran	Rejoso	East Java

145	45	Abdul Malik		Patuguran	Rejoso	East Java
146	46	Hasanudin		Patuguran	Rejoso	East Java
147	47	H. Umar		Patuguran	Rejoso	East Java
147	48	H. Ma'mud		Patuguran	Rejoso	East Java
149	49	H. Maksum		Patuguran	Rejoso	East Java
150	50	H. Sofyan		Jarangan	Rejoso	East Java
151	51	Misbak		Jarangan	Rejoso	East Java
152	52	Narguman		Jarangan	Rejoso	East Java
153	53	H. Hamid		Jarangan	Rejoso	East Java
154	54	H. Makmun		Jarangan	Rejoso	East Java
155	55	H. Abdullah		Tambak Lekok	Lekok	East Java
156	56	Sabrawi		Tambak Lekok	Lekok	East Java
157	57	Abdul Azis		Tambak Lekok	Lekok	East Java
158	58	H. Djamil		Tambak Lekok	Lekok	East Java
159	59	Sodik		Tambak Lekok	Lekok	East Java
160	60	Abdul Salam		Tambak Lekok	Lekok	East Java

Annex 19. List of interviewed traders

Trader ID	Name	Addresss	Village	Subdistrict/ District	Province
1	Misdi	Langkat	Selatan	Secanggang	North Sumatra
2	Sulaiman	Langkat		Belawan	North Sumatra
3	Said	Langkat	Secanggang	Secanggang	North Sumatra
4	Sabar Sembiring	Langkat	-	Bukit Jengkal/Pangkalan Susu	North Sumatra
5	Misman	Langkat	Pasar 20	Gebang	North Sumatra
6	Nana	Karawang	Tirta Jaya	Pedes	West Java
7	Karbi	Karawang	Tirta Jaya	Pedes	West Java
8	Barjo	Karawang	Muara	Cilamaya wetan	West Java
9	Munawar	Karawang	Muara	Cilamaya wetan	West Java
10	H.Suman		Pagirikan	Pasekan	West Java
11	H.Tasmin		Karangsong	Pasekan	West Java
12	H.Dirya		Pagirikan	Pasekan	West Java
13	H.Kasoshi		Balongan	Balongan	West Java
14	Maftuchin		Kapolo	Balongan	West Java
15	H.Hanif	Gresik	Randuboto	Randuboto/Sedayu	East Java
16	Masduki	Gresik	Betoyo	Manyar	East Java
17	H.Bambang	Gresik	Sembayat	Manyar	East Java
18	Hj.Khusnaliah	Gresik		Manyarejo/manyar	East Java
19	H.Rohmat	Gresik	Randuboto	Sedayu	East Java
20	H.Supinah	Gresik	Betoyo	Manyar	East Java
21	H.Riyatin	Gresik		Betoyo/manyar	East Java
22	H.Suwandi	Gresik	Randuboto	Sedayu	East Java
23	Ibu Rini		Pejangkrungan	Rembang	East Java

Annex 20. List of interviewed processors

Processor ID	Name	Company Name	Addresss	District	Province
1	P. Paulus Agustinus	PT. Harapan Benderang	Jl. Pulau Sumatera NO. 13	Kawasan Industri Medan	North Sumatra
2	Heri	PT. Growth Pacific	Jl.KL Yos Sudarso Km. 10,5	Kawasan Industri Medan	North Sumatra
3	Jarot	PT. Red	Jl. K.L. Yos	Kawasan Industri	North

		Ribbon	Sudarso Km. 10,5	Medan	Sumatra
4	Dani	PT. Pokphan (Central Windu Sejati)	Jl. K.L. Yos Sudarso Km. 10,5	Kawasan Industri Medan	North Sumatra
5	Supartini	PT. Sari Ayu Windu Semesta	Jl. Hamparan Perak/Paya Pasir No. 40 A,	Kawasan Industri Medan	North Sumatra
6	Narwis Thaufik	PT. Pertiwi Alam Samudra	Jl. Tunggakjati Km 5 Karawang	Karawang	West Java
7	Johanes	PT. Marinepride	Gununggangsir, Gempol	Gresik	East Java

Annex 21. Socio-economic indicators of the sampled stakeholders

	Socio-economic characteristics	Farmer	Trader	Processor
1	Age (years)	46.08	45.55	40.50
2	Experience in shrimp farming/trading/processing (years)	11.77	13.59	17.50
3	Gender			
3.1	Male (%)	98.75	86.96	85.71
3.2	Female (%)	1.25	13.04	14.29
4	Household size (no.)	4.59	4.24	
5	Number of family labourers	1.12	2.45	
5.1	Male	0.96	1.95	
5.2	Female	0.16	0.50	
6	Number of family labourers involved in shrimp farming/trading/processing	0.86		
6.1	Male	0.72		
6.2	Female	0.14		
7	Number of shrimp farming/trading/processing employees	3.82	4.09	
7.1	Male	1.91	3.64	
7.2	Female	0.06	0.45	
8	Involvement with other occupation (%)	57.50	69.57	-
8.1	Trade	23.13	8.70	
8.2	Agriculture	16.25	4.35	
8.3	Livestock	3.13	8.70	
8.4	Employment	1.25	-	
8.5	Working for the government	3.13	-	
8.6	Workshop	1.25	-	
8.7	Estate	0.63	-	
8.8	Shop	0.63	-	
8.9	Transportation	1.25	-	
8.1	Huller	1.25	-	
8.11	Teaching	1.25	-	
8.12	Bordir	0.63	-	
8.13	Pertanian	0.63	-	
8.14	Raksa bumi	0.63	-	
8.15	Other	2.50	-	

8.16	Farmer		47.83	
9	Illiterate (%)	-	-	
10	Literate (%)	100.00	100.00	100.00
10.1	Primary attended	21.88	17.39	-
10.2	Secondary school attended	46.25	-	-
10.3	High school attended	23.75	65.22	-
10.4	Diploma	4.38	-	-
10.5	College/University. attended	3.75	17.39	100.00
10	Aquaculture technical knowledge (%):		95.65	
10.1	Own initiative	49.38	78.26	28.58
10.2	Training	40.63	17.39	57.14
10.3	Vocational school	1.25	-	-
10.4	college/ university	-	-	14.28
10.5	Own initiative and training	8.75	-	-
10.6	Post graduate	-	-	-

Annex 22. Investment made in shrimp farming

Items of investment	Average (IDR)	% out of the total
Construction of the system	6,997,087	12.69
Upgrading of the system	8,739,341	15.84
Machinery	13,028,205	23.62
Guard shade	3,587,619	6.50
Major equipment	22,805,714	41.35
All items	55,157,966	100.00

Annex 23. Volume of shrimp traded 2000-2005

Stakeholders	Commodity (kg)	Year					
		2000	2001	2002	2003	2004	2005
Trader	<i>P.monodon</i>	166,707	143,427	129,033	97,727	64,313	54,653
	<i>P.vannamei</i>	0	0	0	3,650	4,212	3,911
	<i>Other white shrimp</i>	4,202	2,797	2,687	2,449	2,510	2,500
Processor	<i>P.monodon</i>	3,166,667				2,000,000	1,000,000
	<i>P.vannamei</i>	0	0	0		500,000	1,000,000

Annex 24. Perception of changes in shrimp farming

Indicator	Level of changes (%)			
	Decreased	Not changed	Increased	NA
Total culture area of the farm	6.88	83.75	0.63	8.75
Number of ponds	3.75	78.75	0.63	16.88

Nursing pond area	-	100.00	-	-
Settlement pond area	-	100.00	-	-
Investment (including machinery)	8.75	68.75	21.25	1.25
Ownership of land	5.63	92.50	1.88	-
	More intensive	Same	More diversified	
Shrimp farming mode	0.63	85.63	13.75	-
	Decreased	Not changed	Increased	
Use of labourers (family and employed)	12.19	80.94	1.88	5.00
Farmed species	-	98.13	1.88	-
	Changed	Not changed		
Seed sources	26.25	73.75		-
	Decreased	Not changed	Increased	
Average stocking density of 1st crop	27.50	69.38	3.13	-
Stocking duration of 1st crop	1.88	71.88	2.50	-
Use of feed	14.69	49.06	10.94	-
Use of drugs/chemicals	6.88	74.38	1.88	16.88
	Worse	Not changed	Better	
Shrimp productivity of the 1st crop (kg/1000m ²)	61.25	35.00	3.75	-
Marketing of shrimp	9.38	88.13	0.63	1.88
	Decreased	Not changed	Increased	
Average cost per ha of the 1st crop	7.50	40.00	32.50	20.00
Average profit per ha of the 1st crop	52.50	23.13	4.38	20.00

Annex 25. Per hectare shrimp farming variable cost and their percentages

Items of cost (Unit: 1000 IDR/ha/crop/year)	2004		2005	
	Cost	%	Cost	%
Shrimp post larvae	2,456,333.33	4.40	1,443,846.15	2.41
Fish seed	1,994,736.84	3.57	953,870.97	1.59
Labour for pond preparation	767,818.18	1.38	458,879.31	0.77
Labour during production	1,003,535.35	1.80	844,611.11	1.41
Labour during harvesting	400,000.00	0.72	384,555.56	0.64
Chlorine/bleach	844,000.00	1.51	425,108.70	0.71
Chemical/drugs	447,022.22	0.80	1,120,000.00	1.87
Lime	1,293,660.38	2.32	641,856.32	1.07
Fertilizer	14,379,538.22	25.75	16,326,873.68	27.26
Home made feed	1,507,674.42	2.70	453,633.72	0.76

Commercial feed	26,259,456.52	47.03	25,299,318.18	42.24
Electricity	450,000.00	0.81	7,726,623.38	12.90
Fuels	1,808,823.77	3.24	3,304,545.45	5.52
Harvest/transportation	371,315.38	0.66	267,708.33	0.45
Others	1,853,363.64	3.32	243,333.33	0.41
Total	55,837,278.26	100.00	59,510,208.65	100.00

Annex 26. Monthly average sale prices for farmers for different sizes

Unit: IDR/kg

Date	26-30	31-40	45-50	45-66	67-100
Jan-04	90,000				
Feb-04				42,000	
Mar-04				41,000	25,000
Apr-04		54,000			
May-04	62,000	56,000			
Jun-04		55,667		40,000	
Jul-04				43,000	
Aug-04			62,000	40,000	24,000
Sep-04	60,000				
Oct-04	53,000			42,500	
Nov-04		45,000			
Dec-04			57,000		
Jan-05					
Feb-05	62,000			42,500	22,000
Mar-05				42,000	
Apr-05		53,000			
May-05		50,000			
Jun-05			54,500	42,000	
Jul-05	60,000			37,000	20,000
Aug-05					
Sep-05					
Oct-05					
Nov-05			50,000		
Dec-05			53,333	36,000	21,000
Jan-06					
Feb-06					
Mar-06				35,000	20,000
Apr-06					

May-06				
Jun-06	52,000		32,000	

Annex 27. Monthly average procurement prices for traders for size 50 pieces/kg

Unit: IDR/kg

Date	45-50
Apr-04	48,000
May-04	
Jun-04	45,000
Jul-04	45,000
Aug-04	45,000
Sep-04	45,000
Oct-04	50,000
Nov-04	48,000
Dec-04	50,000
Jan-05	45,000
Feb-05	42,500
Mar-05	45,000
Apr-05	39,500
May-05	50,000
Jun-05	50,000
Jul-05	44,000
Aug-05	42,000
Sep-05	50,000
Oct-05	50,000
Nov-05	42,500
Dec-05	48,000
Jan-06	50,000
Feb-06	45,400
Mar-06	50,000
Apr-06	47,000
May-06	50,000
Jun-06	42,000
Jul-06	38,000

Annex 28. Monthly average procurement prices for processor for different sizes

Unit: IDR/kg

Date	U20	21-30	31-44	45-66	67-80
Jan-04	77,000	53,000	42,000	28,000	25,000
Feb-04	77,000	52,000	41,000	29,000	25,000
Mar-04	80,000	55,000	45,000	29,000	26,000
Apr-04	83,000	56,000	45,000	29,000	27,000
May-04	81,000	56,000	45,000	29,000	27,000
Jun-04	82,000	58,000	45,000	31,000	27,000
Jul-04	82,000	58,000	45,000	31,000	27,000
Aug-04	82,000	59,000	46,000	31,000	28,000
Sep-04	82,000	60,000	46,000	30,000	28,000
Oct-04	82,000	60,000	46,000	30,000	28,000
Nov-04	81,000	60,000	46,000	30,000	29,000
Dec-04	81,000	58,000	45,000	29,000	26,000
Jan-05	80,000	56,000	43,000	27,000	24,000
Feb-05	79,000	55,000	43,000	28,000	25,000
Mar-05	78,000	54,000	43,000	28,000	25,000
Apr-05	78,000	54,000	43,000	28,000	25,000
May-05	80,000	55,000	44,000	30,000	26,000
Jun-05	81,000	55,000	45,000	30,000	26,000
Jul-05	82,000	56,000	46,000	30,000	26,000
Aug-05	83,000	57,000	46,000	30,000	26,000
Sep-05	82,000	56,000	46,000	30,000	26,000
Oct-05	82,000	56,000	46,000	29,000	26,000
Nov-05	81,000	56,000	45,000	28,000	26,000
Dec-05	81,000	55,000	45,000	29,000	26,000
Jan-06	74,000	51,000	41,000	25,000	23,000
Feb-06	74,000	51,000	40,000	26,000	23,000
Mar-06	75,000	51,000	40,000	26,000	23,000
Apr-06	74,000	50,000	40,000	26,000	23,000
May-06	76,000	55,000	43,000	29,000	27,000

Annex 29. Perception of the stakeholders on the unusual events in 2004

	Farmers n=160	Traders n=38	Proc/ Exporters n=7
Knew that the tsunami affected some Asian countries in 2004	90.6	94.8.0	100.0
Affected by the tsunami in 2004	24.8	37.3	98.1
Knew that the US anti-dumping affected some Asian countries in 2004	2.1	10.6	100.0
Affected by the US anti-dumping in 2004	2.1	10.6	87.5
Have done anything to prevent the effect of the US anti-dumping?	2.1	10.6	80.8
Aware of any other international trader that affected some Asian countries from 2004		30.3	95.7
Affected by other international trade		30.3	95.7

Annex 30. Impacts of the Tsunami in 2004

		Farmers	Traders	Pro/Exp
Number of respondents	n	56	28	12
Decrease in shrimp prices	%	24.8	37.3	26.5
Loss of competitiveness	%		24.6	19.3
Abnormal fluctuation of shrimp price	%	24.8	37.3	87.5
Worsen trading activities	%		31.9	45.2
Difficult in exporting the shrimp	%		33.4	87.5
More and strict quality control/investigation	%		33.4	92.3
Bad images of the environment associated with the potential occurrence of human diseases	%		17.4	100.0

Annex 31. Impacts of the US anti-dumping in 2004

		Farmers	Traders	Pro/Exp
Number of respondents	n	160	28	7
Decrease in shrimp price	%	2.1	10.6	87.5
Abnormal fluctuation of shrimp price	%	2.1	10.6	87.5
More competition in the international markets	%	2.1	10.6	87.5

Annex 32. Solutions to mitigate the impacts of the US anti-dumping

		Farmers	Traders	Pro/Exp
Number of respondents	n	9	13	4
Stop re-exporting	%	88.9		0
Reduced shrimp farming activity	%	11.1		0
Change species to vannamei	%	0	7.7	0
Improve shrimp quality	%	0	53.8	75
Improve production efficiency	%	0	7.7	50
Improve law enforcement	%	0	0.0	50
Government to provide marketing information	%	0	76.9	0
Improve governmental monitoring	%	0	30.8	0

Annexes for Bangladesh case study

Annex 33. Samples and locations for the study

No	Respondent		Khulna	Bagherhat	Satkhira	Cox's Bazar	Chittagong	Total
	Location							
1	Shrimp farmers		36	36	32	32	0	136
1.1	Sell to Depot		4	4				8
1.2	Sell to Traders		32	32	32	32		128
2	Shrimp middlemen		16	13	12	6	1	44
2.1	Traders		8	8	8	4		24
2.2	Depots		4	4	4			12
2.3	Agents		4	1		2	1	8
3	Processors/ Exporters		4	1	0	2	1	8
	Total number of respondents		56	50	44	40	2	188

Annex 34. List of interviewed farmers

Farmer ID	Farmer's Name	Village	Union	Upazilla	District
1	G.M.Fajul	Chakba	Shyamnagar	Shyamnagar	Satkhira
2	Zamat Ali	Jhapa	Padmapur	Shyamnagar	Satkhira
3	Abu Based Sardar	Khagraghat	Isharipir	Shyamnagar	Satkhira
4	Naushar Alli	Mirzapur	Koikhali	Shyamnagar	Satkhira
5	Jaker Hassin	Burilia	Burilia	Shyamnagar	Satkhira
6	A,GM,Amanula	Chuterpur	Pada Pokor	Shyamnagar	Satkhira
7	Toufiqur Rahman	Ghola	Kasimari	Shyamnagar	Satkhira
8	Krishpod Mondal	Durduskhali	Nvrnagar	Shyamnagar	Satkhira
9	Mahfujur Rahman	Munshinagar	Munshinagar	Shyamnagar	Satkhira
10	Solaiman	Ishordipur	Ishordipur	Shyamnagar	Satkhira
11	Sanjoy	Bagmara	Khulia	Debhata	Satkhira
12	Ashif	Bagmara	Khulia	Debhata	Satkhira
13	Md.Nur nabi	Kulia	Kulia	Debhata	Satkhira
14	Joy Krishna	Bagmara	Kulia	Debhata	Satkhira
15	Provat Mondal	Kulia	Kulia	Debhata	Satkhira
16	Rostam Ali	Kulia	Kulia	Debhata	Satkhira
17	Basudev Mondal	Dattavanga	Kulia	Debhata	Satkhira
18	Abdul Kader	Bohera	Kolia	Debhata	Satkhira
19	MD.Shater Gagy	Pyjayly	Kulia	Asasuni	Satkhira
20	Shahjahan	Bashukhali	Shuvnali	Asasuni	Satkhira

Farmer ID	Farmer's Name	Village	Union	Upazilla	District
21	Mojibur Rahaman	Kola	Protab Nagar	Asasuni	Satkhira
22	Sharfattula	Hage pur	Hova Nondy	Asasuni	Satkhira
23	Milon	Kkaikhali	Shovnali	Asasuni	Satkhira
24	Nurul	Kollan Pur	Protapnagar	Asasuni	Satkhira
25	Abul Kasem	Bashirampur	Koshavnali	Asasuni	Satkhira
26	Taleb Islam	Shovnali	Shovnali	Asasuni	Satkhira
27	Md. Mannan	Shovnali	Shovnali	Asasuni	Satkhira
28	Hazi Daud Ali	Protap Nagar	Protapnagar	Asasuni	Satkhira
29	A Khalek Sana	Anulia	Anulia	Asasuni	Satkhira
30	Hazi Jonab Ali	Chechua	Anulia	Asasuni	Satkhira
31	Md.Mozzamma I Gazi	Sridharpur	Dargapur	Asasuni	Satkhira
32	Anar Gazi	Sridharpur	Dorgapur	Asasuni	Satkhira
33	Samsur Rahman	Srikolosh	Ashasoni	Asasuni	Satkhira
34	Volanath	Harivanga	Asasoni	Asasuni	Satkhira
35	Dalim	Godaipur	Khajra	Asasuni	Satkhira
36	Md.Gaziul Huq	Sriramkhali	Katakhali	Asasuni	Satkhira
37	Mahfuz	Ragurampur	Bemrota	Sadar	Bagherhat
38	MD. Akermol Sake	Bojoypur	Bemrota	Sadar	Bagherhat
39	Abdul Sobhan	Fulbare	Sategumbog	Sadar	Bagherhat
40	Babol Fakir	Kasimpur	Dema	Sadar	Bagherhat
41	Ekramul	Goalkhali	Baroimari	Sadar	Bagherhat
42	Abdul Gani	Fulbari	Ssatgombuz	Sadar	Bagherhat
43	Md Abdul Hossine	Fulbarie	Dema	Sadar	Bagherhat
44	Shidur	Aafra	Jotabpur	Sadar	Bagherhat
45	Asok Kumer	Poschim danga	Shat gombuz	Sadar	Bagherhat
46	Shaik Molaleb	Mojidpur	Jatpur	Sadar	Bagherhat
47	Hafijur Rahman	Morshedpur	Jatapur	Sadar	Bagherhat
48	Ali Newaz Tohin	Mojidpur	Jatrapur	Sadar	Bagherhat
49	Gaous Hauldar	Fulbari	Satgombuj	Sadar	Bagherhat
50	Kamruzzaman	Koliadaour	Karapara	Sadar	Bagherhat
51	Abul Kashem Azad	bjoypur	Basrota	Sadar	Bagherhat
52	Dulal Haulapar	Khrasombol	Bamrota	Sadar	Bagherhat
53	Gazi Gulam Rosul	Ulubuniga	Sanatait	Mongla	Bagherhat
54	Mostafa	Bastala	Sonderboun	Mongla	Bagherhat
55	Shahan Ali	Bastala	sondarban	Mongla	Bagherhat
56	Abul Kalam	Khorma	Sundarban	Mongla	Bagherhat
57	Afzal Hossain	Bastola	Sbonundar	Mongla	Bagherhat
58	Konkon Roy	Digraj	Borirvang	Mongla	Bagherhat
59	Aziz Faquer	Bashtala	Suandarbon	Mongla	Bagherhat

Farmer ID	Farmer's Name	Village	Union	Upazilla	District
60	Atior Shikkari	Burburiga	Sndarbon	Mongla	Bagherhat
61	Horidash	Khalikabri	Chadpai	Mongla	Bagherhat
62	Farid Uddin	Holdibulia	Chila	Mongla	Bagherhat
63	Harun	Corma	Sundarban	Mongla	Bagherhat
64	Profulo Kumar	Kainmari	Chadpai	Mongla	Bagherhat
65	Salina Begum	Brammannath	Chandpur	Mongla	Bagherhat
66	Gulam Mustafa	Bashtala	Undarban	Mongla	Bagherhat
67	Harun Ur Rasid	Kainmari	Chandpai	Mongla	Bagherhat
68	Sumer Puddar	Kainmari	Chandpai	Mongla	Bagherhat
69	Motiar Shikari	Burburia	Cundarban	Mongla	Bagherhat
70	Eskandar Talukder	Bastola	Sondarban	Mongla	Bagherhat
71	Debobroto	Bajua	Bajua	Dakup	Khulna
72	MD.Mohsin	Anandanagar	Chalna	Dakup	Khulna
73	Shorder Faruq	Sarinogfr	Kamarkily	Dakup	Khulna
74	Anil	Kamine	Tilgonga	Dakup	Khulna
75	Noni Gopal	Sutarkhali	Sutarkhali	Dakup	Khulna
76	Shaik Azizul	Bazui	Bazui	Dakup	Khulna
77	Md. Safiqul ahmed	Khalisha	Chalna	Dakup	Khulna
78	Md. Hashemuzz Aman	Srinagar	Sammarkhula	Dakup	Khulna
79	M Amalek	Kalabagi	Sutarkhali	Dakup	Khulna
80	A.b.n Ruhul Amin	Pankhali	Chalna	Dakup	Khulna
81	MD.Ashikur	Moukhali	Chalna	Dakup	Khulna
82	S.M.Omar Faruq	Pankhali	Chalna	Dakup	Khulna
83	Nurul Islam	Grmati	Chalna	Dakup	Khulna
84	Bimolandra	Samari	Sutarkhali	Dakup	Khulna
85	Sheik Abdul Hosain	Khuna	Chalna	Dakup	Khulna
86	S M Golam Akber	Srinagr	Kamarkhula	Dakup	Khulna
87	Md. Aliar Rahaman	Kamarkhali	Kamarkhali	Dakup	Khulna
88	Bimolandra Mondol	Ramnagar	Koilashgong	Dakup	Khulna
89	S.m.Rafiqul	Sivnagar	Kamarkhula	Dakup	Khulna
90	Pulal Chanda	Kamilibasias	Tildanga	Dakup	Khulna
91	Mohadev Roy	Rokakhali	Kamarahali	Dakup	Khulna
92	Md. Khalek Sana	Koilashgonj	Koilashgonj	Dakup	Khulna
93	Jahangir	Koilashgonj	Kiolashgonj	Dakup	Khulna
94	Poresh Mondol	Sahrabad	Dakub	Dakup	Khulna
95	A. Gofur	Katobonia	Chalna	Dakup	Khulna
96	Md. Arsad	Nolian	Sutarkhali	Dakup	Khulna

Farmer ID	Farmer's Name	Village	Union	Upazilla	District
	Gazi				
97	Hafizur	Nolian	Sutarkhali	Dakup	Khulna
98	Abdul Barik Gazi	Nolian	Sutarkhali	Dakup	Khulna
99	Romesh	Chunkuri	Bazua	Dakup	Khulna
100	Sonjoy	Orabonia	Dakup	Dakup	Khulna
101	Monir Ahmed	Rampur	Saharbil	Chokoria	Cox's Bazar
102	Md.Abu Sama	Rampul	Saharali	Chokoria	Cox's Bazar
103	Nurul Islam	Rampur	Saharbil	Chokoria	Cox's Bazar
104	Md.Abdul Sukur	Rampur	Saharbil	Chokoria	Cox's Bazar
105	Monjur Alam	Rampur	Saharbil	Chokoria	Cox's Bazar
106	Md Abul Kasem	Budurkhali	Budurkhali	Chokoria	Cox's Bazar
107	Sahanawaz	Ilisia	Vaula	Chokoria	Cox's Bazar
108	Md. Nurul Alam	Rampur	Saharbil	Chokoria	Cox's Bazar
109	Md. Ruhul Amin	Kuabkhali	Saharbil	Chokoria	Cox's Bazar
110	Md. Rafiq	Ilisia	Vaura	Chokoria	Cox's Bazar
111	Abu Sayed	Kuralkhali	Saharbil	Chokoria	Cox's Bazar
112	Anamul	Ilisia	Vaura	Chokoria	Cox's Bazar
113	Sofiquil Islam	Bodorkhali	Bodorkhali	Chokoria	Cox's Bazar
114	Md.Sardar Kamal	Rampur	Saharbil	Chokoria	Cox's Bazar
115	Nur Mohammad	Ilisia	Valua	Chokoria	Cox's Bazar
116	Md.Azim Uddin	Rampur	Saharbil	Chokoria	Cox's Bazar
117	Samsul Alam	Ilisia	Vaula	Chokoria	Cox's Bazar
118	Nurul Islam	Bodorkhali	Bodorkhali	Chokoria	Cox's Bazar
119	Haji Abdul gafur	Dhimonkhali	Palongkhali	Ukhia	Cox's Bazar
120	Nazi	Tolatuli		Teknaf	Cox's Bazar
121	Md. Aias Uddin	Tolatuli	Huaikong	Teknaf	Cox's Bazar
122	Kabir Ahmed	Huaiking	Huaikong	Teknaf	Cox's Bazar
123	Md. Firoz Ahmed	Bulokali	Huakong	Teknaf	Cox's Bazar
124	Mustak Ahmed	Huaikong	Huaikong	Teknaf	Cox's Bazar
125	Hazi Mazhar	Kharongkhali	Huaikong	Teknaf	Cox's Bazar
126	Afder Ali	Nilabazar	Nelabazar	Teknaf	Cox's Bazar
127	Ziual Huq	Kinjarpara	Huaikong	Teknaf	Cox's Bazar
128	Abu Taleb	Muharakata	Huaikong	Moheshkhali	Cox's Bazar
129	Aman Ullait	Boro Moheshkhali	Moheshkhali	Moheshkhali	Cox's Bazar
130	Md. Nizam Uddin	Kalaliakata	Huaikong	Moheshkhali	Cox's Bazar
131	Nurul Alam	Borosora	Huaikong	Moheshkhali	Cox's Bazar
132	Mustak Ahmed	Fakirakhali	Huankong	Moheshkhali	Cox's Bazar
133	Faridul Alam	Fakirkitali	Huankond	Moheshkhali	Cox's Bazar

Farmer ID	Farmer's Name	Village	Union	Upazilla	District
134	Abul Kasem	Foriarsora	Hoankong	Moheshkhali	Cox's Bazar
135	Abu Kaisar	Fakiritali	Huankong	Moheshkhali	Cox's Bazar
136	Sharif Maibor	Adharkhola	Kalarmatsora	Moheshkhali	Cox's Bazar

Annex 35. List of interviewed traders

Trader ID	Trader's name	Village	Union	Upazila	District
1	Md. Abdus Satter Sana	Saharabad	Kamarkhola	Dacope	Khulna
2	Panchanan Mandal	Perchalna	Chalna	Dacope	Khulna
3	Prodip Kumar Roy	Tildanga	Tildanga	Dacope	Khulna
4	MD. Nasir Uddin	Khona	Chalna	Dacope	Khulna
5	MD. Shafiqul Molla	Nalian	Sutarkhal	Dacope	Khulna
6	Suroth Golder	N.Kaminibasia	Tildanga	Dacope	Khulna
7	Milton Sarkar	Garkathi	Chalna	Dacope	Khulna
8	Shahidul islam	Garkathi	Chalna	Dacope	Khulna
9	Gaffar Shak	Goalkhali	Baripara	Bagherhat	Bagherhat
10	Suko Ranjan	Kapalibandar	Bamorta	Bagherhat	Bagherhat
11	Ramizul Islam	Kainmari	Chandpie	mongla	Bagherhat
12	Panchanon Bairagi	Kunainagar	Chandpie	mongla	Bagherhat
13	samor Sarkar	Kainmari	Chandpie	mongla	Bagherhat
14	Gourungo Rai	Kainmari	Chandpie	mongla	Bagherhat
15	Md. Zillur rahman	Dema	Dema	Bagherhat	Bagherhat
16	Md. Motaleb Tarafder	Dema	Dema	Sadar	Bagherhat
17	Rakhal Chandra Roy	Beledanga	Kulia	Debhata	Satkhira
18	Prodip Kumar Mandal	Kulia	Kulia	Debhata	Satkhira
19	Md. Shahinur Islam	Godaipur	Khazra	Asasuni	Satkhira
20	Milon	Kadakati	Kadakati	Asasuni	Satkhira
21	Monotosh	Dhalirchak	Anulia	Asasuni	Satkhira
22	Md. Rabiul Islam	Mariala	Sriulla	Asasuni	Satkhira
23	Md. Mizanur Rahman	Kadamtola	Munsigonj	Shyamnagar	Satkhira
24	Anadi Biswas	Porakatla	Burigoalini	Shyamnagar	Satkhira

Annex 36. List of interviewed depots

Depot ID	Depot owner's name	Company	Village	Union	Upazila	District
1	Bikash Chandra Mondal	Bhai Bhai Fish Ltd	Munsigonj	Munsigonj	Shyamnagar	Satkhira
2	Md. Akram Hossain	Ms Mayer Doa Fish	Chapra	Budhata	Assasuni	Satkhira
3	Md. Rahul Amin	Ms Salina Fish	Asasuni	Asasuni	Asasuni	Satkhira
4	Alhaz Rowsan Ali	Mahmud Fish & Commission	Beledanga	Kulia	Debhata	Satkhira
5	Md. Yellas Ali	Russel Fish Ltd.	BagerBazer	Sadar	Bagherhat	Bagherhat
6	Ham Chandra Mistre	Joint Fish Ltd.	Joymahal	Mongla	Mongla	Bagherhat
7	Siddiqur Rahman	Bap-mayer Doa Fish Ltd	Bazer Road	Mongla	Mongla	Bagherhat
8	Md. Babul Ahmed	Babul Fish Ltd.	Sonatala	Doma	Bagherhat	Bagherhat

9	Kh. Golam Hossain	Anik Raju Fish Ltd.	Jontrapur	Jontrapur	Rupsha	Khulna
10	Prokash Chandra Roy	Papia Fish	Betbungia	Tildanga	Dacope	Khulna
11	Md. Nurunabbi Dhali	Ms Nabi Fish	Achavua	Chalna	Dacope	Khulna
12	Gouranga Mollik	Golok Fish	Perchalna	Chalna	Dacope	Khulna

Annex 37. List of interviewed agents

Agent ID	Agent owner's name	Company	Village	Union	Upazila	District
1	Badhan Mojumder	Ms Zabber & Co.	Notun Bazar	Sadar	Rupsha	Khulna
2	M Delwar Hossain	Tala Fish Ltd.	Purba Rupsha	Rupsha	Rupsha	Khulna
3	Abdur Razzak	Imam Fish Ltd.	Soth Rupsha	Rupsha	Rupsha	Khulna
4	Panna	Shepsah Fish Ltd.	Notun Bazar	Sadar	Rupsha	Khulna
5	M Azadul Isalam	Ms Friends Trading	Battawali	Katakhali	Sadar	Bagherhat
6	Md. Jahangir Alam	Ms Jesmin Fish Agent	Parulia	Parulia	Debhata	Satkhira
7	Haji Jalal Ahmed	ShilaMoni Enterprize	Main Road	Sadar	Sadar	Cox's Bazar
8	Md. Jamil Sawdegar	Chatgoan Fish Ltd	Firingi Bazar	Sadar	Sadar	Chittagong

Annex 38. List of interviewed processors

Processor ID	Name of interviewee	Position	Company	District
1	Mrinal Kanti Das	General Manager	Bagherhat Sea Food	Bagherhat
2	Kazi Tipu	Asst. General Manager	Southern Sea Food Ltd. Rupsaha	Khulna
3	Abdul Baki	Managing Director	Oriental F Pr. Industries, KDC	Khulna
4	Monir Hossain	Chief Accountant	COBI Fish Limited, Rupsha	Khulna
5	K H Rahaman	General Manager	Rupsha Fish/Alide Indus, Rupsha	Khulna
6	M Anisur Rahman	General Manager	Sekai Corporation Ltd., Debhata	Satkhira
7	M S A Chowdhury	Chief ExecutiveE	Cox's Bazar Sea Food, Mohalchhari	Cox's Bazar
8	Iqbal H Chodhury	Managing Director	Sea Marks Ltd., Firingi Bazar	Chittagong

Annex 39. Socio-economic indicators of the sampled stakeholders

	Socio-economic characteristics	Farmer	Trader	Depot	Agents	Processor
1	Age (years)	46.00	36.00	43.00	41.87	50.50
2	Experience in shrimp farming/trading/processing (years)	11.93	11.95	13.00	17.50	21.75
3	Household size (no.)	5.63				
4	Illiterate (%)	40	16.60	-	-	-
5	Literate (%)	60	83.40	100	100	100.00

5.1	College/University. attended	3	-	-	-	100.00
5.2	High school attended	32	-	-	-	
5.3	Primary attended	24	58.40	58.40	62.50	
5.4	Secondary school attended	1	25.00	41.60	12.50	
5.5	Vocational education	-	-	-	25.00	
6	Shrimp farming/trading/processing as major occupation (%)	100	100	100.00	100.00	100.00
7	Involvement with other occupation (%)	100	100	75.00	12.50	25.00
7.1	Agriculture	52.00	47.00	44.45		
7.2	Business	0.70	9.50	11.10		
7.3	Livestock	40		44.45		
7.4	Service	7.30	4.70			
7.5	Shrimp farming		28.50		12.50	12.50
7.6	Ice plant					12.50
8	Aquaculture/ trading/ processing technical knowledge (%):					
8.1	Own initiative	45.00	91.60	33.33	-	
8.2	Training	29.00	8.40	8.34	-	87.50
8.3	Own initiative and training	28.00	-	33.33	100.00	12.50

Annex 40. Investment made in shrimp farming

Items of investment	Average (BDT)	% out of the total
Construction of the system	20,688.00	22.34
Upgrading of the system	16,032.00	17.31
Machinery	35,731.00	38.58
Guard shade	13,316.00	14.38
Major equipment	6,857.00	7.40
All items	92,624.00	100.00

Annex 41. Volume of shrimp traded 2000-2005

Stakeholders	Commodity (kg)	Year					
		2000	2001	2002	2003	2004	2005
Traders/ faria	<i>P.monodon</i>	36,853	44,998	57,652	53,910	78,130	90,420
	<i>Macrobrachium</i>	5,830	8,450	8,835	10,973	14,025	16,300
Depots	<i>P.monodon</i>	990,880	846,500	1,036,850	1,055,650	1,112,100	1,057,100
	<i>Macrobrachium</i>	7,200	7,900	22,700	29,700	35,450	19,500
Agents	<i>P.monodon</i>	852,950	270,332	1,094,670	1,181,100	1,323,650	1,462,420
	<i>Macrobrachium</i>	396,300	380,220	571,190	456,820	555,460	583,600
Processors	<i>P.monodon</i>	6,684,250	11,698,93	13,661,265	16,707,166	21,247,953	16,456,169
	<i>Macrobrachium</i>	905,550	793,120	1,007,370	2,257,370	1,782,345	2,273,501

Annex 42. Perception of changes in shrimp farming

Indicator	Level of change (%)			
	Decreased	Not changed	Increased	Total
Total culture area of the farm	5.15	92.64	2.21	100
Number of ponds	2.94	93.38	3.68	100
	No	Add	Remove	Total
Added or removed the nursery ponds	71.32	24.26	4.42	100
	Decreased	Not changed	Increased	Total
Investment (including machinery)	2.94	32.35	64.70	100
Ownership of land	1.47	97.79	0.74	100
	More intensive	Same	More diversified	Total
Types of farming	0.74	98.52	0.74	100
	Decreased	Not changed	Increased	Total
Number of shrimp crop per year	2.21	82.35	15.44	100
Use of family labor	0.74	97.29	1.47	100
Use of hired labor	0.74	97.29	1.47	100
Species of aquaculture farming	0.74	98.52	0.74	100
	Southern region	Mangrove	Cox's Bazar	Total
Sources of seed	-	-	100.00	100
	Decreased	Not changed	Increased	Total
Average stocking density for crop 1	5.88	82.35	11.77	100
Stocking duration of crop 1	3.68	93.38	2.94	100
Use of home made feed	2.21	37.50	60.29	100
Use of commercial feed	2.21	92.64	5.15	100
Use of chemical/medicine	86.02	11.02	2.94	100
	Worse	Same	Better	Total
Shrimp Yield of crop 1	1.47	94.12	4.42	100
Marketing of shrimp	3.68	-	96.32	100
	Decreased	Not changed	Increased	Total
Average cost per 1000 acre of water area crop	-	7.36	92.64	100
Average profit per 1000 acre of water area crop	0.74	1.48	97.79	100

Annex 43. Per hectare shrimp farming variable cost and their percentages

Items of cost (Unit: BDT/ha/crop/year)	2004		2005	
	Cost	%	Cost	%
Shrimp post larvae	9,129.77	60.63	10,390.96	58.73
Labour for pond preparation	1,129.52	7.50	2,359.22	13.33
Labour during production	1,891.30	12.56	1,823.67	10.31
Labour during harvesting	418.77	2.78	324.82	1.84
Chlorine/bleach	6.98	0.05	8.74	0.05

Chemical/drugs	4.68	0.03	-	-
Lime	776.77	5.16	924.87	5.23
Fertilizer	361.27	2.40	379.66	2.15
Home made feed	226.60	1.50	304.71	1.72
Commercial feed	212.70	1.41	309.66	1.75
Electricity	13.33	0.09	20.72	0.12
Fuels	114.51	0.76	121.93	0.69
Communications	198.36	1.32	199.66	1.13
Others	574.11	3.81	524.66	2.97
Total	15,058.66	100.00	17,693.29	100.00

Annex 44. Monthly average sale prices for farmers for different sizes

Unit: BDT/kg

Date	U20	21-30	31-44	45-66	67-100
Jan-04	500.0	390.0	255.0	212.3	70.0
Feb-04			342.0		
Mar-04	477.6	352.6	255.3	145.3	88.7
Apr-04	463.2	351.6	264.0	176.9	88.8
May-04	460.1	346.0	263.5	178.0	91.8
Jun-04	458.1	343.5	266.8	183.1	103.1
Jul-04	456.9	354.0	259.8	168.7	96.3
Aug-04	455.3	372.9	271.0	179.3	95.3
Sep-04	422.0	365.0	263.6	185.6	88.3
Oct-04	417.5	352.0	280.9	203.2	93.3
Nov-04		349.7	323.0		
Dec-04	415.5	400.0	200.0		
Jan-05			312.5		
Feb-05	500.0	340.0	357.0		
Mar-05	486.7	366.6	261.7	150.9	85.0
Apr-05	482.8	363.7	280.8	184.2	94.2
May-05	472.9	363.8	270.5	185.2	89.6
Jun-05	481.3	366.5	274.1	187.2	92.5
Jul-05	488.1	362.1	265.2	172.4	94.1
Aug-05	483.1	373.0	257.0	178.0	100.9
Sep-05	425.3	399.0	304.1	199.0	90.0
Oct-05	433.3	367.2	278.9	243.3	90.0
Nov-05		385.0	311.0		
Dec-05	439.0	353.7	275.0		
Jan-06	550.0				
Feb-06					
Mar-06	501.7	374.9	277.1	162.5	100.0
Apr-06	499.1	375.6	300.0	212.4	129.4
May-06	489.9	384.7	297.2	198.0	98.6
Jun-06	511.7	394.3	280.0	193.8	100.0
Jul-06	514.3	376.4	301.4	210.6	98.0
Aug-06	510.0	410.0	315.0	285.0	120.0

Annex 45. Monthly average procurement prices for middlemen for different sizes

Unit: BDT/kg

Date	Trader					Depot					Agent				
	U20	21-30	31-44	45-66	67-100	U20	21-30	31-44	45-66	67-100	U20	21-30	31-44	45-66	67-100
Jan-04	486.3	388.8	260.0	151.3	66.3	505.4	403.3	274.6	164.9	72.2	522.4	416.3	282.1	172.6	76.5
Feb-04	486.3	388.8	260.0	151.3	66.3	502.7	406.5	267.9	160.5	71.8	523.5	416.3	282.1	172.6	76.5
Mar-04	478.0	359.0	240.4	152.7	80.7	495.4	392.5	268.6	164.0	85.1	528.1	416.9	284.4	177.5	77.4
Apr-04	474.8	357.7	247.7	150.7	79.7	494.2	383.0	265.8	162.8	83.2	533.1	423.1	288.1	183.1	82.0
May-04	470.1	355.3	246.3	150.3	80.3	483.3	381.5	257.6	156.0	81.3	533.1	423.1	288.1	183.1	83.1
Jun-04	478.3	357.3	250.8	154.1	82.4	497.5	379.5	264.3	159.7	86.7	517.5	416.1	281.8	176.9	82.0
Jul-04	474.8	353.8	248.7	155.6	84.5	485.0	372.3	262.7	164.8	90.8	517.5	416.4	281.6	177.1	82.3
Aug-04	478.2	355.9	249.3	158.1	85.0	491.7	368.9	259.2	155.0	90.0	538.1	428.1	293.1	187.1	86.5
Sep-04	485.1	357.7	248.4	153.6	82.8	482.3	367.9	260.5	164.3	88.9	538.1	428.1	291.9	187.3	86.5
Oct-04	506.8	376.4	265.5	163.6	80.5	510.2	385.2	272.8	170.3	85.4	544.4	433.1	298.1	193.1	93.1
Nov-04	497.8	379.6	264.4	163.3	72.2	504.7	388.9	270.4	168.7	75.7	510.6	393.8	277.3	174.1	74.5
Dec-04	495.0	382.5	265.0	162.5	66.3	515.1	387.9	270.3	168.9	71.6	520.0	388.8	273.1	173.0	77.6
Jan-05	506.3	381.3	266.3	153.8	67.5	525.3	390.3	271.7	163.7	71.8	523.4	393.9	278.0	159.6	75.4
Feb-05	497.5	369.5	259.5	154.1	74.5	524.5	387.7	271.9	163.8	73.9	530.6	390.3	283.3	158.0	78.5
Mar-05	493.5	363.1	255.6	153.1	84.8	525.8	381.1	271.9	163.6	83.3	541.9	387.9	283.8	165.3	77.9
Apr-05	485.5	356.9	252.3	148.8	82.5	502.2	372.8	264.0	153.9	84.7	494.8	365.3	264.8	148.8	78.4
May-05	479.5	359.7	251.7	149.6	83.6	485.8	377.4	264.3	155.3	84.6	485.1	366.6	265.1	142.8	75.4
Jun-05	492.7	355.6	249.3	152.8	84.0	492.1	369.3	262.7	157.8	88.7	469.0	349.1	251.3	160.0	81.8
Jul-05	486.2	359.5	251.0	146.9	82.1	503.1	377.8	262.5	159.8	82.4	483.5	352.5	253.0	152.0	75.0
Aug-05	489.9	362.0	252.8	152.3	83.8	515.3	383.5	270.9	168.0	87.7	510.8	368.5	274.3	170.5	84.1
Sep-05	490.3	360.1	251.6	149.8	82.7	516.8	382.1	268.3	165.2	88.0	504.4	375.3	270.1	166.6	84.8
Oct-05	488.2	364.6	253.5	152.2	80.4	506.9	386.8	270.9	164.6	79.1	506.6	387.6	277.8	164.0	78.5
Nov-05	496.7	378.3	265.0	156.7	68.3	508.8	386.8	272.7	164.2	80.8	516.6	377.4	277.9	167.8	84.0
Dec-05	496.7	378.3	265.0	156.7	68.3	507.2	387.0	272.3	164.2	76.5	513.0	388.9	275.0	167.9	78.6
Jan-06	515.0	383.3	273.3	155.0	75.0	533.4	393.8	289.7	164.9	90.9	540.3	396.3	290.3	162.5	89.9
Feb-06	517.1	385.7	277.1	161.4	77.9	533.0	393.3	288.7	166.6	86.8	541.5	396.0	293.1	175.3	87.4
Mar-06	525.5	383.8	280.6	165.0	90.4	540.7	394.3	287.8	169.0	91.0	544.9	400.1	294.5	165.6	87.9
Apr-06	517.7	377.5	275.0	165.7	88.3	527.3	382.3	272.7	166.8	88.0	510.6	362.8	262.9	160.3	80.0
May-06	517.5	377.9	275.7	166.0	89.3	534.7	382.8	275.9	165.1	88.8	528.0	363.0	265.9	159.8	77.5

Annex 46. Monthly average procurement prices for processors

Unit: BDT/kg

Date	U20	21-30	31-44	45-66	67-100
Jan-04	532.1	427.5	292.1	178.1	81.5
Feb-04	534.6	426.6	291.4	181.6	81.5
Mar-04	536.3	426.9	294.4	185.9	82.5
Apr-04	543.1	433.1	298.1	193.1	86.3
May-04	543.1	433.1	298.3	193.1	88.1
Jun-04	527.5	426.9	293.1	183.1	87.1
Jul-04	528.1	427.1	291.6	183.4	87.3
Aug-04	548.1	438.1	303.1	197.1	91.5
Sep-04	548.1	438.1	301.9	196.9	90.1
Oct-04	554.4	441.9	308.1	203.1	98.5
Nov-04	520.6	403.8	287.3	186.0	77.5
Dec-04	530.0	398.8	283.1	182.8	81.3
Jan-05	534.8	405.4	288.0	169.8	80.3
Feb-05	542.1	400.3	293.3	167.8	81.6
Mar-05	551.3	400.3	293.8	175.4	82.3
Apr-05	500.6	372.8	273.5	158.8	81.6
May-05	495.1	376.6	275.1	152.8	83.5
Jun-05	478.1	359.1	261.1	165.1	86.1
Jul-05	493.1	362.5	263.0	161.4	79.3
Aug-05	519.9	378.6	283.0	180.5	87.0
Sep-05	515.8	385.3	280.1	176.6	89.1
Oct-05	516.9	396.1	286.6	174.9	82.3
Nov-05	524.8	387.4	287.4	177.6	89.1
Dec-05	522.4	403.0	285.0	171.0	83.4
Jan-06	551.7	406.3	300.3	170.6	90.8
Feb-06	552.4	406.0	303.1	185.4	91.9
Mar-06	553.6	410.1	305.6	171.8	92.4
Apr-06	520.6	374.8	270.8	166.3	84.9
May-06	537.5	373.0	275.8	169.0	79.9

Annex 47. Perception of the stakeholders on the unusual events in 2004

Awareness and Impact of tsunami and US anti dumping	Farmer	Trader	Depots	Agents	Processor
Whether aware about tsunami					
Yes	28	84	100	100	100
No	72	16	-	-	-
Whether tsunami has any impact on livelihood					
Yes	-	-	-	100	100
No	100	100	100	-	-
Whether aware about US anti dumping					
Yes	-	-	-	-	100
No	100	100	100	100	-
Whether US anti dumping has any impact on livelihood					
Yes	100	100	100	100	-
No	-	-	-	-	100

Other Annexes

Annex 48. Average monthly exchange rates between USD and VND, BDT and IDR (Oanda.com)

Month/Year	VND	BDT	IDR
Jan-04	16,147.45	60.25	8,405.15
Feb-04	16,221.14	60.33	8,445.96
Mar-04	16,270.52	60.49	8,597.01
Apr-04	16,249.17	60.62	8,630.82
May-04	16,260.16	61.04	9,004.62
Jun-04	16,253.93	61.68	9,403.86
Jul-04	16,236.94	60.99	9,052.00
Aug-04	16,275.74	60.95	9,242.68
Sep-04	16,274.80	61.01	9,198.37
Oct-04	16,241.87	60.96	9,108.46
Nov-04	15,884.03	61.02	9,020.76
Dec-04	15,781.06	61.25	9,223.05
Jan-05	15,868.94	62.20	9,223.92
Feb-05	15,921.29	64.51	9,255.80
Mar-05	16,089.32	64.48	9,382.77
Apr-05	15,929.50	63.52	9,557.38
May-05	16,063.26	63.63	9,492.25
Jun-05	16,034.50	63.71	9,629.18
Jul-05	16,092.16	64.70	9,813.32
Aug-05	15,897.81	65.33	9,988.80
Sep-05	15,909.93	65.79	10,265.40
Oct-05	15,905.84	65.77	10,108.77
Nov-05	15,910.95	65.81	10,048.46
Dec-05	15,979.71	66.34	9,868.50
Jan-06	16,048.31	66.84	9,488.00
Feb-06	16,129.74	67.87	9,355.54
Mar-06	16,129.37	69.61	9,170.33
Apr-06	16,422.54	71.57	8,948.45
May-06	16,455.68	70.73	8,999.16
Jun-06	16,528.13	70.92	9,350.61
Jul-06	16,616.45	71.80	9,225.75
Aug-06	16,520.02	71.85	9,093.94

Questionnaire for shrimp farmers

Sample No. _____ Name of interviewer: _____ Date: _____

The objective of this questionnaire is to collect information on your experiences in shrimp farming over the past few years so that we can advise the government of Indonesia and of other countries that buy shrimp on ways to maximize the income from shrimp farming

Although we will collect a lot of information about the money you spend and the money you earn, this information will not be reported to anybody outside our team, it will only be used to assess the overall process and it will not be used to impose taxes against you or your product.

General questions

1. Farmer's name _____; Tel: _____;
2. Address 2.1 Village _____ 2.2 Sub-district _____
 2.3 District _____ 2.4 Province _____
3. Age: _____
4. Gender: Male Female
5. Household size: _____
6. Family labor: _____ 6.1. Male _____ 6.2 Female _____
7. Family labors involved in shrimp farming: _____ 7.1. Male _____ 7.2 Female _____
8. Regular hired labors for shrimp farming: _____ 8.1. Male _____ 8.2 Female _____
9. Do you have any other occupation? Yes No If YES, please specify
 Agriculture Livestock Trading Employee Other (specify) _____
10. Education: Illiterate Primary Secondary (SSC) High school (HSC)
 Vocational University Other (specify) _____
11. Aquaculture technical level: Own Training Vocational BSc Higher
12. How long have you been farming shrimp? _____ years
13. What is the total area of the farm? _____ acre _____ ha
14. What is the total area of the shrimp pond(s)? _____ acre _____ ha
15. What is the total number of shrimp ponds? _____ pond(s)
16. The area of sedimentation/treatment pond(s)? _____ acre _____ ha
17. The area of used nursery pond(s)? _____ acre _____ ha
18. How many owners does you farm have? Single owner 2-4 5 or more
19. What is the shrimp cultured area you lease? _____ acre _____ ha

19.1 The costs to which you lease the farm/yr? IDR _____ / _____ year(s)

20. Do you have any other arrangement for using the land? Yes No

20.1 If YES, please describe the arrangement: _____

Investment for shrimp farming	1. When (yr)?	2. Value (IDR)	3. Usable duration (yrs)
21. Construction of the system			
22. Upgrading of the system			
23. Machinery			
24. Guard shade			
25. Major equipment			
26. Related fees & taxes/year	X		X

Comparing 2 years, 2004 & 2005 (ask if there were any changes, How and Why)

Issue	1. Level of change (1=Decreased; 2=Not changed; 3=Increased)	2. If CHANGED, specify how & why (a = 2004; b = 2005)
27. Total culture area of your farm	Code _____	a. _____ b. _____
28. Number of ponds	Code _____	a. _____ b. _____
29. Added or removed the nursery pond(s)	<input type="checkbox"/> No <input type="checkbox"/> Add <input type="checkbox"/> Remove	a. _____ b. _____
30. Added or removed the sedimentation pond(s)	<input type="checkbox"/> No <input type="checkbox"/> Add <input type="checkbox"/> Remove	a. _____ b. _____
31. Investment (including machinery)	Code _____	a. _____ b. _____
32. Ownership of land	Code _____	a. _____ b. _____
33. Type of farming (1=more intensive; 2=same; 3= more diversified)	Code _____	a. _____ b. _____
34. Number of shrimp crops per year	Code _____	a. _____ b. _____
35. Use of family labor	Code _____	a. _____ b. _____
36. Use of hired labor	Code _____	a. _____ b. _____
37. Species for aquaculture farming	Code _____	a. _____ b. _____
38. Sources of seed (a=within Dist.; b=within prov; c= imported from other prov)	Code _____	a. _____ b. _____
39. Average stocking density for crop 1	Code _____	a. _____ b. _____
40. Stocking duration crop 1 (months/crop)	Code _____	a. _____ b. _____

41. Use of home-made feed	Code _____	a. _____ b. _____
42. Use of commercial feed	Code _____	a. _____ b. _____
43. Use of chemicals/medicines	Code _____	a. _____ b. _____
44. Shrimp yield crop 1	Code _____	a. _____ b. _____
45. Marketing of shrimp	Code _____	a. _____ b. _____
46. Average costs/ per ha _____ ha of water area crop 1 ⁶	Code _____	a. _____ b. _____
47. Average profit per ha _____ ha of water area crop 1	Code _____	a. _____ b. _____
48. Any other change Specified: _____	_____	a. _____ b. _____

Some questions specific to the first crop of shrimp you harvested in 2004 & 2005

	1. 2004	2. 2005
49. What is the total pond area in which you produced shrimp in your farm (__ha)?		
50. How many crops did you have that year of: a. Udang windu/monodon b. Macrobrachium c. Vanamae d. Fish	a. _____ b. _____ c. _____ d. _____	a. _____ b. _____ c. _____ d. _____
51. What type of farming did you apply during that year? (1 = monoculture ; 2 = polyculture)		
52. In which month did you stock the 1 st crop for the 1 st time?		
53. How many times did you stock shrimp for that crop?		
54. What species did you stock in the 1 st crop?	a. _____ b. _____ c. _____	a. _____ b. _____ c. _____
55. How many seed did you stock in the 1 st crop?	a. _____ b. _____ c. _____	a. _____ b. _____ c. _____
56. Where the Monodon PL produced or wild caught? (1 = hatchery; 2 = wild caught)		
57. What was the stocking density in the grow-out ponds (pieces/m ²) in the 1 st crop? (a =Monodon; b = Vannamei)	a. _____ b. _____	a. _____ b. _____
58. Did you stock any fish in that pond and culture them with the shrimp in the 1 st crop? (Y/N)		
59. What species of fish?		

⁶ The 1st crop of the year

60. How many fish did you stock?		
61. In which month did you start harvesting the shrimp for the first crop?		
62. How many times did you harvest in the crop?		
63. In which month did you finish harvesting the shrimp for the 1 st crop?		
64. To whom did you sell the shrimp after harvesting the 1 st crop? (a=collector/trader; b=wholeseller; c=processing plant; d=others)		

Now some questions about the cost of farming the first crop of SHRIMP in 2004 & 2005

Cost items	65. 2004			66. 2005		
	<input type="checkbox"/> Monodon; <input type="checkbox"/> vannamei			<input type="checkbox"/> Monodon; <input type="checkbox"/> vannamei		
	a. Quantity	b. Unit cost (IDR)	c. Total cost (IDR)	a. Quantity	b. Unit cost (IDR)	c. Total cost (IDR)
1. Shrimp postlarvae						
2. Other fish seed						
3. Labour for pond preparation (mandays)						
4. Labour during production (mandays)						
5. Labour for harvest (mandays)						
6. Chlorine/Bleach (litre)						
7. Chemicals/Drugs						
8. Lime (kg)						
9. Fertilizers, if any (kg)						
10. Home-made feed, if any (kg)						
11. Commercial feed, if any (kg)						
12. Electricity						
13. Fuels						
14. Communication, harvest, transport						
15. Others, if any						

67. What incentives did you get? Loan Other (specify) _____

68. From whom do you get incentives? _____

69. Have the prices you get for your shrimp changed over the past **5 years**?

Yes Decreased Yes Increased Fluctuated No change

69.1 **If yes**, when did prices change over the past 5 years? _____ Don't know

69.2 What do you think were the reasons for this change?

1. Reason 1: _____

2. Reason 2: _____

3. Reason 3: _____

70. Have the prices you get for your shrimp changed since the **start of 2004**?

Yes Decreased Yes Increased Fluctuated No change

70.1 If **yes**, when did prices change? _____ Don't know

70.2 What do you think were the reasons for this change?

1. Reason 1: _____

2. Reason 2: _____

3. Reason 3: _____

71. What stakeholders are most **negatively/positively** affected by these changes? No one or

Stakeholder	1. Negative effects	2. Positive effects
a. <input type="checkbox"/> Farmers		
b. <input type="checkbox"/> collector/trader		
c. <input type="checkbox"/> wholeseller		
d. <input type="checkbox"/> Processors		
e. <input type="checkbox"/> Exporters		
f. Other _____		

I will now ask you some questions about the prices you got over the last 3 years for your shrimp. We know that you harvested shrimp many times since the first crop of 2004. For each time you sold shrimp we would like to know:

- in which month you sold the shrimp
- for each species of shrimp you sold, how many kg of shrimp did you sell for each size
- for each species of shrimp you sold, what was the price of every size at that time

72. First of all, you sell the shrimp as HOSO or HLSO? HOSO HLSO

IMPORTANT! FOR THE INTERVIEWER

If both HOSO and HLSO are sold, it is important that "HOSO" or "HLSO" should be specified in the last column

If possible use the sizes reported in the table below

Pieces/kg	Pieces/lb
20=1-20 pieces/kg	U/8 = Up to 8 pieces/lb
30=21-30 pieces/kg	9/12=9-12 pieces/lb
44=31-44 pieces/kg	13/20=12-20 pieces/lb
66=45-66 pieces/kg	21/30=21-30 pieces/lb
100=67-100 pieces/kg	41/50=41-50 pieces/lb
Broken=Broken	51/60=51-60 pieces/lb
	61/70=61-70 pieces/lb
	71/80=71-80 pieces/lb
	81/90=81-90 pieces/lb

Prompt month by month starting from January 2004 and finishing with May 2006

73. Quantity, count size and price of shrimp harvested from January 2004 to May 2006

Month/Year	Species	Pieces / kg	Quantity (kg)	Price (IDR)	HOSO/HLSO

Month/Year	Species	Pieces / kg	Quantity (kg)	Price (IDR)	HOSO/HLSO

74. Do you know about the **Tsunami** that hit some countries in Asia in 2004? Yes No
75. Do you think that the Tsunami had an impact on your livelihood? Yes No
If YES, what impact did it have?

75.1. *Impact 1* _____

75.2. *Impact 2* _____

75.3. *Impact 3* _____

76. Do you know about the US antidumping affecting some countries in Asia in 2004? Yes No

77. Do you think that the US antidumping had an impact on your livelihood? Yes No

If YES, what impact did it have?

77.1. *Impact 1* _____

77.2. *Impact 2* _____

77.3. *Impact 3* _____

78. What did you do to prevent the impact of US antidumping on your livelihood?

78.1. *Activity 1* _____

78.2. *Activity 2* _____

78.3. *Activity 3* _____

THANK YOU VERY MUCH FOR YOUR HELP

FOR THE INTERVIEWER

Add below any comments you may have on this interview (eg quality of the information, quality of farm management, etc.)

Questionnaire for Traders

Sample No. _____ Name of interviewer: _____ Date: _____

The objective of this questionnaire is to collect information on your experiences in shrimp trading over the past few years so that we can advise the government of Indonesia and of other countries that buy shrimp on ways to maximize the income from shrimp farming
Although we will collect a lot of information about the money you spend and the money you earn, this information will not be reported to anybody outside our team, it will only be used to assess the overall process and it will not be used to impose taxes against you or your product.

Interviewee information

1. Name of interviewee _____; Tel: _____;
2. Name of the business: _____
 - 2.1 Village _____
 - 2.2 Sub-district _____
 - 2.3 District _____
 - 2.4 Province _____
3. Age: _____
4. Gender: Male Female
5. Household size: _____
6. What is your position in the business? _____
7. Do you have any other occupation? Yes No If YES, please specify
 Shrimp farming Agriculture Livestock Employee Other (specify) _____
8. Education: Illiterate Primary Secondary (SSC) High school (HSC)
 Vocational University Other (specify) _____
9. Aquaculture technical level: Own Training Vocational BSc Higher
10. How long is the longest experience in shrimp trading among the management of the business?
 _____ years
11. How many owners does you business have? Single owner 2-4 5 or more

Investment for shrimp trading	1. When (year)?	2. Value (IDR)
12. Construction of the business		
13. Upgrading of the business		
14. Machinery		
15. Trading place		
16. Major equipment		
a. Property/location rent		
b. Related fees & taxes/year	X	

Major traded commodities

17. What are the most important fisheries species and the total quantity traded by you in 2005?

Commodity	Quantity (kg)	Commodity	Quantity (kg)
1		6	
2		7	
3		8	
4		9	
5		10	

18. Now I would like to ask you some more specific information on the volume of shrimp your business traded over the last 5 years for Monodon, Vannamei, Indicus, and Macrobrachium

Year	Monodon (kg)		Vannamei (kg)		Indicus (kg)		Macrobrachium (kg)	
	HOSO	HLSO	HOSO	HLSO	HOSO	HLSO	HOSO	HLSO
2000								
2001								
2002								
2003								
2004								
2005								

19. Do you think there is enough supply of shrimp for your business? Yes No

If NOT, what are the main reasons for the lack of shrimp?

19.1 Reason 1 _____

19.2 Reason 2 _____

19.3 Reason 3 _____

20. Do you have problems with selling shrimp? Yes No

If YES, what are the main problems in selling shrimp?

20.1 Problem 1 _____

20.2 Problem 2 _____

20.3 Problem 3 _____

Price trends

21. Have the prices you get for your shrimp changed over the past 5 years?

Yes Decreased Yes Increased Fluctuated No change

21.1 If yes, when did prices change over the past 5 years? _____ Don't know

21.2 What do you think were the reasons for this change?

1. Reason 1: _____

2. Reason 2: _____

3. Reason 3: _____

22. Have the prices you get for your shrimp changed since **the start of 2004**?

Yes Decreased Yes Increased Fluctuated No change

22.1 **If yes**, when did prices change? _____ Don't know

22.2 What do you think were the reasons for this change?

1. Reason 1: _____

2. Reason 2: _____

3. Reason 3: _____

23. What stakeholders are most **negatively/positively** affected by these changes? No one or

Stakeholder	1. Negative effects	2. Positive effects
a. <input type="checkbox"/> Farmers		
b. <input type="checkbox"/> Collector/trader		
c. <input type="checkbox"/> Wholeseller		
d. <input type="checkbox"/> Processors		
e. <input type="checkbox"/> Exporters		
f. Other _____		

Now I would like to know some specific information about your business. I will ask you for some information on the prices you pay to procure and you get from resale. Please be aware that this information would be used in complete confidentiality and we will not reveal to people outside our team specific information about your business. We have a common goal, which is to maximize profits from shrimp farming and we would require accurate information from you to be able to do that.

	1. in 2004	2. in 2005
24. How many family labors involving in shrimp trading? a. Male b. Female	a. _____ b. _____	a. _____ b. _____
25. How many regular labors involving in shrimp trading did you hire? a. Male b. Female	a. _____ b. _____	a. _____ b. _____
26. How many seasonal labors involving in shrimp trading did you hire? a. Male b. Female	a. _____ b. _____	a. _____ b. _____
27. Total amount bought (kg)		
a. from farmers		
b. from collector/trader		
c. from wholeseller		

d. from processors		
e. from others (specify) _____		
28. Total amount resold (kg)		
a. to collector/trader		
b. to wholeseller		
c. to processors		
d. to others (specify) _____		
29. Total trading costs (million IDR)		
30. Total marketing margins (million IDR)		
31. Did you give any incentives (e.g. commission) to anybody supplying shrimp to you? <input type="checkbox"/> Yes <input type="checkbox"/> No		
32. If yes, to whom did you give incentives?	a. _____ b. _____ c. _____	a. _____ b. _____ c. _____
33. What incentives did you give?	a. _____ b. _____ c. _____	a. _____ b. _____ c. _____
34. Did you get any incentives (e.g. commission) from anybody supplying shrimp to you? <input type="checkbox"/> Yes <input type="checkbox"/> No		
35. If yes, to whom did you get incentives?	a. _____ b. _____ c. _____	a. _____ b. _____ c. _____
36. What incentives did you get?	a. _____ b. _____ c. _____	a. _____ b. _____ c. _____

I will now ask you some questions about the prices you got since January 2004 for your shrimp and the prices at which you sold the shrimp. If you have records of these prices we would very much like to look at them. If you don't have records, you may not remember exactly the prices for every size and every month.

Please provide us at least data for the months and count sizes you remember from January 2004 to May 2006

monodon

If possible use the sizes below.

Pieces/kg 20=1-20 pieces/kg 30=21-30 pieces/kg 44=31-44 pieces/kg 66=45-66 pieces/kg 100=67-100 pieces/kg Broken=Broken	Pieces/lb U/8 = Up to 8 pieces/lb 9/12=9-12 pieces/lb 13/20=12-20 pieces/lb 21/30=21-30 pieces/lb 41/50=41-50 pieces/lb 51/60=51-60 pieces/lb 61/70=61-70 pieces/lb 71/80=71-80 pieces/lb 81/90=81-90 pieces/lb
--	---

Month	Pieces/ kg	Procurement price (IDR)		Resale price (IDR)	
		HOSO	HLSO	HOSO	HLSO
Jan 04					
Feb 04					

Continue until August 2006

Macrobrachium

(Table similar to the one used for *P.monodon* was removed)

Penaeus indicus

(Table similar to the one used for *P.monodon* was removed)

Penaeus vannamei

(Table similar to the one used for *P.monodon* was removed)

36. Do you know about the **Tsunami** that hit some countries in Asia in 2004? Yes No

37. Do you think that the Tsunami had an impact on your business? Yes No

If YES, what impact did it have?

27.1. Impact 1 _____

27.2. Impact 2 _____

27.3. Impact 3 _____

38. Do you know about the US antidumping affecting some countries in Asia in 2004? Yes No

39. Do you think that the US antidumping had an impact on your business? Yes No

If YES, what impact did it have?

30.1. *Impact 1* _____

30.2. *Impact 2* _____

30.3. *Impact 3* _____

40. What do you do to prevent the impact of US antidumping on your livelihood?

31.1. *Activity 1* _____

31.2. *Activity 2* _____

31.3. *Activity 3* _____

THANK YOU VERY MUCH FOR YOUR HELP

FOR THE INTERVIEWER

Add below any comments you may have on this interview (eg quality of the information, quality of business management, etc.)

Questionnaire for Processors

Sample No. _____ Name of interviewer: _____ Date: _____

The objective of this questionnaire is to collect information on your experiences in shrimp trading over the past few years so that we can advise the government of Indonesia and of other countries that buy shrimp on ways to maximize the income from shrimp farming

Although we will collect a lot of information about the money you spend and the money you earn, this information will not be reported to anybody outside our team, it will only be used to assess the overall process and it will not be used to impose taxes against you or your product.

Interviewee information

24. Name of interviewee _____; Tel: _____;

25. Name of the business: _____

2.1 Village _____ 2.2 Sub-district _____

2.3 District _____ 2.4 Province _____

26. Age: _____

27. Gender: Male Female

28. Household size: _____

29. What is your position in the business? _____

30. Do you have any other occupation? Yes No If YES, please specify

Shrimp farming Agriculture Livestock Employee Other (specify) _____

31. Education: Illiterate Primary Secondary (SSC) High school (HSC)

Vocational University Other (specify) _____

32. Aquaculture technical level: Own Training Vocational BSc Higher

33. How long is the longest experience in shrimp trading among the management of the business? _____ years

34. How many owners does you business have? Single owner 2-4 5 or more

Investment for shrimp trading	1. When (year)?	2. Value (IDR)
35. Construction of the business		
36. Upgrading of the business		
37. Machinery		
38. Trading place		
39. Major equipment		
c. Property/location rent		
d. Related fees & taxes/year	X	

Major traded commodities

40. What are the most important fisheries species and the total quantity traded by you in 2005?

Commodity	Quantity (kg)	Commodity	Quantity (kg)
1		6	
2		7	
3		8	
4		9	
5		10	

41. Now I would like to ask you some more specific information on the volume of shrimp your business traded over the last 5 years for Monodon, Vannamei, Indicus, and Macrobrachium.

Year	Monodon (kg)		Vannamei (kg)		Indicus (kg)		Macrobrachium (kg)	
	HOSO	HLSO	HOSO	HLSO	HOSO	HLSO	HOSO	HLSO
2000								
2001								
2002								
2003								
2004								
2005								

42. Do you think there is enough supply of shrimp for your business? Yes No

If NOT, what are the main reasons for the lack of shrimp?

19.4 Reason 1 _____

19.5 Reason 2 _____

19.6 Reason 3 _____

43. Do you have problems with selling shrimp? Yes No

If YES, what are the main problems in selling shrimp?

20.4 Problem 1 _____

20.5 Problem 2 _____

20.6 Problem 3 _____

Price trends

44. Have the prices you get for your shrimp changed over the past 5 years?

Yes Decreased Yes Increased Fluctuated No change

21.1 If yes, when did prices change over the past 5 years? _____ Don't know

21.2 What do you think were the reasons for this change?

1. Reason 1: _____

2. Reason 2: _____

3. Reason 3: _____

45. Have the prices you get for your shrimp changed since **the start of 2004**?

Yes Decreased Yes Increased Fluctuated No change

22.1 **If yes**, when did prices change? _____ Don't know

22.2 What do you think were the reasons for this change?

1. Reason 1: _____

2. Reason 2: _____

3. Reason 3: _____

46. What stakeholders are most **negatively/positively** affected by these changes? No one or

Stakeholder	1. Negative effects	2. Positive effects
g. <input type="checkbox"/> Farmers		
h. <input type="checkbox"/> Collector/trader		
i. <input type="checkbox"/> Wholeseller		
j. <input type="checkbox"/> Processors		
k. <input type="checkbox"/> Exporters		
l. Other _____		

Now I would like to know some specific information about your business. I will ask you for some information on the prices you pay to procure and you get from resale. Please be aware that this information would be used in complete confidentiality and we will not reveal to people outside our team specific information about your business. We have a common goal, which is to maximize profits from shrimp farming and we would require accurate information from you to be able to do that.

	1. in 2004	2. in 2005
37. How many family labors involving in shrimp trading? a. Male b. Female	a. _____ b. _____	a. _____ b. _____
38. How many regular labors involving in shrimp trading did you hire? a. Male b. Female	a. _____ b. _____	a. _____ b. _____
39. How many seasonal labors involving in shrimp trading did you hire? a. Male b. Female	a. _____ b. _____	a. _____ b. _____
40. Total amount bought (kg)		
f. from farmers		
g. from collector/trader		
h. from wholeseller		

i. from processors		
j. from others (specify) _____		
41. Total amount resold (kg)		
e. to farmers		
f. to collector/trader		
g. to wholeseller		
h. to processors		
i. to others (specify) _____		
42. To which country did you sell the shrimp?	USA : _____ % EU : _____ % Japan : _____ % Other1 _____ : _____ % Other2 _____ : _____ %	USA : _____ % EU : _____ % Japan : _____ % Other1 _____ : _____ % Other2 _____ : _____ %
43. What shrimp commodities did you sell (eg HOSO, HLSO, etc)?	HOSO : _____ % HLSO : _____ % PUD : _____ % Other1 _____ : _____ % Other2 _____ : _____ %	HOSO : _____ % HLSO : _____ % PUD : _____ % Other1 _____ : _____ % Other2 _____ : _____ %
44. What shrimp commodities did you sell (e.g. block, IQF)?	Block : _____ % IQF : _____ % Semi-IQF : _____ % Other1 _____ : _____ % Other2 _____ : _____ %	Block : _____ % IQF : _____ % Semi-IQF : _____ % Other1 _____ : _____ % Other2 _____ : _____ %
45. Total trading costs ('million IDR)		
46. Total marketing margins ('million IDR)		
47. Did you give any incentives (e.g. commission) to anybody supplying shrimp to you? <input type="checkbox"/> Yes <input type="checkbox"/> No		
48. If yes, to whom did you give incentives?	a. _____ b. _____ c. _____	a. _____ b. _____ c. _____
49. What incentives did you give?	a. _____ b. _____ c. _____	a. _____ b. _____ c. _____
50. Did you get any incentives (e.g. commission) from anybody supplying shrimp to you? <input type="checkbox"/> Yes <input type="checkbox"/> No		
51. If yes, to whom did you get incentives?	a. _____ b. _____ c. _____	a. _____ b. _____ c. _____

52. What incentives did you get?	a. _____	a. _____
	b. _____	b. _____
	c. _____	c. _____

I will now ask you some questions about the prices you got since January 2004 for your shrimp and the prices at which you sold the shrimp. If you have records of these prices we would very much like to look at them. If you don't have records, you may not remember exactly the prices for every size and every month.

Please provide us at least data for the months and count sizes you remember from January 2004 to May 2006

MONODON

If possible use the sizes below.

Pieces/kg 20=1-20 pieces/kg 30=21-30 pieces/kg 44=31-44 pieces/kg 66=45-66 pieces/kg 100=67-100 pieces/kg Broken=Broken	Pieces/lb U/8 = Up to 8 pieces/lb 9/12=9-12 pieces/lb 13/20=12-20 pieces/lb 21/30=21-30 pieces/lb 41/50=41-50 pieces/lb 51/60=51-60 pieces/lb 61/70=61-70 pieces/lb 71/80=71-80 pieces/lb 81/90=81-90 pieces/lb
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Month	Pieces/ _____ (kg or lb)	Procurement price (IDR)		Resale price (IDR)	
		HOSO	HLSO	HOSO	HLSO
Jan 04					
Feb 04					

Continue until August 2006

Macrobrachium

(Table similar to the one used for *P.monodon* was removed)

Penaeus indicus

(Table similar to the one used for *P.monodon* was removed)

Penaeus vannamei

(Table similar to the one used for *P.monodon* was removed)

41. Do you know about the **Tsunami** that hit some countries in Asia in 2004? Yes No
 42. Do you think that the Tsunami had an impact on your business? Yes No
 If YES, what impact did it have?

27.1. Impact 1 _____
 27.2. Impact 2 _____
 27.3. Impact 3 _____

43. Do you know about the US antidumping affecting some countries in Asia in 2004? Yes No
 44. Do you think that the US antidumping had an impact on your business? Yes No
 If YES, what impact did it have?

30.1. Impact 1 _____
 30.2. Impact 2 _____
 30.3. Impact 3 _____

45. What do you do to prevent the impact of US antidumping on your livelihood?
 31.1. Activity 1 _____
 31.2. Activity 2 _____
 31.3. Activity 3 _____

46. Do you know about any **other international trade factors** affecting some countries in Asia in 2004? Yes No

47. If yes, what are these factors? _____

48. What impact did these factors have? _____

THANK YOU VERY MUCH FOR YOUR HELP

FOR THE INTERVIEWER

Add below any comments you may have on this interview (eg quality of the information, quality of business management, etc.)

