Network of Aquaculture Centres in Asia-Pacific

Shrimp Price Study, Phase II

Case studies in Vietnam, Indonesia and Bangladesh

January 2010

Prepared by the Network of Aquaculture Centres in Asia-Pacific (NACA)

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 these three countries for providing assistance and information throughout the study. We are also grateful to the various persons providing feedback to the study team during the finalization of the report.

Table of Contents

Executive Summary

The purpose of this study is to update the previous study, "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, 2006"[1]. The previous study highlighted the need for continuous collection of price data, not only from processors of exported commodities, but also from traders and farmers. A broader collection of price data would facilitate a more thorough evaluation of the state of the industry and provide the opportunity for interventions to increase the sustainability of the sector.

The present study was conducted in Vietnam, Indonesia and Bangladesh, and updates information on shrimp price trends from January 2008 to June 2009. The locations and methods, as far as possible, followed those adopted in the previous study, enabling comparisons and analysis with the previous study period.

In Vietnam, there has been a continuous trend among farmers to reduce the previously reported 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 (2008-2009). The price of Vietnamese shrimp initially appeared to recover from the initial negative effects of the US antidumping duties, perhaps because of the market expansion to other countries, or various other strategies designed to mitigate these negative impacts. The most effective solutions were efforts to: (1) reduce production and marketing costs, (2) improve shrimp quality, and (3) increase the proportion of value added products for export.

In Indonesia, shrimp prices for most count sizes of *P. monodon* and for most stakeholder groups were stable or demonstrated a slight decrease over the study period. The primary explanation reported for this stability in price pointed to the limited volume of production and market share in the shrimp industry. In the instance of the processing plant, the study was based on one data set due to difficulties in accessing requested information. Farmers' selling price lowered because of the decreased availability of fresh shrimp and due to the introduction of antidumping duties in a range of countries. These factors allegedly led to the illegal importation of shrimp from affected countries. However, the shrimp production volume is increasing in Aceh, though it has not returned to the same level as its pre-Tsunami conditions. Indonesian shrimp appeared to be facing several difficulties, such as unusual events (i.e. the Tsunami), disease outbreak, and increasing pressure from international markets requesting quality products.

In Bangladesh, trends of both procurement as well as resale prices of all the concerned stakeholders were positive, indicating that over time both trends increased (the sales price for farmers is expressed as the traders procurement price, as traders buy directly from farmers). The Bangladesh shrimp industry seems to be the healthiest in terms of the price trends among the three countries studied. However, according to a media release[2], sixty consignments of frozen shrimp from Bangladesh were

[1] NACA in collaboration with Can Tho University (Vietnam), Department of Marine Affairs and Fisheries (Indonesia), PMTC Bangladesh Ltd (Bangladesh) 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. 2006. 138pp. http://www.enaca.org/modules/wfdownloads/singlefile.php?cid=71&lid=761

[2] http://fis.com/fis/worldnews/worldnews.asp?l=e&country=0&special=&monthyear=&day=&id=33793&ndb=1&df=0

rejected by the EU between 2005 and 2009, due to nitrofuran contamination. These food safety concerns could affect Bangladesh's export reputation, export volume, and overall price unless proper measures and controls are set in place.

In conclusion, this study shows various fluctuations in shrimp prices. Shrimp price trends in Vietnam for most of the sample period showed upward trends for farmers and downward trends for procurement prices for both traders and processors. On the other hand, both the procurement price and resale price of all concerned stakeholders in Bangladesh demonstrated upward trends – particularly during the first half of 2009. Indonesian black tiger shrimp price was considerably stable during the study period, with only minor changes.

Abbreviations

Aila	Cyclone in 2009
Bagda	Local Bangladesh name for *Penaeus monodon* (Black Tiger or Tiger Shrimp)
Baor	Ox-bow Lake (Bangladesh)
BBS	Bangladesh Bureau of Statistics
BDT	Bangladesh Taka
Beel	Inland semi-closed open water bodies (Bangladesh)
BTO	Butterfly, Tail-On Shrimp
Chaka	Local name of *Penaeus indicus* (Bangladesh)
DGAF	Directorate General of Aquaculture Fisheries
Ditch	Smaller seasonal pond (Water retention period six - nine months) (Bangladesh)
DOF	Department of Fisheries, Bangladesh
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
Golda	Local name for *Macrobrachium rogenbergii* (Fresh water Prawn) (Bangladesh)
GSO	General Statistics Office of Vietnam
Horina	Local name of *Metapenaeus monoceros* (Bangladesh)
HLSO	Headless and shell on
HOSO	Head on and shell on
IDR	Indonesian Rupiah
IE	Improved Extensive
IQF	Individual Quick Frozen
I/SI	Intensive/ Semi-intensive
NACA	Network of Aquacultures Centres in Asia-Pacific
PMF	*Penaeus monodon* Farming
PVF	*Penaeus vannamei* Farming
PUD	Peeled and Undevained
RIA2	Research Institute for Aquaculture Number 2
SD	Standard Deviation
SIDR	Cyclone in 2007
U20	Under 20
US	United States
USD	US Dollar
VASEP	Vietnam Association of Seafood Exporters and Producers
VIFEP	Vietnam Institute of Fishery Economic and Planning
VND	Vietnam Dong

Introduction

Objectives

The purpose of this study is to update the previous study on NACA's 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. This study highlights the need for continuous collection of price data, not only from processors and affected exported commodities, but also from traders and farmers. With a broader collection of data, a more thorough evaluation of the health of the industry could be conducted and improvements to increase the sustainability of the sector could be implemented.

The present study was conducted in Vietnam, Indonesia and Bangladesh, providing information on shrimp price trends from January 2008 to June 2009. The locations and methods, as far as possible, followed those adopted in the initial study, enabling comparisons with the previous study.

Methodology

This study was conducted by NACA under the supervision of Dr. C.V. Mohan (mohan@enaca.org) and Mr. Koji Yamamoto, and was implemented in partnership with institutions in Vietnam (Mr. Phan Thanh Lam, *et. al*[3]), Indonesia (Mr. Pamudi) and Bangladesh (Mr. Humayun Kabir, PMTC Bangladesh Ltd).

As in the previous study, the focus was on three countries: Vietnam, Indonesia and Bangladesh.

Study Sites

The study was conducted in Bangladesh, Indonesia and Vietnam. Sites were selected for survey across each country, with visits to the same sites surveyed during the previous study, to the extent possible. Additional points regarding the locations selected are described in more detail in the country sections of this study.

Data collection and analysis

Data on shrimp prices and its impact on shrimp farmers' income in the three countries was collected during the period between January 2008 and June 2009. Data were collected throughout the shrimp supply chain, from farmer to processor as determined from field studies and some published literature.

The detailed methodology used for data collection and analysis is presented in the case studies. In short, structured questionnaires were prepared for every link in the supply chain, including farmers, traders (for Vietnam collectors; for Indonesia traders; for Bangladesh traders, depots, agents) and processors/exporters.

[3] The authors of the Vietnam study were Phan Thanh Lam1, Tran Quoc Chuong, Pham Van Nam, Le Van Huy, Nguyen Thi Hoai An, Pham Ba Vu Tung, Doan Van Bay, and Le Tuyen.

The questionnaires were based on those used in the 2007 survey, but this study's questionnaires focused on information regarding shrimp prices.

As in the previous survey, priority was given to collecting data on *Penaeus monodon* (black tiger or "tiger" shrimp), although some data on *Penaeus vannamei* (white leg shrimp) and other shrimp was also collected.

Owing to the availability of written records for individual shrimp transactions (with the exception of farmers), price information was generated by analyzing individual transactions and summarizing the data into monthly records for individual shrimp species and various sizes of these shrimp. When the number of transactions in a single month was exceptionally high, care was given to review a representative sample of transactions to minimize the effect of aberrational observations.

Questionnaires were made uniform to the maximum extent possible between in each of the three 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 in order to ensure data accuracy.

The following points were given particular attention:

- Prices were collected from actual fresh shrimp sales transactions in order to ensure accuracy.
- Prices were collected to reflect a broad cross section of each country, picking up the main shrimp producing areas (using the same locations studied in 2007, when possible).
- Data was collected from the same groups as before -- farmers, agents, traders, and processors -- and, when possible, from the same individuals, to ensure consistency from the first study to the update.
- Prices were collected and reported on a monthly basis
- Prices collected and reported for specified species. Black tiger were collected in all cases, as this is the single species common in all countries analyzed. White, pink, and brown shrimp were collected as available.
- Prices were collected to reflect shrimp count sizes so that trends in prices could be fully understood, and covered all ranges of shrimp count sizes produced and sold in the country.

As in the previous study, regression analysis was used to define shrimp price trends.

Time schedule

The data for this study was collected over the period from January 2008 to June 2009.

The following provides the details of the outcomes from each country case study.

Vietnam

1. Summary

The goal of this study is to provide a thorough evaluation of the health of the shrimp industry and also to provide suggestions to increase the sustainability of the sector if implemented. The survey includes a total of 154 shrimp (*Penaeus monodon*) farmers, 21 shrimp traders and 24 processors/exporters from the 4 provinces with the largest shrimp production in the Mekong Delta, and 23 shrimp (*Penaeus vannamei*) farmers from central provinces. Primary data is collected using questionnaires which were pre-tested before being used. Data on prices and quantity traded for the period 2008-2009 was taken from actual records maintained by the stakeholders.

In Vietnam, there was an overall trend among farmers to reduce the investment level, especially by reducing the stocking density and other major production costs (i.e. feed and chemical/drug use). Consequently, both the total production of shrimp harvested per year and the shrimp yield per crop decreased over the period examined (2008-2009). The results also showed that the shrimp price depended on the size and seasonal crop, and tended to increase specifically between 2008 and 2009. About 85% of the respondents knew about US anti-dumping in 2004.The respondents attributed US anti-dumping to the decreased shrimp prices and said it had impacts even before the official application of antidumping duties. However, the industry appeared to have recovered from those initial negative effects, perhaps as a consequence of market expansion to other countries. In general, all the shrimp farmers, traders and processors/exporters who were impacted by the US antidumping duties tried to find strategies to mitigate the negative impacts. The most primary solutions sought to: (1) reduce production and marketing costs, (2) improve shrimp quality, and (3) increase the proportion of value added products for export.

2. Introduction

The fishery sector plays an important role in the economy of Vietnam. For many years, the development of this sector has depended on capture fisheries, although the contribution of aquaculture to the sector has become increasingly important (NACA, 2006). In 2008, the total fishery production was 4.602 million tonnes, of which aquaculture contributed 2.437 million tonnes (53%) (Figure 1), and aquaculture gradually played a more important role in the fishery sector of Vietnam (DoF, 2008). Recently, aquaculture became a significant source of income contributing to the national economy as well as providing a considerable source of protein for local provinces and Vietnam as a whole (Vu & Phan, 2008; Phan *et al.*, 2008). Aquaculture products are provided not only for the domestic market but also for the international market.

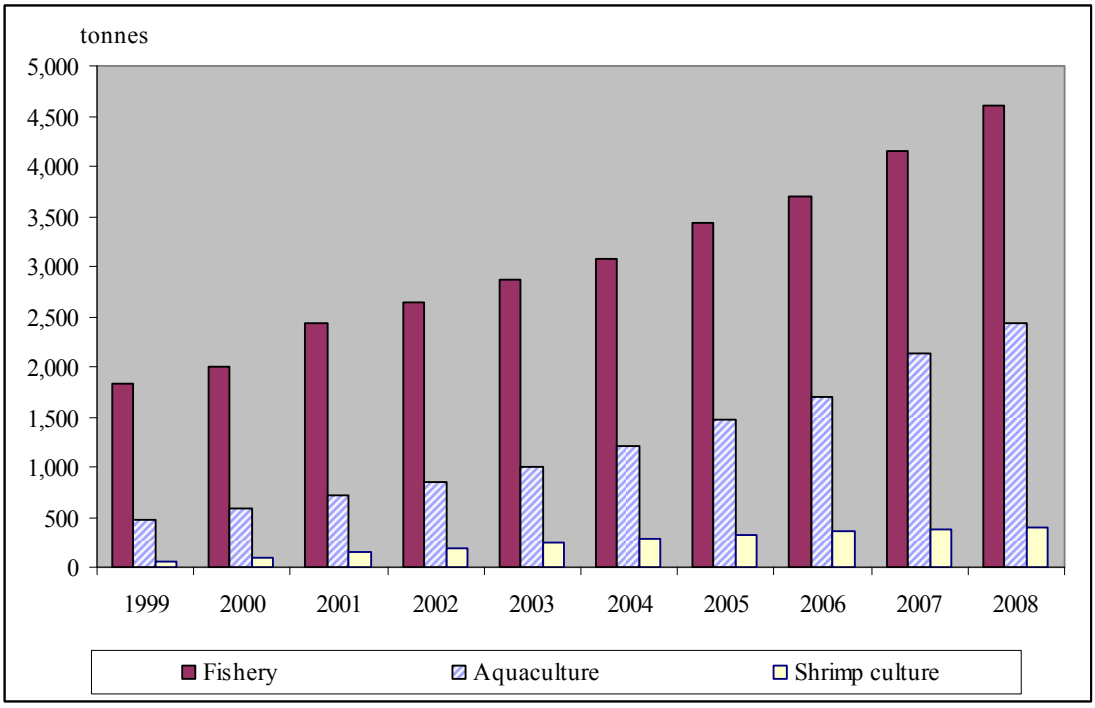
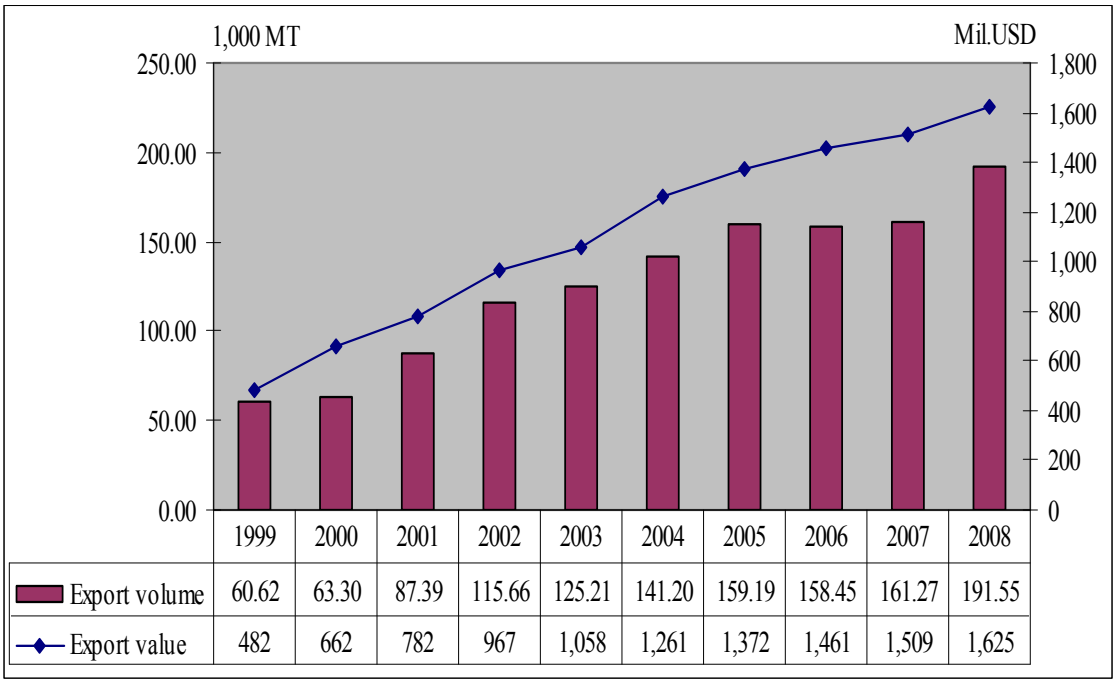


Figure 1: Aquaculture/and shrimp culture production vs. fishery production, Vietnam. *(Sources: General Statistics Office of Vietnam, 2008)*

The shrimp industry has primarily developed during the last decade, especially following Government resolution no. 09/NQ-CP which permitted the transfer of ineffective agriculture land for use in aquaculture development from the year 2000. This change was a primary factor leading to increased aquaculture areas and production during this the period of time. Shrimp culture is believed to be the most economically important sector of Vietnamese aquaculture. In 2008, Vietnam had approximately 638,614 ha of shrimp culture area and produced 388,400 tonnes of shrimp, contributing more than USD1.625 -13824 billion dollars out of the total USD4.509 billion dollar value of aquatic species exported from the country (Figure 2).



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Export volume	60.62	63.30	87.39	115.66	125.21	141.20	159.19	158.45	161.27	191.55
Export value	482	662	782	967	1,058	1,261	1,372	1,461	1,509	1,625

Figure 2: Shrimp export volume and values 1999-2008, Vietnam.
(Sources: VASEP, 2008 and 2009)

The Mekong Delta is by far the largest shrimp producing area in Vietnam, with eight coastal provinces constituting 584,000 ha of shrimp farms that produce 293,829 tonnes of shrimp per year, the Mekong Delta accounted for 91% and 75% of the total shrimp industry in Vietnam, respectively (Figure 3). 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/challenges have limited the development of the shrimp industry in Vietnam, including: 1) elevated food safety requirements, 2) anti-dumping and trade remedies, 3) labeling and trade fraud, 4) international competition, 5) the declining trend for price of farmed seafood, and 6) more stringent environmental protections and increased social responsibility in importing countries. (Nguyen *et al.*, 2008).

The trend of shrimp farming in Vietnam and the Mekong Delta from 2000-2008 is shown in Figure 3 (GSO, 2008; VIFEP, 2008 & 2009). It is important to note that the area used for intensive and semi-intensive (SI) shrimp farming in 2008 was about 10.5% of the total cultured area in the Mekong Delta, as most of the production was conducted in improved extensive (IE) systems.

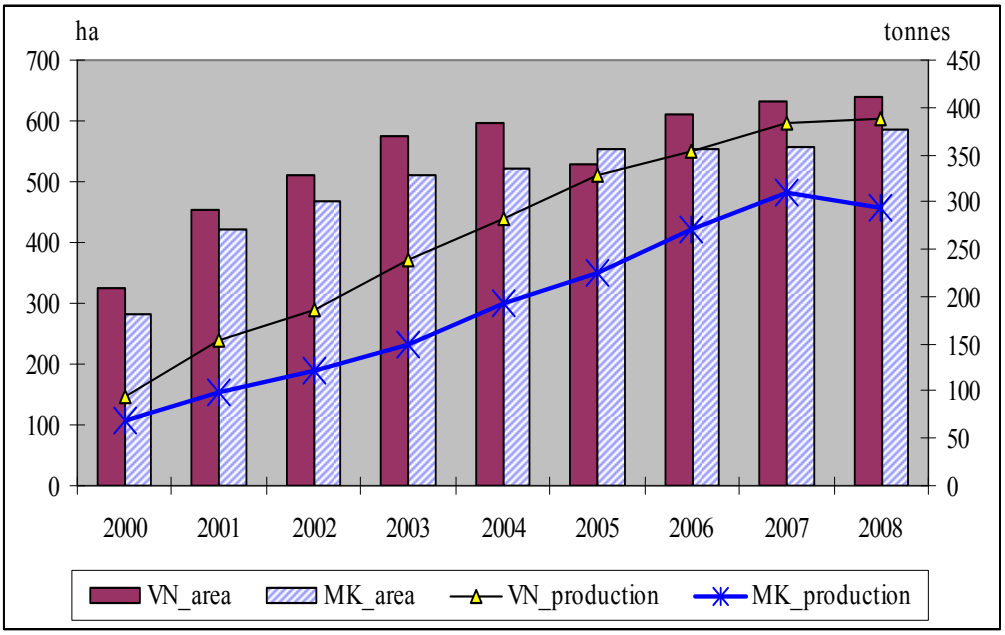


Figure 3: Culture area & production of coastal shrimp in Vietnam & the Mekong Delta *(Sources: GSO, 2008 and VIFEP, 2008 & 2009)*

After 8 years (2000 – 2008), in response to the change in use of agricultural land by resolution No. 09/2000/NQ-CP, brackish shrimp culture moved to a key position. The Resolution not only generated changes in business scale and usefulness of land/water/labor resources but also facilitated the mobilization of material resources to develop the culture/process/service of brackish shrimp (Phi *et al.*, 2007). Yet, there were some limitations to these achievements such as: (1) the Development of brackish shrimp culture is not sustainable long –term and poses a high rate of risk, (2) Brackish shrimp culture has been a main cause of the environmental pollution of soil and water; (3) Increases in productivity, yield, quality and export return are still low, and this does not correspond with potential and advantages; (4) The yield of brackish shrimp in the same model (intensive, semi-intensive, extensive) varies greatly between households, farms, and areas in an ecologically zone; (5) The solutions, which increase yield, quality and effect, are still limited; (6) The co-operation between the 4 steps of the shrimp industry: production – buying – process – consumption do not correspond to the reduction of competition of products in the market; and (7) The standards of food safety for brackish shrimp are insufficient.

The aim of this study is to give a thorough evaluation of the health of the shrimp industry and to provide improvements that would increase the sustainability of this sector.

3. 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 (DoF, 2008; Nguyen, 2008), the survey was focused on the 4 biggest shrimp (*P.monodon*) farming provinces in the Mekong Delta, namely: Ca Mau, Soc Trang, Bac Lieu and Ben Tre. To make the comparison between *P.monodon* and *P.vannamei* shrimp, the shrimp (*P.vannamei*) farmers' survey also included the three provinces in the center of Vietnam: Khanh Hoa, Ninh Thuan and Binh Thuan (Figure 4).

Primary data was collected from 3 groups of respondents in these provinces. The total sample size for the study was 222, including 24 processors/exporters, 21 shrimp traders, and 177 shrimp farmers (154 *P.monodon*, and 23 *P.vannamei* farmers). The farmers were selected through the use of stratified random sampling based on culture systems and areas. Because of differences in the farming practices between semi-intensive or intensive farmers when compared with improved extensive farmers, and in spite of the sector being overwhelmingly dominated by small scale producers, both groups were sampled in approximately equal proportions to obtain representative samples from both groups. The details of the interviews are provided in Annex 1 to Annex 4.

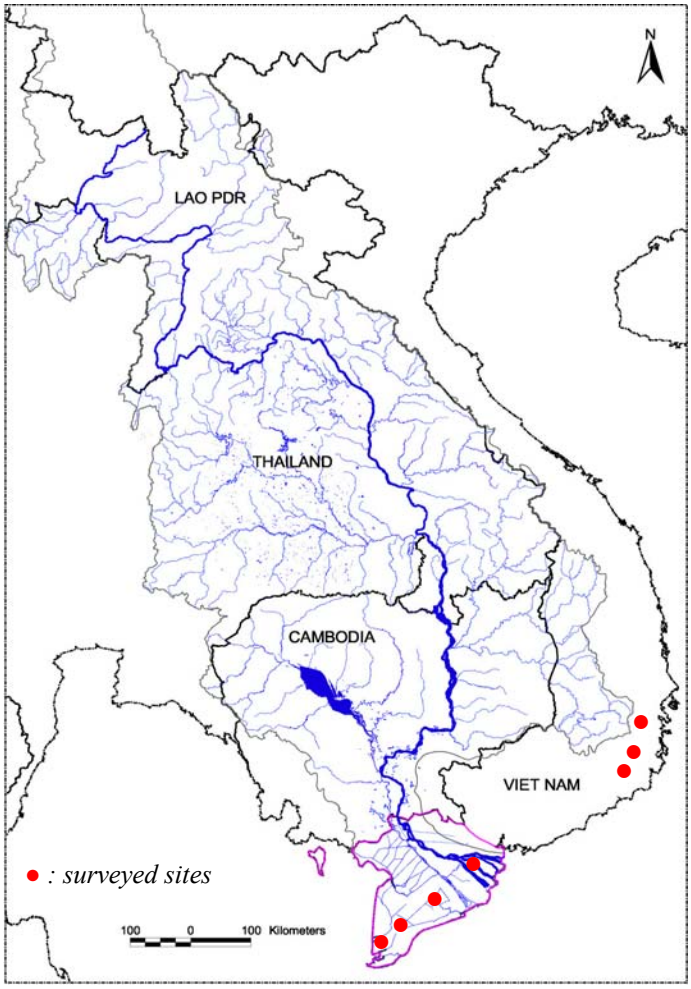


Figure 4: Map of study areas in Vietnam

Data was collected using questionnaires developed for each of the 3 stakeholder groups (Annex 17, 18, 19). Questionnaires were pre-tested before being used for data collection. Data on prices and quantity traded for the period 2008-2009 *(January 1, 2008 to June 30, 2009)* was 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, and their opinions on the effects of the anti-dumping and other business information mainly based on their memory. The data were processed using MS Excel and SPSS for statistical analysis. Raw price data for every link in the supply chain was 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. 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.

4. Results and Discussion

4.1. Socio-economic characteristics of the shrimp farmers

On average, households consisted of 4.6 persons in *P.monodon* farming (PMF) areas and 4.3 persons in *P.vannamei* farming (PVF) areas. The age of shrimp farmers varied from 25 to 75 years with an average age of 45.9 years in the PMF and 42.8 years in the PVF. More than 94% of the owner of

shrimp farmers were male. On average, the farmers had 10 years of shrimp farming experience (Annex 5). Educational levels were relatively low with roughly 70% of the shrimp farmers having stopped formal education at elementary school level and 25% having obtained high school or higher degrees. The educational level of famers in the PMF is lower than that in the PVF, because PVF have developed for 7 years and most farmers are younger and have higher educational degrees.

Farmers' aquaculture technical knowledge was derived mainly from two sources: self-learning (98% of farmers in PMF, and 70% in PVF), and short training courses offered by different types of institutions (77% and 22% respectively). Only a small proportion of PMF farmers (2%) attended professional programs from vocational schools and/or universities, whereas this rate in the PVF is 26% (Annex 5). Shrimp farming was the occupation ranking first among the surveyed farmers in both PMF and PVF. Agriculture was the second important income of famers in the PMF, while trading was ranked second in the PVF.

In the PMF, the average total land area for farms was 1.94 ha, ranging from 0.18 ha to 9.8 ha. Within the total land area, the area of shrimp culture were 1.43 ha with an average of 3.2 ponds/ farm and 0.44ha/ponds. Whereas, in the PVF total farm area was 3.52 ha (1 to 12 ha), in which surface water for shrimp pond accounted for around 70% with an average of 7 ponds/ farm and 0.35ha/pond. The majority of farmers (98%) were single owners of their farm and 2% had the farm shared with others.

The most common cropping practice was a single annual crop with 74% of the PMF farmers and 6% in the PVF farmers adopting this strategy. This probably reflects the effect that environmental conditions and disease has had on shrimp culture and that has translated into the "one-crop-per-year" policy recommended by the Government of Vietnam. However, a significant proportion of farmers planted more than one crop per year, especially in the PVF farming region (84% of total farmers). The average stocking density in the PMF and PVF farms was 15.02 and 120.13 postlarvae/m2/crop respectively, and most of shrimp seed originated from hatcheries. The crop is harvested 4-5 months after stocking; most of the stocked shrimp are harvested from April to August resulting in a very clear seasonal supply of both farming inputs and raw materials for trading and processing activities.

4.2. Volume changes of commodities traded

The shrimp industry has increased quickly between 2005 and 2007, and reached stable development in 2008. Most shrimp products were exported to international markets; the shrimp export has contributed over 30% of the total value of fishery export and became a target commodity of export for Vietnam.

Table 1. Volume and value of shrimp export trade of Vietnam: 2005-2008

Year	**Shrimp production from culture** *(1,000 tonnes)*	**Shrimp export**	
		Volume *(1,000 tonnes)*	**Value** *(million USD)*
2005	327.20	159.19	1372.00
2006	354.50	158.45	1461.00
2007	384.50	161.27	1509.00
2008	388.40	191.55	1625.00

(Sources: GOS 2008, VASEP 2008 & 2009)

4.3. Changes taking place between 2008 and 2009

a). Overall changes

In general, the farmers in both PMF and PVF areas have tended to reduce their investment level (Annex 8). The unstable markets, shrimp price reduction, anti-dumping measures and the quickly increasing price of input costs were the main reasons leading to farmers' change in shrimp culture planning.

Most of the farmers in the both PMF and PVF did not change the total area used for shrimp farming, but about 44% and 22% of the farmers reduced their level of investment respectively, whereas 29% and 52% of total famers respectively have increased their investment level. Most farmers have tended to reduce production costs such as shrimp seed cost (reducing stocking density), cost for feed and chemicals used. The farmers also changed the number of days from stocking to harvesting; the reasons given for changing the length of the crop cycle were slower shrimp growth, falling shrimp prices, and the occurrence of shrimp diseases.

b). Description and evaluation of the 1st production cycles in 2008 and 2009

There were minimal changes in farmed species or farm management between 2008 and 2009. Most of the farmers stocked the first crop from January to March. There was not much change in time of stocking for each farmer in 2008 and 2009.

A total of 33% of farmers reported a decreased average stocking density in the 1st crop while 24% of them said that stocking density had been increased in the PMF. while These rates were 4% and 17% respectively in the PVF. Hatcheries were the only source of shrimp PL for the shrimp farmers in both years examined. In the PMF, 50% of the shrimp farmers reported that the yield of tiger shrimp harvested from crop 1 in 2005 was increased and slightly higher than that in 2004, while 39% said that they had lower harvest in 2005 compared to 2004, and the remainder reporting no difference between the two years. Whereas, in the PVF, 35% of farmers stated that the yield of white leg shrimp in 2005 was lower than that of 2004, and the same rate reported that higher yield in 2005.

Harvesting took place during April 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 farmers harvested their crop once a year. The survey clearly indicates a reduction in the production cost/crop in 2005 compared with 2004, around 20% lower than that of 2004 (PMF) and 33% for PVF. However, there was a high degree of variability (SD) in the amounts spent- the details of variable costs can be observed in Annex 9. As a result of reduction in the production cost/crop, a decrease in the total net return generated from shrimp farming between 2008 and 2009 could be observed.

4.4. Shrimp price trend analysis

The monthly price of all sizes of shrimp fluctuated over time; the price depends on harvested size and seasonal crop. Generally, the selling price in 2009 has tended to increase and is higher than that in 2008. The economic crisis in 2008's effect on the shrimp industry was the primary reason leading to a price reduction.

a) Farmers

In general, the prices obtained by farmers were in fluctuation during 2008-2009 with a slightly increasing trend for the 21-30 size, and rapidly rising trend of the small size (Figure 5). The price of *P.vannamei* was also in fluctuation, but tended to be stable between 2008 and 2009.

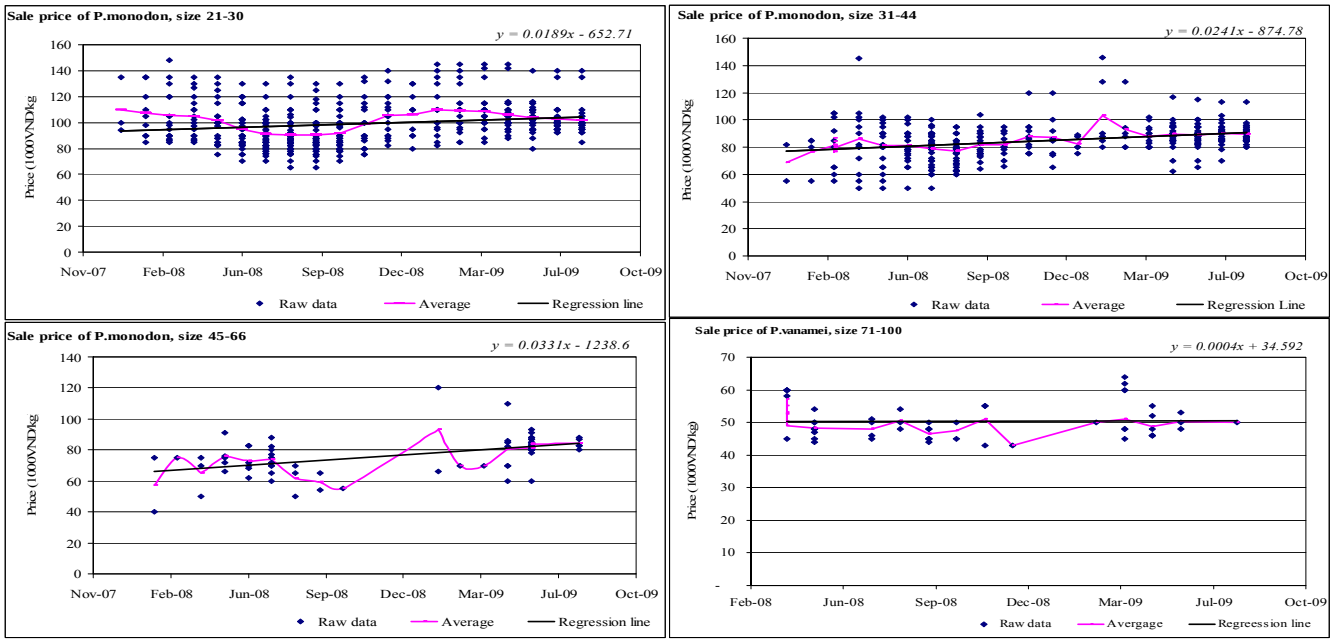


Figure 5: Scatters of actual sale prices of harvested shrimp for farmers

b) Traders

The trend in selling prices by traders for the 3 most typical sizes (21-30 pieces/kg, 31-44 pieces/kg and 45-66 pieces/kg) can be observed in Figure 6. The monthly price for all sizes of shrimp fluctuated over time and depended on the seasonal crop. The price in 2009 was higher than that in 2008, especially for size 31-44 shrimp/kg. The selling price of while leg-shrimp has been decreased during 2008 and 2009.

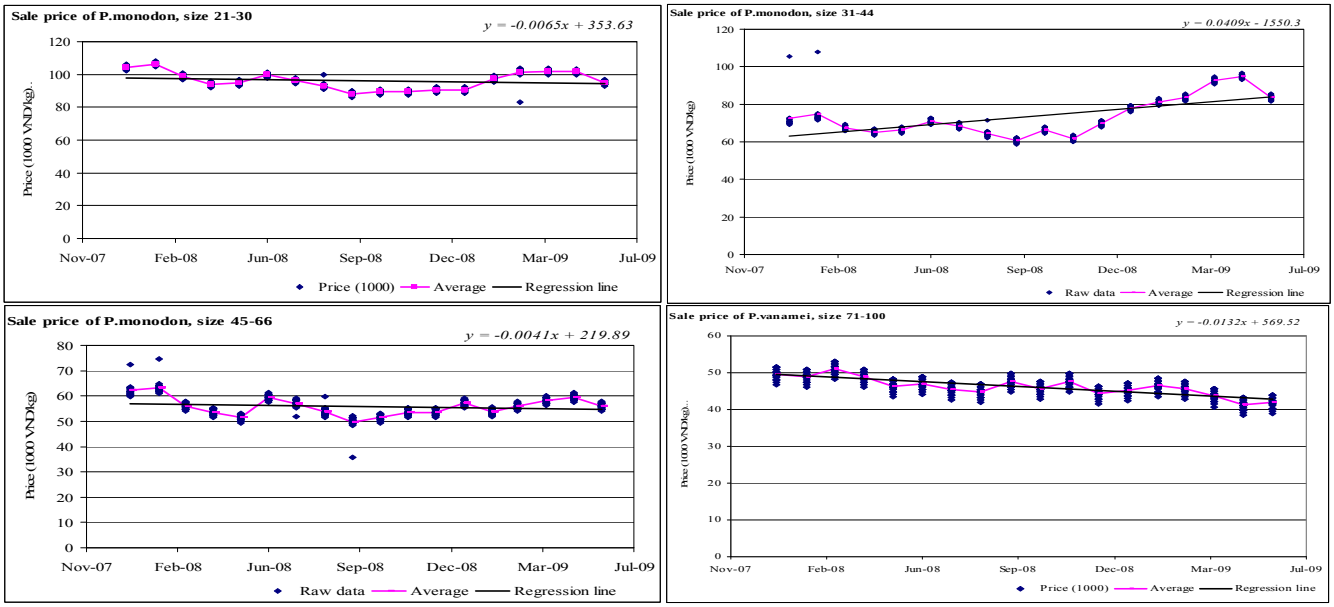


Figure 6: Scatters of selling prices of shrimp for traders

c) Processors

The selling prices reported by the processors show a slight increasing trend for most sizes during 2008 and 2009 (Figure 7). The selling price of while leg-shrimp has been decreased slightly from 2008 to 2009.

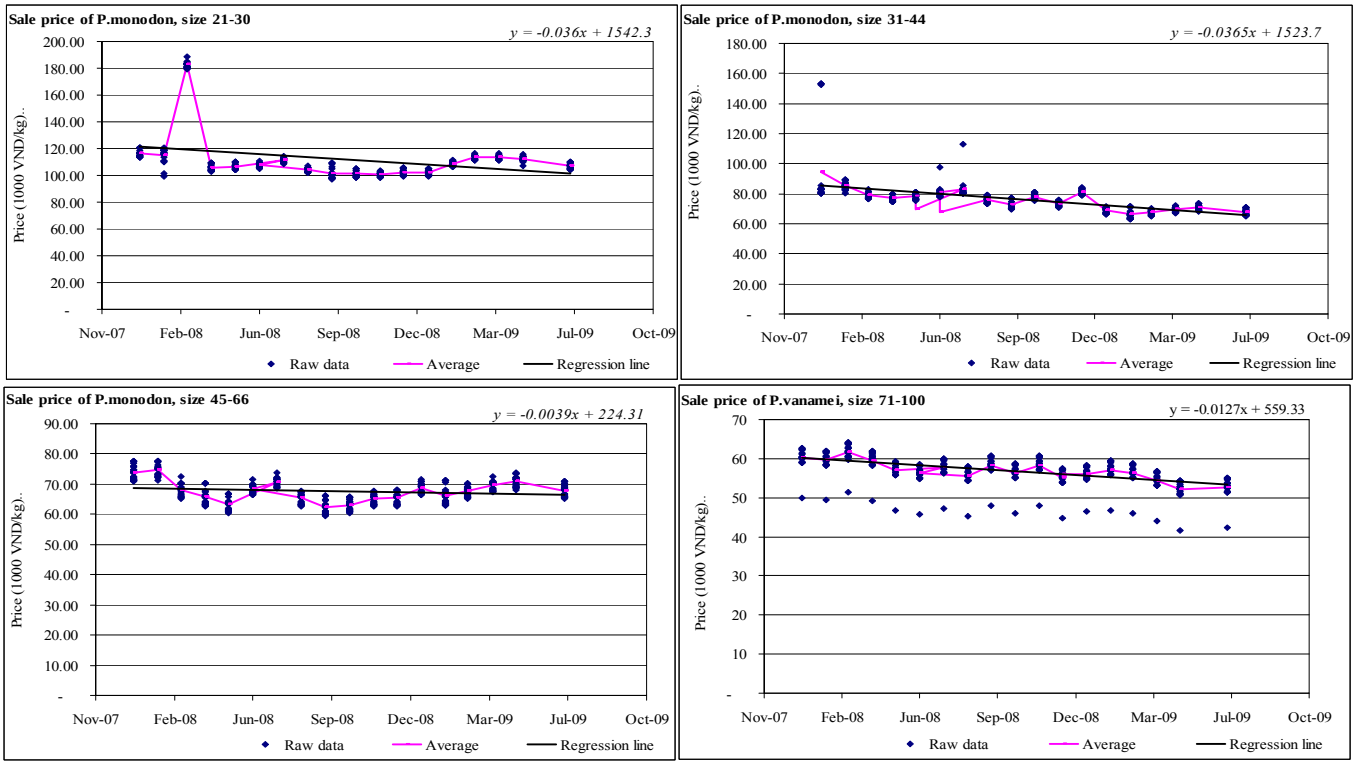


Figure 7: Scatters of selling prices of shrimp for processors

Table 2 and 3 summarize the trends of prices for the stakeholders in Vietnam. For more information on monthly average prices, see Annexes 10 through 12.

Table 2. The price trends of stakeholders, black tiger shrimp (*P.monodon*) in 1,000 VND/kg.

Stakeholders	**Size**	**Slope**	**Intercept**	**Jan-08[1]**	**Jan-09[1]**
Farmers	21-30	0.0189	-652.71	109.67	106.11
	31-44	0.0241	874.78	68.50	82.40
	45-66	0.0331	-1238.6	-	-
Traders	0-20	-0.0723	3019.6	175.53	141.97
	21-30	-0.0065	353.63	104.24	90.36
	31-44	0.0409	-1550.3	72.46	77.84
	45-66	-0.0041	219.89	62.21	57.13
	67-100	-0.0034	175.26	54.88	49.90
Processors	0-20	-0.0744	3115.4	187.13	154.17
	21-30	-0.036	1542.3	116.12	102.07
	31-44	-0.0365	1523.7	73.88	68.76
	45-66	-0.0039	224.31	73.88	68.76
	67-100	0.0004	33.672	54.88	49.90

Table 3. The price trends of stakeholders, white leg shrimp (*P.vannamei*) in 1,000VND/kg

Stakeholders	Size	Slope	Intercept	Jan-08[1]	Jan-09[1]
Farmers	71-100	0.0004	34.592	-	-
Traders	45-70	-0.0103	468.5	62.91	59.67
	71-100	-0.0132	569.52	49.61	45.26
Processors	45-70	-0.0092	433.72	73.23	70.19
	71-100	-0.0127	559.33	60.25	56.01

d) Perceived reasons of price trends

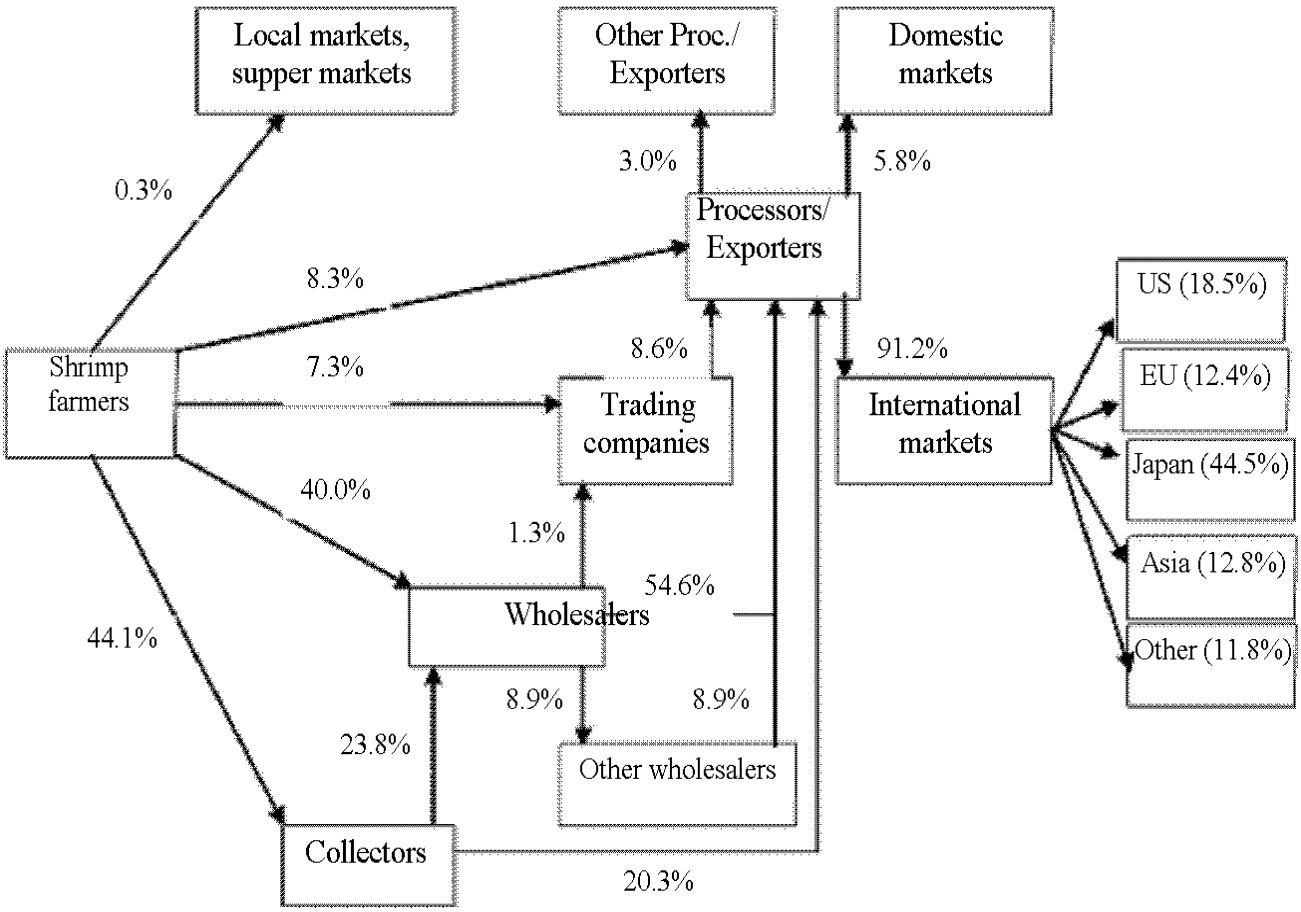
About 87% of farmers who reported changes in shrimp prices in the last 5 years since 2004 said that the price of shrimp was fluctuating. The unstable markets, buying sectors (traders, middleman), economic crisis, and overproduction were considered to be the main reasons for the changes in shrimp price during this period of time (Table 4 and annex 16).

Table 4. The perceived reasons of price trends

	Number	%
Price trends:		
Price change/trend:	174	98.31
Decreased	*16*	*9.20*
Increased	*3*	*1.72*
Fluctuated	*152*	*87.36*
No change	3	1.72
The reasons:		
Fluctuation markets	41	23.56
Buying sectors	43	24.71
Economic crisis	34	19.54
Too much production	47	27.01
Bad shrimp quality	26	14.94
Other	35	20.12

4.5. Supply chain analysis

The survey did not collect data related to this section, especially the "supply chain" issue. According to NACA (2006), 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 8).



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

Figure 8: Marketing channels of shrimp production in the Mekong Delta. *(Source: NACA, 2006)*

It is clear that most of the raw shrimp production for processors/exporters in the Mekong Delta was supplied via the network of wholesalers (62.5% of the total volume of raw shrimp). Raw shrimp was 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, the US, and European nations (Figures 8 and 9). 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 in 2005 and 2006, but this market has been gradually restored since 2007.

The Vietnamese incentive system was rather complex. There were shrimp farmers, shrimp traders and 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.

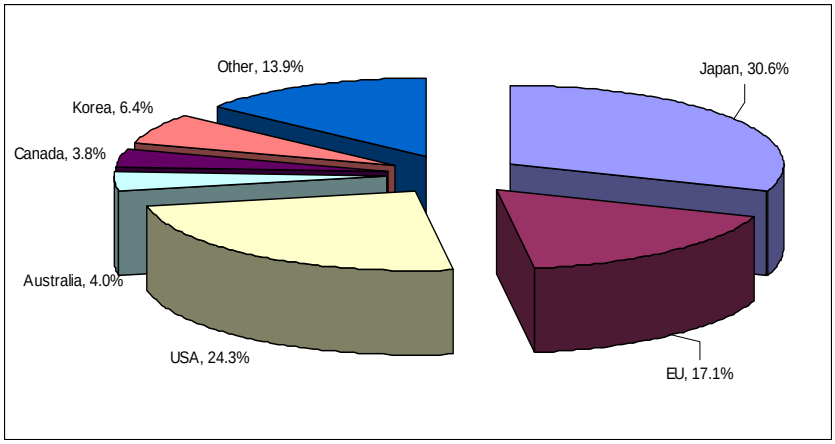


Figure 9. Export market structure of shrimp products in 2008 (by volume), *(Source: VASEP, 2009)*

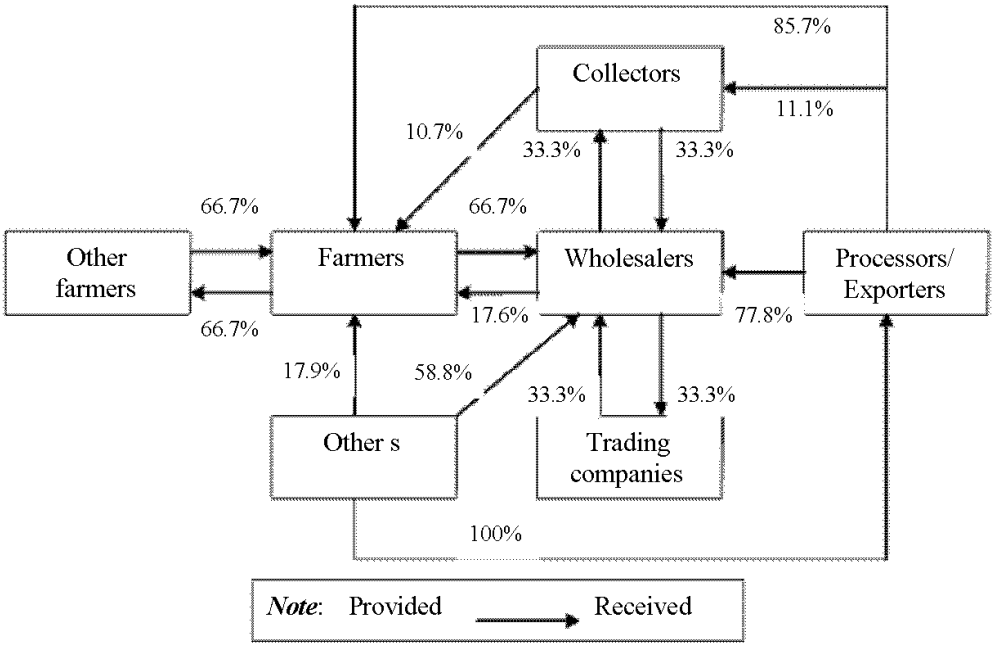


Figure 10: Proportion of the number of stakeholders who provided and received the incentives from the others, Vietnam *(Source: NACA, 2006)*

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

a) Tsunami

There were around 80% of the surveyed farmers who knew about the Indian Ocean tsunami. However, the impacts of the tsunami on the Vietnamese stakeholders appeared minimal as only 20% farmers perceived themselves as having been affected (Annex 13).

b) US anti-dumping duties

Around 80% of the surveyed farmers were aware of the US anti-dumping case in 2004 (Annex 13). In general, as a result of US anti-dumping duties, all 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 an impact on 80% of shrimp farmers who participated in the survey.

Almost all the affected farmers (80%) emphasized the decrease in household income and shrimp prices. Besides, farmers reported that US-anti-dumping led to a decreased cultured area and lost markets (Annex 14). According to NACA (2006), 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 a fear of greater competition in shrimp trading (4.3%). Following the imposition of US anti-dumping duties, 3.3% 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 market for shrimp products was their most significant concern. They also considered other important impacts of the US anti-dumping duties including requests for payment of bonds 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%). 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 identified improvements in government supports (i.e. stable prices, expansion of markets, final support, and management) and self-improvement of practices to help them to stabilize shrimp farming activities. Whereas the 2006 NACA report stated that around 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. To face impact of US anti-dumping, about 50% of the processors emphasized the importance of a higher capability to compete in the market, and 40% said that they needed to focus on market penetration and expansion. Upgrading processing techniques and improvements in management quality were also cited as potential solutions (30%).

5. Conclusions and Recommendations

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

The results also showed that the shrimp price depends on the size and seasonal crop, and tended to increase between 2008 and 2009.

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.
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 an impact even before the official application of antidumping duties. However, the industry appeared to have recovered from those initial negative effects, perhaps as a consequence of market expansion to other countries. Stakeholders have been trying to determine ways that will help them to mitigate the impact 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.

References

1) DOA, 2008. Aquaculture Report in 2008 and Planning for 2009. Technical Report, Department of Aquaculture (DOA) Ministry of Agriculture and Rural Development, Ha Noi, Vietnam.

2) GSO, 2009. Yearly Statistics Book of Vietnam-2008. General Statistics Office of Vietnam (GSO), Ha Noi, Vietnam.

3) NACA, 2006. 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. Network of Aquaculture Centers in Asia-Pacific (NACA), Bangkok, Thailand.

4) Nguyen V.D., 2008. Achieving a Sustainable Future for Vietnamese Seafood Industry. Presentation in IIFET 2008 Vietnam: "Achieving a Sustainable Future: Managing Aquaculture, Fishing, Trade and Development - Nha Trang, Vietnam, July 22 - 25, 2008.

5) Nguyen V.H., Phan T.L., Trinh T.P., Pham B.V.T., Doan V.B., 2008. Better Management Practices (BMPs) for Intensive and Semi-insensitive Shrimp Farming in the South Vietnam. Technical report, Research Institute for Aquaculture No.2 Ho Chi Minh City, Vietnam.

6) Phan T.L., Doan V.B. and Pham T.B.H., 2008. Review of Market Survey in the Lower Mekong Basin. Technical report, Fisheries Valuation project, Research Institute for Aquaculture No.2 Ho Chi Minh City, Vietnam.

7) Trinh T.P., Phan T.L., Do Q.T.V., Nguyen D.H., Pham B.V.T., Nguyen V.H., 2007. Planning for Development of Brackish Shrimp Culture to 2015 and Orientation to the Year 2020. Technical Report, RIA2, Ho Chi Minh City.

8) VASEP, 2008. Statistics of Vietnam Seafood Export 1998 – 2007. Vietnam Association of Seafood Exporters & Producers (VASEP), Ha Noi, Vietnam.

9) VASEP, 2009. Statistics of Vietnam seafood export 2008. Vietnam Association of Seafood Exporters & Producers (VASEP), Ha Noi, Vietnam.

10) VIFEP, 2008. Project on Development Planning for Catfish Production and Consumption in the Mekong Delta up to 2010 and Strategic Planning up to 2020. Project Report, Sub-Institute for

Fisheries Economics and Planning in Southern Vietnam (VIFEP), Ministry of Agriculture and Rural Development, Ho Chi Minh City, Vietnam.

11) VIFEP, 2009. Project on Development Planning for Crustacean Culture up to 2020. Project report, Institute for Fisheries Economics and Planning in Southern Vietnam (VIFEP), Ministry of Agriculture and Rural Development, Ha Noi, Vietnam.

12) Vu V.A. and Phan T.L., 2008. Inland Fisheries and Aquaculture in the Mekong Delta: A Review. Technical Report, Fisheries Valuation project, Research Institute for Aquaculture No.2 Ho Chi Minh City, Vietnam.

Indonesia

1. Summary

This study aimed to examine the shrimp farming sector of Indonesia over the past 5 years, focusing particularly on the potential effects of the unusual events occurring between 2008 and mid 2009, such as the Indian Ocean tsunami and the imposition of US anti-dumping duties.

A total of 151 stakeholders comprising 134 farmers, 13 traders and 4 processors from 9 districts of 4 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 23 to 80 years. The traders were the youngest group followed by the processors and the farmers. Therefore, the farmers were the most experienced. The average experience in the shrimp business ranged between 10.5 (farmers) and 15.9 (processors) years. The farmers were also of the lowest educational level and processors were university/college educated (100%), although some *P.vannamei* owners were also university graduates. The traders and farmers had involvement with other occupations but the processors focused on their 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 or tilapia. Harvesting of shrimp took place throughout the year. Almost all of the *P. monodon* farmers sold their products to collectors and, to a limited extent, to wholesalers and processors. Farmers in East Java were more likely to sell directly to wholesalers and processors compared with farmers in other provinces. *P.vannamei*, farmers mainly sold their products to processors.

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. Taking into the seasonality and peak production periods (June-October), the apparent decrease of *P.monodon* supply can be explained, however it is important to note the increase of *P. vannamei* during the top half of 2009. Shrimp prices for most count sizes of *P. monodon* and for most stakeholder groups considerably stabilized during the study period. The main reasons reported for stable prices were limited volume of production and a reduced market in shrimp industries. The procurement prices of fresh shrimp faced by traders and processors was reported to be considerably stable possibly because of stable market demand. However, it is a rather inadequate sample size because the analysis was based on one processing plant, due to the limited number of processing plants handling *P.monodon* and their strict business policies.

In term of the shrimp production in the country, the study noted the sign of disease outbreak, and number of farmers switching thier shrimp ponds to fish culture, or temporarily stopping their operations. The disease outbreak got severe particulary second half of 2009, and according to the FAO-Globefish shrmp report in Feburary 2010[4], the total shrimp production in Indonesia fell from 230,000 tonnes in 2008 to 180,000 tonnes in 2009.

[4] Market report Shrimp February 2010, Japan by Helga Josupeit: http://www.globefish.org/dynamisk.php4?id=4613

As expected, the overwhelming majority of farmers and traders knew about the occurrence of the tsunami on December 2004 but only 22.4% of farmers, 38.5% of traders said that the event impacted their business, especially in Aceh and North Sumatra. Three quarters of the processors, however, said that their business had been affected. The decrease in availability of fresh shrimp and the almost simultaneous introduction of antidumping duties in a range of countries allegedly led to the illegal importation of shrimp from affected countries, further contributing to lowered shrimp prices.

In general, the Indonesian shrimp appeared to be facing several problems, not only associated with the occurrence of unusual events but also because of the disease outbreak and increasing pressure from international markets requesting quality products.

2. Introduction

Indonesia is currently the sixth largest shrimp producer in the world. Data from DGAF indicates that from 2004-2008, fishery production from aquaculture increased by an average of 25.2% per year, from 1.47 million tonnes in 2004 to an estimated 3.53 million tonnes in 2008. Most of the country's total fish production comes from seaweed production (55.1% in 2008), while shrimp production contributes 11.6% of total country's production, with 14.5% growth per annum (Table 5).

Table 5 Indonesian Aquaculture Production 2004-2008 (tonnes)

No	Items	2004	2005	2006	2007	2008
1	Pangasius	23,962	32,575	31,490	36,755	52,470
2	Seaweed	410,570	910,636	1,374,462	1,728,475	1,944,800
3	Tilapia	107,116	148,249	169,390	206,904	220,900
4	Gouramy	23,758	25,442	28,710	35,708	37,100
5	Milkfish	241,438	254,067	212,883	263,139	253,000
6	Catfish	51,271	69,386	77,272	91,735	108,200
7	Grouper	6,552	6,493	4,021	8,035	8,800
8	Shellfish	12,991	16,348	18,896	15,623	16,200
9	Carp	192,462	216,920	247,633	264,349	290,100
10	Shrimp	238,857	280,629	327,610	358,925	410,000
11	Seabass	4,663	2,935	2,183	4,418	4,200
12	Crab	3,015	4,583	5,525	6,631	7,750
13	Others	161,955	195,411	182,521	172,866	178,200

(Source: DGAF, 2009)

This growth was a result of technological innovations, area expansion, and availability of suitable quality and quantity of fish seed. Aquaculture 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 carp, tilapia, catfish, gouramy and prawns (*Macrobrachium rosenbergii*), while the main marine species are grouper and seaweed. However, farming in brackish water environment 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, brackish water aquaculture contributes 19% of the total Indonesian aquaculture production in quantity and 66% in value in 2006 (Indonesian Statistics 2008).

In terms of shrimp value in total value of aquaculture production, it was noted that during 2008, total exported shrimp volume reached 171,658 tonnes valued at USD 1,168,940,664. From total exported volume, 72.41%, 20.01%, and 7.58% were in the form of frozen/IQF/Block (valued at USD 884,674,871), canned (valued at USD 231,479,822), and other forms (USD 52,768,971) respectively.

At first quarter of 2009, Indonesia experienced an increase in shrimp volume exports from 40,013,960 kg (valued USD 266,962,682) to 42,433,375 kg (valued USD 267,789,138). However, the increase in volume was not followed with increase in price (i.e. from USD 6.67/kg (2008) to USD 6.31/kg (2009)) on average. Average export price (2008) was USD 5.64/kg, as frozen shrimp was priced at USD 7.11/kg, canned shrimp was priced at USD 6.78/kg, and other forms were priced at USD 3.04/kg (Fishery Statistics, 2009).

In the earlier stage of shrimp farming in Indonesia the sector was dominated by tiger shrimp (*P. monodon*) and to a lesser extent by 'white' shrimp (*P.indicus* and *P.merguensis*). The culture of tiger shrimp began in the late seventies, and grew up rapidly during the eighties and nineties. The last decade, however, has given rise to a number of constraints for the sector, such as diseases, environmental degradation, low quality of seed, increased price of feed and declining shrimp prices. These events have been instrumental to the spread of *P. vannamei* aquaculture. In fact, *P. vannamei* is known to perform better than local species in terms of growth, survival and Feed Conversion Ratio, although prices for this species are generally lower. For this reason, *P. vannamei* was introduced into Indonesia in 2001 and the production share of this species to the national shrimp production has increased regularly from 29.3% in 2002 to 44.7% in 2004, and 66.7% in 2005. This conversion has led to an increase in the overall shrimp aquaculture production, which rose from 121,000 tonnes in 1999 to 218,000 tonnes in 2004 (FAO FISHSTAT Plus, 2006). DGAF is now expecting *P. vannamei* could share 70% of shrimp exports next year (2010).

Shrimp production in Indonesia has now spread through the islands of Sumatra, Java, Kalimantan, Nusa Tenggara, and Sulawesi. Each region has relatively unique characteristics in terms of scale of production, level of intensity applied, and shrimp species selected for culture. In general, it can be said that 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. Most farmers in Nanggroe Aceh Darussalam prefer to grow tiger shrimp. In the southern part of Aceh (e.g. North Sumatra and Lampung) shrimp farming is dominated by larger industrial shrimp farms which operate a semi/intensive *P.vannamei* shrimp culture. In most of the north coast of Java, shrimp farmers adopt small to medium-scale production strategies culturing both tiger shrimp and *P. vannamei*. In this area, monoculture and polyculture (shrimp with milkfish or tilapia) are practiced. In Kalimantan, shrimp production was characterized by large-scale production applying traditional and semi-intensive culture methods. A similar strategy is also used in Nusa Tenggara. Sulawesi – mainly its southern part – is characterized by traditional to semi-intensive production systems. In addition, farmers conduct both monoculture and polyculture of shrimp with milkfish and both tiger shrimp and *P. vannamei* are cultured.

Shrimp production from aquaculture in Indonesia was derived from 290,982 ha brackish water ponds lying in several provinces such as West Java, East Java, Central Java, Banten, Lampung, East Kalimantan, NTB, Riau, NAD, and South Sulawesi. According DGAF, 20% of the area used for

shrimp farming applied semi/intensive technology while 80% applied extensive (traditional) technology.

3. Methodology

As indicated by the National Aquaculture and Fisheries Statistics for the year 2007, the major brackish water species producing provinces in Indonesia are South Sulawesi (297,667 tonnes), Lampung (165,990 tonnes), North Sumatra (22,171 tonnes), Aceh (26,451 tonnes), East Java (104,865 tonnes), West Java (92,302 tonnes). Since, as described above, the production in South Sulawesi and Lampung is dominated by large vertically integrated farms, this study focuses on North Sumatra, Aceh, East Java and West Java and, within those, in the sites of Medan and Langkat (North Sumatra), Pidie, Bireuen and Aceh Utara (Aceh), Indramayu and Karawang (West Java) and Tuban, Sidoarjo, and Pasuruan (East Java). Last studies which involved Gresik are now switched to Tuban and Sidoarjo due to recent existing situations in shrimp aquaculture (zero *P.monodon* culture in Gresik). 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 conducted.

Figure 11: Map of studied areas in Indonesia. From left to right these are Aceh, North Sumatra, West Java and East Java (blue circles)

To get a true representation of the Indonesian shrimp supply chain, data was 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 was collected from a total of 134 farmers, 13 traders and 4 processors.

Questionnaires were developed for each stakeholder group to collect information on socio-economic status, occurrence and impact of any major changes, management practices in 2008 and 2009, quantity of shrimp produced or traded over the previous few years (2 for farmers and processors, and 5 for traders), procurement and resell prices for different shrimp sizes and over the period between January 2008 to June 2009. Particular attention was paid to collect information on changes related to the occurrence of the Indian Ocean tsunami and the introduction to 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. Notably, farmers and traders did not keep written records of shrimp sales. In addition, prices were presented for several different sizes, making comparisons between different farmers difficult. On the contrary, most processors were not prepared to share this information with the research team at all. In one case, a processor was prepared to share this information only through the 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 the analysis were 26-30, 31-40, 41-50, 51-60 and 61-100 pieces/kg for farmers, size 31-40 (*P. monodon*) and size 60 (*P. vannamei*) for traders and U20, 21-30, 31-40, 41-50 and 51-60 pieces/kg (*P. monodon*) and 60-70, 71-80, 81-100, 101-150 and 151-200 (*P. vannamei*) 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 the data interpretation. In addition to primary data, relevant information was also collected through focus group discussions (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. Results and Discussion

General Description of the stakeholders

a) Farmers

All the farmers interviewed were male (100%) with an average age of 44.5 years, ranging from 23-80 years. This was the oldest group and the most experienced compared with the traders and processors. Farmers' experience in shrimp culture was 15.9 years, ranging from 2-35 years. On average, households were composed of 3.8 people, of which 0.8 people were involved in the family's labour force. All of them were male labourers. Besides the family members, the farmers also on average hired 1.3 workers to work on their farms. The educational level of shrimp farmers was mostly up to primary school (35.1%) with 7% being illiterate. Some farmers only attended secondary school (23.1%). Fewer of them attended high school (28.4%). Only 3% of the farmers obtained a diploma and 2.2% graduated from colleges or universities, which mainly *P. vannamei* farmers. Shrimp farming was the first occupation or livelihood for the farmers. However, 48.5% of them were also involved in other businesses like trading (20.9%), agriculture (10.4%). Many farmers were employed with second jobs. Most of the farmers conducted shrimp farming based on their own experiences (66.4%). Only 0.7% of the farmers attended vocational school. However, it was interesting to notice that over 31.3% of the farmers had received some sort of training. Detail of the social and economic background of shrimp farmers can be found in the Annex.

b) Traders, depots and agents

The traders were the youngest stakeholder group interviewed (37 years). Their average experience in trading shrimp was 11.1 years. All of the traders were male (100%). The average size of the traders' family was 3 people, of which 1.8 people worked as family labourers. Shrimp trading also provided jobs for more than 2.2 people per trader household. The traders were often involved in other occupations (69.2%), all of them were also working as farmers (69.2%). *P. monodon* traders were also better educated than farmers. Most traders attended high school (46.2%). Although traders' educational level was relatively high, their business was operated using personal experience (100%). Further details on the socio-economic characteristics of traders can be found in the Annex

c) Processors

The average age of processors was slightly lower than that of the traders. Their average age was 37.3 years. Their experience in processing/exporting was also the lowest and averaged 10.5 years. Processors' educational level was the highest, and all of them were university/college graduates. Females were the majority in this category (75%). Technical knowledge was derived mainly through training and from college/university (75%). The processors seemed very satisfied with their business as they chose this as the sole occupation. None of the interviewees had other occupations. The further details can be found in the Annex.

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 2004-mid 2009 can be seen in Figure 12. More details of the quantities traded are presented in the Annex.

Comparison of 2009 with 2008 data (the half of total volume) for the average volume of shrimp procured by traders (Figure 12) and processors (Figure 13) shows slight decrease for *P. monodon* (25.9% and 16.7% respectviely) but increased for *P. vannamei* (14.1% and 36.8% respectively).

It is important to note that the data of 2009 is for January- June and, generally speaking the peak of the production is June to October for both species of shrimp. Taking this seasonality into the considerltion, it indicates significant increase of *P. vanamei* trading in the top half of the 2009.

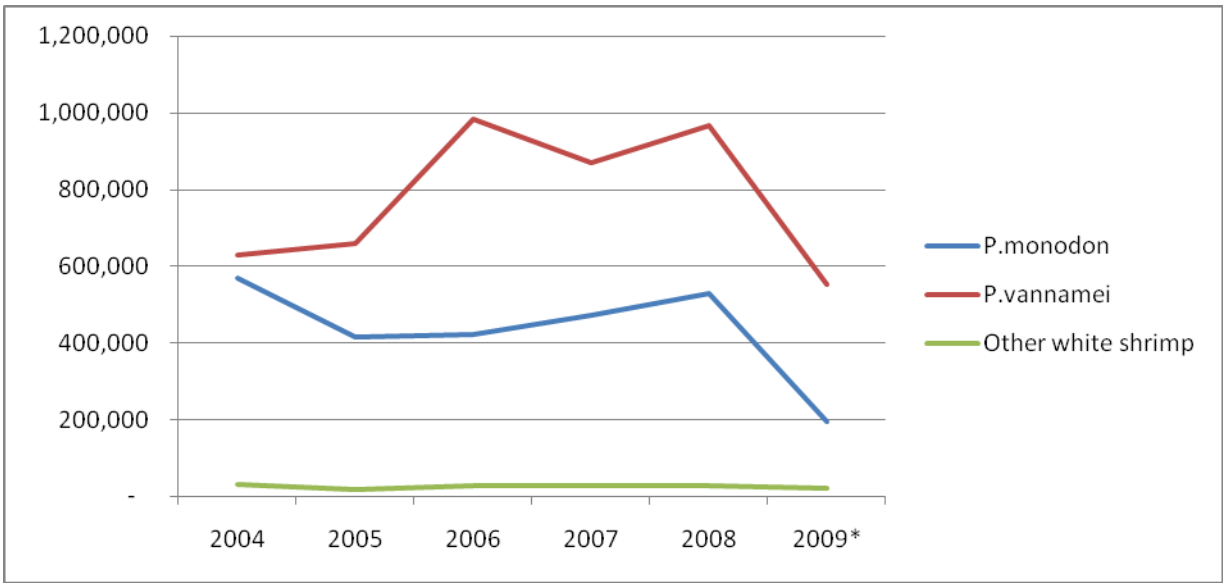


Figure 12: Average quantity of procurement of traders (a), Indonesia

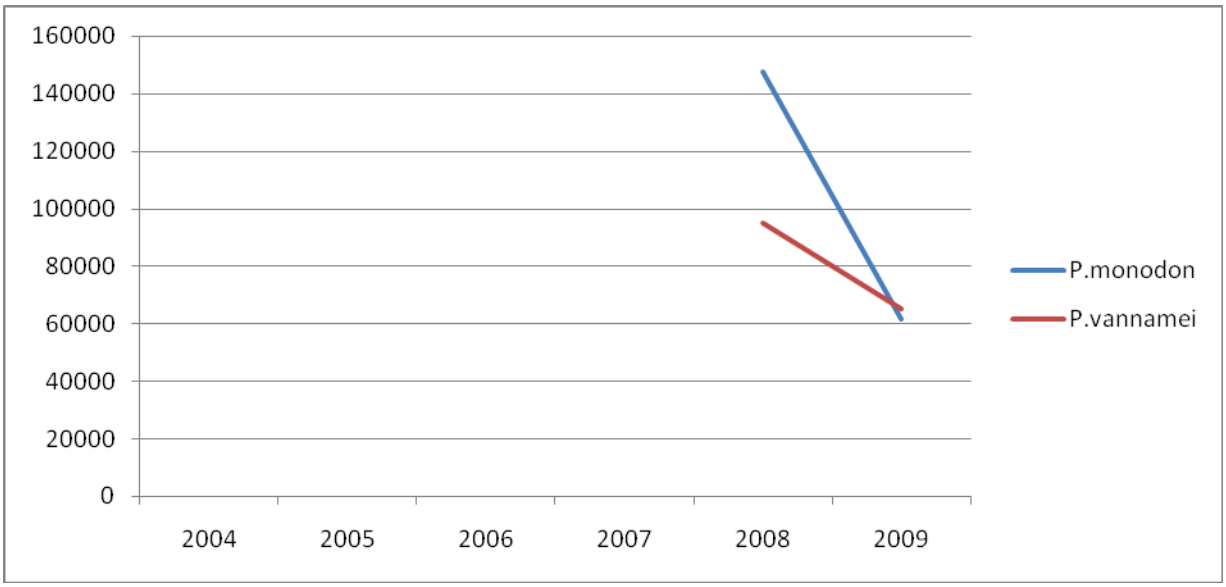


Figure 13: Average quantity of procurement of processors (b), Indonesia

Changes taking place between 2008 and 2009

a) Overall changes

There were no major changes in the culture area or number of ponds of most farmers. Only 1.49% of the farmers reduced farming areas and only 6.72% increased the farming areas. No farmers changed either the nursing pond or settlement pond areas. Land ownership also mainly remained unchanged (93.28%). The investment was rather stable during the observed period though 11.19% of the farmers reported that investment had increased. The labour use, however, did not change much although less than 3% of the farmers said that they used fewer labourers than before. Most farmers kept same stocking density though 11.19% of the farmers reduced the stocking density. This partially resulted in the reduction of feed (16.42%) as well as drug/chemical use (32.84%). The shrimp productivity,

however, decreased significantly as reported by 52.99% of the farmers. The average costs of shrimp farming were reported to have increased slightly (23.88%) and average profits were reported to have decreased by 52.24% of farmers. The perception of the changes in shrimp farming is described in detail in the Annex.

b) Description and evaluation of the 1st production cycles in 2008 and 2009

When comparing the management practices adopted in the years 2008 and 2009, a number of measurable differences can be detected. The average pond area under production per farmer decreased from 2.34 to 2.27 ha in 2008 and 2009, respectively. This reduction was not associated with a change in production systems. *P. monodon* was cultured mainly (82% of farmers) in polyculture with milkfish (*Chanos chanos*) or tilapia (*Oreochromis* spp.), with only 32.1% conducting monoculture. The latter practice was most common in Aceh Province. There were no changes in the proportion of farms operating polyculture or in the average number of milkfish stocked during the 2 years. Farmers generally produced (93.3%) only 1 crop per year, while others produced 2 crops. Stocking of the first crop of *P. monodon* occurred most commonly in January-March (60.45% and 65.67% of the farmers in 2008 and 2009 respectively). However, a smaller proportion (about 21.6%) stocked the first crop in October-December. Seed originated mostly from hatcheries (82.8%) with limited numbers of farmer stocked seed from nurseries. The average stocking density remained the same (5.9 PL/m2) between 2008 and 2009. Shrimp harvesting appeared to be conducted throughout the year. Variable costs associated with production can be found in the Annex.

Shrimp price trend analysis

a) 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 stable trend in *P. monodon* prices could be detected for all the sizes examined. The graphics in the figures demonstrated the trend was quite stable. The association with the unusual events occurring at the end of 2004 could not be assessed. However, it is possible that prices remained stable because of the limited supply and demand of raw material and it had nothing to do with unusual events.

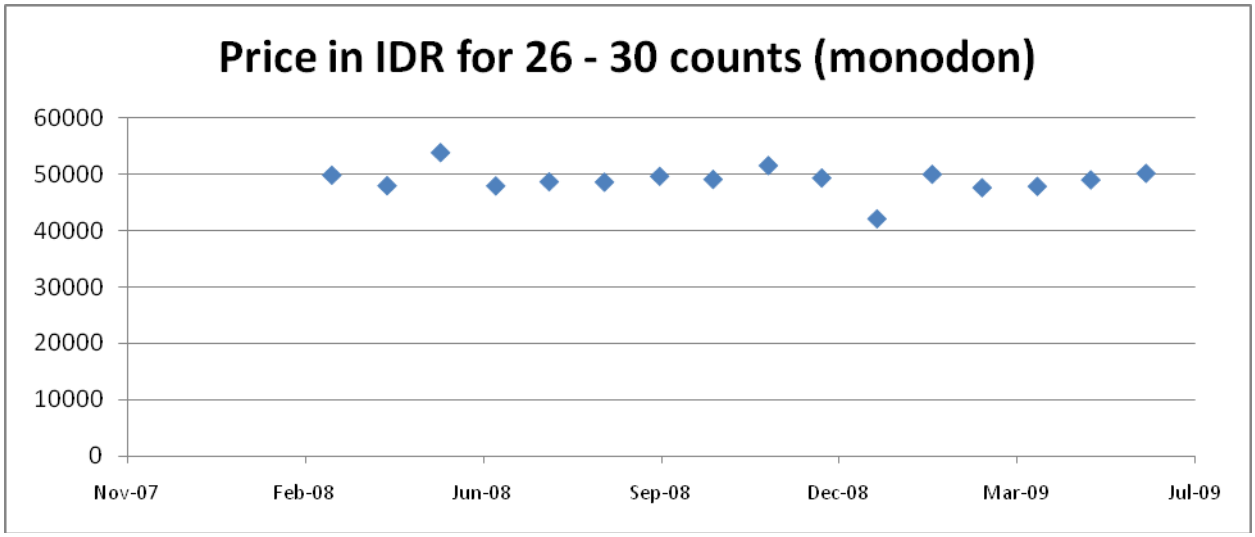


Figure 14: Scatters of actual sale prices of *P. monodon* for farmers, size 26-30 (a), Indonesia

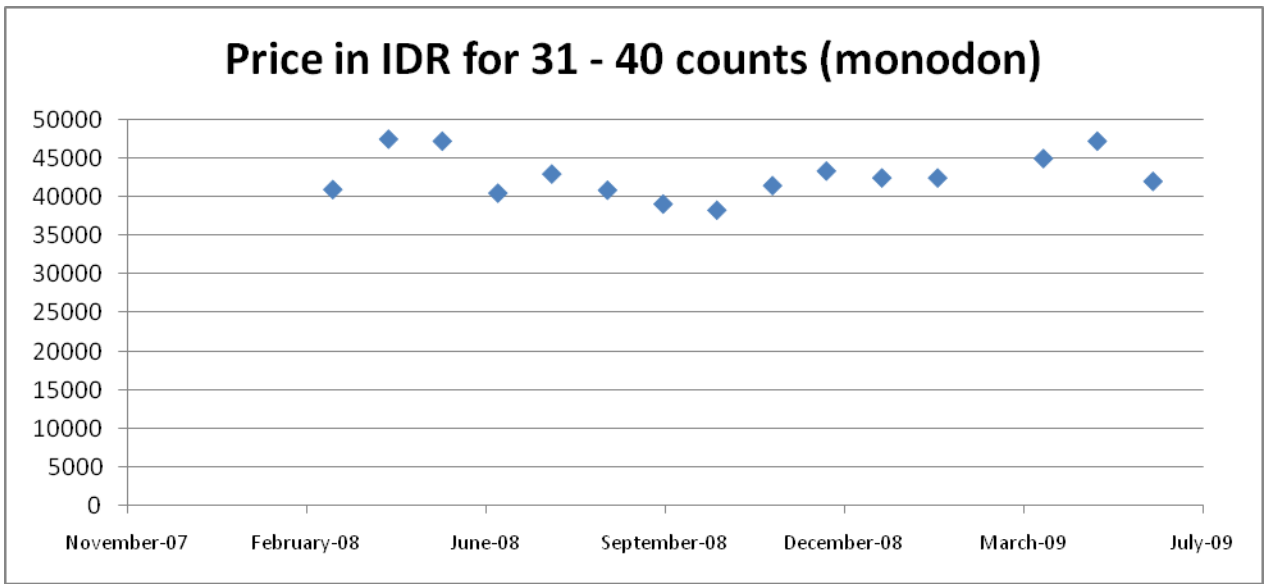


Figure 15: Scatters of actual sale prices of *P. monodon* for farmers, size 31-40 (b), Indonesia

In terms of price trends of *P. vannamei* products, a stable trend could also be detected for size 51-60 examined during 2008 and 2009 (Figure 16)

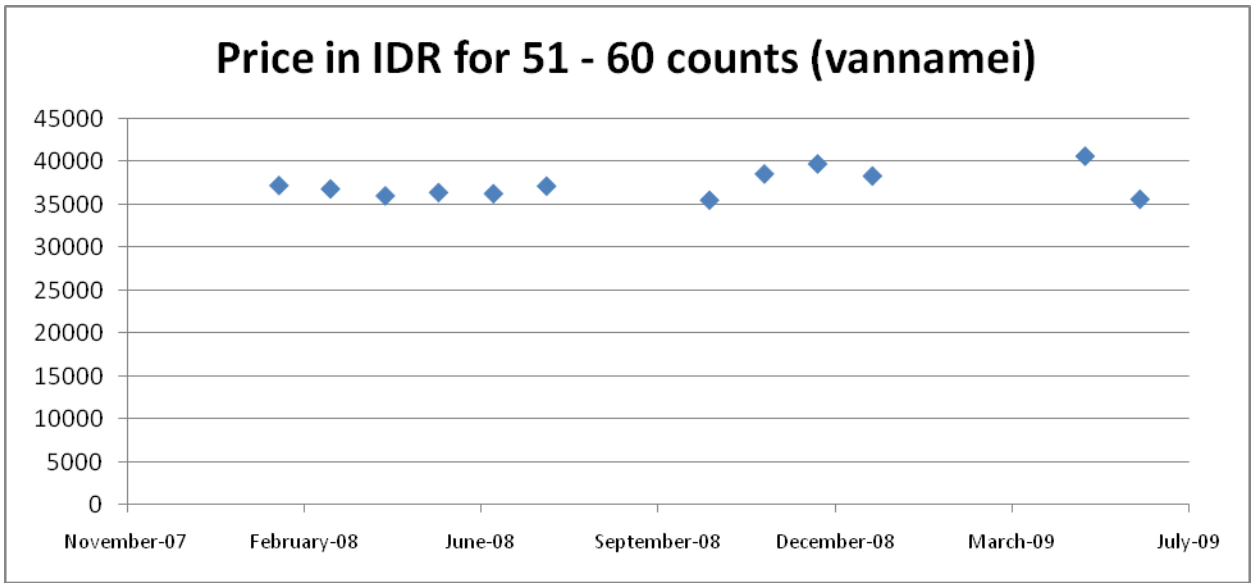


Figure 16: Scatters of actual sale prices of *P. vannamei* for farmers, size 51-60 (c), Indonesia

b) Traders

Although enough data was available to examine only price trends for *P. monodon* shrimp of size 40, prices paid by collectors and wholesalers also appeared to be stable over time, therefore confirming the observations reported by farmers (Figure 17).

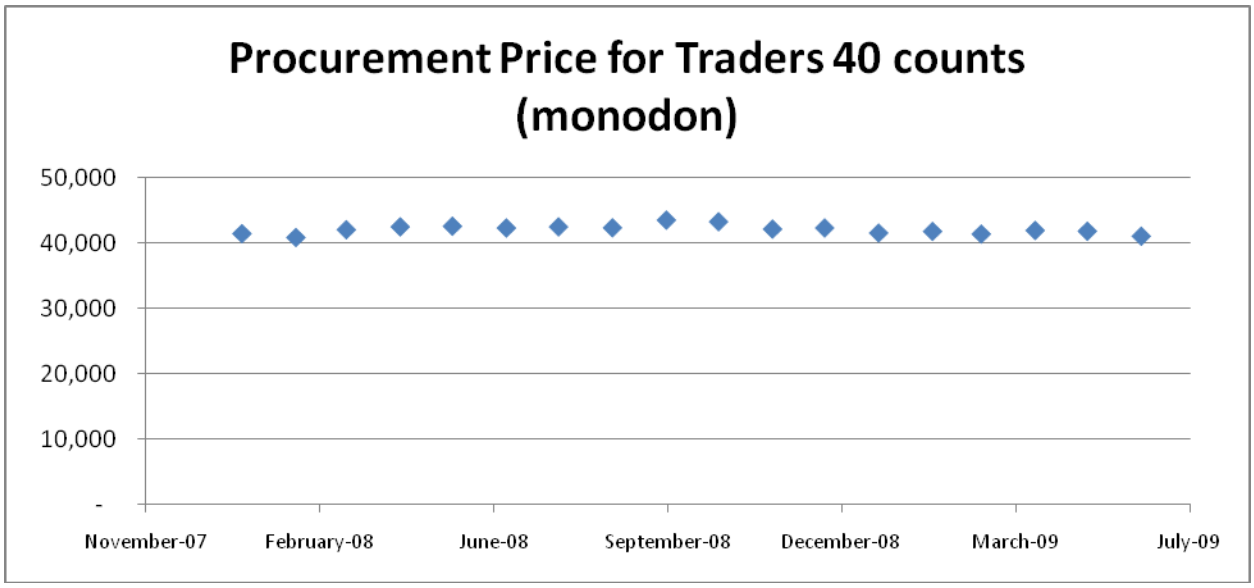


Figure 17: Scatters of actual procurement prices of *P. monodon* for traders, size 40, Indonesia

P. vannamei collectors and traders in Indonesia had also experienced stable price procurements during 2008 and 2009 thus confirming the observations reported by farmers (Figure 18).

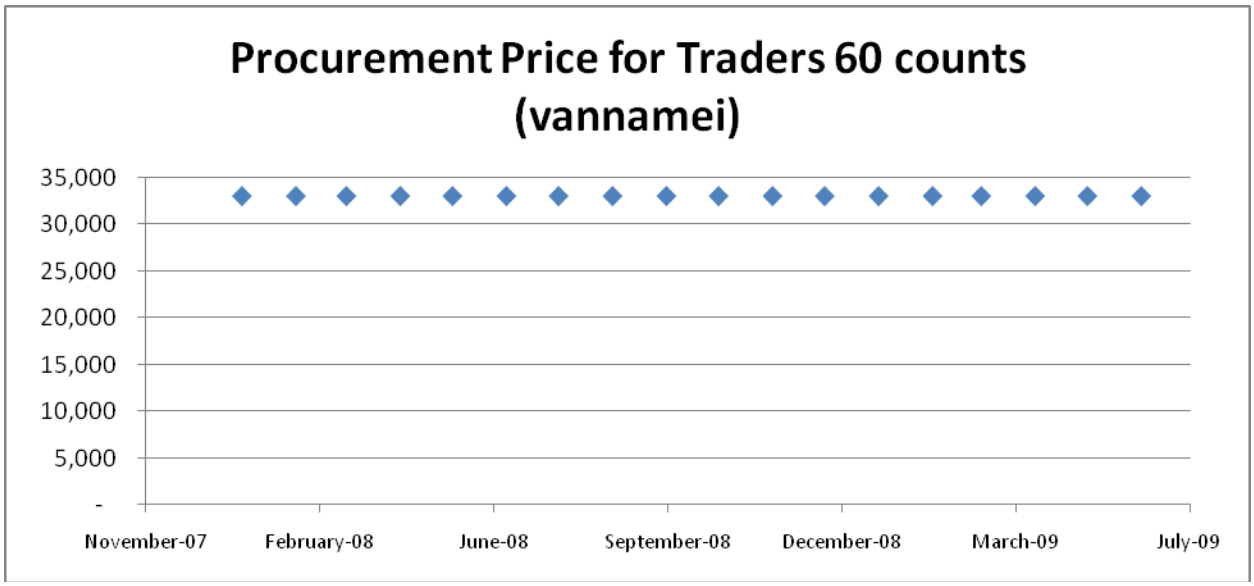


Figure 18: Scatters of actual procurement prices of *P. vannamei* for traders, size 60, Indonesia

c) Processor

Similar to *P. monodon* prices faced by farmers and traders, procurement prices paid by processors also appeared to be stable over time (Figure 19). This trend was observable for size 21-30, which was traded the most.

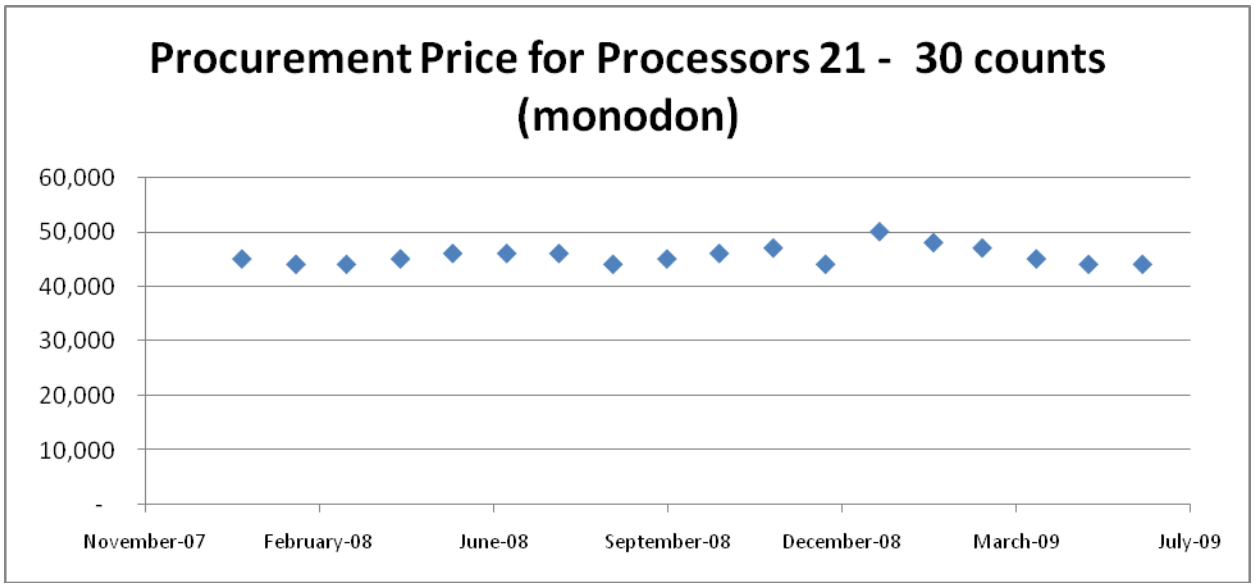


Figure 19: Scatters of actual procurement prices of *P. monodon* for processors, size 21-30 (a), Indonesia

Like trend prices in monodon, a similar situation occurred with *P. vannamei* prices (Figure20)

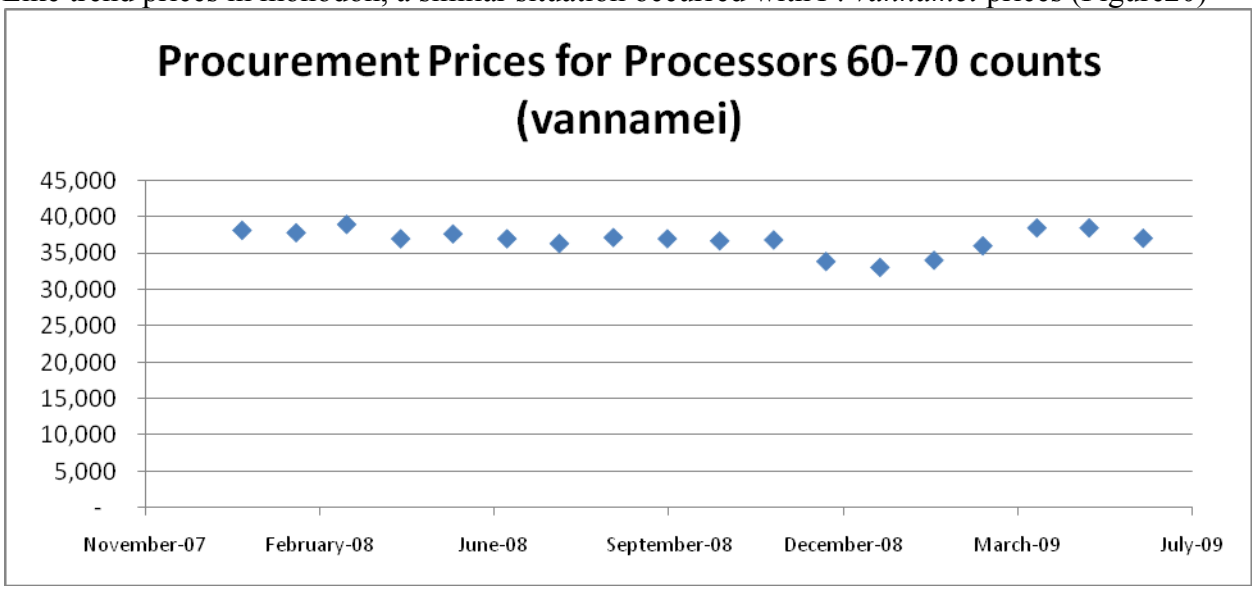


Figure 20: Scatters of actual procurement prices of *P. vannamei* for processors, size 60-70 (b), Indonesia

Perceived reasons and impact of price trends

According to all of the farmers, shrimp prices have been fluctuating over the past 5 years. 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, or because of unstable exchange rates. 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 chemical use; and over-supply of shrimp on the international market. All of the traders reported that shrimp prices were changing, either decreasing (30.8%), increasing (7.7%), or fluctuating (61.5%). 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 antidumping measures; poor post-harvest handling; unstable exchange rates. Most processors recognized that prices have been decreasing (50%) or fluctuating (50%) over the past few years. One of the main reasons for these price changes was unstable supplies and unstable exchange rates, as well as difficulties faced by the processors to keep businesses viable, forcing processors to set lower prices and to identify strategies to add value to the exported products. Exporters also recognized that Indonesian shrimp faced lower market prices because of allegedly poorer quality. Trade barriers 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 the perceptions of the stakeholders on the unusual events are provided in the Annex.

Supply Chain Analysis

The data generated through this survey revealed more than 80% of the shrimp harvests are sold to collectors. A smaller proportion of farmers (17.9%) sold their harvests to wholesalers and none of them sold directly to the processors. Farmers who sold *P. vannamei* were more likely to sell directly to wholesalers compared with farmers who sold *P. monodon*. About 70% 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 channel of tiger shrimp is provided in Figure 21

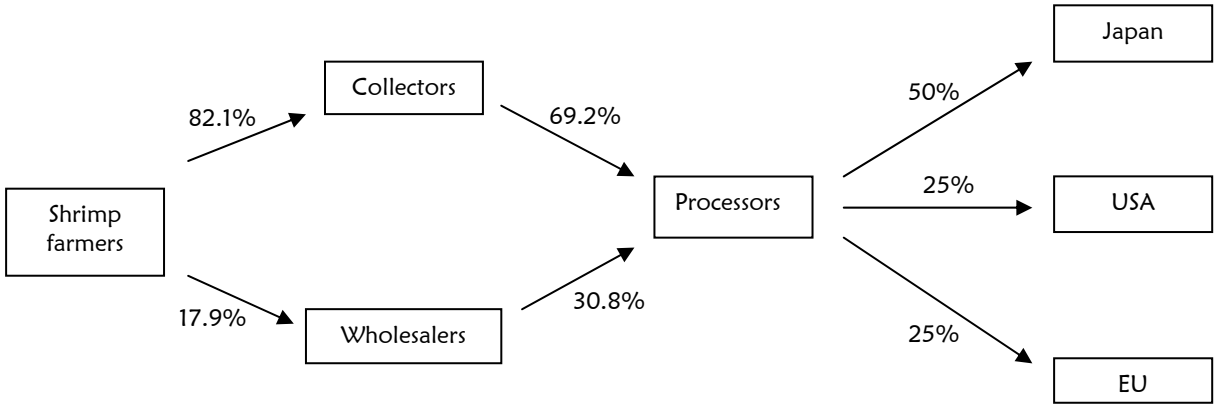


Figure 21: Marketing channels of *P. monodon* shrimp

As it can be seen in Table 6, most of the exported shrimp were sold to the Japanese (50%) while USA and EU markets shared equally with each other (25% respectively), in 2008-2009. During year 2008-2009, processors did not experience any changes in terms of market destinations, type of products, or packaging.

Table 6. Composition of the total exported amount of shrimp products by the markets and type of products

Item	2008	2009	% of Change
By the market (%) of the total amount exported			
Japan	50	50	0
USA	25	25	0
EU	25	25	0
By the type of products (%) of the total amount exported			
HOSO	50	50	0
HLSO	50	50	0
PUD	0	0	0
BTO cooked	0	0	0
Others	0	0	0
By the type of packaging (%) of the total amount exported			
Block	75	75	0
IQF	25	25	0
Semi IQF	0	0	0
Others	0	0	0

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.

Impact of Tsunami and US Anti- Dumping or other events

1. Tsunami

All of the surveyed farmers, shrimp traders and processors/exporters knew about the occurrence of the tsunami in December 2004 (Annex). However, the impact of the tsunami appeared to be limited among the respondents, with 22.4% of farmers, 38.5% of traders and 75% of processors/exporters reporting that their farm or business had been affected (Annex). The tsunami mostly impacted farmers in Aceh Province (22.4%) which caused the loss of their incomes. Farmers in other provinces did not experience any impact from the tsunami. Similarly, traders in Aceh Province were also receiving direct impact from the tsunami (38.5%), whilst the remainder did not. Most processors also believed that the tsunami worsened their business as supplies of raw materials were greatly reduced thus increased procurement prices. Processors also declared that quality controls for their products were intensified to satisfy customers.

2. US anti-dumping duties

There were 4.5%, 7.7%, and 100.0% of the surveyed farmers, shrimp traders, and processors/exporters who were aware of the US anti-dumping duties affecting some other Asian countries, respectively (Annex). However, only 3.7% of farmers and 25% of processors reported an impact from this event on their livelihood. Some solutions for reducing the impact of the US anti-dumping duties were also suggested (Annex). The interviewees reported the effect of the U.S. anti-dumping duties on decreasing price and increased competition in international markets. However, the event also stimulates positive effect in gaining greater access to the US market.

Additional secondary information

The information provided through the survey was complemented by additional information generated through focus group discussions. 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 and raw materials 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 prices and shrimp feed costs. 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. For 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, 2005). In addition, hatcheries in the province were also directly damaged, therefore reducing significantly the shrimp seed supply in the area (Table 7).

Table 7. Estimates of losses to shrimp and fish hatcheries in Aceh Province (units are number of hatcheries) *(Source: FAO 2005)*

District	Pre-Tsunami	Post Tsunami						% damage
		Level of Damages				Total	No Damages	
		Light	Moderate	Heavy	Lost			
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
Langsa	2						2	0
Total	223	17	24	114	38	193	30	86

At the time of the study, it was reported by several stakeholders from the private and public sector that significant volumes of raw materials were imported from countries that had been affected by the impositions of US anti-dumping duties (i.e. Thailand, Vietnam, PR China and India). Although less dramatic, a similar picture was reported also from other provinces.

Farmers in Aceh, West Java, and East 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 transport harvested products for 2-8 hours to reach the plants located in Medan, Jakarta, or Surabaya.

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

insight into the shrimp supply chain in the Aceh province was also gathered by collecting secondary information. The master plan 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.

5. Conclusions and Recommendations

The Indonesia shrimp industry has experienced an increasing number of difficulties throughout the past few years. This study identified the decline in shrimp production as well as the profit in shrimp sector in Indonesia. Major factors influencing the above situation were poor quality products as a result of environmental degradation and poor management practices. Among others, linked factors affecting the sector were unfair prices paid by the traders and processors, increased competition among traders, the suspected occurrence of shrimp importation and re-exportation, poor shrimp quality because of antibiotic use, over-supply of shrimp on the international market, and the unstable political environment of the country. Although the US anti-dumping duties were not introduced in Indonesia, they were said to have impacted Indonesian shrimp prices, mainly because of the allegedly illegal importation of shrimp from countries affected by the US duties.

The introduction of better planning for the sector, improvements in management practices and shrimp quality, improvements to the overall image appeared to be potential solutions to revive the Indonesian shrimp industry. These issues need to be given consideration and should be targeted through the commitment of both the government and stakeholders throughout the supply chain.

Bangladesh

1. Summary

This study has been undertaken mainly to update NACA's 2006 October study entitled Evaluation of the Impact of the Indian Ocean Tsunami and US Anti-dumping Duties on the Shrimp Farming Sector of South and South-Asia. The 2009 study has focused more on analyzing the prices of shrimp of the concerned stakeholders - namely, traders, depots, agents, and processors. Since *P. vannamei* is not cultured in Bangladesh, *Penaeus monodon* has been intensively analyzed as the common trading species among the study countries. This study has gone beyond the 2006 study and analyzed the price spreads (gross marketing margins) of the concerned stakeholders. Besides, the important socioeconomic characteristics of stakeholders, this report examined the business characteristics of the other stakeholders, the supply-demand situation of shrimp, and reasons for inadequacy/adequacy of shrimp supply. As demanded by the ToR, the same set of stakeholders included in the 2006 study have been revisited and included in the 2009 study. A total of 188 stakeholders comprising 136 farmers, 24 traders/faria[5], 8 depots, 8 agents and 8 processors from 9 Upazillas[6] of 5 major shrimp producing districts of Bangladesh were selected, from whom primary data was collected by administering pre-designed questionnaires. The timeframe for the present study is 18-months, from January 2008 to June 2009.

The average ages of the selected stakeholders ranged from 39 to 54 years. Traders and depots were the junior most stakeholders while the processors were most senior. The shrimp farming /trading experience lasted 15 to 25 years. Most farmers were illiterate, unlike the processor's educational attainment, which was much higher – up to the university level. Although shrimp farming/ trading remained the main occupation of the stakeholders, the overwhelming majority had involvement with other occupations. Few processors also had involvement with shrimp farming. The average number of shrimp ponds for the farmers was 1.4 with pond water areas of 14.14 ha (35 acre). Seventy eight percent of the shrimp farms were singly owned and 11 percent had 2-4 and more than 4 owners.

Trader's price differentials (gross marketing margins) ranged between Tk[7] 10.07 to Tk 11.33 per kg for bagda and between Tk 9.07 to Tk 12.67 for horina[8]. The same for depots ranged from Tk 7.11 to Tk 9.33 per kg for bagda and Tk 5.72 to Tk 17.94 per kg for horina. Agents earned gross margins of Tk 3.33 to Tk 6.89 for *Bagda* and Tk 7.99 to Tk 12.81for *Horina*. The average gross marketing margins of the processors were the highest of all the stakeholders. For *Bagda*, the minimum per kg margin enjoyed by the processors was Tk 169.13 (US$2.45) and the maximum was Tk 243.99 (US$3.53) per kg. As far as horina is concerned, the average per kg gross margins of the processors ranged from Tk 78.84 (US$1.14) to Tk 216.54 (US$3.13).

The staffing situation of the traders, depots, agents and processors did not have any noticeable changes when compared to the previous study period. The industry is heavily dominated by males particularly for the farmers, traders, depots and agents as was the case observed in the earlier study. However, this is reversed for the processors. Females have a very good stake in the processing activities of processor's factories.

[5] Faria: Traders who trade in between farmers and depot/agents
[6] Upazilla: Sub district
[7] Tk: BDT
[8] Horina: Metapenius monodon

Incentives in the form of receiving cash advances are a common phenomenon in shrimp marketing. This is mainly to ensure supply continuity and business relations. All but the processors received advance cash incentives.

Trends of both procurement as well as resale prices of all the concerned stakeholders were positive, indicating that over time both increased. Tradres/farias position themselves in the second link in the marketing channel. They buy shrimp directly from the farmers. Procurement prices of all the different sizes of shrimp of the traders increased over the 18-month period starting from January 2008 to June 2009 as is evident from the positive slopes of the trend line. Slopes of the resale price trends of the traders were also positive. The procurement price trends of depots were also positive for all the sizes of shrimp. This holds true for resale prices as well. Average monthly growth rates ranged from 0.09% to 0.67% for procurements prices and from 0.022% to 0.505% for the sale prices. For agents, average monthly growth rates ranged from 0.21% to 0.32% for procurement prices and 0.02% to 0.63% for sale prices. The growth of processor's procurement prices ranged from 0.001% to 0.33%. Their sale prices growth ranged from 0.14% to 1.23%. Monthly average growth rates in procurement prices did not even reach 1% but increased significantly in terms of sale price, which happened only for processors.

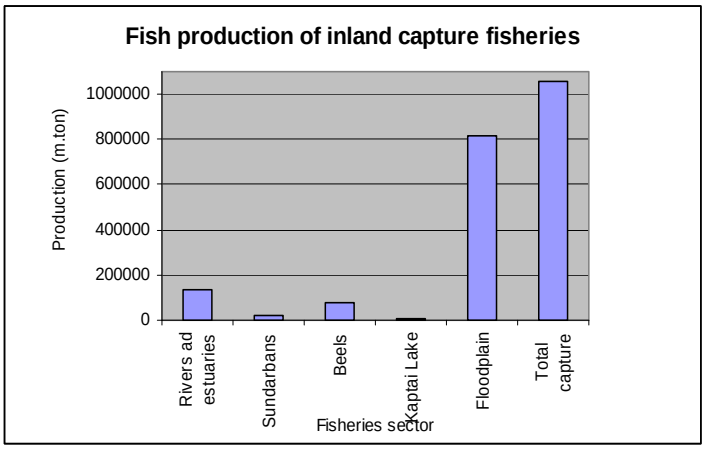
One hundred percent of the traders replied that the price of shrimp was lower during 2008 while it was higher during 2009. They indicated that during 2008, shrimp prices started declining from January and continued declining for the rest of year. From March 2009 onward, it started reversing**.** The general impression of the depot owners, agents and processors is also that price was lower during 2008 and higher during 2009. Processors indicated that prices of shrimp decreased (increased) from January 2008 (January 2009) onward. Most of the stakeholders were affected negatively while price remained lower during 2008 as their earning was reduced thus negatively affecting their livelihood. However, they benefited from the higher prices during 2009. The price increase helped expand the businesses of many stakeholders favorably.

2. Introduction

Bangladesh fisheries

Depending on the types of water, Bangladesh fisheries are broadly classified into two categories, namely, (i) inland fisheries and (ii) Marine fisheries. Inland fisheries are comprised of inland capture fisheries and inland culture fisheries. Inland capture fisheries consist of rivers and estuaries (10,31,563 ha) including Sundarban, *beels*[9] (11,461ha), Kaptai Lake (68,800 ha) and floodland (28,32,792 ha) totaling 4047,316 ha. It contributed 10,60,181 tonnes (41.36%) to total fish production of the country during 2007-08. Rivers and estuaries, Sundarbans, beels, Kaptai lake and floodplain contributed respectively 136,812 tonnes (5.13%), 18151 tonnes (0.70%), 77,524 tonnes (3.02%), 8248 tonnes (0.32%) and 819446 tonnes (31.97%) to total inland capture fisheries production (DoF, 2009).

[9] Beels : Inland closed water bodies that may be linked with river or cananl by a small channel



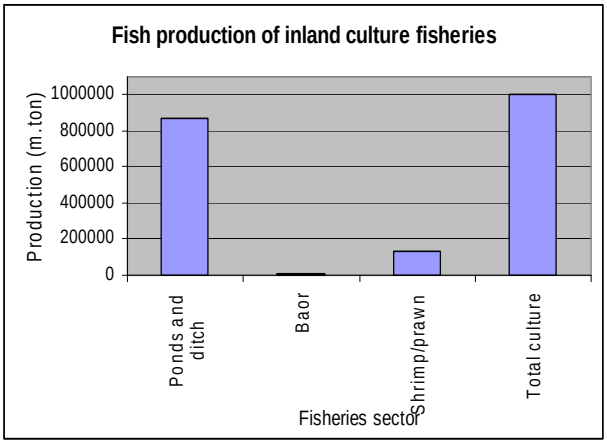


Figure 22: Fish production: capture and culture and total

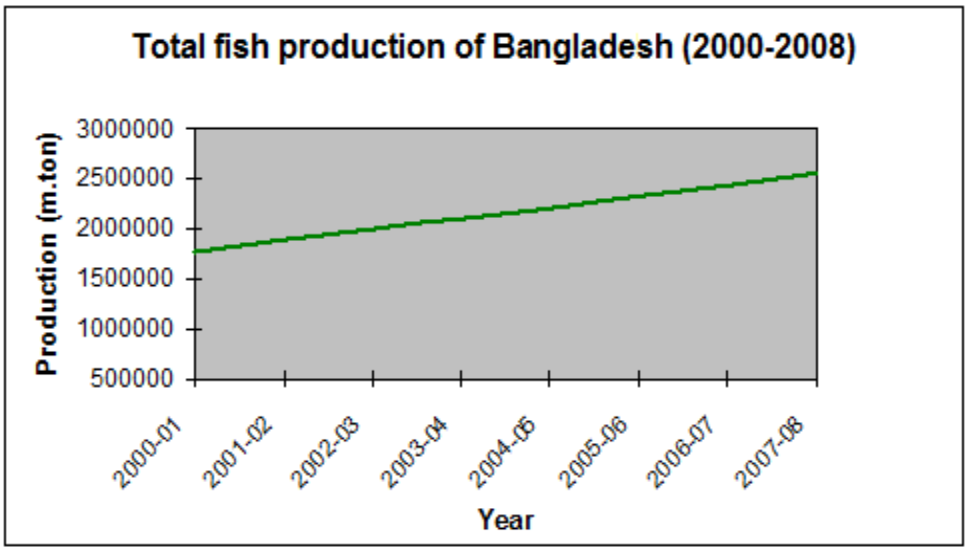


Figure 23: Total fish production of Bangladesh, 2000-01 to 2007-08

The inland culture fisheries are comprised of ponds and ditches (305,025 ha), *baors*[10] (5,488 ha) and coastal shrimp farms (217,877 ha) totaling 528,390 ha. The inland water areas suitable for fish capture and culture total 4575,706 ha where fish capture and culture takes place. Inland culture fisheries contributed 100,5542 tonnes (39.23%) to the total fish production. The most important components of the inland culture fisheries were the ponds and ditches that contributed 866,049 tonnes (33.78%) to the total production (Table 8).

[10] Baors: Oxbow lake

Table 8: Area, catch and productivity by sectors of fisheries, 2007-08

Sectors of fisheries	Water area		Production (tonnes)		Catch per hectare (kg)
	Area (ha)	%	Quantity (tonnes)	%	
A. Inland Fisheries:					
(i) Capture (Open water)					
1. River & Estuaries*	853,863	22.62	136,812	5.34	160
2. Sundarbans	177,700		18,151	0.71	102
3. Beel	114,161	2.50	77,524	3.02	679
4. Kaptai Lake	68,800	1.51	8,248	0.32	120
5. Flood Land	2,832,792	62.11	819,446	31.97	289
Capture Total	**4,047,316**	**88.73**	**1,060,181**	**41.36**	
(ii) Culture (Closed water)					
1. Pond & Ditch	305,025	6.69	866,049	33.79	2839
2. Baor (Ox-bow lakes)	5,488	0.12	4,778	0.19	871
3. Shrimp/Prawn Farm	217,877	4.45	134,715	5.25	618
Culture Total	**528,390**	**11.26**	**1,005,542**	**39.23**	**618**
Total Inland Water	**4,575,706**	**100.00**	**2,065,723**	**80.59**	
B. Marine Fisheries					
1. Industrial Fisheries (Trawl)			34,159	1.33	
2. Artisanal Fisheries			463,414	18.08	
Marine Total	**16,606,600**		**497,573**	**19.41**	
Country Total			**2,563,296**	**100.00**	

(Source: DoF, 2009: Fisheries Statistical Yearbook of Bangladesh 2007-08)

The country has a coastal area of 2.30 million ha and a coastline of 710 km along the Bay of Bengal. Marine fisheries constitute a total area of 16.6 million ha (Mazid, 2002). Marine fisheries production during the same period was 497,573 tonnes comprising 34,159 tonnes (1.33%) of industrial trawling and 463,414 tonnes (18.07%) of artisanal fisheries (DoF, 2009).

In addition, the coastal aquaculture comprises 217,877 ha of shrimp/prawn farms. The shrimp/prawn farms provide 5.25% of the total fish production in the country. The country had a total fish production of 2,563,296 tonnes during the 2007-08 year, composed of 41.36% from inland capture, 39.23% from inland culture, and 19.41% from marine waters (Table 9).

Shrimp production trend of Bangladesh

The shrimp sector has undergone dramatic changes in terms of area, production, and improvement of quality and marketing. The area under shrimp production was 108,280 ha (DoF, 1992) in 1990-91 which increased to 217,877 ha (DoF, 2009) in 2007-08 -almost doubling. On the other hand, the yield of shrimp for the same period increased from 263 kg to 675kg/ha, showing a 2.57 fold increase. Two areas in the south, the Chittagong-Cox's Bazar belt and Khulna, Satkhira-Bagerhat belt, account for 95% of the total area of shrimp culture in the country (Bhattacharya *et. al.* 1999). Total shrimp production takes place from three sources, namely, inland capture, inland culture, and marine fisheries. In 1990-91 Total shrimp production in the country totaled 80,384 tonnes in which cultured shrimp contributed 24 percent. In 2007-08, the total shrimp production increased to 223,095 tonnes of which cultured shrimp contributed 42.23 percent. That means, the shrimp production share from the culture sources increased by 18 percentage points as compared to 1990-91.

Table 9: Shrimp production during 1990-91 to 2003-04

Year	Shrimp catch (tonnes)				% of cultured shrimp
	Inland Fisheries		Marine Fisheries	Total	
	Capture	Culture			
1990-91	43,262	19,489	17,633	80,384	24.24
1991-92	61,042	20,335	20.042	101,419	20.05
1992-93	78,226	23,530	23,975	125,731	18.71
1993-94	50,721	28,302	21,519	100,542	28.15
1994-95	58,973	34,030	20,363	113,366	30,02
1995-96	44,079	46,223	26,353	116,655	39.62
1996-97	41,868	52,272	24,818	118,958	43.98
1997-98	46,635	62,167	24,790	133,592	46.53
1998-99	49,296	63,164	31,742	144.,202	43.80
1999-00	43,167	64,647	31,395	139,209	46.44
2000-01	44,343	64,970	31,037	140,350	46.29
2001-02	54,965	65,579	31,976	152,520	43.00
2002-03	60,876	66,703	31,931	159,510	41.82
2003-04	63,103	75,167	36,488	174,758	43.01
2004-05	68,768	82,661	44,261	195,690	42.24
2005-06	77,381	85,510	48,119	211,010	40.52
2006-07	82,422	86,840	51,869	221,131	39.27
2007-08	75,678	94,211	53,206	223,095	42.23

(Source: DoF, 2005 and 2009. Jatiya Motsho Pakkho, DoF, MOFL)

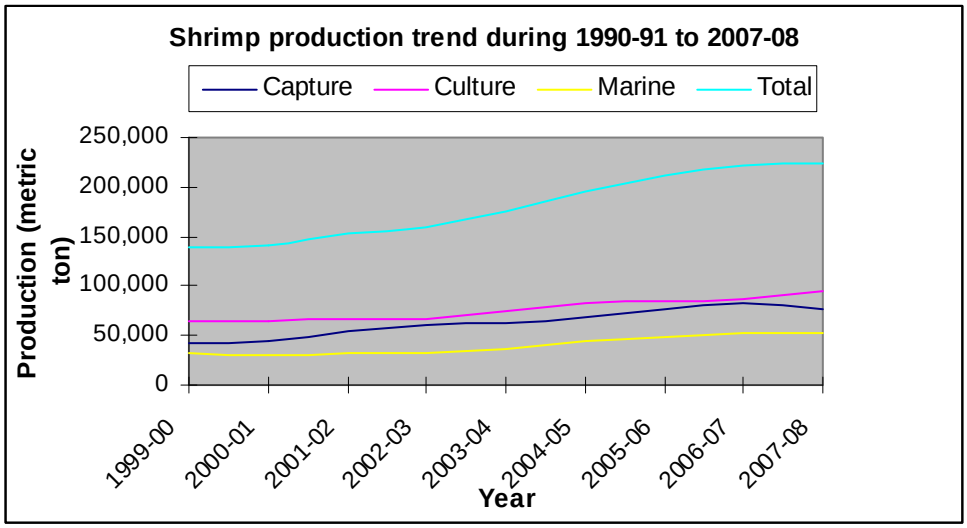


Figure 24: Shrimp production trend of Bangladesh, 1990-91 to 2007-08

There were a total of 30.80 million fish and shrimp/prawn farmers in 2007-08 comprised of 11.50 million shrimp farmers and 19.30 million fish farmers in the country (DoF, 2009). The number of licensed fish processing plants was 130,117. Fish processing plants approved by the EU was 67 (BFFEA, 2009). The quantity of frozen food exported in 2007-08 was 49,907 tonnes. The quantity of shrimp exported in 2007-08 was 33.73 million kg. The processing capacity of all plants was 2,65,000 tonnes. Export earnings from frozen foods in 2007-08 was US$ 429 million. The production of

shrimp fry totaled 400-550 crore[11]. The number of shrimp hatcheries was 57 in 2007-08 (BFFEA, 2009). The major markets for the Bangladesh shrimp have been the USA, UK, Belgium, Germany and Japan. From 2002-03 to 2007-08 the quantity exported to the USA was on the increase. The quantity of shrimp exported to the USA was 26% of the total exported in 2002-03 which increased to 46% in 2007-08. It was only the USA where export quantity continuously increased. The quantity of shrimp exported to the UK decreased from 29% to 21% during this period. Belgium also showed a similar downward trend (Table 10).

Table 10: Volume of shrimp exported to different countries (%)

Countries where exported	2002-03	20030-04	2004-05	2007-08	2008-09
USA	26	36	40	43	41
UK	29	22	21	23	24
Belgium	25	26	23	12	15
Germany	8	6	5	3	5
Japan	5	5	5	4	4
Others	7	5	6	15	11

(Source: BFFEA, 2009. Shrimp and Fish News)

3. Methodology

This is a follow-up study of a pervious study conducted in 2006, to examine the nature and extent of changes in the price situation of the different stakeholders involved in the marketing channel of shrimp. The initial selection of locations for this study was purposeful in the sense that not all areas in Bangladesh are shrimp cultured areas. Accordingly, five districts namely Khulna, Satkhira, Bagerhat, Cox's Bazar and Chittagong were selected (Figure 25).

The total sample size for the study was 188 comprising 8 processors, 8 agents, 12 depots, 24 traders and 136 farmers (8 selling directly to depot plus 128 selling directly to traders). Data from the different stakeholders was collected from 9 upazillas of the five selected districts (Table 11).

Table 11: Samples and locations for the study

District	**Upazillas**	**Processors**	**Agents**	**Depots**	**Traders**	**Farmers**	
						Sell to Depot	**Sell to Traders**
Khulna	Dakup	4	4	2	4	2	16
	Batiaghata			2	4	2	16
Bagerhat	Bagerhat	1	1	2	4	2	16
	Mongla			2	4	2	16
Satkhira	Sayamnagar			1	2		16
	Asasuni			2	4		16
	Debhata			1	2		
Cox's Bazar	Cox's Bazar	1	1				16
	Chakaria	1	1		4		16
Chittagong		1	1				
Total		8	8	12	24	8	128

(Source: Field Investigation (2009): Bangladesh)

[11] 1 Crore = 10 million

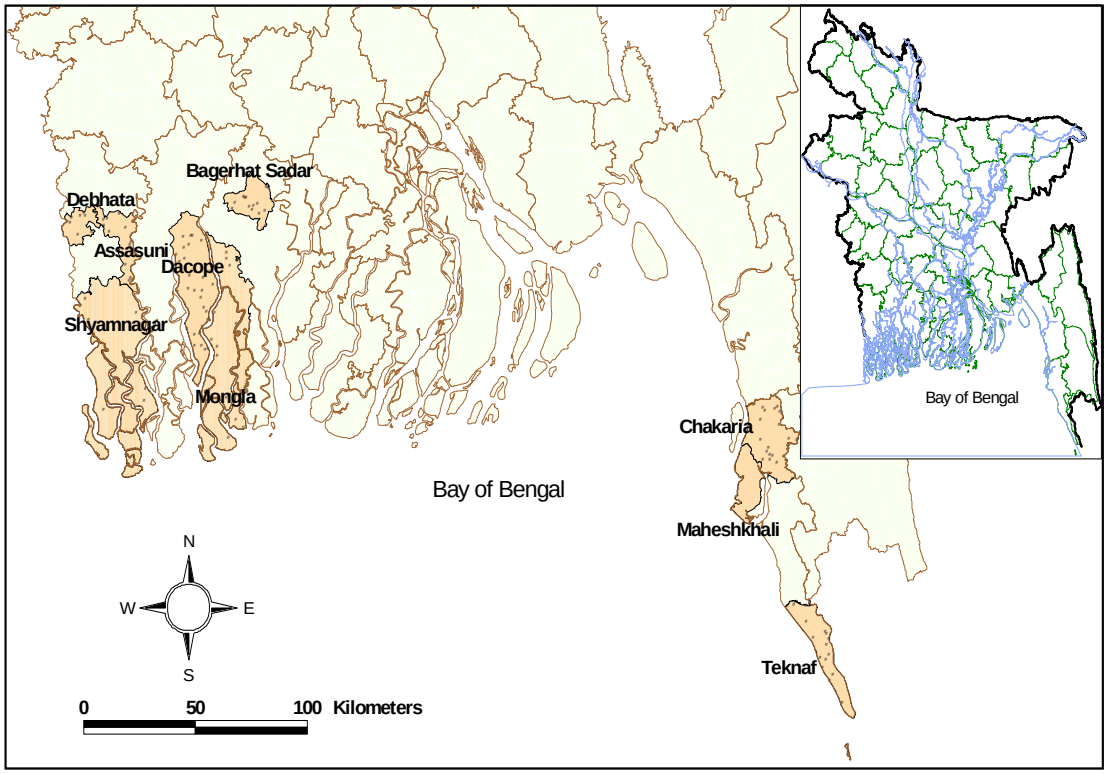


Figure 25: Maps of Study Locations

The same questionnaires for 5 different stakeholders, used in the earlier study, were used to collect the data. The same survey method was followed to collect the data from the field. In addition, different key persons were also consulted to generate meaningful information. The average price of each size was calculated from the written records of the stakeholders and entered into the questionnaire to show prices of each size were different for different transactions taking place during the month. For other information, such as prices (for farmers in particular), responses regarding the socioeconomic characteristics of the stakeholders, incentives mechanisms, shrimp price trends and their effects, and to some extent, business information, the enumerators had to rely solely on stakeholders memory.

The fisheries officers of the area generated the data for this revisit. Not much difficulty was faced as this is the second visit to them. However, some difficulties relating to the information on incentives were encountered, as the stakeholders had the tendency to hide this aspect. However, the enumerators were largely familiar with the incentive system of the area so it was possible to elicit authentic information. All possible efforts were made to verify the consistency of the collected data and to make sure that this data was error free. The data was processed in the computer using MS Access, Excel and SPSS. For studying price trends, simple regression methodology was followed. Regression equations were fitted using time and price as the independent and dependent variables. A linear functional specification was given as: $P = a + bt$,

where, "P" and "t" stand for price (monthly per kg) and time respectively, and "a" and "b" are constants to be estimated.

In addition, attempts were made to estimate linear monthly growth rates from the estimated price trend lines. Since, the prices for the 18 month time period were of interest and since examining price trends was an important issue, the regression method was chosen. The different sizes of shrimp were:

size U20 = 1-20 pieces per kg; Size 30 = 21-30 pieces per kg; Size 44= 31-44 pieces per kg; Size 66 = 45-66 pieces per kg; Size 100 = 67-100 pieces per kg; Size PUD = miscellaneous and broken shrimp. The same sets of stakeholders were interviewed for this study as in 2006 survey.

4. Results and Discussion

Socio-economic Characteristics of Shrimp Stakeholders

All but one shrimp stakeholder was male. The average ages of the respondents ranged from 39 to 53 years. Traders and depots were the most junior while processors were more senior. They had an average shrimp farming/trading experience of about 15 to 25 years. The household sizes of the farmers averaged 5.6 people which was almost consistent with the national average household size (national family size was 5.56: BBS 2005). Farmers were the most illiterate followed by traders. All other stakeholders, namely, depots and agents were literate with educational attainment ranging from primary to secondary schooling. Processors had the highest level of education (i.e., up to university level). Shrimp farming/trading remained the main occupation of all the traders. However, many of them had additional involvement with other economic activity such as crop farming, business, livestock farming, shrimp farming, and ice making. It was one processor (12.50%) who had involvement with shrimp farming, and another one (12.5%) dealt additionally with ice plant. The above makes clear that traders, agents and processors preferred to be involved with shrimp farming although they were directly involved with shrimp trading (Table 12).

Table 12: Socioeconomic indicators of the sampled stakeholders

Socioeconomic characteristics	Farmer	Trader	Depots	Agents	Processor
Age (years)	46.00	36.00	43.00	41.87	50.50
Shrimp farming experience (years)	11.93	11.95	13.00	17.50	21.75
Household size (no.)	5.63				
Illiterate farmer (%)	40	16.60	-	-	-
Literate farmer (%)	60	83.40	100	100	100.00
College/University. attended	3	-	-	-	100.00
High school attended	32	-		-	
Primary attended	24	58.40	58.40	62.50	
Secondary school attended	1	25.00	41.60	12.50	
Vocational education	-	-	-	25.00	
Shrimp farming/trading as major occupation (%)	100	100	100.00	100.00	100.00
Involvement of shrimp farmers with other occupation (%)	100	100	75.00	12.50	25.00
Agriculture	52.00	47.00	44.45		
Business	0.70	9.50	11.10		
Livestock	40		44.45		
Service	7.30	4.70			
Shrimp farming		28.50		12.50	12.50
Ice plant					12.50
Aquaculture technical knowledge (%):					
Own initiative	45.00	91.60	33.33	-	
Training	29.00	8.40	8.34	-	87.50
Own initiative and training	28.00	_	33.33	100.00	12.50

(Source: Field Investigation (2009): Bangladesh)

Shrimp Farming Characteristics of the farmers

The average farm size of the shrimp farmers was found to be 42.87 acres (17.36 ha) and ranged from 0.50 acres (0.20 ha) to a maximum of 400 acres (161.9 ha). The average number of ponds of the selected shrimp farmers was 1.47 with a minimum of 1 and a maximum of 8. The average size of ponds was 41.48 acres (16.75 ha) (Table 13).

Table 13: Description of Shrimp Farm:

Farm characteristics	Average	Std Dev	Min	Max
Total Farm Area (Acre)	42.87	67.58	0.50	400.0
Total Farm Area (Hectare)	17.36	27.36	0.20	161.9
Number of pond/farm	1.47	1.02	1.00	8
Pond Area (Acre)	41.38	67.10	0.50	400.0
Pond Area in (Hectare)	16.75	27.17	0.20	161.9

Production and trading of shrimp by the stakeholders during 2008-09

The average shrimp production of the farmers has been reported to have decreased significantly from 90 kg in 2008 to only 28 kg in 2009, totaling 512,883 kg for the previous year and 169,154 kg for 2009. Traders transacted Bagda, Golda[12] and Horina during the reference period. Forty eight percent of the traders/faria traded Bagda while 34 and 18 percent traded Golda and Horina respectively. Chaka[13] and other fish were not transacted by the shrimp traders. The volume of shrimp transacted by traders during 2009 was lower than that of the year 2008. The total volume of Bagda traded was 84,200 kg comprising 64,390 kg in 2008 and 19,810 kg in 2009, which constituted respectively 76 and 24 percent. The average Bagda trade in 2008 and 2009 was 2643 kg and 408 kg. On the other hand, the Horina trade averaged only 646 kg and 256 kg, constituting 72% in 2008 and only 28% in 2009.

All of the depots traded Bagda. In addition to the Bagda trade, 58% and 83% of them simultaneously traded Golda and Horina. The total volumes of Bagda, Golda, and Horina traded by the depots were 342,775kg, 49,983kg and 56,885kg respectively. The average trading per depot was 28,563 kg for Bagda, 7,077 kg for Golda and 57,884 kg for Horina. Of these total volumes, 74% of Bagda, 70% of Golda and 96% of Horina shrimp were traded during 2008, making it clear that the quantity traded during 2009 was much lower.

Unlike other stakeholders of the lower links of the marketing channel, agents traded both shrimp and fish. A hundred percent of the agents traded *Bagda*, *Horina*, and other fish species, but 63 percent of the agents traded all the species of shrimp and fish species. The total volume of shrimp traded by them was 2,575,080 kg of Bagda, 995,490 kg of Golda, 482,600 kg of *Horina* and 39,230 kg of fish. These constituted 89% for *Bagda*, 82% for *Golda*, 78% of *Horina* and 70% of fish species.

Processors traded all the different types of fish and shrimp such as *Bagda, Golda, Horina,* and fish. However, about 37% of the processors did not trade *Golda* (Table 8). The total quantity of HOSO (Head On Shell On) shrimp traded by the processors for the reference period of 18 months was 22,823,085 kg, comprised of 73% *Bagda*, 9% *Golda*, 4% Horina and 14% fish. As far as the HLSO (Head Less Shell On) shrimp trade is concerned, the compositions of trade were 87% for *Bagda*, 9%

[12] Golda: Macrobrachium rogenbergii
[13] Chaka: Penius indicus

for *Golda* and 4% for fish. The average HOSO and HLSO trade was 393,501 kg and 3,39,745 kg (Table 15).

Table 14: Commodities traded in one and a half years (processor)

Types of commodities traded	No. of processors	% of processors
Com-1: Bagda	8	100
Com-2: Golda	5	62.5
Com-3: Horina	8	100
Com-4: Fish	8	100
Com-5: Other	8	100

Table 15: Commodities traded over last one and a half years by the processors (January 2008 - June 2009)

Types of commodities traded	Total qty. traded (Kg)	Av. Qty. traded (kg)	% of total qty. traded
HOSO			
Bagda	16,661,900	1,041,369	73
Golda	212,1350	212,135	9
Horina	825,320	51,583	4
Fish	3,214,515	200,907	14
Total	22,823,085	393,501	100
HLSO			
Bagda	12,348,775	771,798	87
Golda	1,366,457	136,646	9
Horina	554,045	34,628	4
Total	14,269,277	339,745	100

Trade volumes have varied depending on specieis. For Bagda, volumes appeared largely steady from 2008 to 2009, with first half 2009 volumes slightly less than half of full year 2008. For Golda, there has been a significant decline, while Horina appears to be on the rise (Table 16).

Table-16 Volume of traded commodities by the processors during January 2008 - June 2009

Year	*Penaeus monodon* (*Bagda*-Kg)					
	HOSO			HLSO		
	Total	Average	%	Total	Average	%
2008	11739875	1467484	70	8804910	1100614	71
2009 (6 months)	4922025	615253	30	3543865	442983	29
Total	**16661900**	**906584**	**100**	**12348775**	**771798**	**100**
Year	*Macrobrachium rosenbergii*. (*Golda*-Kg)					
	HOSO			HLSO		
	Total	Average	%	Total	Average	%
2008	1702015	340403	80	1106302	221260	81
2009 (6 months)	419335	83867	20	260155	52031	19
Total	**2121350**	**212135**	**100**	**1366457**	**136646**	**100**
Year	*Metapenius monodon* (*Horina*-Kg)					
	HOSO			HLSO		
	Total	Average	%	Total	Average	%
2008	534925	66866	65	390380	48798	70
2009 (6 months)	290395	36299	35	163665	20458	30
Total	**825320**	**51583**	**100**	**554045**	**34628**	**100**
Year	Fish (Kg)					
	HOSO					
	Total	Average	%			
2008	2262080	282760	70			
2009 (6 months)	952435	119054	30			
Total	**3214515**	**200907**	**1000**			

Factors affecting shrimp production during 2008 and 2009

The foregoing discussion reveals that farmers, traders, and depots dealt with different kinds of shrimp, while the agents and processors dealt with shrimp and fish simultaneously. Production and trading during the year 2008 was reported to be very good by all the stakeholders under consideration, but it was quite frustrating during 2009. Three factors came to be the most important reasons for the inadequate supply and high prices during 2009. These include: cyclone "Aila", the existence of drought during 2009 and the global recession. No problem was identified as a constraint to sell the shrimp.

Table 17. Factors affecting the shortage of shrimp supply in 2009

Reasons		**Responses of the stakeholders (%)**				
		Farmers	**Traders**	**Depots**	**Agents**	**Processors**
1	Cyclone "Aila" affected ponds and production	65	50	83	100	75
2	Production affected due to occurrence of drought	37	25	42	100	12

3	Increased demand in the international market due to ban in the Bangladesh market		50	50	37	50
4	World-wide recession	21				
5	High competition among the market actors	29	50	67		

Price differentials (Gross marketing margins) of shrimp of the stakeholders

Price differentials here refer roughly to gross marketing margins, which is defined as the difference between the sale price minus the procurement price. The purpose of this analysis is to examine how this differs across traders, depots, agents, and processors.

a) Farmers

The average per kg monthly prices of bagda received by farmers was Tk527 for size-20, Tk421 for size-30, Tk326 for size-44, Tk253 for size-66, Tk87 for size-99 and Tk162 for size 100. Size-20 displayed the least price variation across the 18-month period. The CVs of bagda prices were 4.94% (size-20), 6.35% (size-30), 7.82% (size-44), 13% (size-66) and 13.98% (size-100). Clearly that the price variation increases as the grade size (number per kg) also increases. For example, size-100 shrimp had the highest coefficient of variation of 13.94% while it was only 4.94% with the size-20. The average per kg price received by the farmers for Horina, size -100, was Tk 170 ranging from Tk152 to Tk196 per kg.

b) Traders

The average bagda procurement price of size-20 shrimp enjoyed the highest per kg price (Tk 531). The same for size-30, size-44, size-66 and size-100 were Tk 423, Tk 324, Tk 255 and Tk 155 per kg respectively. On the other hand, the average sale prices were Tk 542 for size-20, Tk 434 for size-30, Tk336 for size-44, Tk 264 for size-66, and Tk 165 for size-100. These patterns of procurement and sale prices of shrimp generated per kg gross marketing (price differential) margins of Tk 9.0 for size-20, Tk 9.4 for size-30, 44, and 66, and Tk 8.4 per kg for size-100 (Table 18).

The *Bagda* procurement price of size-44 had the highest variance as evidenced by the coefficient of variation. Size-100 had the second highest price variation across months. Bigger shrimp had relatively lower price variation than the smaller sizes. Similar variations were also observed for the sale price of shrimp for the traders. Gross marketing margins also displayed similar variation as the procurement and sale price.

Table 18. Bagda price differential per kg by Count size-wise (traders)

Statistics	20	30	44	66	100
Procurement Price per kg					
Standard deviation	18.41	19.32	19.74	12.05	8.54
Mean	531.13	422.67	324.47	252.47	155.20
Coefficient of variation	3.47	4.57	6.08	4.77	5.50
Sale Price per kg					
Standard deviation	18.55	19.54	19.78	11.60	8.28
Mean	541.93	433.93	335.80	263.73	165.27
Coefficient of variation	3.42	4.50	5.89	4.40	5.01
Price Differentials/Gross Marketing Margin per kg					
Standard deviation	4.41	5.57	5.29	5.37	5.63
Mean	9.00	9.39	9.44	9.39	8.39

Coefficient of variation	48.95	59.37	56.05	57.20	67.08

Horina had different size characteristics. The sizes considered here are 80, 90, 100, 150, 200 and PUD. The mean procurement prices of different sizes of *Horina* ranged from Tk 59 to a maximum of Tk 179 per kg. The variation of procurement prices was higher for the smaller sizes and vice versa. Sales prices ranged from Tk 72 to a maximum of Tk 191 per kg. Per kg gross marketing margins of *Horina* averaged Tk 12, Tk9.00, Tk9.94, Tk10.44, Tk 9.56, and Tk 12.67 for sizes-80, 90, 100, 150, 200 and PUD respectively. The coefficients of variations were higher for the smaller sizes particularly for the procurement and sale price. Gross margins per kg ranged from Tk 9.07 to Tk 12.67. Coefficients of variation in the gross marketing margin of the traders were estimated to be the highest for size-90 followed by size-100 (Table 19).

Table 19. *Horina* price differential per kg by Count size-wise (traders)

Statistics	80	90	100	150	200	PUD
Procurement Price per kg						
Standard deviation	12.26	7.65	10.50	9.43	10.23	7.91
Mean	179.07	163.00	143.33	123.11	92.22	59.06
Coefficient of variation	6.84	4.70	7.33	7.66	11.09	13.39
Sale Price per kg						
Standard deviation	11.00	8.71	8.95	8.36	9.07	9.67
Mean	191.20	172.07	153.28	133.56	101.78	71.72
Coefficient of variation	5.75	5.06	5.84	6.26	8.91	13.48
Price Differentials/Gross Marketing Margin per kg						
Standard deviation	3.64	6.98	5.06	4.33	3.75	5.72
Mean	12.13	9.07	9.94	10.44	9.56	12.67
Coefficient of variation	30.02	77.03	50.86	41.44	39.19	45.15

c) Depots

Depot traded HOSO (Head On Shell On) type of shrimp only as indicated by one hundred percent of the depot owners. Average per kg Bagda procurement price for size-20, size-30, size-44, size-66, size-100 and PUD over the 18-month period were Tk 533.78, Tk 425.78, Tk 327.50, Tk 256.00, Tk155.06 and Tk 69.83. The sale prices were respectively Tk 543.11, Tk 433.00, Tk 334.78, Tk 263.50, Tk 162.17 and Tk 77.33. Procurement prices of bagda had the highest variation for the PUD followed by size-66. For its sale price, the structure of price variation was similar, being the highest with PUD and lowest with size-66. The per kg gross marketing margin (sale price minus procurement price) became Tk 9.33 for size-20, Tk 7.22 for size-30, Tk 7.28 for size-44, Tk 7.50 for size-66, Tk 7.11 for size-100 and Tk 7.50 for PUD (Table 20).

Table 20. *Bagda* price differential per kg by Count size-wise (depots)

Statistics	20	30	44	66	100	PUD
Procurement Price per kg						
Standard deviation	20.79	18.78	16.09	8.15	7.32	3.96
Mean	533.78	425.78	327.50	256.00	155.06	69.83
Coefficient of variation	3.89	4.41	4.91	3.18	4.72	5.67
Sale Price per kg						
Standard deviation	19.22	17.96	15.70	7.98	6.79	3.93
Mean	543.11	433.00	334.78	263.50	162.17	77.33

Coefficient of variation	3.54	4.15	4.69	3.03	4.19	5.08
Price Differentials/Gross Marketing Margin per kg						
Standard deviation	6.41	2.49	1.32	1.58	1.32	1.20
Mean	9.33	7.22	7.28	7.50	7.11	7.50
Coefficient of variation	68.65	34.43	18.13	21.08	18.61	16.01

For *Horina*, the mean procurement prices were Tk 191.67 for size-20, Tk 170.61 for size-30, Tk 153.11 for size-40, Tk 130.78 for size-66, Tk 103.17 for size-100 and Tk 72.78 for PUD while the resale prices were Tk Tk201.11 for size-20, Tk 176.33 for size-30, Tk 159.28 for size-44, Tk 136.78 for size-66, Tk 121.11 and Tk 91.00. These provided gross marketing margins (price differentials) of Tk 9.44 for size 30, Tk 5.72 for size 30, Tk 6.17 for size 40, Tk 6.00 for size 66, Tk 17.94 for size 100 and Tk 18.22 for size PUD. It is worth mentioning that gross margins for some months for *Horina* were zero or negative. The PUD provided the highest per kg gross margin, followed by size-100 and size-20. The magnitude of per kg gross margins were Tk 18.22, Tk 17.94, and Tk 9.44. Size-80 showed the highest coefficient of variation (Table 21).

Table 21. *Horina* price differential per kg by Count size-wise (depots)

Statistics	**20**	**30**	**44**	**66**	**100**	**PUD**
Procurement Price per kg						
Standard deviation	10.85	8.99	8.48	6.88	10.33	6.89
Mean	191.67	170.61	153.11	130.78	103.17	72.78
Coefficient of variation	5.66	5.27	5.54	5.26	10.01	9.47
Sale Price per kg						
Standard deviation	12.92	11.10	8.72	7.35	5.07	5.27
Mean	201.11	176.33	159.28	136.78	121.11	91.00
Coefficient of variation	6.42	6.30	5.47	5.38	4.19	5.79
Price Differentials/Gross Marketing Margin per kg						
Standard deviation	6.97	8.90	8.16	8.10	10.58	6.59
Mean	9.44	5.72	6.17	6.00	17.94	18.22
Coefficient of variation	73.83	155.59	132.36	134.92	58.96	36.19

d) Agent

Average price differentials of *Bagda* for the agents were Tk 6.89 (size-20), Tk 3.33 (size 3-30), Tk 6.83 (size 44), Tk 6.56 (size 66), Tk 6.22 (size 100) and Tk 6.72 (size PUD). For Horinas, the prices differentials were TK 6.81, Tk 7.06, Tk 5.13, Tk 5.40, Tk 4.65, and Tk 2.96 per kg respectively for different sizes. Here, it is also observed that smaller size shrimp provided a larger margin than the bigger shrimp (Table 22).

Table 22. *Bagda* price differential per kg by Count size-wise (agents)

Statistics	20	30	44	66	100	PUD
Procurement Price per kg						
Standard deviation	17.85	19.18	14.52	7.16	6.07	5.51
Mean	544.83	442.61	338.50	264.00	163.78	66.67
Coefficient of variation	3.28	4.33	4.29	2.71	3.71	8.26
Sale Price per kg						
Standard deviation	17.74	18.58	14.25	7.11	6.31	5.37
Mean	551.72	445.94	345.33	270.56	170.00	73.39

Coefficient of variation	3.22	4.17	4.13	2.63	3.71	7.32
Price Differentials/Gross Marketing Margin per kg						
Standard deviation	0.76	13.61	1.62	0.70	0.55	1.84
Mean	6.89	3.33	6.83	6.56	6.22	6.72
Coefficient of variation	11.01	408.37	23.68	10.75	8.81	27.39

Table 23. *Horina* price differential per kg by Count size-wise (agents)

Statistics	20	30	44	66	100	PUD
Procurement Price per kg						
Standard deviation	12.72	11.79	7.94	7.97	4.70	5.92
Mean	200.50	176.33	158.61	136.22	120.61	90.89
Coefficient of variation	6.34	6.69	5.01	5.85	3.90	6.51
Sale Price per kg						
Standard deviation	11.04	9.04	8.54	7.81	7.47	6.75
Mean	210.94	186.89	172.17	153.39	130.28	99.72
Coefficient of variation	5.23	4.84	4.96	5.09	5.73	6.76
Price Differentials/Gross Marketing Margin per kg						
Standard deviation	6.51	6.44	4.13	3.71	4.51	2.96
Mean	10.44	10.56	13.56	17.17	9.67	8.83
Coefficient of variation	62.33	60.98	30.49	21.64	46.67	33.46

e) Processors

The mean prices of *Bagda* per kg were Tk 552 for size-20, Tk 446 for size 30, Tk 345 for size 44, Tk 270 for size 66, Tk 169 for size 100 and Tk 72 for size PUD. The coefficient of variation was the highest for the PUD, followed by size-30, size-00, size-20 and so on. The sale prices per kg were US$ 10.6, 9.55, 8.53, 6.37, 5.09 and 4.54 respectively for sizes, 20, 30, 44, 66, 100 and PUD. The sale prices show less variation as compared with procurement prices. In general, prices of *Horina* were much lower than Bagda. Like the procurement *Bagda, Horina* resale price also had lesser variation than that of the procurement prices (Table 24).

Table 24. *Bagda* price differential per kg by Count size-wise (processor)

Statistics	20	30	44	66	100	PUD
Procurement Price per kg						
Standard deviation	17.47	18.96	13.94	6.89	6.09	5.88
Mean	551.89	446.44	344.89	270.17	169.33	71.78
Coefficient of variation	3.17	4.25	4.04	2.55	3.60	8.19
Sale Price per kg						
Standard deviation	0.17	0.18	0.23	0.18	0.16	0.35
Mean	10.60	9.55	8.53	6.37	5.09	4.54
Coefficient of variation	1.60	1.93	2.67	2.75	3.15	7.65
Price Differentials/Gross Marketing Margin per kg						
Standard deviation	21.47	25.08	21.05	8.24	9.65	20.96
Mean	179.74	212.24	243.99	169.13	181.69	241.41
Coefficient of variation	11.95	11.82	8.63	4.87	5.31	8.68

Average gross marketing margins of the processors were the highest of all the stakeholders. For *Bagda*, the minimum per kg margin enjoyed by the processors was Tk 169.13 (US$2.45) and the

maximum was Tk 243.99 (US$3.53) per kg. As far as horina is concerned, average per kg gross margins of the processors ranged from Tk 78.84 (US$1.14) to Tk 216.54 (US$3.13) (Table 25).

Table 25. *Horina* price differential per kg by Count size-wise (processor)

Statistics	20	30	44	66	100	PUD
Procurement Price per kg						
Standard deviation	10.07	8.31	8.52	7.81	7.50	6.70
Mean	207.39	186.17	171.94	153.39	130.17	99.33
Coefficient of variation	4.86	4.46	4.95	5.09	5.76	6.75
Sale Price per kg						
Standard deviation	0.07	0.31	0.12	0.12	0.11	0.17
Mean	6.14	5.07	4.24	3.78	3.35	2.58
Coefficient of variation	1.10	6.09	2.89	3.23	3.26	6.48
Price Differentials/Gross Marketing Margin per kg						
Standard deviation	9.21	20.00	11.07	10.28	9.04	10.28
Mean	216.54	163.97	120.50	107.35	100.64	78.84
Coefficient of variation	4.25	12.20	9.18	9.58	8.98	13.04

Business information for the Stakeholders

The number of regular and seasonal staff of the traders was 29 and 53. All of the staffers were male. The average number of regular staff per trader was 1.20, while it was 2.20 for the seasonal staff. One hundred percent of the traders made purchases from the farmers. On average a single trader made shrimp purchases from 12 farmers. All of the staff (both regular and seasonal) of the depots were male too. Average regular staff per depot is 1.08 while seasonal staff average 2.50. All depots received supply from trader/faria while 25% of them simultaneously received supplies directly from farmers. Sources for procuring shrimp and fish for the agents were mainly farmers, depots, and landing/service centers. However, agent's most important source of procurement were the depots followed by landing/service centers. Processor's average numbers of regular and seasonal staff were 37 and 253 respectively. One important characteristic for the processor was that about 12% of the regular staff was female.

Incentive mechanism to and from different stakeholders

Incentives in the form of receiving cash advances is a common phenomenon in the shrimp market. This is mainly to ensure supply continuity and business relations.

Farmers did receive cash incentives from the traders/farias. Three-fourth of the traders said that they needed to provide incentives to ensure their supply comes from farmers and its continuity is maintained. Cash advances were the type of incentive given to the farmers. A trader advanced on an average, Tk 2157 per farmer. Farmers often receive cash incentives from the agents also.

One hundred percent of traders supplied shrimp to depots. Often the traders received cash incentives from the depots also. Sixty three percent of the traders indicated that they received cash advances from the depots. On average they received cash advance of Tk 71,451 from depots.

Fifty eight percent of the depots gave incentives to the traders, and the remaining 42% did not give any incentives for receiving supplies. The average number of traders receiving cash from the depots was 8, and the average cash advance amounted to Tk 17,14,285 each. As a supplier of shrimp to their next link, depots also received cash advances from higher stakeholders (agent). The average cash advance depots received from agents was Tk 11,75,000 per depot. However, not everybody received cash advances as incentives from the agent. One hundred percent of depots sold shrimp to agents. The average number of farmers and depots receiving incentives per agent was 75 and 11 percent respectively who were given cash advances averaging Tk2000 to each farmer and Tk 10,12,857 to each depot.

Like providers of incentives for procuring shrimp and fish, agents do receive incentives from their buyers also(i.e., processors). Each and every agent received cash advances from their buyer counterpart in 2008 and 2009. On average, each agent received a cash advance of Tk 14,56,250 as an incentive from the processors and big agents. All the agents sold shrimp to processors.

The processor was also required to provide cash incentives to agents to ensure supply continuity. The amount of cash advance given to the agent averaged Tk 52,50,000. Processors did not receive any incentive from the exporters. Processors sold most of the shrimp to the international market. However some also sold to both the local and international market. Fifty four percent of the exporters sold to the USA, 26% to UK, 4% to Japan and 16% sold to other international markets.

Opinion of stakeholders on price situation during 2008 and 2009

One hundred percent of the traders replied that price of shrimp was lower during 2008 while it was higher during 2009. They indicated that during 2008, shrimp prices started declining from January and continued downward for the rest of year. From March 2009 onward, it started reversing**.** The general impression of the depot owners, agents and processors is also that the price was lower during 2008 and higher during 2009. Processors indicated that prices for shrimp decreased (increased) from January 2008 (January 2009) onward. Most of the stakeholders were affected negatively while the price remained lower during 2008 as their earnings were reduced and their livelihood was negatively affected. However, they benefited from the existence of higher prices during 2009. The price increase helped expand the businesses of many stakeholders favorably.

Price trend Analysis

Shrimp price trend analysis:

Table 26 and 27 summarize the results of the trend line fitted to the data on procurement and resale price of the selected traders, depots, agents, and processors. It is to be mentioned that in case of the resale price of the processor, the prices per kg are in US dollars. In examining the price trends, graphical analyses showing the scatters of prices, average prices, and trend prices have also been made. These are presented in the graphs below (Figure 26 to 67).

Table 26: Results of the estimates of bagda procurement price trend of different stakeholders

Stakeholder	Shrimp size	Intercept	Slope	Mean price	R^2
Trader	Size-20	514.30	2.093	531.13	0.394
	Size-30	406.32	2.040	422.66	0.225
	Size-44	305.18	2.421	324.46	0.292
	Size-66	233.78	2.350	252.46	0.933
	Size-100	146.12	1.133	155.2	0.730
Depot	Size-20	533.27	0.458	534	0.09
	Size-30	420.84	0.517	426	0.12
	Size-44	320.25	0.754	328	0.22
	Size-66	246.44	1.017	256	0.20
	Size-100	149.26	0.602	155	0.38
	Size PD	65.41	0.469	70	0.67
Agent	Size-20	531.42	1.417	545	0.26
	Size-30	428.88	1.431	443	0.32
	Size-44	328.47	1.055	339	0.31
	Size-66	258.66	0.558	264	0.21
	Size-100	159.49	0.448	164	0.27
Processor	Size-20	539.29	1.324	551.89	0.23
	Size-30	445.44	0.105	446.00	0.001
	Size-44	333.44	1.206	345.00	0.216
	Size-66	264.38	0.605	270.16	0.22
	Size-100	163.07	0.646	169.33	0.33
	Size PD			71.77	

Table 27: Results of the estimates of bagda resale price trend of different stakeholders

Stakeholder	Shrimp size	Intercept	Slope	Mean price	R^2
Trader	Size-20	525.18	2.079	541.93	0.38
	Size-30	416.57	2.167	433.93	0.49
	Size-44	315.84	2.481	335.80	0.73
	Size-66	245.87	2.227	263.73	0.84
	Size-100	154.33	1.347	165.26	0.82
Depot	Size-20	541.98	0.120	543.11	0.022
	Size-30	430.68	0.243	433	0.055
	Size-44	328.52	0.663	334.77	0.200
	Size-66	253.73	1.023	263.5	0.383
	Size-100	157.86	0.454	162.16	0.279
	Size PD	73.58	0.391	77.33	0.505
Agent	Size-20	539.40	1.308	551.72	0.23
	Size-30	445.52	0.094	445.94	0.02
	Size-44	335.40	1.051	345.33	0.30
	Size-66	265.71	0.499	270.05	0.18
	Size-100	165.87	0.431	170.00	0.25
	Size PD	68.77	0.467	73.39	0.63
Processor	Size-20	10.46	0.015	10.60	0.14
	Size-30	9.41	0.014	9.55	0.15
	Size-44	8.26	0.028	8.53	0.32
	Size-66	6.17	0.021	6.37	0.32
	Size-100	4.85	0.025	5.09	0.49
	Size PD	4.03	0.056	4.54	1.23

Trader:

Traders/farias are usually the second link in the market channel. The traders buy shrimp directly from the farmers. Procurement prices of all the different sizes of shrimp of the traders increased over the 18-month period starting from July 2008 to June 2009 as evidenced by the positive slopes of the trend line. The average monthly linear growth rates were estimated at 0.394% for size-20, 0.225% for size-30, 0.933% for size 66, and 0.73% for size-100 shrimp (Table 26). Slopes of the resale price trend of the traders were also positive. The highest average monthly growth rate for the resale price was 0.84% for size-66 shrimp. On the other hand, the lowest monthly growth (0.38%) took place with the size-20 shrimp (Table 27). This makes clear that prices of bigger shrimp (lower number shrimp per kg) grew less as compared to the prices of the smaller shrimp.

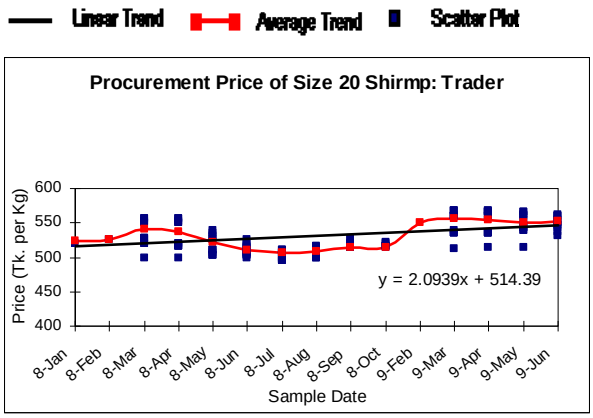


Fig-26: Trader's Procurement Price of Count size 20

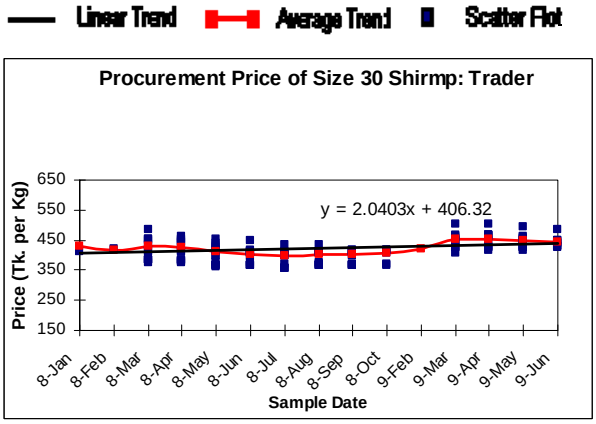


Fig-27: Trader's Procurement Price of Count size 30

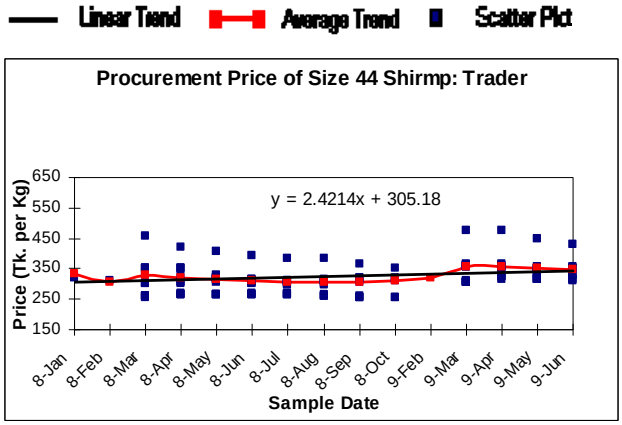


Fig-28: Trader's Procurement Price of Count size 44

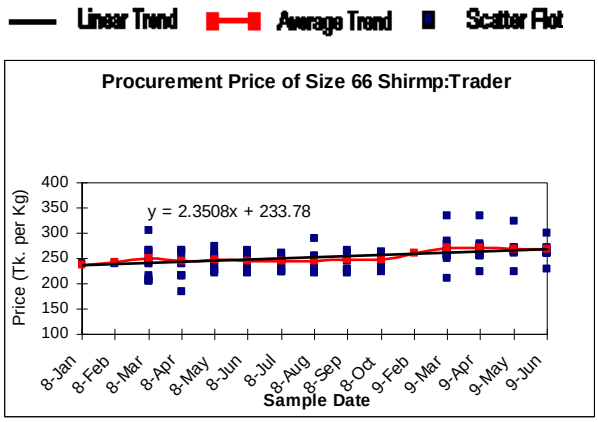


Fig-29: Trader's Procurement Price of Count size 66

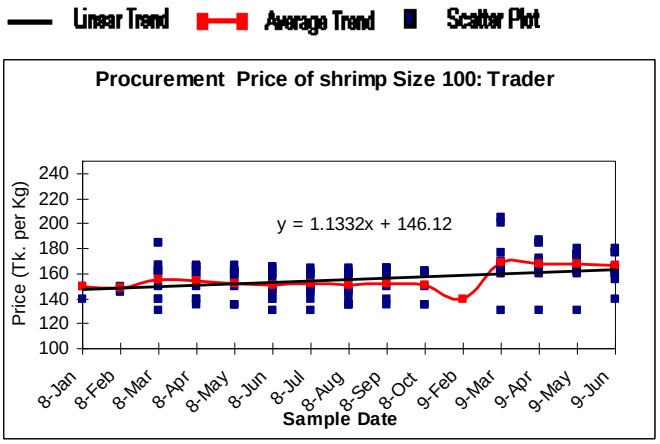


Fig-30: Trader's Procurement Price of Count size 100

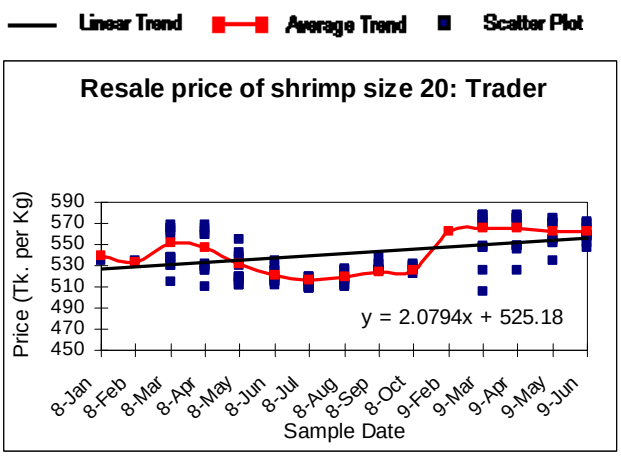


Fig-31: Trader's Sale Price of Count size 20

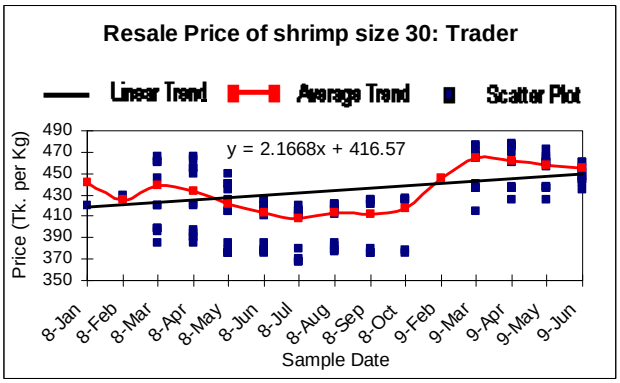


Fig-32: Trader's Sale Price of Count size 30

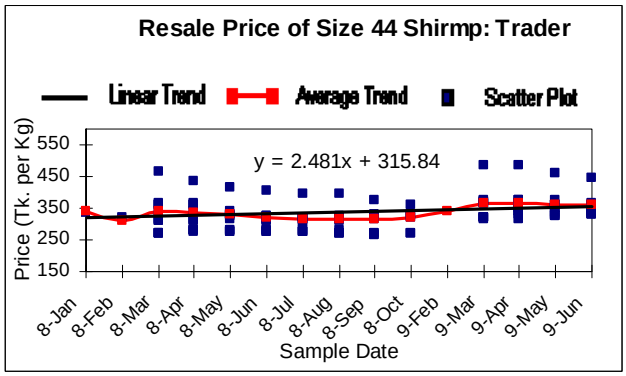


Figure 33: Trader's Sale Price of Count size 44

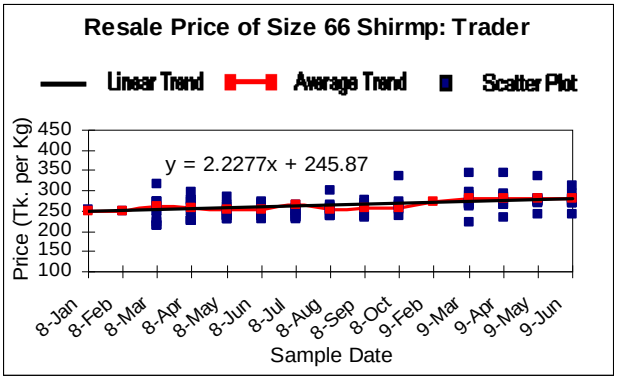


Figure34: Trader's Sale Price of Count size 66

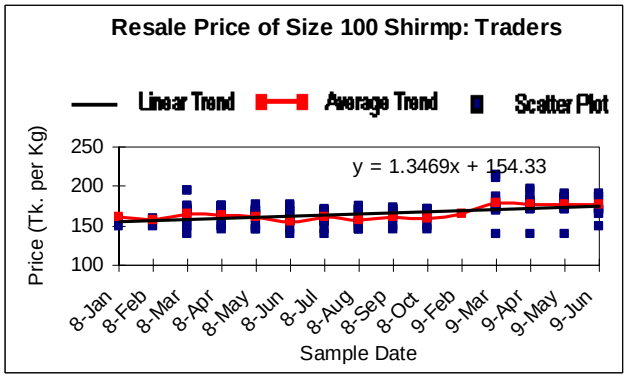


Figure 35: Trader's Sale Price of Count size 100

Depots:

The depots buy shrimp mostly (90-95%) from the traders. However, some portion (about 5-10%) of their procurement also comes directly from farmers. The procurement price trends of depots were also positive for all the sizes of shrimp. This holds for resale prices as well. The monthly procurement prices were estimated to have grown by 0.09% for size-20, 0.12% for size-30, 0.22% for size-44, 0.20% for size -66, 0.38% for size-100 and 0.67% for size-PD (Table 26 and Fig-36-46). Rate of monthly resale price growth of shrimp was the lowest (0.022%) for size-20 and highest (0.505%) for size PUD.

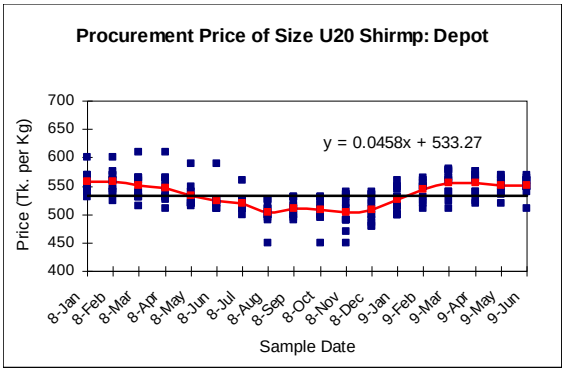


Fig-36: Depot's Procurement Price of Count size 20

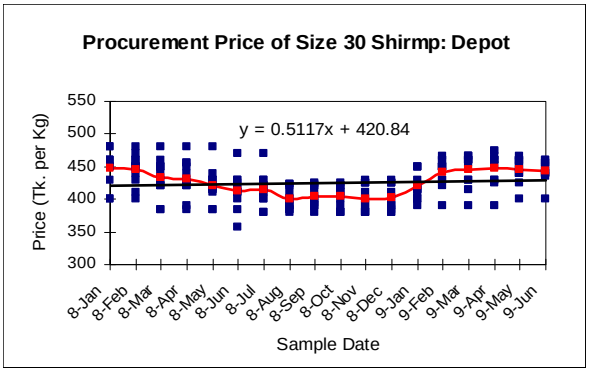


Fig-37: Depot's Procurement Price of Count size 20

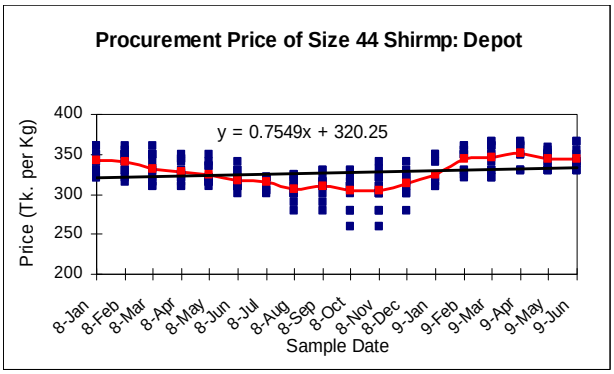


Fig-38: Depot's Procurement Price of Count size 44

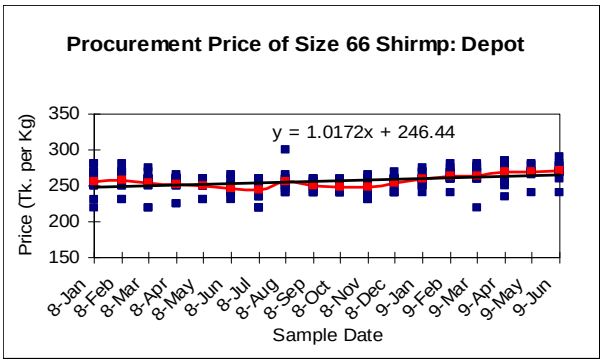


Fig-39: Depot's Procurement Price of Count size 66

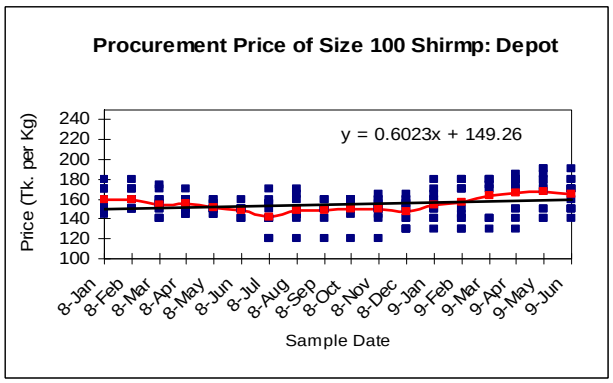


Fig-40: Depot's Procurement Price of Count size 100

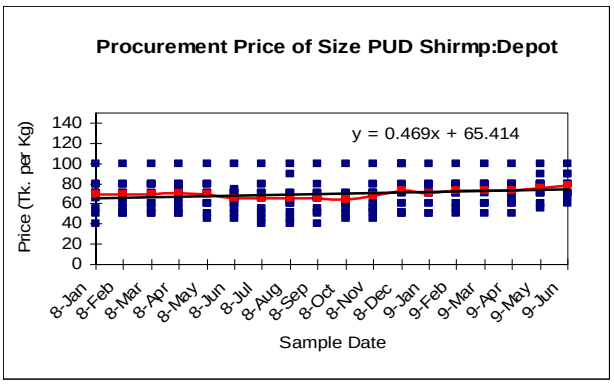


Fig-41: Depot's Procurement Price of Count size PUD

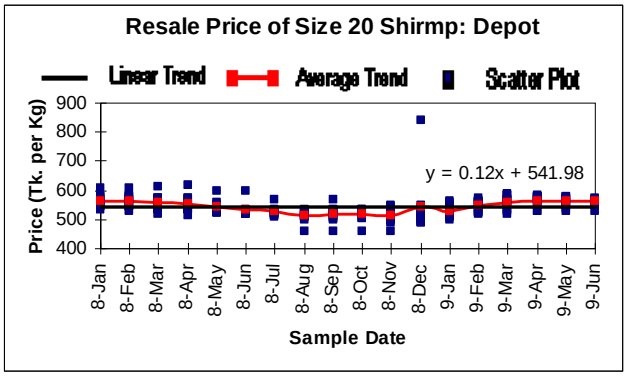


Fig-42: Depot's Sale Price of Count size 20

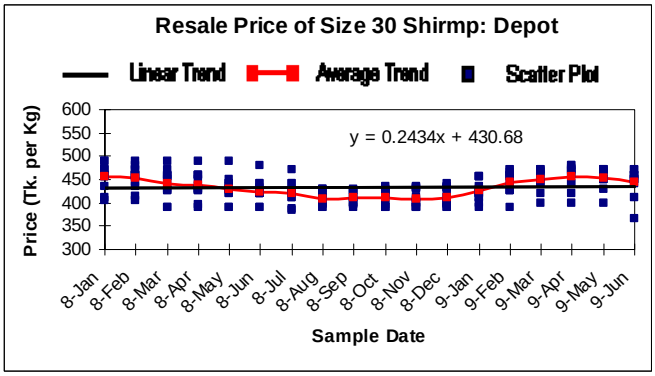


Fig-43: Depot's Sale Price of Count size 30

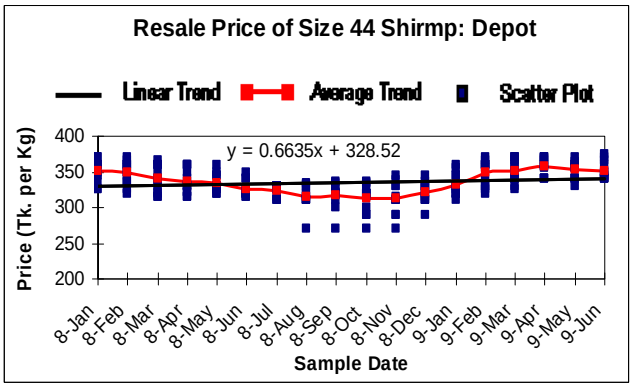


Fig-44: Depot's Sale Price of Count size 44

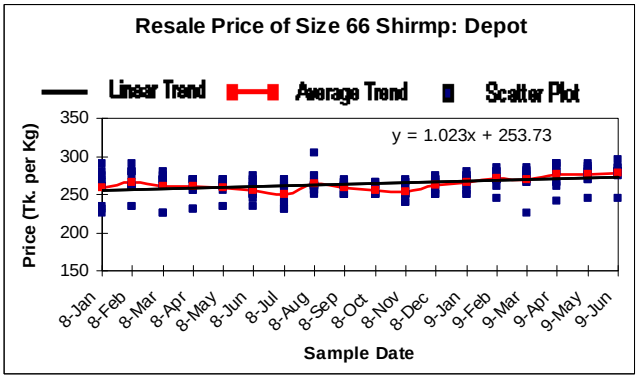


Fig-45: Depot's Sale Price of Count size 66

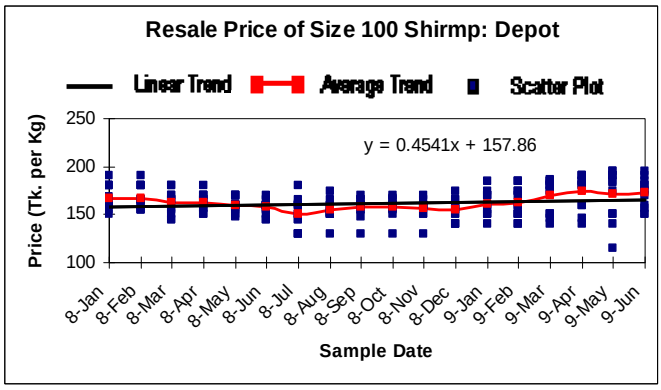


Fig-46: Depot's Sale Price of Count size 100

Agents:

Agents procure shrimp mainly (90-95%) from depots, the rest also come from traders. Having procured, they supply shrimp to the processor. Both the procurement and resale price trends of shrimp the agent handles, were positive. The average monthly growth rate of the procurement price of shrimp of the agents ranged from 0.21% to 0.32% (Table 26). The lowest growth rate occurred for the size-66 shrimp while the highest was with size-30 shrimp. Size PD achieved the highest (0.63%) monthly price growth followed by size-100 shrimp. All are presented in Figures 47 -57.

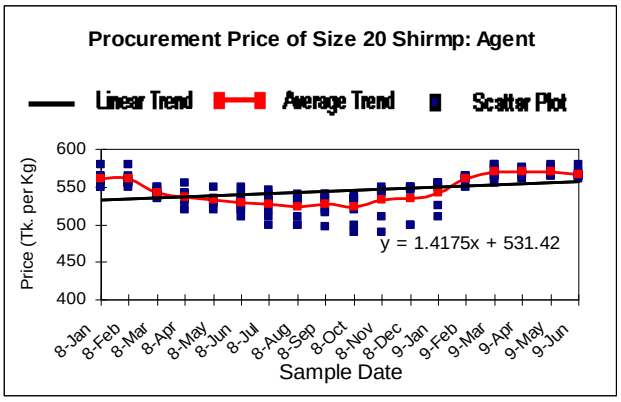


Fig-47: Agent's Procurement Price of Count size 20

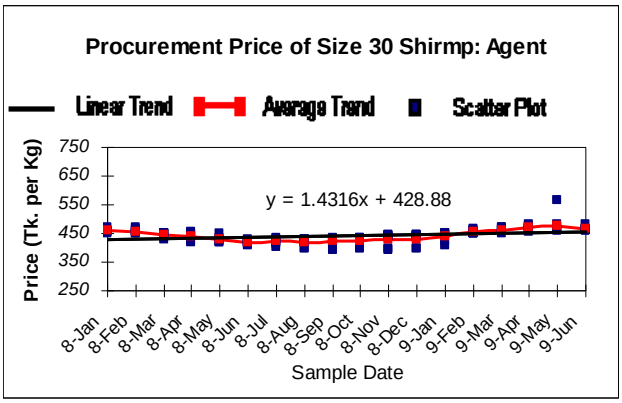


Fig-48: Agent's Procurement Price of Count size 30

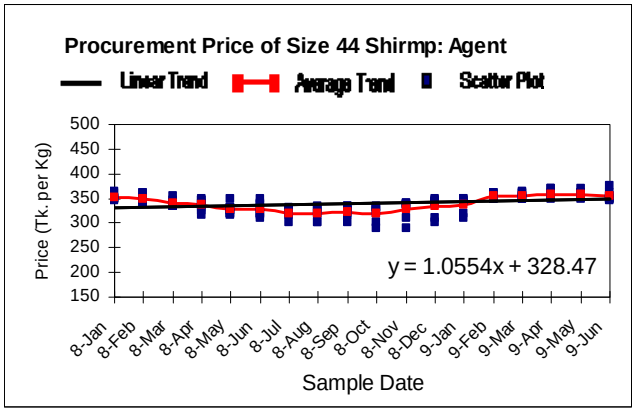


Fig-49: Agent's Procurement Price of Count size 44

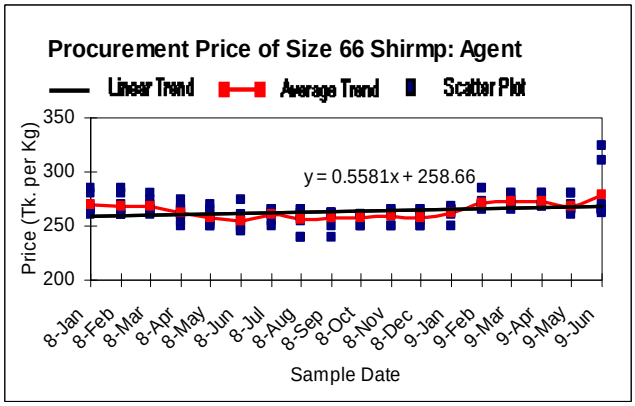


Fig-50: Agent's Procurement Price of Count size 66

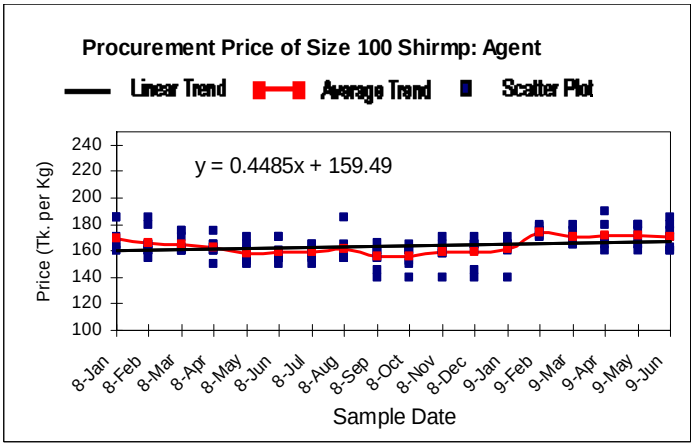


Fig-51: Agent's Procurement Price of Count size 100

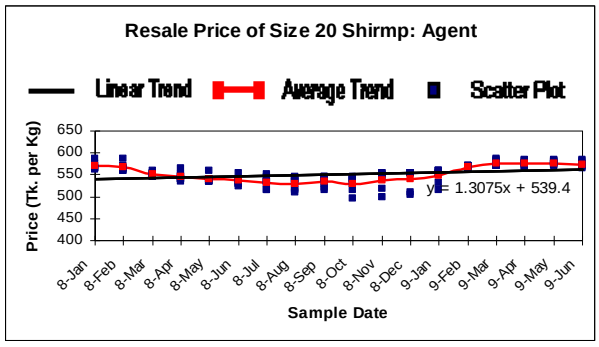


Fig-52: Agent's Sale Price of Count size 20

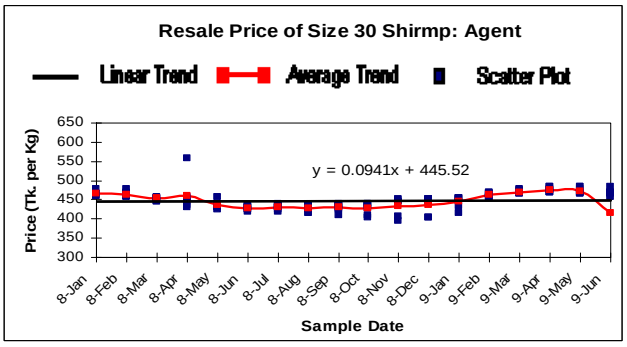


Fig-53: Agent's Sale Price of Count size 30

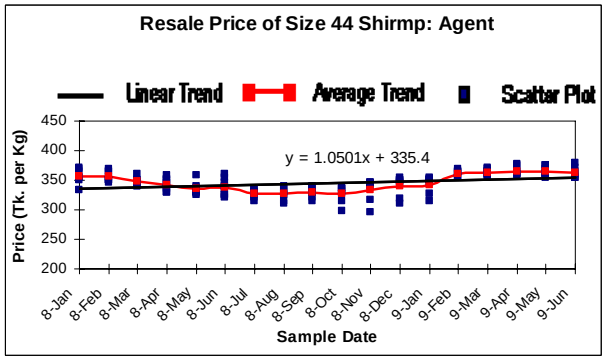


Fig-54: Agent's Sale Price of Count size 44

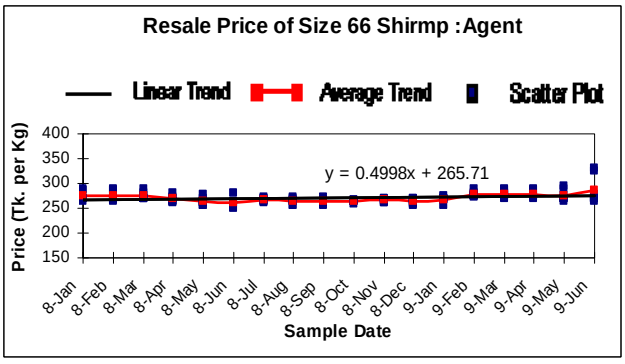


Fig-55: Agent's Sale Price of Count size 66

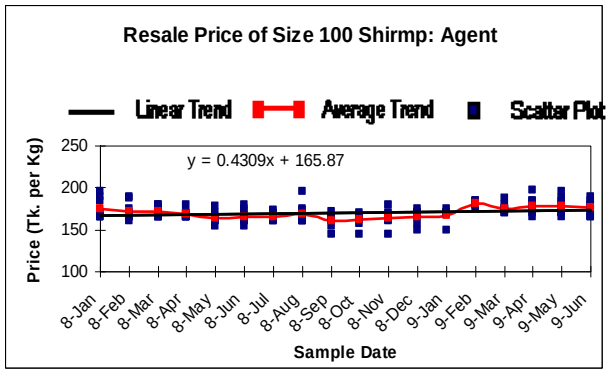


Fig-56: Agent's Sale Price of Count size 100

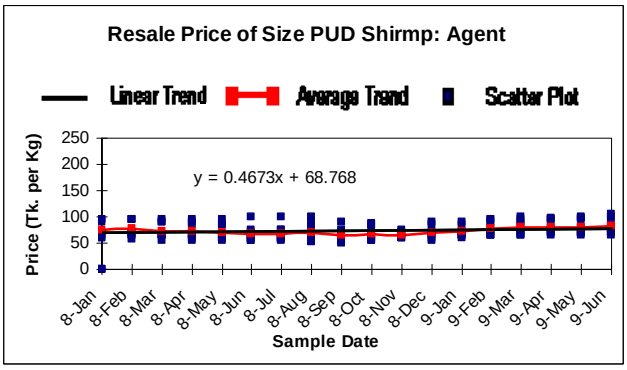


Fig-57: Agent's Sale Price of Count size PUD

Processors:

Processors are the last link in the marketing channel. They procure 100% from the agents. Having collected shrimp from the agents, they process it and export it in the international markets. USA, Belgium, UK and Japan are the most important international markets of the processors of Bangladeshi shrimp. Growth rates in the procurement prices of the processors ranged from a minimum of 0.02% per month to as high as 0.33%. Again the price of small shrimp (size PD and 100) grew at a relatively higher rate. It is to be mentioned that resale price of the processors are shown in US dollars. The monthly growth rates in the resale price of shrimp for the processors appear to be higher for all sizes compared to other stakeholders. The growth of resale prices was the minimum for size-20 shrimp (0.20%) and maximum with the shrimp PUD (1.23%).

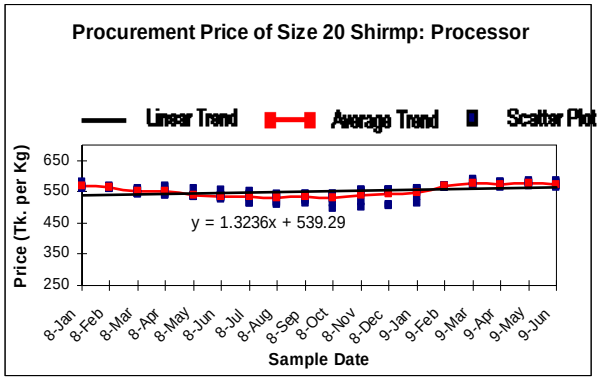


Fig-58: Processor's Procurement Price of Count size 20

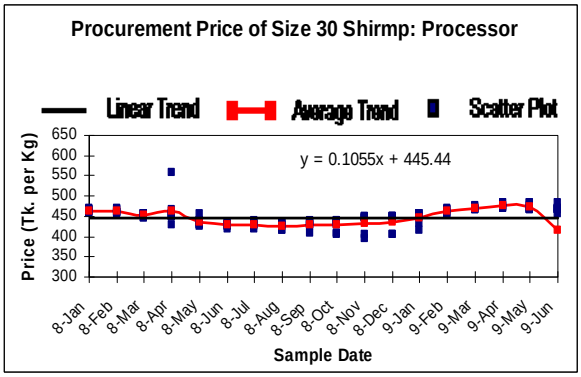


Fig-59: Processor's Procurement Price of Count size 30

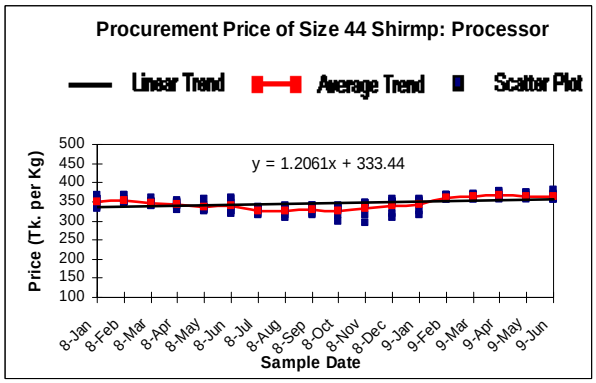


Fig-60: Processor's Procurement Price of Count size 44

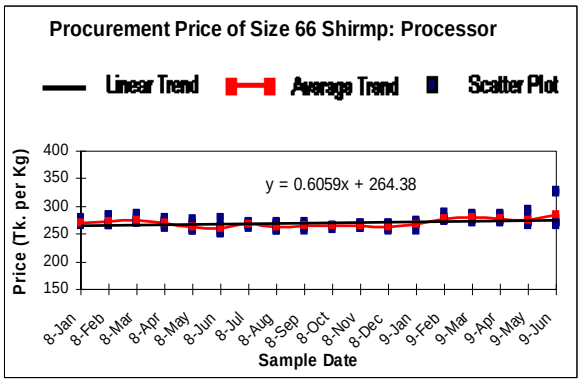


Fig-61: Processor's Procurement Price of Count size 66

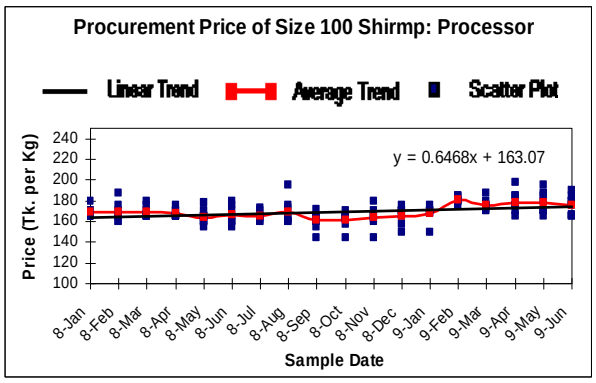


Fig-62: Processor's Procurement Price of Count size 100

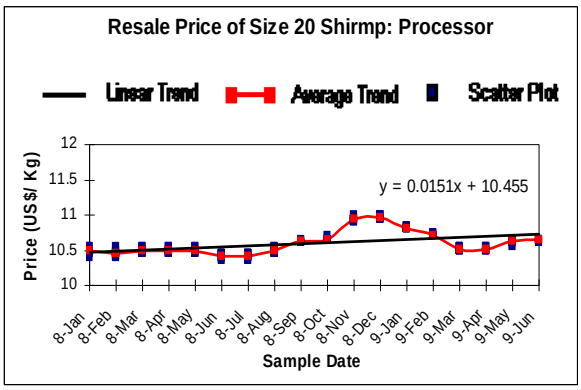


Fig-63: Processor's Sale Price of count size 20

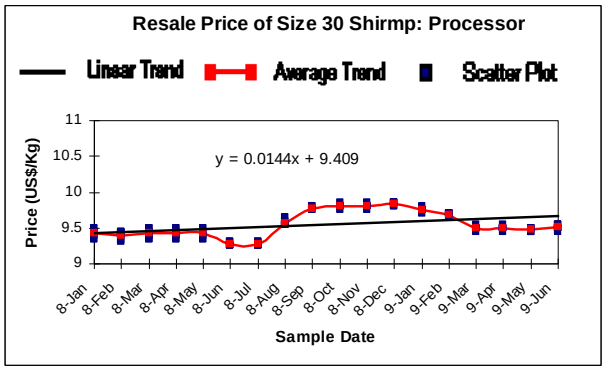


Fig-64: Processor's Sale Price of Count size 30

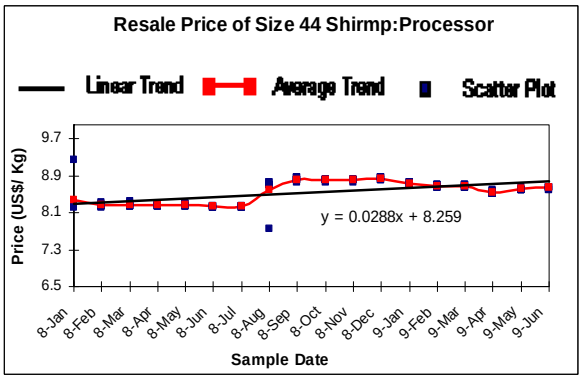


Fig-65: Processor's Sale Price of Count size 44

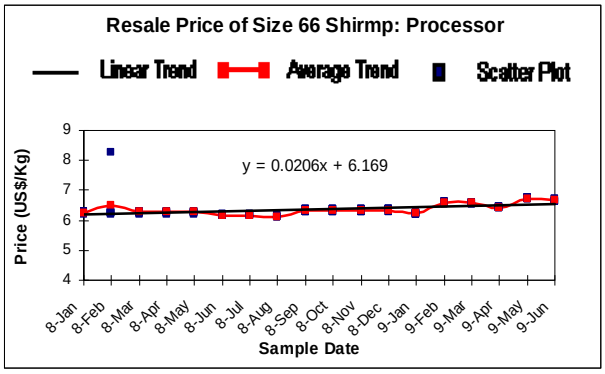


Fig-66: Processor's Sale Price of Count size 66

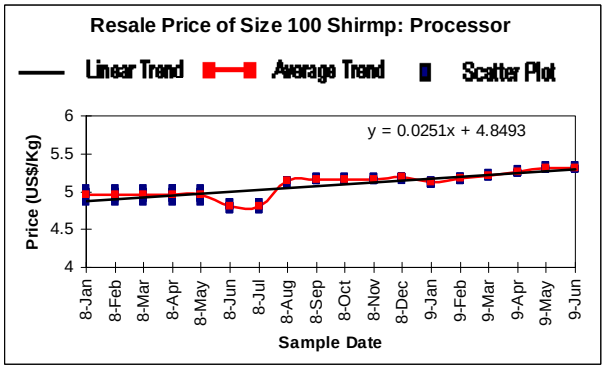


Fig-67: Processor's Sale Price of Count size 100

5. Conclusions and Recommendations

Impact of Price Changes on Different Stakeholder

No stakeholders were reported to have suffered adversely due to price changes. The price changes affected farmers, traders, depot, agents, processors, exporters, input suppliers, technology providers, associated labourers, fishermen and transporters. Good health was believed to have been maintained due to price increases to families of farmers, traders, depot owners, agents, associated labourers, fishermen and transporters. Other positive benefits, as mentioned by different stakeholders, were increased employment, the extension of farm areas, extension of business, and better capacity utilization.

Impact of Tsunami and US Anti Dumping

Regarding the tsunami, the majority of farmers did not know about its occurrence. However, from traders onward up to processors they were aware of the occurrence of the tsunami. Farmers, traders and depots indicated that there were no effects of the tsunami on their livelihood but the Sidr in 2007 and Aila in 2009 affected shrimp production, price, and livelihoods. However, agents and processors indicated that there were some indirect effects of imposing non-tariff barriers like quality concerns imposed by the EU that reduced shrimp exports from Bangladesh. The processors and the agents concluded this since there was less production in the Aila affected areas in 2009. Most of the stakeholders were concerned about the affect of climate change in Bangladesh that may reduce the opportunity to export more shrimp in the future.

With regards to US anti dumping, the stakeholders other than processors were unaware. Since the processors are directly involved with the export of shrimp, they heard about it. The answers relating to the impact of US anti dumping were same as those of the effect of tsunami. The farmers, traders, depots and agent were not negatively affected by this. However, the processors identified some indirect effects, but livelihood was not directly affected.

Recommendations

This report shows that the shrimp industry in Bangladesh is relatively healthy. Shrimp prices have changed over the years but do not show any significant changes. The Indian Ocean tsunami and the

occurrence of the US anti-dumping case against other Asian countries did not have any negative effects.

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

References

Bhattacharya, D., M. Rahman, and F.A. Khatun (1999) Environmental Impacts of Trade Liberalization and of Policies for the Sustainable Management of Natural Resources: A Case Study on Bangladesh's Shrimp Farming Industry, Geneva.

BFFEA, Bangladesh Frozen Foods Exporters Association (2009). Shrimp and Fish News, BFFEA, Skylark point, 24/A, Bijoynagar North South Road, Dhaka-1000.

DoF, 2007: Fish Catch Statistics of Bangladesh 2206-07, Matshya Bhaban, Ramna, Dhaka

DoF, 2009: Fisheries Statistical Yearbook of Bangladesh 2007-08, Matshya Bhaban, Ramna, Dhaka

DoF, 2009: National Fish Week 2009. Matshya Bhaban, Ramna, and Ministry of Fisheries and Livestock, Dhaka, August, 2009

Mazid, M.A. (2002). Development of Fisheries in Bangladesh: Plans and Strategies for Income Generation and Poverty Alleviation, published by Nasima Mazid, 74, A/2, Kallyanpur Main Road, Dhaka 1207, Dhaka

Vietnam Annexes

Annexes

Annex 1. Samples and locations for the study

	Ca Mau	Bac Lieu	Soc Trang	Ben Tre	Tra Vinh	Kien Giang	Hau Giang	Can Tho	Khanh Hoa	Ninh Thuan	Binh Thuan
Farmers	48	24	54	28	0	0	0	0	14	3	6
Traders	2	10	0	0	1	8	0	0	0	0	0
Processors	8	8	4	0	0	1	2	1	0	0	0
TOTAL	**58**	**42**	**58**	**28**	**1**	**9**	**2**	**1**	**14**	**3**	**6**

Annex 2. List of surveyed farmers

No.	Farmer's name	Village	Commune	District	Province	Species
1	Ma Van Son	Thanh Hoa	Thanh Quoi	My Xuyen	Soc Trang	*P.monodon*
2	Phan Thanh Binh	Hamlet 1	Thanh Tri	Binh Dai	Ben Tre	*P.monodon*
3	Nuyen Van Binh	Hamlet 1	Dinh Trung	Binh Dai	Ben Tre	*P.monodon*
4	Le Sy Luyen	Bac Mieu	Dai Hoa Loc	Binh Dai	Ben Tre	*P.monodon*
5	Phan Thanh Nghia	Hamlet 1	Dinh Trung	Binh Dai	Ben Tre	*P.monodon*
6	Vo Tan Moi	Binh Thanh 1	Thanh Tri	Binh Dai	Ben Tre	*P.monodon*
7	Dao Van Dong	Binh Thanh 2	Thanh Tri	Binh Dai	Ben Tre	*P.monodon*
8	Nguyen Van Hai	Bac Mieu	Dai Hoa Loc	Binh Dai	Ben Tre	*P.monodon*
9	Vo Van Hieu	Bac Mieu	Dai Hoa Loc	Binh Dai	Ben Tre	*P.monodon*
10	Dao Van Thuat	Hamlet 1	Dinh Trung	Binh Dai	Ben Tre	*P.monodon*
11	Le Minh Tuan	Hamlet 5	Binh Thang	Binh Dai	Ben Tre	*P.monodon*
12	Tran Huy Vu	Hamlet 1	Dinh Trung	Binh Dai	Ben Tre	*P.monodon*
13	Nguyen Thanh Minh	Hamlet 1	Thanh Tri	Binh Dai	Ben Tre	*P.monodon*
14	Nguyen Van Giao	Hamlet 2	Thanh Tri	Binh Dai	Ben Tre	*P.monodon*
15	Ho Ngoc Thanh	Hamlet 2	Thanh Tri	Binh Dai	Ben Tre	*P.monodon*
16	Ngo Thi Nho	Hamlet 1	Thanh Tri	Binh Dai	Ben Tre	*P.monodon*
17	Phan Thanh Hoa	Hamlet 1	Dinh Trung	Binh Dai	Ben Tre	*P.monodon*
18	Tran Van Mai	Binh Hoa	Thi Tran	Binh Dai	Ben Tre	*P.monodon*
19	Nguyen Thi Em	Hamlet 1	Dinh Trung	Binh Dai	Ben Tre	*P.monodon*
20	Phan Thanh Binh	Hamlet 1	Dinh Trung	Binh Dai	Ben Tre	*P.monodon*
21	Nguyen Van Hung	Hamlet 1	Dinh Trung	Binh Dai	Ben Tre	*P.monodon*
22	Nguyen Van Liem	Hamlet 1	Dinh Trung	Binh Dai	Ben Tre	*P.monodon*
23	Nguyen Tat Linh	Hamlet 1	Dinh Trung	Binh Dai	Ben Tre	*P.monodon*
24	Le Van Xuan	Hamlet 1	Thanh Tri	Binh Dai	Ben Tre	*P.monodon*
25	Tran Van Liem	Hamlet 2	Thanh Tri	Binh Dai	Ben Tre	*P.monodon*
26	Tran Tan Bay	Binh Hoa	Thi Tran	Binh Dai	Ben Tre	*P.monodon*
27	Tran Quoc Viet	Bac Mieu	Dai Hoa Loc	Binh Dai	Ben Tre	*P.monodon*
28	Nguyen Van Hung	Hamlet 1	Dinh Thoi	Binh Dai	Ben Tre	*P.monodon*
29	Tran Vu Phong	Hamlet 1	Thanh Tri	Binh Dai	Ben Tre	*P.monodon*
30	Dao Van Chung	An Trach Dong	Vinh Trach	tx bac lieu	Bac Lieu	*P.monodon*
31	Bui Minh Cuong	An Trach Dong	Vinh Trach	tx bac lieu	Bac Lieu	*P.monodon*

32	Dao Thanh Phong	An Trach Dong	Ben Trach	tx bac lieu	Bac Lieu	*P.monodon*
33	Tran Thanh Huan	Hamlet 3	Phuong 2	tx bac lieu	Bac Lieu	*P.monodon*
34	Do Hong Hoa	Hamlet 3	Phuong 3	tx bac lieu	Bac Lieu	*P.monodon*
35	Tran Van Vu	An Trach Dong	Vinh Trach	tx bac lieu	Bac Lieu	*P.monodon*
36	Tran Van Trinh	Hamlet 3	Phuong 2	tx bac lieu	Bac Lieu	*P.monodon*
37	Nguyen Van Hau	Dau Lo	Nha Mat	tx bac lieu	Bac Lieu	*P.monodon*
38	Quach Thanh Hung	Dau Lo	Nha Mat	tx bac lieu	Bac Lieu	*P.monodon*
39	Le Thi Tam	Dau Lo	Nha Mat	tx bac lieu	Bac Lieu	*P.monodon*
40	Nguyen Dung Minh	An Trach Dong	Ben Trach	tx bac lieu	Bac Lieu	*P.monodon*
41	Ngo Van Diep	An Trach Dong	Ben Trach	tx bac lieu	Bac Lieu	*P.monodon*
42	Lai The Chien	Hamlet 3	Phuong 2	tx bac lieu	Bac Lieu	*P.monodon*
43	Le Thanh Phong	Hamlet 3	Phuong 2	tx bac lieu	Bac Lieu	*P.monodon*
44	Luu Viet Nghi	Dau Lo	Nha Mat	tx bac lieu	Bac Lieu	*P.monodon*
45	Le Van Tu	Dau Lo	Nha Mat	tx bac lieu	Bac Lieu	*P.monodon*
46	Tran Van Son	Hamlet 17	Vinh Hau A	Hoa Binh	Bac Lieu	*P.monodon*
47	Nguyen Ngoc An	kinh tu	Hoa My	Cai Nuoc	Ca Mau	*P.monodon*
48	Ho Van Bien	kinh tu	hoa my	cai nuoc	ca mau	*P.monodon*
49	Ngo Van Dien	kinh tu	hoa my	cai nuoc	ca mau	*P.monodon*
50	Tran Van Do	kinh tu	hoa my	cai nuoc	ca mau	*P.monodon*
51	Nguyen Van Tuan	Cai Bat	hoa my	cai nuoc	ca mau	*P.monodon*
52	Le Trung Hau	Cai Bat	hoa my	cai nuoc	ca mau	*P.monodon*
53	Ngo Van Nam	Tan Thanh A	Ta Dan	Dam Doi	Ca Mau	*P.monodon*
54	Ngo Minh Tan	Tan Long	Tan Duyet	Dam Doi	ca mau	*P.monodon*
55	Pham Thanh Binh	Tan Thanh A	Tan Dan	Dam Doi	ca mau	*P.monodon*
56	Phan Van Bao	Tan Long	Tan Duyet	Dam Doi	ca mau	*P.monodon*
57	Nguyen Van Lam	kinh tu	hoa my	cai nuoc	ca mau	*P.monodon*
58	Ngo Van Moc	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
59	Nguyen Phuc Hung	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
60	Doan Van Tuan	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
61	Vo Van Mung	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
62	Pham Chi Trung	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
63	Vo Van Trau	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
64	Vo Van Viet	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
65	Ngo Xuan Hong	kinh tu	hoa my	cai nuoc	ca mau	*P.monodon*
66	Nguyen Van My	kinh tu	hoa my	cai nuoc	ca mau	*P.monodon*
67	Nguyen Luan	Cai Bat	hoa my	cai nuoc	ca mau	*P.monodon*
68	Vo Van Nhon	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
69	Nguyen Phi Hong	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
70	Quach Thanh Liem	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
71	Nguyen Dang Khoa	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
72	Ha Van Tuan	Tan Long	Tan Duyet	Dam Doi	ca mau	*P.monodon*
73	Tran Van Truong	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
74	Doan Van Nhon	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
75	Quach Van Vu	Cai Bat	hoa my	cai nuoc	ca mau	*P.monodon*
76	Vo Thanh Hung	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
77	Nguyen Thanh Liem	Tan Thanh A	Tan Dan	Dam Doi	ca mau	*P.monodon*
78	Tran Huy Hoang	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
79	Vo Van Giang	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*

80	Vo Chuc Nang	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
81	Nguyen Manh Thuong	kinh tu	hoa my	cai nuoc	ca mau	*P.monodon*
82	Le Thanh Trieu	kinh tu	hoa my	cai nuoc	ca mau	*P.monodon*
83	Truong Van Hiep	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
84	Nguyen Van Tuan	Tan Long	Tan Duyet	Dam Doi	ca mau	*P.monodon*
85	Ngo Van Dinh	Tan Long	Tan Duyet	Dam Doi	ca mau	*P.monodon*
86	Nguyen Minh Chien	Tan Thanh A	Tan Dan	Dam Doi	ca mau	*P.monodon*
87	Nguyen Van Rong	kinh tu	hoa my	cai nuoc	ca mau	*P.monodon*
88	Nguyen Thanh Hai	Cai Bat	hoa my	cai nuoc	ca mau	*P.monodon*
89	Vo Van Be	Lung Thuoc	Loi An	Tran Van Thoi	ca mau	*P.monodon*
90	Tran Chi Su	Tan Thanh A	Tan Dan	Dam Doi	ca mau	*P.monodon*
91	Ly Chi Thanh	Tan Thanh A	Tan Dan	Dam Doi	ca mau	*P.monodon*
92	Tran Van Viet	Tan Thanh A	Tan Dan	Dam Doi	ca mau	*P.monodon*
93	Ngo Hoang Ngoi	Tan Long	Tan Duyet	Dam Doi	ca mau	*P.monodon*
94	Vo Minh Thanh	Tan Long	Tan Duyet	Dam Doi	ca mau	*P.monodon*
95	Trinh Minh Trong	Co Co	Ngoc To	My Xuyen	Soc Trang	*P.monodon*
96	Nguyen Van Ngoc	Hoa Loi	Ngoc Dong	My Xuyen	Soc Trang	*P.monodon*
97	Trinh Minh Chung	Co Co	Ngoc To	My Xuyen	Soc Trang	*P.monodon*
98	Nguyen Thi Hong	Hoa Trung	Hoa Tu 1	My Xuyen	Soc Trang	*P.monodon*
99	Trinh Minh Duong	Co Co	Ngoc To	My Xuyen	Soc Trang	*P.monodon*
100	Nguyen Van Dung	Hoa Loi	Ngoc Dong	My Xuyen	Soc Trang	*P.monodon*
101	Quach Hoang Tuoi	Thanh Hoa	Thanh Quoi	My Xuyen	Soc Trang	*P.monodon*
102	Ngo Van Lanh	Hoa Nho A	Hoa Tu 2	My Xuyen	Soc Trang	*P.monodon*
103	Luu Thanh Cong	Hamlet 3	Phuong 2	tx bac lieu	Bac Lieu	*P.monodon*
104	Bui Van Tuyen	Hamlet 17	Vinh Hau A	Hoa Binh	Bac Lieu	*P.monodon*
105	Tran Van Huan	Hamlet 17	Vinh Hau A	Hoa Binh	Bac Lieu	*P.monodon*
106	Nguyen Van Toa	Gong Giua	Hiep Thanh	tx bac lieu	Bac Lieu	*P.monodon*
107	Tran Thi Lao	Hoa Truc	Hoa Tu 1	My Xuyen	Soc Trang	*P.monodon*
108	Nguyen Van Hai	Hoa Binh	gia hoa 2	my xuyen	Soc Trang	*P.monodon*
109	Bui Van Chuan	Hoa Truc	Hoa Tu 1	my xuyen	Soc Trang	*P.monodon*
110	Dang Thanh Liem	Hoa De	Hoa Tu 1	My Xuyen	Soc Trang	*P.monodon*
111	Dang Van Theo	Hoa De	Hoa Tu 1	My Xuyen	Soc Trang	*P.monodon*
112	Tran Hong A	Hoa Truc	Hoa Tu 1	my xuyen	Soc Trang	*P.monodon*
113	Nguyen Thanh Tan	binh hoa	gia hoa 2	my xuyen	Soc Trang	*P.monodon*
114	Ngo Minh Chien	Nhon Hoa	gia hoa 2	my xuyen	Soc Trang	*P.monodon*
115	Le Van Hoc	hoa tan	Hoa Tu 1	my xuyen	soc trang	*P.monodon*
116	trinh minh phung	co co	ngoc to	my xuyen	Soc Trang	*P.monodon*
117	Lam Minh Lon	hoa nho A	Hoa Tu 2	my xuyen	Soc Trang	*P.monodon*
118	nguyen van may	hoa loi	ngoc dong	my xuyen	soc trang	*P.monodon*
119	nguyen van khi	Nhon Hoa	gia hoa 2	my xuyen	Soc Trang	*P.monodon*
120	vo thanh thang	hoa nho B	Hoa Tu 2	my xuyen	Soc Trang	*P.monodon*
121	nguyen hoang tu	co co	ngoc dong	my xuyen	Soc Trang	*P.monodon*
122	ngo van cong	hoa loi	ngoc dong	my xuyen	Soc Trang	*P.monodon*
123	le hong van	hoa trung	Hoa Tu 1	my xuyen	Soc Trang	*P.monodon*
124	huynh van trieu	long hoa	gia hoa 1	my xuyen	soc trang	*P.monodon*
125	pham van hien	hoa muon	ngoc to	my xuyen	soc trang	*P.monodon*
126	vo van kieu	du thoa	tham don	my xuyen	Soc Trang	*P.monodon*
127	duong ho vu	du thoa	tham don	my xuyen	Soc Trang	*P.monodon*

128	ngo cong minh man	hoa nho A	Hoa Tu 2	my xuyen	soc trang	*P.monodon*
129	ly quynh ly	hoa binh	gia hoa 2	my xuyen	Soc Trang	*P.monodon*
130	ta thi phuong	du thoa	tham don	my xuyen	Soc Trang	*P.monodon*
131	duong van cuong	du thoa	tham don	my xuyen	Soc Trang	*P.monodon*
132	tran tan thanh	hoa de	Hoa Tu 1	my xuyen	Soc Trang	*P.monodon*
133	tran ngoc long	hoa binh	gia hoa 2	my xuyen	Soc Trang	*P.monodon*
134	nguyen van bac	hoa nho A	Hoa Tu 2	my xuyen	Soc Trang	*P.monodon*
135	le van ton	du thoa	tham don	my xuyen	Soc Trang	*P.monodon*
136	vo van sinh	du thoa	tham don	my xuyen	Soc Trang	*P.monodon*
137	kha quoc huong	hoa de	Hoa Tu 1	my xuyen	soc trang	*P.monodon*
138	nguyen thanh cong	co co	ngoc to	my xuyen	Soc Trang	*P.monodon*
139	nguyen quoc chien	hoa thinh	Hoa Tu 1	my xuyen	Soc Trang	*P.monodon*
140	nguyen van huynh	hoa loi	ngoc dong	my xuyen	soc trang	*P.monodon*
141	do cao thang	thanh hoa	thanh quoi	my xuyen	Soc Trang	*P.monodon*
142	nguyen van duc	hoa loi	ngoc dong	my xuyen	Soc Trang	*P.monodon*
143	ho van dung	hoa nho A	Hoa Tu 2	my xuyen	soc trang	*P.monodon*
144	tang van cho	hoa nho B	Hoa Tu 2	my xuyen	Soc Trang	*P.monodon*
145	tran tan tai	Thanh Hoa	Thanh Quoi	my xuyen	Soc Trang	*P.monodon*
146	le hong lao	hoa trung	Hoa Tu 1	my xuyen	Soc Trang	*P.monodon*
147	dang van dat	hoa nho B	Hoa Tu 2	my xuyen	Soc Trang	*P.monodon*
148	nguyen van hich	hoa nho B	Hoa Tu 2	my xuyen	Soc Trang	*P.monodon*
149	dang thanh phung	hoa nho B	Hoa Tu 2	my xuyen	Soc Trang	*P.monodon*
150	le thi mung	du thoa	tham don	my xuyen	Soc Trang	*P.monodon*
151	le van cuc	hoa loi	ngoc dong	my xuyen	Soc Trang	*P.monodon*
152	nguyen van tung	khom 6	phuong 5	tx bac lieu	bac lieu	*P.monodon*
153	le van long	Hamlet 17	vinh hau A	hoa binh	bac lieu	*P.monodon*
154	pham duy kien	Hamlet 3	phuong 2	tx bac lieu	bac lieu	*P.monodon*
155	Nguyen Van Son	Vinh Tien	Vinh Tan	Tuy Phong	Binh Thuan	*P.vannamei*
156	Nguyen Van Hoc	Phu Tho	Minh Phuoc	Minh Hai	Ninh Thuan	*P.vannamei*
157	Phan Cong Duy	Dong Bo	Vinh Thai	TP. Nha Trang	Khanh Hoa	*P.vannamei*
158	Ho Ky Hung	Vinh Tien	Vinh Tan	Tuy Phong	Binh Thuan	*P.vannamei*
159	Le Van Vu	Phong Thanh	Ninh Loc	Ninh Hoa	Khanh Hoa	*P.vannamei*
160	Huynh Kim Khoanh	Phong Thanh	Ninh Loc	Ninh Hoa	Khanh Hoa	*P.vannamei*
161	Ngo Thanh Huy	Phung Can	Ninh Hung	Ninh Hoa	Khanh Hoa	*P.vannamei*
162	Diep	Dong Bo	Vinh Thai	TP. Nha Trang	Khanh Hoa	*P.vannamei*
163	Son	Minh Duc	Ninh Loc	Ninh Hoa	Khanh Hoa	*P.vannamei*
164	Nguyen Tan An	Minh Duc	Ninh Loc	Ninh Hoa	Khanh Hoa	*P.vannamei*
165	Nguyen Van Son	Vinh Tien	Vinh Tan	Tuy Phong	Binh Thuan	*P.vannamei*
166	Than	Thuy Tu	Vinh Thai	TP. Nha Trang	Khanh Hoa	*P.vannamei*
167	Duong Ngoc Dung	Thuy Tu	Vinh Thai	TP. Nha Trang	Khanh Hoa	*P.vannamei*
168	Nguyen Huu Cua	phong thanh	ninh loc	ninh hoa	khanh hoa	*P.vannamei*
169	A Loi		Vinh Hao	Tuy Phong	Binh Thuan	*P.vannamei*
170	Nguyen Van Phuc		An Hai	Ninh Phuoc	Ninh Thuan	*P.vannamei*
171	Pham Van Dung		Lien Huong	Tuy Phong	Binh Thuan	*P.vannamei*
172	Pham Van Minh	Phu Tho	An Hai	Ninh Phuoc	Ninh Thuan	*P.vannamei*
173	Dao Nguyen Thien	Vinh Tien	Vinh Tan	Tuy Phong	Binh Thuan	*P.vannamei*
174	Vo Hoang Nhan	Phu Thua	Ninh Ich	ninh hoa	khanh hoa	*P.vannamei*
175	Tran Ngoc	Huu Phu	Ninh Ich	Ninh Hoa	khanh hoa	*P.vannamei*

176	Ngo Xuan Kinh	Dong Bo	Vinh Thai	Nha Trang	khanh hoa	*P.vannamei*
177	Do Sang Son	Dong Bo	Vinh Thai	Nha Trang	khanh hoa	*P.vannamei*

Annex 3. List of surveyed traders

No.	Owne's name	Trading name	Commune	District	Province
1	Cao Van Chuong	DAI LY TOM VAN CHUONG	Tho Son	Hon Dat	Kien Giang
2	Duy Dan	Dai Ly Duy Dan	Phong Thanh Nam	Phuoc Long	Bac Lieu
3	Hong Van Ut	Dai Ly Tom Ut	Tan Thanh	An Minh	Kien Giang
4	Tong My Linh	Dai Ly Tom My Linh	Phuong 2	TP. Ca Mau	Ca Mau
5	Ho Vu Quang	Dai Ly Tom Vu Quang	Phong Thanh Dong A	Gia Rai	Bac Lieu
6	Nguyen Van Chuong	Dai Ly Tom Chuong	Tho Son	Hon Dat	Kien Giang
7	Chi Loan	Dai Ly Tom Loan	Nam Thai A	An Bien	Kien Giang
8	Anh Tan	Dai Ly Tom Tam	Dong Thanh	An Minh	Kien Giang
9	Du Sen	Dai Ly Du Sen	Dong Thanh	An Minh	Kien Giang
10	Ta Hoang Nam	Dai Ly Tom Hoang Nam	Tan Thanh	Gia Rai	Bac Lieu
11	Minh Duc	Dai Ly Tom Minh Duc	Ho Phong	Gia Rai	Bac Lieu
12	Nguyen Thi Ngoc Nu	Dai Ly Tom Ngoc Nu	Phong Thanh Dong	Gia Rai	Bac Lieu
13	Pham Hong Viet	Dai LY Tom Pham Viet Hong	NA	Phuoc Long	Bac Lieu
14	Nguyen An Ninh	Dai Ly Tom An Ninh	F8	Ca Mau	Ca Mau
15	Dang Van Quan	Dai Ly Tom Van Quan	P3	Tra Vinh	Tra Vinh
16	Tran Le Hang	Dai Ly Tom Le Hang	Phong Thanh Dong	Gia Rai	Bac Lieu
17	Anh Dien	Dai Ly Tom Dien	Vinh Phong	Vinh Thuan	Kien Giang
18	Chi Mi	Dai Ly Tom My	Vinh Loc	Hong Dan	Bac Lieu
19	Thanh Tam	Dai Ly Tom Thanh Tam	Nam Thai A	An Bien	Kien Giang
20	Tran Van Quang	Dai Ly Tom Van Quang	Vinh Phu Tay	Phuoc Long	Bac Lieu
21	Pham Hong Viet	Dai Ly Tom Viet Hong	Vinh Phu Tay	Phuoc Long	Bac Lieu

Annex 4. List of surveyed processors

No.	Interviewee's name	Company name	Commune	District	Province
1	Nguyen Huu Thanh	CT. TNHH TP XK Nam Hai	Tra Loc	Binh Thuy	Can Tho
2	Truong Dinh Cung	CT. CP XNK TS Nam Can	Nam Can	Ngoc Hien	Ca Mau
3	Tran Minh Hen	CT. XNK Thuy San Ho Phong	Ho Phong	Gia Rai	Bac Lieu
4	Tran Ngoc Hiep	CT. CP TP SAO TA	Phuong 2	Soc Trang	Soc Trang
5	Quat Dua	CT.XNK GIA RAI	Ho Phong	Gia Rai	Bac Lieu
6	Pham Anh Dao	CTTNHH CBTS & XNK PHU CUONG	phuong 6	Ca mau	Ca Mau
7	Le Van Luu	CT CPCBTS MINH HAI	khom 7	phuong 8	Ca Mau
8	Nguyen Van Phuc	CT TNHH PHUONG NAM	Phuong 7	Soc trang	Soc Trang
9	Nuyen Thanh Phong	CT CPCBTS & XNK CA MAU	phuong 8	Ca mau	Ca Mau
10	Nguyen Viet Binh	CTCPTS CAFATEX		Chau Thanh	Hau Giang
11	Nguyen Quoc Thai	NHA MAY THUY SAN F78	Tra Kha	Bac Lieu	Bac Lieu
12	Huynh Huu Nhan	CTCP CBTS KIEN CUONG	Tac Cau	Chau Thanh	Kien Giang
13	Le Xuan Quoc	444 Ly Thuong Kiet	Phuong 6	Ca Mau	Ca Mau
14	Huynh Ngoc Tua	CT XNK Vinh Loi	Hoa Binh	Vinh Loi	Bac Lieu
15	Lam Kim Hai	Cong Ty Che Bien Thuy San Minh Hai	Tra Kha	Bac Lieu	Bac Lieu
16	Tran Van Tuyet	CTY LIEN DOANH CBTS MINH HAI	Ho Phong	Gia Rai	Bac Lieu
17	Vu Thai Tra	Cong Ty KD XNK Thuy San Cai Doi	Cai Doi Vam	Cai Nuoc	Ca Mau
18	Pham Thi Hong	Cong Ty CBTS FINE FOOD	Luong The Tran	Cai Nuoc	Ca Mau
19	Nguyen Tuong Long	Cong ty co phan thuy san Bac Lieu	Gia Rai	Gia Rai	Bac Lieu

20	Nguyen Van Chuong	Cong Ty XNK Thuy San Minh Hai	Phuong 8	Ca Mau	Ca Mau
21	Bui Chi Thien	Cong Ty TSX XNK Tong Hop Soc Trang	phuong 7	Soc Trang	Soc Trang
22	Nguyen Hong Pham	49 QL1A	Phuong 2	Soc Trang	Soc Trang
23	Huynh Thanh Duoc	Cong ty TNHH Hai San Viet Hai	Long Thanh	Phung Hiep	Hau Giang
24	Nguyen Huu Dung	CT CP Che Bien Thuy San Viet Cuong	Vinh Trach	Bac Lieu	Bac Lieu

Annex 5. Socio - economic indicators of the sampled stakeholders

No.	Socio - economic	Farmers		Trader	Proeessor
		P.Monodon	*P.Vanamei*		
1	Age (years)	45.94	42.78	48.12	42.23
2	Experience in shrimp industry (years)	10.05	10.00	-	-
3	Gender			-	-
3.1	Male (%)	94.16	100.00	77.27	78.26
3.2	Female (%)	5.84	-	22.73	21.74
4	Household size (no.)	4.66	4.35	-	-
5	Number of family labors	3.24	2.17	-	-
5.1	Male	1.80	1.30	-	-
5.2	Female	1.53	1.05	-	-
6	Number of family labors involved in shrimp	2.29	1.74	-	-
6.1	Male	1.45	1.22	-	-
6.2	Female	0.84	1.00	-	-
7	Number of shrimp farming employees	0.40	5.57	-	-
7.1	Male	0.36	5.33	-	-
7.2	Female	0.04	1.25	-	-
8	Involvement with other occupation (%)	64.94	56.52	-	-
	Of which: (%)			-	-
8.1	Agriculture	67.00	7.69	-	-
8.2	Livestock	40.00	-	-	-
8.3	Trading	22.00	46.15	-	-
8.4	Employee	10.00	7.69	-	-
8.5	Other	5.00	38.46	-	-
9	Illiterate (%)	-	-	-	-
10	Literate (%)	100	100.00	-	-
10.1	Illiterate	4.55	4.35	-	-
10.2	Primary	23.38	39.13	-	-
10.3	Secondary (SSC)	50.65	17.39	-	-
10.4	High school (HSC)	21.43	4.35	-	-
10.5	Vocational	-	34.78	-	-
10.6	University	-	-	-	100
10.7	Other	-	-	-	-
11	Aquaculture technical knowledge (%)	-	-	-	-
11.1	Own	98.05	69.57	-	-
11.2	Training	76.62	21.74	-	-
11.3	Vocational	-	4.35	-	-
11.4	BSc	-	17.39	-	-
11.5	Higher	1.95	4.35	-	-

Annex 6. Investment made in shrimp farming (*in average*)

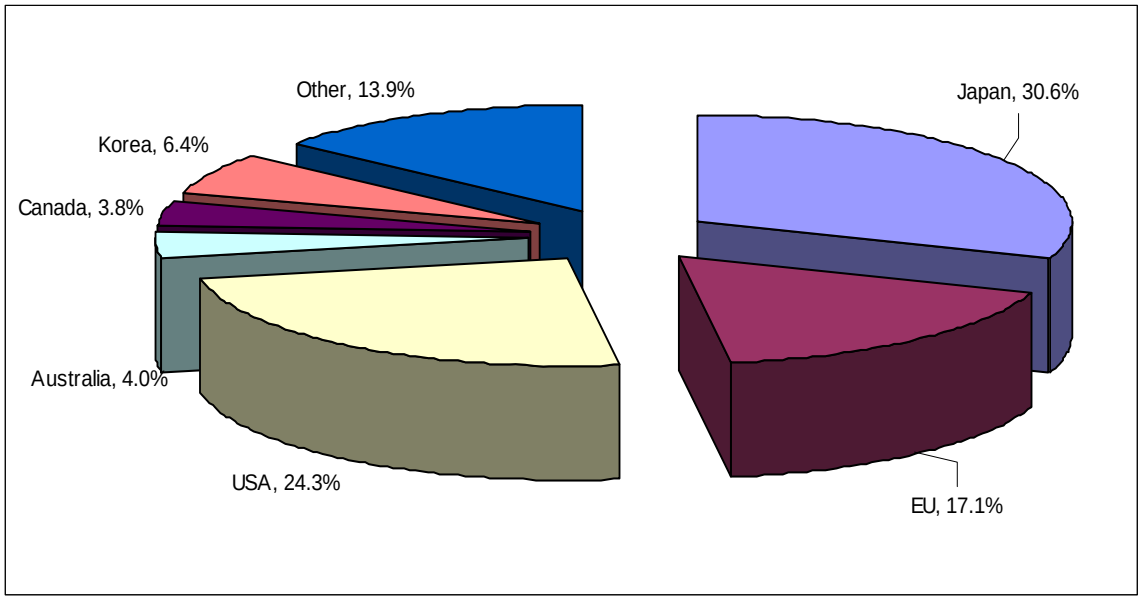
Items of invesments	***P.monodon***		***P.vanamei***	
	Average (VND)	*% out of the total*	*Average (VND)*	*% out of the total*
Construction of the system	35,920,130	53.14	579,533,816	71.25
Upgrading of the system	9,264,935	13.71	149,722,222	18.41
Machinery	13,621,429	20.15	29,792,593	3.66
Guard shade	2,992,532	4.43	4,183,333	0.51
Major equipment	4,520,065	6.69	36,833,333	4.53
Related fees & taxes/year	1,282,110	1.90	13,333,333	1.64
All itemts	**67,601,201**	**100**	**813,398,631**	**100**

Annex 7: Volume and value of shrimp exported traded of Vietnam: 2006-2008

	Shimp production from culture *(1,000 tonnes)*	**Volume** *(1,000 tonnes)*	**Value** *(million USD)*
2005	327.20	159.19	1372.00
2006	354.50	158.45	1461.00
2007	384.50	161.27	1509.00
2008	388.40	191.55	1625.00

(Sources: GOS 2008, VASEP 2008 & 2009)

Export market structure of shrimp products in 2008 (by volume)



(Sources: VASEP 2008 & 2009)

Annex 8: Perception of change in shrimp farming

Annex 8.1. Perception of change in shrimp farming (*P.monodon)*

Indicator	**in 2008**			
	Level of change (%)			
	Decreased	Not changed	Increased	NA
Total culture area of the farm	1.95	93.51	4.55	-
Number of ponds	1.95	94.81	3.25	-
Added or removed the nursery pond(s)	99.35	-	0.65	-
Added or removed the sedimentation pond(s)	97.40	-	2.60	-
Investment (including machinery)	19.48	33.12	47.40	-
Ownership of land	-	99.35	0.65	-
	More intensive	Same	More diversified	-
Type of farming	7.79	86.36	5.84	-
Number of shrimp crops per year	5.84	92.21	1.95	-
Use of family labor	0.65	99.35	-	-
Use of hired labor	1.30	77.92	1.95	18.83
Species for aquaculture farming	0.65	98.70	0.65	-
	within district	Within province	imported from other province	-
Sources of seed	5.19	89.61	5.19	-
Average stocking density for crop 1	14.29	62.99	22.08	0.65
Stocking duration crop 1 (months/crop)	22.73	53.25	24.03	-
Use of home-made feed	-	12.34	0.65	87.01
Use of commercial feed	22.08	28.57	34.42	14.94
Use of chemicals/medicines	9.74	37.66	22.08	30.52
Shrimp yield crop 1	46.75	21.43	31.82	-
Marketing of shrimp	10.39	85.71	3.25	0.65
Average costs/ per ha of water area crop 1	20.13	25.97	53.90	-
Average profit per ha of water area crop 1	53.90	19.48	26.62	-

Annex 8.1. Perception of change in shrimp farming (*P.monodon) – cont.*

Indicator	**in 2009**			
	Level of change (%)			
	Decreased	Not changed	Increased	NA
Total culture area of the farm	6.49	90.91	2.60	-
Number of ponds	3.90	93.51	2.60	-
Added or removed the nursery pond(s)	98.70	0.65	0.65	-
Added or removed the sedimentation pond(s)	97.40	-	2.60	-
Investment (including machinery)	43.51	27.27	29.22	-
Ownership of land	0.65	99.35	0.00	

	More intensive	Same	More diversified	-
Type of farming	9.74	86.36	3.90	-
Number of shrimp crops per year	5.84	89.61	4.55	-
Use of family labor	0.00	98.70	1.30	-
Use of hired labor	1.30	78.57	1.30	18.83
Species for aquaculture farming	1.30	98.70	0.00	-
	within district	Within province	imported from other province	-
Sources of seed	11.04	81.17	7.79	-
Average stocking density for crop 1	33.77	41.56	24.03	0.65
Stocking duration crop 1 (months/crop)	35.06	36.36	28.57	-
Use of home-made feed	0.65	12.34	0.00	87.01
Use of commercial feed	42.86	16.23	25.97	14.94
Use of chemicals/medicines	31.17	29.22	28.57	-
Shrimp yield crop 1	38.96	11.04	50.00	-
Marketing of shrimp	5.19	84.42	9.74	0.65
Average costs/ per ha of water area crop 1	55.19	12.99	31.82	-
Average profit per ha of water area crop 1	27.27	8.44	64.29	-

Annex 8.2. Perception of change in shrimp farming (*P. vanamei)*

Indicator	**in 2008**			
	Level of change (%)			
	Decreased	Not changed	Increased	NA
Total culture area of the farm	-	100.00	-	-
Number of ponds	-	95.65	4.35	-
Added or removed the nursery pond(s)	-	100.00	-	-
Added or removed the sedimentation pond(s)	-	100.00	-	-
Investment (including machinery)	17.39	43.48	39.13	-
Ownership of land	-	100.00	-	-
	More intensive	Same	More diversified	-
Type of farming	-	95.65	4.35	-
Number of shrimp crops per year	4.35	95.65	-	-
Use of family labor	4.35	95.65	-	-
Use of hired labor	-	91.30	8.70	-
Species for aquaculture farming	-	100.00	-	-
	within district	Within province	imported from other province	-
Sources of seed	-	-	100.00	-
Average stocking density for crop 1		100.00		

Stocking duration crop 1 (months/crop)	4.35	95.65	-	-
Use of home-made feed	-	-	-	-
Use of commercial feed	8.70	69.57	21.74	-
Use of chemicals/medicines	4.35	78.26	17.39	-
Shrimp yield crop 1	-	73.91	26.09	-
Marketing of shrimp	4.35	95.65	-	-
Average costs/ per ha of water area crop 1	21.74	47.83	30.43	-
Average profit per ha of water area crop 1	4.35	69.57	26.09	-

Annex 8.2. Perception of change in shrimp farming (*P. vanamei)- cont.*

Indicator	**in 2009**			
	Level of change (%)			
	Decreased	Not changed	Increased	NA
Total culture area of the farm	-	91.30	8.70	-
Number of ponds	-	91.30	7.70	-
Added or removed the nursery pond(s)	-	100.00	-	-
Added or removed the sedimentation pond(s)	-	100.00	-	-
Investment (including machinery)	21.74	26.09	52.17	-
Ownership of land	-	95.65	4.35	-
	More intensive	Same	More diversified	-
Type of farming	-	91.30	8.70	-
Number of shrimp crops per year	-	91.30	8.70	-
Use of family labor	-	100.00	-	-
Use of hired labor	-	91.30	8.70	-
Species for aquaculture farming	-	100.00	-	-
	within district	Within province	imported from other province	-
Sources of seed	-	-	100.00	
Average stocking density for crop 1	4.35	78.26	17.39	
Stocking duration crop 1 (months/crop)	13.04	78.26	8.70	
Use of home-made feed	-	-	-	-
Use of commercial feed	26.09	43.48	30.43	-
Use of chemicals/medicines	4.35	56.52	39.13	-
Shrimp yield crop 1	34.78	30.43	34.78	-
Marketing of shrimp	-	95.65	4.35	-
Average costs/ per ha of water area crop 1	17.39	43.48	47.83	-
Average profit per ha of water area crop 1	43.48	4.35	52.17	-

Annex 9: Per hectare shrimp farming variable cost and their percentage

Annex 9.1: Per hectare shrimp farming variable cost and their percentage **(*P.monodon)***

Items of cost	in 2008		in 2009	
	Cost *(VND)*	%	**Cost** *(VND)*	%
Shrimp post larvae	7,247,557	5.94	7,129,843	7.35
Labor for pond preparation	1,891,441	1.55	1,983,058	2.04
Labor during production	7,671,465	6.29	7,976,141	8.22
Labor for harvest	893,647	0.73	910,731	0.94
Cost of Chlorine/Bleach	1,539,453	1.26	1,487,287	1.53
Cost of Lime	3,031,158	2.48	2,646,396	2.73
Cost of Chemicals/Drugs	4,363,587	3.58	3,922,732	4.04
Cost of Fertilizers	296,401	0.24	184,974	0.19
Cost of Home-made feed	3,896	0.00	3,896	0.004
Cost of Commercial feed	59,821,523	49.04	56,692,218	58.43
Cost of Electricity	514,224	0.42	596,080	0.61
Cost Fuel	10,428,805	8.55	6,325,273	6.52
Cost of Communication, harvest, transport	914,242	0.75	6,659,039	6.86
Cost of Others	482,282	0.40	510,818	0.53
Total Cost	**121,984,884**	**100**	**97,028,487**	**100**

Annex 9.2: Per hectare shrimp farming variable cost and their percentage **(*P. vanamei)***

Items of cost	2008		2009	
	Cost *(VND)*	%	**Cost** *(VND)*	%
Shrimp post larvae	210,450,000	17.14	125,497,391	15.33
Labor for pond preparation	67,500,000	5.50	24,443,478	2.99
Labor during production	59,216,667	4.82	30,767,391	3.76
Labor for harvest	11,963,333	0.97	5,569,565	0.68
Cost of Chlorine/Bleach	14,240,000	1.16	10,311,478	1.26
Cost of lime	38,000,000	3.10	19,227,174	2.35
Cost of chemicals/Drugs	14,750,000	1.20	8,969,565	1.10
Cost of Fertilizers	500,000	0.04	1,078,261	0.13
Cost of Home-made feed	-	-	-	-
Cost of commercial feed	712,066,667	58.00	526,097,826	64.26
Cost of Electricity	77,416,667	6.31	35,408,696	4.32
Cost Fuel	17,981,667	1.46	29,493,043	3.60
Cost of Communication, harvest, trans.	3,633,333	0.30	1,843,478	0.23
Cost of Others	-	-	-	-
Total Cost	**1,227,718,333**	**100.00**	**818,732,329**	**100.00**

Annex 10. Monthly average sale price for farmer for different sizes

Annex 10.1. Monthly average sale price for farmer for different sizes ***(P.monodon)***

Date	**0-20**	**21-30**	**31-44**	**44-66**	**more than 66**
Jan-08	-	109,667	68,500	-	-
Feb-08	-	101,857	76,250	57500	20,000
Mar-08	-	99,500	81,400	75000	27,333
Apr-08	-	99,929	85,846	65000	29,200
May-08	-	96,667	81,114	67333	32,250
Jun-08	-	91,485	80,380	64500	42,500
Jul-08	-	89,179	78,757	68033	45,000
Aug-08	-	87,950	76,793	57600	34,000
Sep-08	-	87,784	81,684	58000	27,500
Oct-08	-	88,778	81,846	57667	-
Nov-08	-	90,643	87,545	-	-
Dec-08	-	102,000	86,889	-	-
Jan-09	-	106,111	82,400	-	-
Feb-09	-	102,923	102,833	93000	-
Mar-09	-	103,000	93,333	70000	-
Apr-09	-	103,650	87,500	70000	51,857
May-09	-	103,000	89,885	72143	46,167
Jun-09	-	102,188	88,971	68769	50,800
Jul-09	-	99,923	89,567	76115	20,000
Aug-09	-	99,000	89,000	68667	48,333

Unit: VND/kg

Annex 10.2. Monthly average sale price for farmer for different sizes ***(P. vanamei)***

Date	**0-70**	**71-100**	**More than 100**
Jan-08	-	-	-
Feb-08	-	-	-
Mar-08	-	-	-
Apr-08	-	57,167	42,000
May-08	65,000	48,250	40,000
Jun-08	64,000	-	46,400
Jul-08	-	48,000	-
Aug-08	-	49,000	45,000
Sep-08	-	46,429	-
Oct-08	-	47,500	-
Nov-08	-	51,000	-
Dec-08	-	43,000	46,500
Jan-09	-	-	-
Feb-09	-	-	-

Mar-09	-	50,000	-
Apr-09	-	55,286	-
May-09	-	48,833	-
Jun-09	-	50,333	43,533
Jul-09	-	-	44,000
Aug-09	-	50,000	-

Unit: VND/kg

Annex 11. Monthly average sale price for trader of different sizes

Annex 11.1. Monthly average sale price for traders of different sizes ***(P.monodon)*-HOSO**

	Buying price:						**Selling price:**					
Date	**0-20**	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**	**0-20**	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**
Jan-08	171,995	100,672	68,894	58,634	44,609	-	175,532	104,242	72,465	62,207	48,192	-
Feb-08	175,187	102,939	69,704	59,831	42,894	-	178,758	106,466	74,785	63,359	46,465	-
Mar-08	167,316	95,183	63,961	52,479	36,284	-	170,887	98,758	67,532	56,048	39,855	-
Apr-08	163,574	88,985	61,639	50,025	47,617	-	166,873	93,919	65,210	53,597	37,597	-
May-08	160,348	91,316	62,800	47,832	32,359	-	163,933	94,887	66,280	51,403	35,657	-
Jun-08	161,574	96,089	67,356	55,832	37,832	-	162,169	99,660	70,952	59,403	41,403	-
Jul-08	91,316	92,606	64,956	53,313	35,785	-	133,171	96,178	68,526	56,884	39,356	-
Aug-08	150,611	89,501	60,668	50,290	35,369	-	154,182	93,072	64,239	53,861	38,803	-
Sep-08	146,804	84,606	57,058	46,748	32,941	-	150,371	88,177	60,629	49,650	36,508	-
Oct-08	142,929	85,768	62,804	47,831	33,261	-	146,500	89,339	66,371	51,403	36,877	-
Nov-08	144,348	85,768	58,219	50,026	36,026	-	147,919	89,339	61,790	53,597	39,597	-
Dec-08	144,348	50,026	66,155	86,800	30,219	-	147,915	90,385	69,726	53,597	33,790	-
Jan-09	138,398	86,788	74,272	53,567	37,772	-	141,972	90,359	57,134	57,134	42,691	-
Feb-09	139,692	93,756	77,692	50,143	36,543	-	143,263	97,327	81,262	53,714	40,101	-
Mar-09	133,885	97,565	80,014	52,453	39,176	-	137,456	101,136	83,585	56,037	42,746	-
Apr-09	135,176	98,401	89,176	54,530	35,821	-	138,747	101,972	92,747	58,101	39,392	-
May-09	132,659	98,014	91,305	55,821	39,392	-	136,230	101,597	94,876	59,392	39,392	-
Jun-09	132,595	91,482	80,014	52,461	59,226	-	136,166	95,082	83,585	56,036	59,226	-
Jul-09	-	-	-	-	-	-	-	-	-	-	-	-
Aug-09	-	-	-	-	-	-	-	-	-	-	-	-

Unit: VND/kg

Annex 11.2. Monthly average sale price for traders of different sizes ***(P.monodon)*-HLSO**

Date	Buying price:						Selling price:					
	0-20	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**	**0-20**	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**
Jan-08	266,598	157,916	108,662	92,762	72,025	-	272,075	161,575	112,311	96,420	75,689	-
Feb-08	268,871	161,416	109,916	93,275	68,362	-	272,530	165,075	115,916	98,207	72,020	-
Mar-08	261,216	149,416	101,016	83,216	58,116	-	264,875	153,075	148,104	86,875	61,775	-
Apr-08	255,416	141,916	97,416	79,416	54,616	-	248,602	145,575	101,075	83,075	58,275	-
May-08	250,416	143,416	98,398	76,016	51,616	-	254,075	147,075	102,875	79,675	55,275	-
Jun-08	247,699	150,839	106,316	88,416	60,516	-	251,362	154,475	109,884	92,075	64,175	-
Jul-08	143,416	140,871	102,557	83,285	57,344	-	146,893	149,075	106,216	87,261	61,002	-
Aug-08	240,280	140,603	95,912	79,825	56,698	-	241,030	144,261	99,570	83,484	61,398	-
Sep-08	229,416	133,016	90,316	74,316	53,389	-	237,211	136,671	93,975	77,975	56,591	-
Oct-08	224,325	134,816	99,216	76,016	53,430	-	227,075	138,475	102,875	111,412	57,066	-
Nov-08	226,071	134,816	92,117	57,716	57,716	-	229,275	138,475	95,775	83,075	61,375	-
Dec-08	225,616	136,416	104,416	79,416	48,716	-	231,548	140,075	108,075	83,075	52,375	-
Jan-09	216,398	136,398	116,998	84,898	60,398	-	220,057	140,057	88,557	88,557	64,057	-
Feb-09	218,398	147,203	122,298	79,599	58,498	-	222,057	150,857	125,502	83,257	62,157	-
Mar-09	209,398	153,103	125,898	83,198	62,598	-	213,057	156,761	129,557	86,693	66,257	-
Apr-09	211,398	154,398	140,098	86,398	57,398	-	215,057	158,043	143,757	90,057	61,057	-
May-09	207,498	153,798	143,398	88,398	61,057	-	211,157	157,457	147,057	92,057	61,057	-
Jun-09	207,398	143,698	125,444	83,198	91,802	-	211,057	147,357	129,557	86,857	91,802	-
Jul-09	-	-	-	-	-	-	-	-	-	-	-	-
Aug-09	-	-	-	-	-	-	-	-	-	-	-	-

Unit: VND/kg

Annex 11.3. Monthly average sale price for trader of different sizes ***(P. vanamei)*-HOSO**

Date	Buying price:						Selling price:					
	0-20	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**	**0-20**	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**
Jan-08	-	-	-	59,774	46,527	-	-	-	-	60,310	49,607	-
Feb-08	-	-	-	60,343	45,594	-	-	-	-	63,399	48,991	-

Mar-08	-	-	-	59,948	48,038	-	-	-	-	63,028	51,120	-
Apr-08	-	-	-	58,046	45,869	-	-	-	-	61,580	48,949	-
May-08	-	-	-	56,264	43,270	-	-	-	-	59,400	46,347	-
Jun-08	-	-	-	57,512	43,894	-	-	-	-	61,955	46,975	-
Jul-08	-	-	-	53,980	42,383	-	-	-	-	57,042	45,462	-
Aug-08	-	-	-	52,317	58,745	-	-	-	-	55,396	44,870	-
Sep-08	-	-	-	59,093	44,624	-	-	-	-	62,173	47,697	-
Oct-08	-	-	-	53,369	42,580	-	-	-	-	56,449	45,659	-
Nov-08	-	-	-	55,738	55,738	-	-	-	-	58,817	47,699	-
Dec-08	-	-	-	53,566	41,264	-	-	-	-	56,646	44,344	-
Jan-09	-	-	-	56,139	42,185	-	-	-	-	59,673	45,265	-
Feb-09	-	-	-	53,436	43,369	-	-	-	-	56,515	46,449	-
Mar-09	-	-	-	54,685	42,580	-	-	-	-	57,764	45,660	-
Apr-09	-	-	-	56,396	40,652	-	-	-	-	59,475	43,686	-
May-09	-	-	-	52,975	39,465	-	-	-	-	56,054	41,316	-
Jun-09	-	-	-	55,935	38,830	-	-	-	-	59,015	41,909	-
Jul-09	-	-	-	-	-	-	-	-	-	-	-	-
Aug-09	-	-	-	-	-	-	-	-	-	-	-	-

Unit: VND/kg

Annex 11.4. Monthly average sale price for trader of different sizes ***(P. vanamei)*-HLSO**

	Buying price:						**Selling price:**					
Date	**0-20**	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**	**0-20**	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**
Jan-08	-	-	-	92,517	72,317	-	-	-	-	95,602	75,402	-
Feb-08	-	-	-	93,281	71,382	-	-	-	-	96,366	74,467	
Mar-08	-	-	-	92,717	74,617	-	-	-	-	95,802	77,702	
Apr-08	-	-	-	90,063	71,317	-	-	-	-	93,602	74,366	
May-08	-	-	-	87,113	67,363	-	-	-	-	90,289	70,448	
Jun-08	-	-	-	89,017	68,317	-	-	-	-	92,102	71,402	

Jul-08	-	-	-	83,617	67,245	-	-	-	-	86,702	69,102	
Aug-08	-	-	-	81,117	65,117	-	-	-	-	118,520	68,202	
Sep-08	-	-	-	91,417	69,417	-	-	-	-	94,502	72,548	
Oct-08	-	-	-	82,717	66,317	-	-	-	-	85,802	69,402	
Nov-08	-	-	-	86,317	86,317	-	-	-	-	89,402	72,502	
Dec-08	-	-	-	83,017	64,313	-	-	-	-	86,102	67,402	
Jan-09	-	-	-	87,617	65,717	-	-	-	-	90,702	68,802	
Feb-09	-	-	-	82,817	67,517	-	-	-	-	85,902	70,602	
Mar-09	-	-	-	84,717	66,317	-	-	-	-	87,802	69,402	
Apr-09	-	-	-	87,317	63,317	-	-	-	-	89,039	66,402	
May-09	-	-	-	82,117	59,717	-	-	-	-	85,202	62,802	
Jun-09	-	-	-	86,617	60,617	-	-	-	-	89,702	63,702	
Jul-09	-	-	-	-	-	-	-	-	-	-	-	-
Aug-09	-	-	-	-	-	-	-	-	-	-	-	-

Unit: VND/kg

Annex 12. Monthly average sale price for processor of different sizes

Annex 12.1. Monthly average sale price for processor of different sizes ***(P.monodon)*-HOSO**

	Buying price:						**Selling price:**					
Date	**0-20**	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**	**0-20**	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**
Jan-08	174,256	103,239	81,459	60,997	60,997	-	187,135	116,117	94,338	73,876	54,883	-
Feb-08	176,952	101,964	72,383	61,865	41,976	-	189,831	114,839	85,262	74,742	54,853	-
Mar-08	169,649	96,680	66,168	55,186	36,455	-	182,528	182,528	78,916	68,065	48,962	-
Apr-08	165,621	92,900	64,124	52,993	33,964	-	178,475	105,779	77,003	65,872	46,408	-
May-08	162,858	93,852	50,533	50,533	33,078	-	175,737	106,731	78,257	63,411	45,958	-
Jun-08	163,331	98,323	70,227	57,790	36,597	-	173,613	111,201	83,106	70,671	49,089	-
Jul-08	110,471	94,622	67,340	55,365	35,407	-	121,785	107,501	80,997	68,244	47,866	-

Aug-08	151,935	91,407	62,993	52,489	34,607	-	165,206	104,282	75,860	65,367	47,051	-
Sep-08	149,438	88,714	59,886	49,354	32,105	-	162,317	101,593	72,764	62,233	44,547	-
Oct-08	145,564	88,332	65,258	50,221	33,892	-	158,444	101,211	78,137	63,101	46,509	-
Nov-08	145,816	88,054	60,487	52,358	35,027	-	159,481	100,932	73,366	65,236	47,645	-
Dec-08	146,251	89,430	68,479	52,480	34,307	-	159,117	102,308	81,358	65,359	46,794	-
Jan-09	141,664	89,173	76,293	55,540	37,034	-	154,169	102,072	89,192	68,756	49,904	-
Feb-09	142,423	95,912	81,213	53,052	36,796	-	155,321	108,810	93,368	66,107	49,825	-
Mar-09	136,442	100,488	82,981	54,461	38,103	-	149,341	113,387	95,618	67,676	50,648	-
Apr-09	137,496	100,588	91,646	56,327	38,999	-	150,395	113,487	104,544	69,575	50,615	-
May-09	135,284	99,222	92,347	57,660	37,720	-	147,791	112,120	105,462	70,901	51,357	-
Jun-09	134,714	93,969	82,276	54,556	38,475	-	147,612	106,868	95,183	67,750	51,914	-
Jul-09	-	-	-	-	-	-	-	-	-	-	-	-
Aug-09	-	-	-	-	-	-	-	-	-	-	-	-

Unit: VND/kg

Annex 12.2. Monthly average sale price for processors of different sizes ***(P.monodon)*-HLSO**

Date	**Buying price:**						**Selling price:**					
	0-20	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**	**0-20**	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**
Jan-08	272,513	162,483	128,783	96,930	96,930	-	286,091	180,135	146,404	114,552	85,057	-
Feb-08	275,087	160,509	114,609	98,274	67,391	-	294,578	178,130	132,230	115,896	85,013	-
Mar-08	265,596	153,517	104,930	87,883	58,191	-	280,087	280,087	122,552	105,504	75,813	-
Apr-08	259,343	146,439	101,761	84,483	54,257	-	276,926	164,061	119,383	101,713	71,878	-
May-08	250,709	147,917	79,426	79,426	53,561	-	271,504	165,583	121,374	98,326	71,226	-
Jun-08	252,239	154,857	111,239	91,926	58,417	-	273,470	172,522	128,904	108,378	76,083	-
Jul-08	173,843	149,109	106,752	88,157	56,565	-	191,117	166,774	124,417	105,822	74,183	-
Aug-08	238,704	144,113	100,009	83,696	55,257	-	256,370	161,778	117,674	101,361	72,922	-
Sep-08	234,222	139,952	95,183	78,830	51,370	-	251,104	157,617	112,848	96,496	69,035	-
Oct-08	228,209	139,348	103,522	80,174	54,417	-	245,874	157,013	121,187	97,839	72,083	-
Nov-08	228,596	138,891	96,091	83,470	56,157	-	245,870	156,557	113,909	101,135	73,822	-
Dec-08	229,222	141,030	108,500	83,661	54,839	-	246,891	158,696	126,165	101,326	72,504	-

Jan-09	222,135	151,091	120,630	88,953	59,337	-	240,222	158,326	138,326	106,600	77,326	-
Feb-09	223,743	140,630	127,122	85,042	59,295	-	241,004	168,787	144,817	102,491	77,204	-
Mar-09	214,457	158,196	130,613	87,226	60,995	-	231,717	175,891	148,309	104,922	79,087	-
Apr-09	215,657	158,352	144,470	90,121	60,589	-	233,352	172,917	155,983	107,870	78,430	-
May-09	211,613	156,226	145,891	92,195	61,989	-	229,309	171,313	162,804	109,930	79,587	-
Jun-09	211,335	148,078	129,935	87,374	62,721	-	230,770	165,774	147,630	105,043	80,452	-
Jul-09	-	-	-	-	-	-	-	-	-	-	-	-
Aug-09	-	-	-	-	-	-	-	-	-	-	-	-

Unit: VND/kg

Annex 12.3. Monthly average sale price for processors of different sizes ***(P. vanamei)*-HOSO**

	Buying price:						**Selling price:**					
Date	**0-20**	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**	**0-20**	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**
Jan-08	-	-	-	62,848	49,681	-	-	-	-	73,233	60,253	-
Feb-08	-	-	-	63,496	49,036	-	-	-	-	73,897	59,616	-
Mar-08	-	-	-	63,102	51,100	-	-	-	-	73,524	61,654	-
Apr-08	-	-	-	61,654	49,023	-	-	-	-	72,078	59,566	-
May-08	-	-	-	59,417	46,391	-	-	-	-	69,869	57,004	-
Jun-08	-	-	-	60,667	47,041	-	-	-	-	71,103	57,654	-
Jul-08	-	-	-	57,115	45,536	-	-	-	-	67,595	56,172	-
Aug-08	-	-	-	55,470	44,944	-	-	-	-	65,535	55,575	-
Sep-08	-	-	-	62,246	47,773	-	-	-	-	72,662	58,368	-
Oct-08	-	-	-	56,523	45,733	-	-	-	-	67,010	56,354	-
Nov-08	-	-	-	58,891	47,773	-	-	-	-	69,349	58,368	-
Dec-08	-	-	-	56,720	44,417	-	-	-	-	67,205	55,042	-
Jan-09	-	-	-	59,746	45,337	-	-	-	-	70,193	56,008	-
Feb-09	-	-	-	56,589	46,523	-	-	-	-	67,075	57,134	-
Mar-09	-	-	-	57,839	46,038	-	-	-	-	68,309	56,354	-
Apr-09	-	-	-	59,549	43,760	-	-	-	-	69,998	54,405	-

May-09	-	-	-	56,128	41,391	-	-	-	-	66,620	52,066	-
Jun-09	-	-	-	59,089	41,983	-	-	-	-	69,544	52,654	-
Jul-09	-	-	-	-	-	-	-	-	-	-	-	-
Aug-09	-	-	-	-	-	-	-	-	-	-	-	-

Unit: VND/kg

Annex 12.4. Monthly average sale price for processors of different sizes ***(P. vanamei)*-HLSO**

Date	**Buying price:**						**Selling price:**					
	0-20	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**	**0-20**	**21-30**	**31-44**	**45-66**	**67-100**	**Broken**
Jan-08	-	-	-	95,563	75,585	-	-	-	-	112,722	92,742	-
Feb-08	-	-	-	96,585	74,605	-	-	-	-	113,746	91,785	-
Mar-08	-	-	-	95,202	77,742	-	-	-	-	113,172	94,760	-
Apr-08	-	-	-	93,785	74,585	-	-	-	-	110,946	91,889	-
May-08	-	-	-	90,385	70,585	-	-	-	-	107,544	87,746	-
Jun-08	-	-	-	92,285	71,585	-	-	-	-	109,446	88,746	-
Jul-08	-	-	-	86,885	69,285	-	-	-	-	104,046	86,446	-
Aug-08	-	-	-	84,385	68,385	-	-	-	-	101,546	85,546	-
Sep-08	-	-	-	94,685	72,685	-	-	-	-	111,976	89,846	-
Oct-08	-	-	-	85,985	69,585	-	-	-	-	103,189	86,746	-
Nov-08	-	-	-	88,976	72,685	-	-	-	-	106,746	89,711	-
Dec-08	-	-	-	86,285	67,585	-	-	-	-	103,442	84,743	-
Jan-09	-	-	-	90,885	68,985	-	-	-	-	108,046	86,146	-
Feb-09	-	-	-	86,085	97,480	-	-	-	-	103,246	87,946	-
Mar-09	-	-	-	87,985	69,585	-	-	-	-	105,146	86,746	-
Apr-09	-	-	-	90,585	66,585	-	-	-	-	107,746	83,746	-
May-09	-	-	-	85,380	62,985	-	-	-	-	102,546	80,146	-
Jun-09	-	-	-	89,885	63,885	-	-	-	-	107,046	81,046	-
Jul-09	-	-	-	-	-	-	-	-	-	-	-	-
Aug-09	-	-	-	-	-	-	-	-	-	-	-	-

Unit: VND/kg

Annex 13. Perception of the stakeholders on the unusual events last two years (%)

No.	Events:	*Shrimp farming (P.monodon)*	*Shrimp farming (P.vanamei)*
		n=154	n= 23
1	Knew that the tsunami affected some Asian countries	81.17	78.26
2	Affected by the tsunami	30.40	5.56
3	Knew that the US anti-dumping affected some Asian countries	85.06	56.52
4	Affected by the US anti- dumping	85.50	76.92
5	Have done anything to prevent the effect of the US anti-dumping?	89.31	39.13

Annex 14. Impact of the US anti-dumping

No.	Impacts:	*Shrimp farming (P.monodon)*	*Shrimp farming (P.vanamei)*
		n=154	n= 23
1	Affected to mental farmers	25.89	-
2	Lost profits/reduce income	56.25	30.0
3	Shrimp price reducing	42.86	60.0
4	Faced limitation for export markets	10.71	-
5	Reduce surface areas	-	10.0
6	Others	4.46	10.0

Annex 15: Solutions to mitigate the impact of the US anti-dumping

No.	Solutions:	*Shrimp farming (P.monodon)*	*Shrimp farming (P.vanamei)*
		n=154	n= 23
1	Government helps to stabilize price	32.48	-
2	Develop organic shrimp farming	38.46	-
3	Government policy for final support	4.27	-
4	Strictly manage and test food safety criterion before exporting	33.33	-
5	Expansion of the markets, more market penetration	14.53	-
6	Others	7.69	-

Annex 16. Perceived reasons and impact of price trends from shrimp farmer survey

	N	%
Received the incentives	105	100
Loan	73	67.59
Other	32	29.63
The sources of incentives		

Relativies	13	12.38
Bank	59	56.19
Wholesale	18	17.14
Collector	12	11.43
Other	3	2.86
Price changed in 2004-2009		
Yes: %	174	98.31
Decreased	*16*	*9.20*
Increased	*3*	*1.72*
Fluctuated	*152*	*87.36*
No change	3	1.72
Causes:		
Fluctuation markets	*41*	23.56
Buying sectors	*43*	24.71
Economic crisis	*34*	19.54
Too much production	*47*	27.01
Bad shrimp quality	*26*	14.94
Other	35	20.12
Price changed in 2008		
Yes: %	171	98.28
Decreased	65	38.01
Increased	31	18.13
Fluctuated	70	40.94
No change	5	2.92
Causes:		
Fluctuation markets	49	28.65
Buying sectors	29	16.96
Economic crisis	18	10.53
Too much production	54	31.58
Bad shrimp quality	23	13.45
Other	16	9.36

Indonesia Annexes

Annex 1: Samples and locations for the study

No	Respondents	West Java	East Java	Aceh/Sumut	Total
1	Shrimp farmers	60	23	51	134
2	Shrimp traders	4	4	5	13
3	Processors/exporters	1	1	2	4
	Total number of respondents	65	28	58	151

Annex 2: List of interviewed farmers

No	Farmer ID	Province	District	Sub-District	Village	Name
1	V1	North Sumatra	Langkat	Tj Pura	Kuala Serapuh	Margiono
2	V2	North Sumatra	Langkat	Tj Pura	Kuala Serapuh	Aseng
3	V3	North Sumatra	Langkat	Tj Pura	Kuala Serapuh	Acin
4	V4	North Sumatra	Langkat	Tj Pura	Kuala Serapuh	Yensen Firnando
5	V5	North Sumatra	Langkat	Tj Pura	Kuala Serapuh	Acai
6	V6	North Sumatra	Langkat	Tj Pura	Kuala Serapuh	Acun
7	V7	North Sumatra	Langkat	Tj Pura	Kuala Serapuh	Ayu
8	V8	North Sumatra	Langkat	Tj Pura	Kuala Serapuh	Edi Candra
9	V9	North Sumatra	Langkat	Tj Pura	Kuala Langkat	Anhwa
10	V10	North Sumatra	Langkat	Tj Pura	Kuala Langkat	Hendri
11	V11	North Sumatra	Langkat	Tj Pura	Kuala Langkat	Pardi
12	L1	North Sumatra	Langkat	Gebang	Dogang	Ade
13	L2	North Sumatra	Langkat	Tj Pura	Kuala Serapuh	Amat
14	L3	North Sumatra	Langkat	Tj Pura	Kuala Serapuh	Adi
15	L4	North Sumatra	Langkat	Tj Pura	Kuala Langkat	Jumaidi
16	L5	North Sumatra	Langkat	Tj Pura	Kuala Langkat	Roni
17	L6	North Sumatra	Langkat	Tj Pura	Bubun	Nizar
18	L7	North Sumatra	Langkat	Tj Pura	Bubun	Udin
19	L8	North Sumatra	Langkat	Tj Pura	Bubun	Sa'ari
20	L9	North Sumatra	Langkat	Gebang	Dogang	Syahlendra
21	L10	North Sumatra	Langkat	Gebang	Dogang	Irvan Siregar
22	A1	NAD	Aceh Utara	Samudera	Blang Nibong	Aulia Huddin
23	A2	NAD	Aceh Utara	Samudera	Sawang	Ruslan
24	A3	NAD	Aceh Utara	Samudera	Blang Nibong	M. Yakub Syeh
25	A4	NAD	Aceh Utara	Samudera	Blang Nibong	Muzakir
26	A5	NAD	Aceh Utara	Samudera	Sawang	Usman Wahid
27	A6	NAD	Aceh Utara	Samudera	Blang Nibong	Abdullah AR
28	A7	NAD	Aceh Utara	Samudera	Blang Nibong	Munir
29	A8	NAD	Aceh Utara	Samudera	Sawang	H. Abubakar
30	A9	NAD	Aceh Utara	Samudera	Sawang	Marzuki Puteh
31	A10	NAD	Aceh Utara	Samudera	Sawang	H. Hasyem Ben
32	B1	NAD	Bireuen	Jangka	Alue U	Andrean Isha
33	B2	NAD	Bireuen	Jangka	Alue U	Mulyadi
34	B3	NAD	Bireuen	Jangka	Alue U	Mursalin
35	B4	NAD	Bireuen	Sp. Mamplam	Calok	Baliyani
36	B5	NAD	Bireuen	Sp Mamplam	Ulee Kareung	Masykur
37	B6	NAD	Bireuen	Sp. Mamplam	Alue Lehop	Nurdin Usman
38	B7	NAD	Bireuen	Sp. Mamplam	Alue Lehop	Baihaqi Ahmad
39	B8	NAD	Bireuen	Sp. Mamplam	Lhok Mane	Hadiani
40	B9	NAD	Bireuen	Pandrah	Nasee Barat	Burhanuddin
41	B10	NAD	Bireuen	Sp. Mamplam	Lhok Mane	Jalaluddin
42	P1	NAD	Pidie	Sp. Tiga	Cot Jaya	Bukhari A. Gani
43	P2	NAD	Pidie	Bandar Baru	Udeung	Bakhtiar AR
44	P3	NAD	Pidie	Bandar Baru	Baroh Lancok	Mustafa Ismail
45	P4	NAD	Pidie	Bandar Baru	Baroh Lancok	Sulaiman
46	P5	NAD	Pidie	Bandar Baru	Udeung	Abdullah Usman
47	P6	NAD	Pidie	Batee	Pulo Bungong	Jufri

48	P7	NAD	Pidie	Bandar Baru	Baroh Lancok	M. Ali Daud
49	P8	NAD	Pidie	Kb. Tanjong	Pasi Lhok	Marwan
50	P9	NAD	Pidie	Bandar Baru	Udeung	M. Jafar Yusuf
51	P10	NAD	Pidie	Bandar Baru	Baroh Lancok	M. Nasir Insya
52	V1	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Sayuti
53	V2	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Sobana
54	V3	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Endang Suratman
55	V4	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Dodi
56	V5	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Saifudin
57	V6	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Karyo
58	V7	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Rosyidi
59	V8	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Sahwan Mulyana
60	V9	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Sabar Priadi
61	V10	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Tiwan
62	K1	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Kasan
63	K2	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Endi
64	K3	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Aneng
65	K4	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Hasman
66	K5	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Sujito
67	K6	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Harmawan
68	K7	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Entis
69	K8	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Darsian
70	K9	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Sarpadi
71	K10	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Endi Sanol
72	K11	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Amir
73	K12	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Adong
74	K13	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Dakam
75	K14	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Endang
76	K15	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Katma
77	K16	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Satam
78	K17	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Salim
79	K18	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Sa'ir
80	K19	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Asep Sopian
81	K20	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Entang
82	K21	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Wayat
83	K22	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Enim
84	K23	West Java	Karawang	Rengas Dengklok	Rengas Dengklok	H. Endi
85	K24	West Java	Karawang	Cilamaya Wetan	Muara Cilamaya	H. Usman Effendi
86	K25	West Java	Karawang	Cilamaya Wetan	Muara Cilamaya	Carwan
87	K26	West Java	Karawang	Cilamaya Wetan	Muara Cilamaya	H. Namatu
88	K27	West Java	Karawang	Cilamaya Wetan	Muara Cilamaya	Hadist
89	K28	West Java	Karawang	Cilamaya Wetan	Muara Cilamaya	Kasdi Soewaryono
90	I1	West Java	Indramayu	Pasekan	Karang Anyar	Sumarno
91	I2	West Java	Indramayu	Pasekan	Karang Anyar	Karno
92	I3	West Java	Indramayu	Pasekan	Karang Anyar	Mamat
93	I4	West Java	Indramayu	Pasekan	Karang Anyar	Kadir
94	I5	West Java	Indramayu	Pasekan	Karang Anyar	Tarno
95	I6	West Java	Indramayu	Pasekan	Karang Anyar	Rahmat
96	I7	West Java	Indramayu	Pasekan	Karang Anyar	Atmo
97	I8	West Java	Indramayu	Pasekan	Karangsong	Tono
98	I9	West Java	Indramayu	Pasekan	Karang Anyar	Haris
99	I10	West Java	Indramayu	Pasekan	Karangsong	Agus Cipto
100	I11	West Java	Indramayu	Pasekan	Karangsong	Darsono
101	I12	West Java	Indramayu	Pasekan	Karang Anyar	Doni
102	I13	West Java	Indramayu	Pasekan	Pagirikan	Herman
103	I14	West Java	Indramayu	Pasekan	Pagirikan	Andi
104	I15	West Java	Indramayu	Pasekan	Pagirikan	Danang
105	I16	West Java	Indramayu	Balongan	Balongan	Viktor
106	I17	West Java	Indramayu	Balongan	Balongan	Adang
107	I18	West Java	Indramayu	Balongan	Balongan	Yanto
108	I19	West Java	Indramayu	Balongan	Balongan	Agus
109	I20	West Java	Indramayu	Balongan	Kapolo	Suyono

110	I21	West Java	Indramayu	Balongan	Balongan	Atmo
111	I22	West Java	Indramayu	Balongan	Kapolo	Hartono
112	T1	East Java	Tuban	Jenu	Solorejo	Sanjam
113	T2	East Java	Tuban	Jenu	Solorejo	Kasdar
114	T3	East Java	Tuban	Jenu	Solorejo	Munasir
115	T4	East Java	Tuban	Jenu	Temaji	Jamiran
116	T5	East Java	Tuban	Palang	Cepoko Rejo	Panut
117	T6	East Java	Tuban	Jenu	Temaji	Zainul Arifin
118	T7	East Java	Tuban	Jenu	Solorejo	Junaedy
119	T8	East Java	Tuban	Jenu	Solorejo	Rumidi
120	T9	East Java	Tuban	Jenu	Temaji	Kasiadi
121	T10	East Java	Tuban	Jenu	Temaji	Mukmin
122	S1	East Java	Sidoarjo	Jabon	Kp. Pandan	Ahmad
123	S2	East Java	Sidoarjo	Jabon	Kp. Pandan	Muklis
124	S3	East Java	Sidoarjo	Jabon	Kp. Pandan	Budi
125	S4	East Java	Sidoarjo	Buduran	Prasung	Ahyar
126	S5	East Java	Sidoarjo	Tanggulangin	Banjar Panji	Haryadi
127	S6	East Java	Sidoarjo	Buduran	Prasung	Adi
128	S7	East Java	Sidoarjo	Buduran	Banjar Panji	Gatot
129	S8	East Java	Sidoarjo	Buduran	Banjar Panji	Samiri
130	S9	East Java	Sidoarjo	Buduran	Prasung	Jarot
131	S10	East Java	Sidoarjo	Buduran	Prasung	Makmur
132	V1	East Java	Tuban	Karang	Karang	Hoky Putra
133	V2	East Java	Tuban	Candi	Kd. Beluk	Haryadi
134	V3	East Java	Tuban	Tambak Boyo	Gelondong	Warsilan

Annex 3: List of Interviewed Traders

No	Trader ID	Province	District	Sub-District	Village	Name
1	EJ1	East Java	Pasuruan	Bangil	Kalirejo	Rowi
2	EJ2	East Java	Pasuruan	Bangil	Kalirejo	H. Ashari
3	EJ3	East Java	Pasuruan	Bangil	Kalirejo	H. Sutrisno
4	EJ4	East Java	Sidoarjo	Candi	Kd. Beluk	H. Kholidin
5	NS1	NAD	Bireuen	Pandrah	Nasee Barat	Burhanudin
6	NS2	NAD	Pidie	Bandar Baru	Baroh Lancok	M. Jamil Abubakar
7	NS3	NAD	Pidie	Sp. Tiga	Cot Jaya	Zulkifli
8	NS4	NAD	Aceh Utara	Samudera	Blang Nibong	Muzakir
9	NS5	NAD	Aceh Utara	Samudera	Sawang	Saiful Bakri
10	WJ1	West Java	Indramayu	Pasekan	Karanganyar	Muhdi
11	WJ2	West Java	Indramayu	Pasekan	Karanganyar	Juhadi
12	WJ3	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Sa'ir
13	WJ4	West Java	Karawang	Cilebar	Pusaka Jaya Utara	Karsa

Annex 4: List of Interviewed Processors

No	Trader ID	Province	District	Address	Company Name	Name
1	F1	West Java	Karawang	Tunggak Jati	PT. Pertiwi Alam Samudra	Narwis Taufik
2	F2	East Java	Gresik	Osowilangun	PT. Indu Manis	Nur
3	F3	North Sumatra	Medan city	Marelan, Belawan	PT. Sari Ayu Windu Sejati	Ayen
4	F4	North Sumatra	Medan city	Kaw. Ind. Medan II	PT. Tanjung Bedagai	Djanuati

Annex 5: Monthly average sale prices (IDR/kg) for farmers of different sizes (*P. monodon*)

Month	Size 26 - 30	Size 31 - 40	Size 41 - 50	Size 51 - 60	Size 61 - 100
January-08	-	-	-	-	-
February-08	-	-	-	-	-
March-08	49,842	41,000	45,000	-	-
April-08	47,947	47,500	41,000	30,000	-
May-08	53,900	47,250	37,500	28,000	30,000
June-08	47,909	40,533	33,667	27,667	25,000
July-08	48,667	43,000	29,000	31,250	23,750
August-08	48,600	40,917	34,250	30,000	-
September-08	49,643	39,125	35,000	28,000	20,000
October-08	49,091	38,333	35,000	25,000	-
November-08	51,571	41,500	33,900	30,333	32,000
December-08	49,333	43,389	42,000	-	25,000
January-09	42,000	42,500	27,000	35,000	25,000
February-09	50,000	42,500	35,000	-	-
March-09	47,600	-	32,000	-	-
April-09	47,833	45,000	34,333	30,000	27,000
May-09	49,000	47,250	33,250	32,500	-
June-09	50,174	42,056	35,455	31,286	23,000

Annex 6: Monthly average sale prices (IDR/kg) for farmers of different sizes (*P. vannamei*)

Month	Size 26 - 30	Size 31 - 40	Size 41 - 50	Size 51 - 60	Size 61 - 100
January-08			-	-	-
February-08			-	37,200	-
March-08			-	36,800	-
April-08			-	36,000	-
May-08			33,000	36,380	28,700
June-08			39,500	36,250	25,000
July-08			-	37,133	-
August-08			-	-	-
September-08			-	-	32,000
October-08			37,500	35,500	28,600
November-08			-	38,533	29,200
December-08			40,500	39,700	-
January-09			-	38,300	-
February-09			-	-	-
March-09			-	-	30,500
April-09			-	-	-
May-09			-	40,600	25,000
June-09			39,100	35,600	26,417

Annex 7: Monthly average procurement prices (IDR/kg) for traders for size 40 pieces/kg

		West Java			North Sumatra					East Java		
Month	**Mean**	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**
January-08	41,400	38,000	38,000	38,000	38,000	41,000	41,000	40,000	40,000	-	50,000	50,000
February-08	40,800	38,000	38,000	38,000	38,000	41,000	41,000	36,000	38,000	-	50,000	50,000
March-08	42,000	38,000	38,000	38,000	38,000	43,000	43,000	36,000	38,000	50,000	50,000	50,000
April-08	42,455	38,000	38,000	38,000	38,000	44,000	43,000	38,000	40,000	50,000	50,000	50,000
May-08	42,545	38,000	38,000	38,000	39,000	44,000	43,000	38,000	40,000	50,000	50,000	50,000
June-08	42,273	38,000	38,000	38,000	39,000	42,000	41,000	39,000	40,000	50,000	50,000	50,000
July-08	42,455	38,000	38,000	38,000	39,000	43,000	43,000	38,000	40,000	50,000	50,000	50,000
August-08	42,300	38,000	38,000	38,000	40,000	43,000	42,000	41,000	43,000	-	50,000	50,000
Sept-08	43,500	-	-	38,000	41,000	44,000	43,000	41,000	41,000	-	50,000	50,000
October-08	43,250	-	-	38,000	41,000	43,000	42,000	41,000	41,000	-	50,000	50,000
Nov-08	42,100	38,000	38,000	38,000	40,000	43,000	42,000	41,000	41,000	-	50,000	50,000
Dec-08	42,278	38,000	-	38,000	40,000	41,000	41,000	40,000	42,500	-	50,000	50,000
January-09	41,500	38,000	-	38,000	40,000	41,000	41,000	41,000	43,000	-	-	50,000
February-09	41,750	38,000	-	38,000	40,000	44,000	42,000	41,000	41,000	-	-	50,000
March-09	41,333	38,000	38,000	38,000	40,000	44,000	43,000	40,000	41,000	-	-	50,000
April-09	41,900	38,000	38,000	38,000	40,000	42,000	42,000	40,000	41,000	50,000	-	50,000
May-09	41,778	38,000	-	38,000	39,000	42,000	41,000	39,000	39,000	50,000	-	50,000
June-09	41,000	38,000	38,000	38,000	39,000	42,000	41,000	41,000	42,000	-	-	50,000

Annex 8: Monthly average procurement prices (IDR/kg) for traders for size 60 pieces/kg

		West Java	East Java		
Month	**Mean**	**1**	**1**	**2**	**3**
January-08	33,000	33,000	33,000	33,000	33,000
February-08	33,000	33,000	33,000	33,000	33,000
March-08	33,000	33,000	33,000	33,000	33,000
April-08	33,000	33,000	33,000	33,000	33,000
May-08	33,000	33,000	33,000	33,000	33,000
June-08	33,000	33,000	33,000	33,000	33,000
July-08	33,000	33,000	33,000	33,000	33,000
August-08	33,000	33,000	33,000	33,000	33,000
September-08	33,000	33,000	33,000	33,000	33,000
October-08	33,000	33,000	33,000	33,000	33,000
November-08	33,000	33,000	33,000	33,000	33,000
December-08	33,000	33,000	33,000	33,000	33,000
January-09	33,000	33,000	33,000	33,000	33,000
February-09	33,000	33,000	33,000	33,000	33,000
March-09	33,000	33,000	33,000	33,000	33,000
April-09	33,000	33,000	33,000	33,000	33,000
May-09	33,000	33,000	33,000	33,000	33,000
June-09	33,000	33,000	33,000	33,000	33,000

Annex 9: Monthly average procurement prices (IDR/kg) for processors for different sizes

	P. monodon	***P.vannamei***			
Month	**Size 21-30**	**Size 71-80**	**Size 81-100**	**Size 101-150**	**Size 151-200**
January-08	45,000	33,500	27,250		
February-08	44,000	33,500	29,250		
March-08	44,000	33,500	28,000		
April-08	45,000	30,250	26,750		
May-08	46,000	33,250	27,350		
June-08	46,000	32,250	27,500		
July-08	46,000	30,750	26,750		
August-08	44,000	29,000	25,000		
September-08	45,000	30,000	25,000		
October-08	46,000	30,000	25,250		
November-08	47,000	30,500	25,750		
December-08	44,000	29,500	24,500		
January-09	50,000	28,000	28,000	28,000	22,000
February-09	48,000	28,250	27,667	28,000	22,000
March-09	47,000	31,000	30,467	28,000	22,000
April-09	45,000	34,850	31,833	28,000	22,000
May-09	44,000	33,000	31,833	28,000	22,000
June-09	44,000	29,700	30,750	28,000	22,000

Annex 10: Per hectare shrimp farming variable cost and their percentages (*P. monodon*)

No	**Items of cost (unit: 1000 IDR/ha/crop/year)**	**2008**		**2009**	
		Cost	**%**	**Cost**	**%**
1	Shrimp post larvae	1,709,609	25.9	1,063,864	9.5
2	Fish seed	1,373,536	20.8	1,057,618	9.5
3	Labour for pond preparation	334,636	5.1	248,727	2.2
4	Labour during production	574,545	8.7	760,909	6.8
5	Labour during harvesting	299,182	4.5	215,000	1.9
6	Chlorine/bleach	273	0.0	-	0.0
7	Chemical/drugs	199,385	3.0	171,885	1.5
8	Lime	97,818	1.5	52,091	0.5
9	Fertilizer	264,077	4.0	203,732	1.8
10	Home made feed	96,909	1.5	99,886	0.9
11	Commercial feed	932,298	14.1	6,706,952	59.9
12	Electricity	54,818	0.8	30,909	0.3
13	Fuels	278,500	4.2	340,341	3.0
14	Harvest/Transportation	356,136	5.4	220,736	2.0
15	Others	31,227	0.5	16,818	0.2
16	Total	6,602,952		11,189,470	

Annex 11: Per hectare shrimp farming variable cost and their percentages (*P.vannamei*)

No	Items of cost (unit: 1000 IDR/ha/crop/year)	2008		2009	
		Cost	%	Cost	%
1	Shrimp post larvae	50,186,458	10.8	47,098,958	12.1
2	Fish seed	-	0.0	1,666,667	0.4
3	Labour for pond preparation	2,540,417	0.5	2,251,250	0.6
4	Labour during production	21,191,667	4.5	17,126,667	4.4
5	Labour during harvesting	1,910,833	0.4	1,480,833	0.4
6	Chlorine/bleach	337,500	0.1	759,375	0.2
7	Chemical/drugs	7,039,583	1.5	13,375,000	3.4
8	Lime	541,667	0.1	500,000	0.1
9	Fertilizer	72,917	0.0	62,500	0.0
10	Home made feed	-	0.0	-	0.0
11	Commercial feed	375,856,667	80.6	302,344,167	77.4
12	Electricity	1,204,167	0.3	866,667	0.2
13	Fuels	4,458,333	1.0	2,270,833	0.6
14	Harvest/Transportation	780,417	0.2	459,063	0.1
15	Others	283,333	0.1	179,167	0.0
16	Total	466,403,958		390,441,146	

Annex 12: Perception of changes in shrimp farming

No	Indicator	Level of change (%)		
		Decreased	Not changed	Increased
1	Total culture area of the farm	1.49	91.79	6.72
2	Number of ponds	1.49	90.30	8.21
3	Nursing pond area	0.00	100.00	0.00
4	Settlement pond area	0.00	100.00	0.00
5	Investment (incuding machinery)	13.43	75.37	11.19
6	Ownership of land	2.99	93.28	3.73
7	Shrimp farming mode	1.49	91.04	7.46
8	Use labourers (family and employed)	2.99	93.28	3.73
9	Farmed species	6.72	91.79	6.72
10	Seed sources	46.27	50.00	3.73
		within district	**within province**	**outside province**
11	Average stocking density of 1st crop	11.19	77.61	11.19
12	Stocking duration of 1st crop	1.49	97.01	1.49
13	use of feed	16.42	71.64	11.94
14	Use of drugs/chemicals	32.84	72.39	0.75
15	Shrimp productivity of the 1st crop	52.99	30.60	16.42
16	Marketing of shrimp	9.70	85.07	5.22
17	Average cost per ha of the 1st crop	7.46	68.66	23.88
18	Average profit per ha of the 1st crop	52.24	33.58	14.18

Annex 13: Investment made in shrimp farming

No	Items of investment	Average (IDR)	% out of the total
1	Construction of the system	8,561,589	18.49
2	Upgrading of the system	3,950,430	8.53
3	Machinery	16,814,612	36.31
4	Guard shade/farmers hut	5,290,726	11.42
5	Major equipment	3,466,425	7.48
6	All items	8,228,013	17.77
	Total	**46,311,797**	

Annex 14: Volume of shrimp traded 2004 - 2009

No	Stakeholders	Commodity (kg)	Year					
			2004	2005	2006	2007	2008	2009*
1	Trader	*P.monodon*	569,200	414,480	423,680	471,160	527,540	195,480
		P.vannamei	630,000	660,000	984,800	869,000	967,300	551,800
		Other white shrimp	30,190	18,600	27,620	26,020	27,902	20,170
2	Processor	*P.monodon*	-	-	-	-	147,501	61,418
		P.vannamei	-	-	-	-	95,000	65,000

Note: * until June 2009

Annex 15: Socio-economic indicators of the sampled stakeholders

No	Socio-economic characteristics	Farmer	Trader	Processor
1	**Age (years)**	44.5	37.0	37.3
2	**Experience in shrimp farming/trading/processing (years)**	15.9	11.1	10.5
3	**Gender**			
3.1	Male (%)	100.0	100.0	25.0
3.2	Female (%)	0.0	0.0	75.0
4	**Household size (no.)**	3.8	3.0	1.5
5	**Number of family laborers**			
5.1	Male	0.8	1.6	0.0
5.2	Female	0.0	0.2	0.0
6	**Number of family laborers involved in shrimp farming/trading/processing**			
6.1	Male	0.7	2.0	0.0
6.2	Female	0.0	0.2	0.0
7	**Number of shrimp farming/trading/processing employees**			
7.1	Male	1.2	2.6	51.8
7.2	Female	0.1	0.0	123.0
8	**Involvement with other occupation (%)**			
8.1	Trade	20.9	0.0	0.0
8.2	Agriculture	10.4	0.0	0.0
8.3	Livestock	0.0	0.0	0.0
8.4	Employment	3.0	0.0	0.0
8.5	Working for the government	1.5	0.0	0.0
8.6	Workshop	0.0	0.0	0.0
8.7	Estate	0.0	0.0	0.0
8.8	Shop	0.0	0.0	0.0
8.9	Transportation	0.7	0.0	0.0

8.10	Huller	0.0	0.0	0.0
8.11	Teaching	0.0	0.0	0.0
8.12	Sewing	0.0	0.0	0.0
8.13	Paddy farmer	0.0	0.0	0.0
8.14	Mining	0.0	0.0	0.0
8.15	Other/freelance	11.2	0.0	0.0
8.16	Aquaarmer	0.7	69.2	0.0
9	***Illiterate (%)***	7.5	0.0	0.0
10	***Literate (%)***			
10.1	Primary attended	35.1	30.8	0.0
10.2	Secondary school attended	23.1	23.1	0.0
10.3	High school attended	28.4	46.2	0.0
10.4	Diploma	3.0	0.0	0.0
10.5	College/University. Attended	2.2	0.0	100.0
11	**Aquaculture technical knowledge (%)**			
11.1	Own initiative	66.4	100.0	25.0
11.2	training	31.3	0.0	25.0
11.3	vocational school	0.7	0.0	0.0
11.4	college/university	0.7	0.0	50.0
11.5	Own initiative and training	0.0	0.0	0.0
11.6	Post graduete	0.0	0.0	0.0

Bangladesh Annexes

Annex1: Name and Addresses of Respondents

Table 1: Shrimp farmers and Farm Profile:

District	Thana	Union	Village	Farmer's name	Farmer's father name
Bagerhat	Bagerhat Sadar	Barai Para	Goalkhali	Nokib Akramul	Late Jobbar Nokib
		Bemarta	Bojoypur	Abul Hossan	Late Md. Ismaile Hossan Sak
			Bojoypur	Md. Akram Sheikh	Late Rohim Uddin Shek
			Khrasombol	Dulal Haulader	Battu Haulade
			Rogunatpur	Md.Mafuj Sardar	Md. Abul Hossion Sardar
		Dema	Kasimpur	Md. Babul Nakib	Late Md. Mohor Fakir
		Jatrapur	Afra	Shidur Rahaman	Late Sardar Hafizur Rahaman
			Moswhad pur	Md. Hafizur Rahaman	Sak Diin Mohammad
			Muijidpur	Ali Newaz Tuhin	Lat Shek Musilim Ali
			Musidpur	Shek Mutaleb Hossan	Late Adom Ali
		Kara Para	Koliadaour	Kamruzzaman	Jafor Shek
		Shat Gambuj	Fulbari	Md. Abul Hossin	Late Akim Uddin
			Fulbari	Gaous Hauldar	Late Nur Mohammad Hauldar
			Phulbari	Abdul Gani Sarder	Md Asimuddin Sarder
			Phulbari	Abdul Shobhan Sarder	Late Mofiluddin Sarder
			Poschim Danga	Asok Kumer Sen	Late Kalipod Sen
	Mongla	Burirdanga	Digraj	Konkon Roy	Gurudas Roy
		Chandpi	Brammannath	Salina Bebum	Md. Shawket Hossin
			Kainmari	Somer Puddar	Upandranat Puddar
			Kainmari	Harun-ur-rasid	Sirazul Islam
			Kayenmari	Profulla Kumar Bishwas	Lat. Samacharan Bishwas
			Khalikabri	Horidash Bishwas	Late Sharat Chandar Bishwas
		Chila	Holdibulia	Farid Uddin	Late Abdul Kader Shek
		Sundarban	Bashtala	Gulan Mustafa Fakier	Late Abdul Samad Fakier
			Bashtala	Abdul Azia Faquer	Late Kadem Ali Faquer
			Bastala	Hassan Ali	Hatem Ali
			Bastala	Mustafa	Late Md. Ibrahim
			Bastola	Afzal Hossain	Aamier Ali Musa
			Bastola	Easkandar Talukder	Hossion Ali Talukder
			Burburia	Motiar Shikari	Late khursed Ali
			Burburiga	Atiar Shikkari	Karim Shikkari
			Khoma	Abul Kalam	Mobin Uddin
			Khorma	Harun	Hakim Ali Hauldar
		Suniltala	Ulubonia	Gazi Gulam Rosul	Late. Amin Gazi
Cox's Bazar	Chakaria	Badarkhali	Bodorkhali	Md. Musa	Asaduzzaman
			East Big Vheola	Nurul Amin	Mustafa Ahmed
			Maisgoma	Anwar Hossain	Monir Ahmed
		Bheola Manik Char	Ilisia	Shahenawas Chowdhury	Late Mustafa Ahmed Chowdhury
			Koral Khali	Md. Rafiq	Late Abdul Motlob
		Paschim Bara Bheola	Ilisia	Shumsul Alam	Sirajul Islam
			Ilisia	Shamsul Alam	Late Muklesur Raham
		Shahar Beel	Eid moni, East Big Vheola	Sarwar Kamal	Akam Uddin
			Eid moni, East Big Vheola	Azim Uddin	Hazi Bodi Alam
			Ilisia	Nur Mohammad	Late Abdul Rahaman
			Koral Khali	Nurul Islam	Late Ali Ahmed
			Koral Khali	Ruhul Amin	Late Ali Ahmed

District	Thana	Union	Village	Farmer's name	Farmer's father name
			Koral Khali	Nurul Islam	Md. Ali Mia
			Koral Khali	Abdul Sukur	Siragul Islam
			Koral khali	Abu Shama	Late Asiare Rahaman
			Koral Khali	Syed Alam	MONIR AHMED
			Rampur	Mujahar Mia	Abdul Kader
			Rampur	Monjur alam	Mujahar mia
	Maheshkhali	Bara Maheskhali	Boro Moheshkhali	Amanullah	Hazi.Kibur Ahamade
	Teknaf	Dakshin Mithachhari	Adharkhola	Md. Sharif Madbor	Late Haz Mokbul Ali Madbor
		Nhilla	Nilabazar	Md. Afsar Ali	Late Shamsuddin
		Palong Khali	Dhimonkhali	Haji Abdul gafur	Late.Moulobi Abdul Haqu
		Whykong	Balukhali	Md. Firoz Ahmed	Late Zakir Ahmed Chow
			Borosora	Nurul Alam	Late Hazi Md. Kashem
			Fakir Ali	Mustafa Ahmed Babul	Janab Ali
			Fokirkhali	Md. Foridul Alam	Late Moulabi Hazi Nur Ahemed
			Fokirkhali	Abu kaisar	Late Sale Ahmed
			Foriasora	Abul kashem	Mia Hossain
			Huaiking	Kabir Ahmed	Lat.A Rajak Chow
			Huaikong	Mustak Ahmed Chow	Late Ali mia Chow
			Kalaliabata	Md. Nizam Uddin	Hazi Member Islam
			Kangarpara	Afsar Ali	Late Abdul Ali
			Kharongkhali	Hazi Mazahar Ahmed	Hazi Ruson Ali
			Mohorkata	Abu Taleb	Late Hazi Sazzatulla
			Tolatuli	Nazir Ahmed	Late.Kalamia Saudger
			Tolauli	Md.Gias uddin	Gulimsurer
Khulna	Dacope	Bajua	Bajua	Sheak Azizul Islam	Late Sheak Sirajul
			Bajua	Debobrota Sarker	Late Dhurgapad Sarker
			Chunuburi	Ramesh Chandra Kobiraj	Late Soshidhar Kobiraj
		Chalna	Baruikhali	Md. Nurul Islam	Late Ishaq Ali
			Khalisha	Md.Shakal Ahamd Dilo	Sake Abdul Hamide
		Dacope	Orabonia	Sonjoy Kumer	Late Mochindra nat
			Sahrabad	Poresh Chanda Mondol	Late Razanda nat Moldol
		Kailasganj	Koilashgonj	Gazi Jahangir Alam	Late Ansar Ali
			Koilashgonj	Abdul Kalek Sana	Late Mahatab sana
			Ramnagar	Bimolandra Mondol	Horendo Nath Mondol
		Kamarkhola	Kamarkhula	Md.Oliar Rahman	Late Abdul Kader Gazi
			Rekakhali	Mohadev Roy	Horendronat Roy
			Shree nagar	Md. Hashemuzzaman	Late Tofajjel Hossan
			Sivnagar	S.M. Rofikul	Late
			Srinagr	Sarder Faruq	Late Sarder Munsurul Haqu
			Srinagr	SM Golam Akber	Iskendar Ali
		Pankhali	Ananda Nagar	Md.Mohsin Akonji	Late Ahed Ali
			Katabonia	Abdul Gafur Sheak	Late Abu Bakar Sheak
			Katabunia	Seike Ashikur rohamin	Md. Sherajul Hqu
			Khuna	Sheikh Abul Hossain	Late. Ashraf Ali Sheikh
			Pankhali	S.M.Omar Faruk	Late Keramot Ali
			Pankhali	ABM Rohul Amin	Late.Ansar Ali Sarder
		Sutarkhali	Gumari	Bimolandra Mondol	Late Ramakanta Mondal

District	Thana	Union	Village	Farmer's name	Farmer's father name
			Kalabagi	M.A. Malek	Late MunSur Rahaman Sheak
			Nolian	Arshad Ali Gazi	Late Md. Ansar Ali Gazi
			Nolian	Md. Hafizur Rahaman Sana	Mhirul Uddin Sana
			Nolian	Abdul Barik Gazi	Abdul Hanid Gazi
			Sutarkhali	Noni Gupal Boiddah	Late Vogoban Boiddah
		Tildanga	Botbunia	Dulal Chandra Sarder	Late Sukendra Nath Sarder
			North Kamine Basia	Anil Roy	Late Pironate Roy
Satkhira	Assasuni	Anulia	Anulia	Abdul Khalek Sana	Abdul Aziz
			Cheytia	Hazi Jonab Ali	Madar Ali
		Assasuni	Harydanga	Volanath	Kalipud Mondol
			Sheekalash	Shamsur Rahaman	Rohaman Gazy
		Durgapur	Sridharpur	Md. Mozammel Gazi	Late. Mokbul Sharder
			Sridharpur	Anar Gazi	Md. Fokir Ali
		Kadakathi	Sriramkhali	Md. Gaziul Huq	LateSharwar Sana
		Khajra	Godaipur	Dalim	Mojaharul Uddion Sardar
		Pratap Nagar	Kola	Mujibur Rahaman	Shohal Huq Sardar
			KooanPur	Nurul	Late Belahet Sarker
			Protab Nagar	Hazi Daud Ali	Late Hazi Kaem Uddin
		Sobhnali	Bashirampur	Abul Kasam	Ismail Mulla
			Bashukhali	Shajahan	Mukshed Ali
			Hagepur	Sharfattula	Abdul Yahab Gazi
			Kaikhali	Milon	jalal Gazi
			Shovonali	Md. Mannan	Abdul Hannan Gazi
			Shovonali	Talebul Islam	Gohor Ali
	Debhata	Debhata	Choto Shanta	Alhaj Md. Fazlur Rahman	Haji Dalil Uddin
			Debhata	Md. Roushan Ali	Md. Mubarak Ali
			Shokhipur	Nur Mohammad	Alhaj Babar Ali Gaji
			Talsripur	Md. Ibrahim Khalil	Late. Kabil Uddin
			Vatshala	Md. Abdul Wahab	Late. Ahmed Sarder
		Noa Para	Atapur	Md. Abdul Majed Shikari	Nouapara
		Pabnapur	Najirer Gher	Md.Sahajahan Sana	Lt.Osman Sana
		Purulia	Najirer Kher	Haji Monsur Ali	Late. Azim Morol
			Purulia	Mrinal Kanti Gosh	Gobinda Gosh
			Subarnbad	Binoy Krishna Haulader	Roy Charan Haulader
	Shyamnagar	Bhurulia	Burilia	Jaker Hossion	Md. Kamrul Hossion
		Ishwaripur	Ishordipm	Solaiman	Md.Babul Sharker
			Khagraghat	Abu Based Sardar	Abu Akram Sardar
		Kaikhali	Mirzapur	Noushar Ali	Md.Pappu Ali
		Kashimari	Ghola	Toufiqur Rahaman	Md. Amzad Rahaman
		Munshiganj	Munshinagar	Hafijur Rahaman	Hafijur Rahman
		Nurnagar	Durduskhali	Krishpod Mondal	Bipul Mondal
		Padma Pukur	Chuterpur	AGM Amanulla	ATM Alamin
			Jhapa	Jamat Ali	Md.Kanon Ali
		Shyamnagar	Chakba	G.M. Fajul	Md. Asam Ali

Table 2: Shrimp Traders' name and address:

Sample No.	Respondent's Name	Location			
		Village	Union	Upazilla	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	Bagerhat	Bagerhat
10	Suko Ranjan	Kapalibandar	Bamorta	Bagerhat	Bagerhat
11	Ramizul Islam	Kainmari	Chandpie	Mongla	Bagerhat
12	Panchanon Bairagi	Kunainagar	Chandpie	Mongla	Bagerhat
13	samor Sarkar	Kainmari	Chandpie	Mongla	Bagerhat
14	Gourungo Rai	Kainmari	Chandpie	Mongla	Bagerhat
15	Md. Zillur rahman	Dema	Dema	Bagerhat sadar	Bagerhat
16	Md. Motaleb Tarafder	Dema	Dema	Bagerhat	Bagerhat
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

Table 3: Depot Name and Address:

	Respondent's Name	Position	Business Name	Location			
				Village	Union	Upazilla	District
1	Bikash Chandra Mondal	Owner	Bhai Bhai Fish Ltd	Munsigonj	Munsigonj	Shyamnagar	Satkhira
2	Md. Akram Hossain	Owner	Ms Mayer Doa Fish	Chapra	Budhata	Assasuni	Satkhira
3	Md. Rahul Amin	Owner	Ms Salina Fish	Asasuni	Asasuni	Asasuni	Satkhira
4	Alhaz Rowsan Ali	Owner	Mahmud Fish & Commission	Beledanga	Kulia	Debhata	Satkhira
5	Md. Yellas Ali	Owner	Russel Fish Ltd.	Bager Bazer	Sadar	Bagerhat	Bagerhat
6	Ham Chandra Mistre	Owner	Joint Fish Ltd.	Joymahal	Mongla	Mongla	Bagerhat
7	Siddiqur Rahman	Owner	Bap-mayer Doa Fish Ltd	Bazer Road	Mongla	Mongla	Bagerhat
8	Md. Babul Ahmed	Owner	Babul Fish Ltd.	Sonatala	Doma	Bagerhat	Bagerhat
9	Kh. Golam Hossain	Owner	Anik Raju Fish Ltd.	Jontrapur	Jontrapur	Rupsha	Khulna
10	Prokash Chandra Roy	Owner	Papia Fish	Betbunia	Tildanga	Dacope	Khulna
11	Md. Nurunabbi Dhali	Owner	Ms Nabi Fish	Achavua	Chalna	Dacope	Khulna
12	Gouranga Mollik	Owner	Golok Fish	Perchalna	Chalna	Dacope	Khulna

Table 4: Agents' Name and Address:

Respondent's Name & Position		Business Name	Location			
			Village	Union	Upzla	District
1	Badhan Mojumder, Manager	Ms Zabber & Co.	Notun Bazar	Sadar	Rupsha	Khulna
2	M Delwar Hossain, Manager	Tala Fish Ltd.	Purba Rupsha	Rupsha	Rupsha	Khulna
3	Abdur Razzak, Manager	Imam Fish Ltd.	Soth Rupsha	Rupsha	Rupsha	Khulna
4	Panna, Manager	Shepsah Fish ltd.	Notun Bazar	Sadar	Rupsha	Khulna
5	M Azadul Isalam, Owner	Ms Friends Trading	Battawali	Katakhali	Sadar	Bagerhat
6	Md. Jahangir Alam, Owner	Ms Jesmin Fish Agent	Parulia	Parulia	Debhata	Satkhira
7	Haji Jalal Ahmed, Owner	ShilaMoni Enterprize	Main Road	Sadar	Sadar	Cox's Bazar
8	Md. Jamil Sawdegar Owner	Chatgoan Fish Ltd	Firingi Bazar	Sadar	Sadar	Chittagong

Table 5. Names and address of Processors

1	Mrinal Kanti Das	GM	Bagerhat Sea Food	Bagerhat
2	Kazi Tipu	AGM	Southern Sea Food Ltd.	Khulna
3	Abdul Baki	MD	Oriental F Pr. Industries	Khulna
4	Monir Hossain	CA	COBI Fish Limited	Khulna
5	K H Rahaman	GM	Rupsha Fish/Alide Indus	Khulna
6	M Shariful Islam	GM	Delta Fish Ltd.	Satkhira
7	M S A Chowdhury	CEO	Cox's Bazar Sea Food	Cox's Bazar
8	Iqbal H Chodhury	MD	Sea Marks Ltd.	Chittagong

Annex-2: Production and Prices Data

Table 1: Fish production during 19998-99 to 2007-08

Year	Fish catch (tonnes)				
	Inland fisheries		Marine Fisheries	Total	% of shrimp
	Capture	Culture			
1998-99	649,419	593,202	309,797	1552,417	5.80
1999-00	670,465	657,120	333,799	1661,384	5.56
2000-01	688,920	712,640	379,497	1781,057	5.29
2001-02	688,435	786,604	415,420	1890,459	5.16
2002-03	709,333	856,956	431,908	1998,197	5.04
2003-04	732,067	914,752	455,207	2102.026	5.45
2004-05	859,269	882,091	474,597	2215,957	5.45
2005-06	958,686	892,049	479,810	2328,545	5.49
2006-07	956,686	892,049	489,810	2440,011	5.50
2007-08	1006,761	945,812	487,438	2440,011	5.30

(Source: DoF 2009: Jatiyo Motsho Pakkho, DoF, MoFL: p.111)

Table-2: Monthly Average Sale Price of Bagda in 2008 and 2009 of Farmers

Year	Month	20	30	44	66	99	100
2008	January	565	490	385	330	100	210
	February	551	455	361	274	100	210
	March	535	428	332	258	100	163
	April	526	418	322	241	90	158
	May	521	416	316	241	85	157
	June	508	403	309	242	85	153
	July	505	398	305	239	80	148
	August	504	398	305	238	90	151
	September	508	403	308	240	85	150
	October	512	407	312	250	70	152
	November	573	455	365	330		213
	December	578	453	350	330		200
2009	January	573	455	360	305		195
	February	564	464	366	291		184
	March	556	448	355	280	95	177
	April	551	443	353	267	90	176
	May	553	446	349	269	80	172
	June	552	448	352	271	80	172
Total		718396	573428	444147	343827	2270	114792
Average		527	421	326	253	87	162

Table 3. Monthly Bagda Procurement Price in BDT/Kg by Count size of Traders

Year	Month	20	30	44	66	100
2008	January	524	430	332	236	150
	February	526	415	305	242	149
	March	541	429	330	250	155
	April	537	423	322	244	155
	May	522	411	313	247	152
	June	511	403	310	244	151
	July	506	399	306	244	151
	August	509	404	305	245	151
	September	513	401	304	246	152
	October	515	407	309	249	151
	November					
	December					
2009	January					
	February	550	420	320	260	140
	March	556	453	355	270	169
	April	555	452	357	272	168
	May	550	447	350	269	167
	June	552	446	349	269	167

Table 4. Monthly Bagda Sale Price in BDT/Kg by Count size of Trader

Year	Month	20	30	44	66	100
2008	January	539	442	343	251	160
	February	534	425	310	250	158
	March	552	439	341	260	166
	April	547	433	337	259	163
	May	532	422	328	254	161
	June	521	413	320	254	155
	July	516	408	317	265	161
	August	520	414	316	255	157
	September	524	412	315	256	162
	October	526	418	319	259	160
	November					
	December					
2009	January					
	February	563	445	340	273	165
	March	565	464	364	279	179
	April	565	462	367	281	178
	May	562	457	361	280	177
	June	563	455	359	280	177

Table 5. Price differentials of Bagda in BDT/Kg by Count size (Trader)

Year	Month	20	30	44	66	100
2008	January	15	12	11	15	10
	February	8	10	5	8	9
	March	11	10	11	10	11
	April	10	10	15	15	8
	May	10	11	15	7	9
	June	10	10	10	10	4
	July	10	9	11	21	10
	August	11	10	11	10	6
	September	11	11	11	10	10
	October	11	11	10	10	9
	November	0	0	0	0	0
	December	0	0	0	0	0
2009	January	0	0	0	0	0
	February	13	25	20	13	25
	March	9	11	9	9	10
	April	10	10	10	9	10
	May	12	10	11	11	10
	June	11	9	10	11	10

Table 6. Monthly Horina Procurement Price in BDT/Kg by Count size (trader)

Year	Month	80	90	100	150	200	PUD
2008	January			153	133	80	50
	February			163	132	90	68
	March	190	179	152	133	83	57
	April	183	173	156	132	80	52
	May	183	172	153	128	77	51
	June	175	164	157	122	92	50
	July	164	154	143	125	80	54
	August	157	154	132	120	88	50
	September	173	161	135	109	88	52
	October	174	158	131	115	97	59
	November	184	158	130	111	91	60
	December			132	108	92	68
2009	January	168	156	138	123	101	59
	February	169	155	142	110	99	60
	March	181	163	133	125	105	60
	April	194	170	143	130	97	75
	May	204	165	137	121	112	71
	June	187	163	150	139	108	67

Table 7. Monthly Horina Sale Price in BDT/Kg by Count size (trader)

Year	Month	80	90	100	150	200	PUD
2008	January			163	142	93	58
	February			167	142	98	78
	March	197	186	166	143	95	72
	April	198	177	160	140	88	60
	May	196	180	163	133	93	57
	June	189	182	165	138	107	58
	July	176	165	146	131	93	65
	August	173	163	144	135	97	69
	September	187	164	145	126	98	69
	October	186	162	144	122	103	71
	November	189	169	142	122	99	70
	December			142	121	102	75
2009	January	178	170	150	137	101	74
	February	184	165	152	125	109	76
	March	199	176	155	134	110	90
	April	202	161	145	130	105	84
	May	213	185	154	132	123	84
	June	201	176	156	151	118	81

Table 8. Price differentials of Horina in BDT/Kg by Count size (Trader)

Year	Month	80	90	100	150	200	PUD
2008	January			10	9	13	8
	February			4	10	8	10
	March	7	7	14	10	12	15
	April	15	4	4	8	8	8
	May	13	8	10	5	16	6
	June	14	18	8	16	15	8
	July	12	11	3	6	13	11
	August	16	9	12	15	9	19
	September	14	3	10	17	10	17
	October	12	4	13	7	6	12
	November	5	11	12	11	8	10
	December			10	13	10	7
2009	January	10	14	12	14	0	15
	February	15	10	10	15	10	16
	March	18	13	22	9	5	30
	April	8	-9	2	0	8	9
	May	9	20	17	11	11	13
	June	14	13	6	12	10	14

Table 9: Monthly Bagda Procurement Price in BDT/Kg by Count size (Depot)

Year	Month	20	30	44	66	100	PUD
2008	January	558	448	343	256	159	69
	February	558	446	341	257	160	69
	March	551	433	332	253	155	70
	April	546	431	328	252	155	70
	May	533	421	325	250	152	69
	June	524	413	317	246	148	65
	July	519	414	315	243	143	66
	August	504	400	307	256	149	65
	September	511	404	310	250	149	65
	October	508	404	305	249	150	64
	November	504	401	304	248	150	69
	December	508	403	314	254	147	73
2009	January	525	420	325	259	154	70
	February	544	442	345	264	157	73
	March	556	446	346	264	163	73
	April	555	448	351	268	167	73
	May	552	446	344	269	168	76
	June	552	444	343	270	165	78

Table 10: Monthly Bagda Sale Price in BDT/Kg by Count size (Depot)

Year	Month	20	30	44	66	100	PUD
2008	January	565	456	350	259	167	77
	February	566	454	348	265	168	77
	March	558	442	339	261	162	78
	April	554	438	336	260	163	78
	May	542	430	334	259	160	77
	June	533	424	326	256	157	75
	July	527	421	323	251	151	74
	August	513	409	314	264	154	70
	September	519	411	317	259	157	72
	October	518	412	312	256	158	73
	November	513	409	312	254	157	74
	December	542	412	321	262	155	80
2009	January	531	425	333	266	161	78
	February	549	445	348	270	162	80
	March	559	450	352	270	169	80
	April	564	456	358	277	174	80
	May	561	455	352	276	172	84
	June	562	445	351	278	172	85

Table 11: Month-wise Average Horina Procurement Price in BDT/Kg by Count size (Depot)

Year	Month	80	90	100	150	200	PUD
2008	January	193	176	164	135	93	69
	February	198	183	164	137	92	78
	March	198	188	164	139	97	76
	April	196	173	159	126	90	65
	May	197	173	164	133	98	66
	June	192	181	157	131	111	66
	July	173	159	143	132	90	66
	August	173	159	143	132	90	66
	September	186	160	143	123	102	66
	October	186	160	143	123	102	66
	November	190	168	143	123	102	71
	December	190	168	143	123	102	75
2009	January	177	168	151	133	113	73
	February	183	165	156	126	115	76
	March	199	168	151	128	111	82
	April	203	164	152	129	108	82
	May	215	183	155	131	123	83
	June	201	175	161	150	118	84

Table 12: Month-wise Average Horina Sale Price in BDT/Kg by Count size (Depots)

Year	Month	80	90	100	150	200	PUD
2008	January	210	191	179	143	125	99
	February	211	186	162	143	118	102
	March	203	186	178	148	120	97
	April	196	173	158	143	124	89
	May	202	172	161	138	126	91
	June	185	166	154	131	119	89
	July	180	164	151	127	116	86
	August	180	165	146	127	116	87
	September	194	164	151	128	116	87
	October	199	174	159	135	118	86
	November	204	181	161	142	125	92
	December	211	184	165	143	130	91
2009	January	189	165	151	127	116	85
	February	193	164	151	127	116	84
	March	206	174	160	136	118	87
	April	210	174	156	136	119	94
	May	224	193	162	142	128	96
	June	223	198	162	146	130	96

Table 13: Price differential of Bagda in BDT/Kg by count size (Depot)

Year	Month	80	90	100	150	200	PUD
2008	January	7	8	7	3	8	8
	February	8	8	7	8	8	8
	March	7	9	7	8	7	8
	April	8	7	8	8	8	8
	May	9	9	9	9	8	8
	June	9	11	9	10	9	10
	July	8	7	8	8	8	8
	August	9	9	7	8	5	5
	September	8	7	7	9	8	7
	October	10	8	7	7	8	9
	November	9	8	8	6	7	5
	December	34	9	7	8	8	7
2009	January	6	5	8	7	7	8
	February	5	3	3	6	5	7
	March	3	4	6	6	6	7
	April	9	8	7	9	7	7
	May	9	9	8	7	4	8
	June	10	1	8	8	7	7

Table 14: Price differential in BDT/Kg Horina by count size the (Depot)

Year	Month	80	90	100	150	200	PUD
2008	January	17	15	15	8	32	30
	February	13	3	-2	6	26	24
	March	5	-2	14	9	23	21
	April	0	0	-1	17	34	24
	May	5	-1	-3	5	28	25
	June	-7	-15	-3	0	8	23
	July	7	5	8	-5	26	20
	August	7	6	3	-5	26	21
	September	8	4	8	5	14	21
	October	13	14	16	12	16	20
	November	14	13	18	19	23	21
	December	21	16	22	20	28	16
2009	January	12	-3	0	-6	3	12
	February	10	-1	-5	1	1	8
	March	7	6	9	8	7	5
	April	7	10	4	7	11	12
	May	9	10	7	11	5	13
	June	22	23	1	-4	12	12

Table 15: Monthly Bagda Procurement Price in BDT/Kg by Count size (Agent)

Year	Month	20	30	44	66	100	PUD
2008	January	561	458	353	269	169	70
	February	560	457	349	268	166	69
	March	543	446	341	268	165	69
	April	537	441	336	262	162	67
	May	532	429	327	257	158	64
	June	529	421	327	254	159	61
	July	526	423	320	260	159	60
	August	523	419	319	256	162	60
	September	527	422	323	257	155	58
	October	523	422	320	258	156	61
	November	532	429	328	259	159	64
	December	535	430	333	258	159	65
2009	January	543	440	337	262	161	65
	February	561	456	354	271	174	70
	March	569	463	356	273	170	74
	April	569	469	358	273	172	73
	May	570	478	357	269	172	74
	June	567	464	355	278	170	76

Table 16: Monthly Bagda Sale Price in BDT/Kg by Count size (Agent)

Year	Month	20	30	44	66	100	PUD
2008	January	569	465	356	276	176	75
	February	567	456	356	275	172	77
	March	550	453	347	275	171	74
	April	545	460	343	269	168	73
	May	540	436	335	264	164	71
	June	536	429	338	260	166	68
	July	533	431	327	267	165	68
	August	530	427	327	264	169	71
	September	534	430	330	264	161	66
	October	530	428	327	264	162	68
	November	539	434	333	265	164	66
	December	541	436	339	264	165	71
2009	January	548	445	342	268	167	71
	February	568	462	361	278	181	78
	March	576	470	363	279	176	80
	April	575	476	365	278	179	81
	May	577	473	365	275	178	81
	June	573	416	362	285	176	82

Table 17: Monthly Horina Procurement Price in BDT/Kg by Count size (Agent)

Year	Month	80	90	100	150	200	PUD
2008	January	206	193	173	142	124	98
	February	211	186	173	141	121	105
	March	204	186	169	142	121	100
	April	194	173	159	146	124	87
	May	199	173	159	146	124	87
	June	184	164	151	131	120	86
	July	184	164	150	126	116	86
	August	184	164	150	126	116	86
	September	186	164	150	126	116	86
	October	199	174	156	132	117	86
	November	204	181	162	142	125	91
	December	211	184	166	144	129	91
2009	January	189	164	150	126	116	86
	February	190	164	150	126	116	86
	March	209	173	156	134	116	89
	April	209	173	156	134	116	94
	May	223	196	161	142	125	96
	June	223	198	164	146	129	96

Table 18: Monthly Horina Sale Price in BDT/Kg by Count size (Agent)

Year	Month	80	90	100	150	200	PUD
2008	January	224	198	187	163	138	114
	February	223	197	186	163	138	114
	March	219	197	180	163	138	104
	April	213	193	180	163	138	98
	May	213	193	180	163	138	99
	June	206	187	172	146	123	96
	July	193	177	163	146	122	93
	August	194	177	163	146	122	93
	September	196	177	163	146	122	93
	October	213	184	163	146	123	93
	November	213	192	171	153	133	103
	December	213	192	175	153	134	103
2009	January	197	173	163	146	122	93
	February	199	176	163	146	122	93
	March	217	179	168	148	128	99
	April	218	179	168	148	128	99
	May	230	199	172	158	133	104
	June	216	194	182	164	143	104

Table 19: Price differential of Bagda in BDT/Kg by count size (Agent)

Year	Month	20	30	44	66	100	PUD
2008	January	8	7	3	7	7	5
	February	7	-1	7	7	6	8
	March	7	7	6	7	6	5
	April	8	19	7	7	6	6
	May	8	7	8	7	6	7
	June	7	8	11	6	7	7
	July	7	8	7	7	6	8
	August	7	8	8	8	7	11
	September	7	8	7	7	6	8
	October	7	6	7	6	6	7
	November	7	5	5	6	5	2
	December	6	6	6	6	6	6
2009	January	5	5	5	6	6	6
	February	7	6	7	7	7	8
	March	7	7	7	6	6	6
	April	6	7	7	5	7	8
	May	7	-5	8	6	6	7
	June	6	-48	7	7	6	6

Table 20: Price differential of Horina in BDT/Kg by count size (Agent)

Year	Month	20	30	44	66	100	PUD
2008	January	18	5	14	21	14	16
	February	12	11	13	22	17	9
	March	15	11	11	21	17	4
	April	19	20	21	17	14	11
	May	14	20	21	17	14	12
	June	22	23	21	15	3	10
	July	9	13	13	20	6	7
	August	10	13	13	20	6	7
	September	10	13	13	20	6	7
	October	14	10	7	14	6	7
	November	9	11	9	11	8	12
	December	2	8	9	9	5	12
2009	January	8	9	13	20	6	7
	February	9	12	13	20	6	7
	March	8	6	12	14	12	10
	April	9	6	12	14	12	5
	May	7	3	11	16	8	8
	June	-7	-4	18	18	14	8

Table 21: Procurement Price of Bagda in BDT/Kg by count size (Processor)

Year	Month	20	30	44	66	100	PUD
2008	January	568	464	349	271	169	66
	February	564	462	354	272	169	71
	March	550	453	347	275	169	66
	April	552	464	344	270	168	66
	May	540	436	335	264	164	71
	June	536	429	338	260	166	66
	July	533	431	327	267	165	68
	August	530	427	327	264	169	71
	September	534	430	330	264	161	66
	October	530	428	327	264	162	68
	November	539	434	333	265	164	69
	December	541	436	339	264	165	71
2009	January	548	445	342	268	167	71
	February	568	462	361	278	181	78
	March	576	470	363	279	176	80
	April	575	476	365	278	179	81
	May	577	473	365	275	178	81
	June	573	416	362	285	176	82

Table 22: Monthly Sale Price of Bagda in US$/Kg by count size (Processor)

Year	Month	20	30	44	66	100	PUD
2008	January	10.48	9.42	8.39	6.26	4.96	4.16
	February	10.46	9.4	8.26	6.51	4.96	4.14
	March	10.49	9.42	8.28	6.27	4.95	4.16
	April	10.49	9.42	8.27	6.27	4.95	4.16
	May	10.49	9.42	8.27	6.27	4.95	4.16
	June	10.42	9.27	8.23	6.18	4.8	4.08
	July	10.42	9.27	8.23	6.18	4.8	4.08
	August	10.49	9.57	8.6	6.13	5.14	4.68
	September	10.62	9.78	8.81	6.33	5.16	4.89
	October	10.66	9.8	8.79	6.33	5.16	4.49
	November	10.94	9.8	8.79	6.33	5.16	4.89
	December	10.97	9.83	8.83	6.34	5.19	4.91
2009	January	10.81	9.75	8.73	6.23	5.12	4.78
	February	10.71	9.69	8.68	6.6	5.18	4.76
	March	10.52	9.5	8.68	6.58	5.21	4.77
	April	10.52	9.5	8.53	6.41	5.26	4.78
	May	10.73	9.48	8.61	6.72	5.31	4.9
	June	10.64	9.51	8.64	6.66	5.31	4.91

Table 23: Monthly Procurement Price of Horina in BDT/Kg by count size (Processor)

Year	Month	80	90	100	150	200	PUD
2008	January	225	198	187	163	138	114
	February	224	197	186	163	138	114
	March	218	197	180	163	138	99
	April	213	193	180	163	138	96
	May	213	193	180	163	138	99
	June	206	187	172	146	123	96
	July	193	177	163	146	122	93
	August	196	177	163	146	122	93
	September	196	177	163	146	122	93
	October	207	184	163	146	122	93
	November	213	192	171	153	133	103
	December	213	192	171	153	133	103
2009	January	197	176	163	146	122	93
	February	197	176	163	146	122	93
	March	199	179	168	148	128	99
	April	199	179	168	148	128	99
	May	208	183	172	158	133	104
	June	216	194	182	164	143	104

Table 24: Sale Price of Horina in US$/Kg by count size (Processor)

Year	Month	80	90	100	150	200	PUD
2008	January	6.14	4.97	4.23	3.79	3.33	2.71
	February	6.17	4.98	4.22	3.71	3.26	2.52
	March	6.17	4.98	4.22	3.71	3.26	2.52
	April	6.14	4.97	4.23	3.79	3.33	2.52
	May	6.14	4.97	4.23	3.79	3.33	2.52
	June	6.09	4.91	4.11	3.66	3.26	2.44
	July	5.99	4.74	4	3.51	3.13	2.25
	August	5.99	4.74	4	3.51	3.13	2.25
	September	6.14	4.97	4.23	3.79	3.33	2.52
	October	6.19	5.13	4.38	3.86	3.44	2.73
	November	6.14	5.3	4.46	3.94	3.49	2.81
	December	6.14	5.3	4.46	3.94	3.49	2.81
2009	January	6.14	4.97	4.23	3.79	3.33	2.52
	February	6.14	4.97	4.23	3.79	3.34	2.52
	March	6.19	5.06	4.24	3.86	3.44	2.71
	April	6.2	5.06	4.24	3.86	3.44	2.71
	May	6.24	5.16	4.29	3.86	3.44	2.71
	June	6.24	6.16	4.29	3.86	3.44	2.71

Table 25: Price differential of Bagda in BDT/Kg by count size (Processor)

Year	Month	20	30	44	66	100	PUD
2008	January	155.12	185.98	229.91	160.94	173.24	221.04
	February	157.74	186.6	215.94	177.19	173.24	214.66
	March	173.81	196.98	224.32	157.63	172.55	221.04
	April	171.81	185.98	226.63	162.63	173.55	221.04
	May	183.81	213.98	235.63	168.63	177.55	216.04
	June	182.98	210.63	229.87	166.42	165.2	215.52
	July	185.98	208.63	240.87	159.42	166.2	213.52
	August	193.81	233.33	266.4	158.97	185.66	251.92
	September	198.78	244.82	277.89	172.77	195.04	271.41
	October	205.54	248.2	279.51	172.77	194.04	241.81
	November	215.86	242.2	273.51	171.77	192.04	268.41
	December	215.93	242.27	270.27	173.46	193.11	267.79
2009	January	197.89	227.75	260.37	161.87	186.28	258.82
	February	170.99	206.61	237.92	177.4	176.42	250.44
	March	149.88	185.5	235.92	175.02	183.49	249.13
	April	150.88	179.5	223.57	164.29	183.94	248.82
	May	163.37	181.12	229.09	188.68	188.39	257.1
	June	161.16	240.19	234.16	174.54	190.39	256.79

Note: At the time of data generation 1US$ was equivalent to BDT69. Accordingly the sales price of processor were converted.

Annex-3: The Name of Study Team

Mr. Humayun Kabir, Team Leader, PSP Ltd
Dr. Ferdous Alam, Senior Economist, PSP Ltd.
Mr. Goutam Chandra Dhar, Data Analyst and Statictician, PSP Ltd.
Mr. Horendra Nath Sarker, Senior Upazilla Fisheries Officer, Dacup, Khuilna
Mr. Sirajul Islam, Senior Upazilla Fisheries Officer, Shyamnager, Satkhira
Mr. Shamim Haider, Senior Upazilla Fisheries Officer, Assasuni, Satkhira
Mr. Narayan Kumar Sarker, Senior Upazilla Fisheries Officer, Sadar, Bagerhat
Mr. Wahiduzzaman, Senior Upazilla Fisheries Officer, Mongla, Bagerhat
Mr. Sarwar Jahangir, Senior Upazilla Fisheries Officer, Chakaria, Chittagong
Mr. Shahidul Alam Chowdhury, Production Manager, Cox's Bazar, Sea Foods Ltd. Cox's Bazar
Mr. Shahan Al Monir, Field Supervisor and Data Entry Operator, PSP Ltd.
Mr. Shahanoor Bin Habib, Field Supervisor and Data Entry Operator, PSP Ltd.