JOURNAL OF ISSN 1529-0905

Bangladesh Studies

VOLUME 12 NO. 1 2010

TABLE OF CONTENTS

From the Editor
Syed S. Andaleeb iv

ARTICLES

Economic Growth in Bangladesh:
Experience and Policy Priorities
Jyoti Rahman *1*
Asif Yusuf

Aid, Debt, and Development in Bangladesh:
Synergies or Contradictions
Bernhard G. Gunter *23*
A. F. M. Ataur Rahman
Jesmin Rahman

Regimes of Environmental Regulations and Governance:
Opportunities and Challenges for Shrimp Aquaculture
in Bangladesh
M. Saidul Islam *44*

Reforming Capitalism to Better Serve the Poor:
The Next Big Ideas
Munir Quddus *62*

TABLE OF CONTENTS

From the Editor	**Syed S. Andaleeb**	**iv**
ARTICLES		
Economic Growth in Bangladesh: Experience and Policy Priorities	**Jyoti Rahman** **Asif Yusuf**	**1**
Aid, Debt, and Development in Bangladesh: Synergies or Contradictions	**Bernhard G. Gunter** **A. F. M. Ataur Rahman** **Jesmin Rahman**	**23**
Regimes of Environmental Regulations and Governance: Opportunities and Challenges for Shrimp Aquaculture in Bangladesh	**M. Saidul Islam**	**44**
Reforming Capitalism to Better Serve the Poor: The Next Big Ideas	**Munir Quddus**	**62**

Regimes of Environmental Regulations and Governance: Opportunities and Challenges for Shrimp Aquaculture in Bangladesh

M. Saidul Islam

Abstract

The emergence of certification regimes—largely known as privatizing environmental governance—has given rise to new realities for agro-food producers. While the new regimes offer both possibilities and opportunities for a sustainable agro-food system, the producers are confronted with various challenges. Field research on Bangladesh shrimp aquaculture shows that despite various improvements to mitigate human and environmental externalities over the last two decades, the sector still faces numerous challenges locally and globally. The key challenges the industry is facing are the campaigns of some NGOs, non-tariff barriers, labor practices, maintaining shrimp quality, corruption and malpractice, and viruses and other natural calamities. Commercial shrimp production generates substantial revenues and foreign exchange, as well as employment for millions in Bangladesh. The study suggests that despite facing various challenges, there exist enormous prospects and possibilities for a sustainable shrimp culture in Bangladesh. In the era of environmental certification and market competition, if Bangladesh fails to act, it actually acts to fail.

Introduction

Because of globalization of the agro-food system, developing nations are orienting their production to meet global needs. As a result, many local agricultural systems in developing countries are increasingly linked to global commodity chains/networks that generate complex intersections and sometimes tensions between the local and the global (Islam 2008a). Cultured shrimp—promoted largely by the FAO and similar other institutions as an alternative to replacing protein loss due the exhaustion of global fisheries—is one such example. Commercial shrimp is one of the major high-valued transnational agro-food commodities, which over the last three decades has become a major global industry; it is regarded as the pinnacle of the blue revolution's achievement (Public Citizen 2005). The global shrimp trade is valued at more than US$ 10 billion annually (Roheim 2004:277) at the farm gate, and more than 60 billion at the point of retail (EJF 2003). Shrimp as a commodity is generally treated differently from other agricultural products because, among other reasons, "it is not part of the agricultural negotiations of the World Trade Organization" (Roheim 2004:275). It is therefore treated more as an industrial product. Thailand and China produce almost 50 percent of world's supply of shrimp, while other developing countries including Bangladesh supply rest. Shrimp and prawns account for just 6.4 percent of the volume of the world fish trade but about 20 percent of its value (OECD 2003). In 2004, the total global production of shrimp that brought a turnover of US$ 9.7 billion reached 6 million tons, of which aquacultured shrimp was 2.5 million tons (OCED 2006).

The coastal zones of some tropical countries, including Bangladesh, dominate the production of commercial shrimp, while exporting to the United States, Europe, Canada, Japan and other wealthy countries. For many developing countries, including Bangladesh, shrimp has become a major source of foreign exchange and has integrated often previously marginal coastal communities into high value commodity networks (Vandergeest et al. 1999; Islam 2009). However, the producing countries are facing increasing challenges in international trade, particularly concerning "quality." Among the recent transformation of the global agro-food system, quality rather than price or quantity has become the basis around which production, commodities, and markets are increasingly organized (Busch and Main 2004; Henson and Reardon 2005). Traditionally, government agencies had the responsibility for monitoring food safety standards and other food quality attributes. However, the recent emergence of privately regulated supply chains organized more around principles of "quality" has precipitated a shift in governance which Busch and Bain (2004:337) term "the private regulation of the public." While previous "quality" assurance was confined only to HACCP (hazard analysis critical control point) manual, recent developments have extended quality assurance to traceability[1], environmental sustainability, labor rights, and community-based resource management in production sites. As major buyers such as Wal-Mart, Darden and Lyons have recently committed to buying only certified" seafood, including farmed shrimp, it is anticipated that other

buyers will also follow the same path and a major portion of shrimp production will soon come under the certification umbrella (Wal-Mart 2006; Vandergeest 2007). This conspicuous trend poses both opportunities and challenges. It offers an opportunity to develop more sustainable aquaculture; however, the producers who fail to meet the shifting privatizing regulations will eventually lose out in the market.

Though Bangladesh contributes to around 5 percent of the world shrimp production, the item is the second largest industry in the country next to garments (USAID Bangladesh 2006). Bangladesh, in fact, enjoys an advantageous natural setting for shrimp culture. While subsistence fishermen have caught shrimp in Bangladesh for hundreds of years, the beginning of the present shrimp culture dates back to the late sixties (Islam 2008a, 2009). Since the 1980s there has been a dramatic increase in shrimp farming, especially in the coastal areas where this has been termed as the "blue revolution" (Deb 1998). The Department of Fisheries (DoF) estimated that there are approximately 270 thousand hectares of coastal shrimp farms producing an average of 80 thousand metric tons of shrimp annually. Experts estimate that the volume can be raised up to 300 thousand tons through, among other measures, proper utilization of shrimp-fry. The FishSite (January 20, 2008) revealed that Bangladesh's shrimp exports continue to be the country's second largest foreign exchange earner, earning US$515 million from exports during the fiscal year of July 2006-June 2007. Though the Bangladesh government was hoping to earn over $1.5 billion from shrimp exports annually by 2010, the sector has failed to meet that target as various challenges continue to confront the industry. Given this background, the paper has three objectives: (a) to elucidate the emergence of privatizing environmental governance—also known as environmental certification; (b) to examine the challenges that Bangladesh shrimp aquaculture is facing in the context of this new governance; and (c) to devise some pragmatic solutions or policy recommendations for the Bangladesh shrimp sector not only to survive but also to thrive in the global competitive shrimp markets.

The next section describes the methods and procedures of data collection. The third section delineates the regimes of regulations and governance in Bangladesh shrimp aquaculture, which have significantly shaped and affected the sector. In the context of the processes and practices of shrimp farming in Bangladesh, particularly the extent to which the country is complying with the international codes of conduct (i.e., certification schemes), the paper then pinpoints the key challenges that the nation's shrimp industry is facing in the era of certification. The paper concludes by providing some suggestions with broad development implications for Bangladesh.

Methods and Procedures

From May 2005 to August 2006, an extensive field research was conducted in Bangladesh involving a triangulation of methods: semi-structured in-depth qualitative interviews, focus group discussions, and ethnography—both local and global—substantiated by secondary sources. A combination of methods was deemed necessary in order to gain a broader and a deeper understanding of shrimp culture in Bangladesh. Secondary sources included journals, books, national newspapers, internet search, government reports, and publications by local and international NGOs. A follow-up study was recently conducted (December 2009—January 2010) to see any recent changes in the industry.

Qualitative Interviews

In-depth qualitative interviews and ethnography (local) were conducted in 3 districts of the greater Khulna region: Satkhira, Bagerhat, and Jessore. The sample size was 9 shrimp farmers (with at least 10 years of farming experience), 9 villagers, 6 government officials, 6 processors, and 5 NGO workers, for a total of 35 respondents. Snowball sampling was employed to find the respondents. All respondents were carefully selected with the consultation of local NGOs and District Fisheries Officers (DFOs) and, therefore, identified as the "key informants" for interview. Alongside an ethnography (direct observation and informal meetings with different stakeholders), in-depth semi-structured qualitative interviews were also conducted with the processing workers, with an emphasis on gender and labor relations, in the Greater Khulna region. Four factories were randomly selected out of 35 factories operating in the Khulna region. One person (owner/manager) from each factory management (a total of four) was interviewed based on prior appointment, whereas 4 male permanent workers, 5 female permanent workers, and 9 female casual workers were interviewed after locating them in the nearby villages. Interviews were conducted in a conversational mode; each lasted for 2 to 4 hours.

Table 1: Focus Groups Interviews

	Type	Number	Place
1.	Fry catchers	12	Mongla
2.	Fry traders	9	Mongla
3.	Fry hatchery owners (Six of them have shrimp farms)	7	Shyam Nagar
4.	Five Shrimp traders and three Middlemen	8	Faqirhat
5.	Women workers in shrimp ponds	12	Shyam Nagar
6.	*Upazila* Fisheries Officers	5	Faqirhat
7.	Informed people (hotel managers, local businessmen, teachers etc.)	10	Faqirhat
8.	Informed people (Two college professors, and six human rights/NGO activists)	8	Shyam Nagar
	Total	71	

This allowed for rapport and trust to develop between the interviewer and the respondents, as well as flexibility in exploring emergent themes. These respondents spoke with relative authority on the subject matter.

Focus Group Discussions

Among the farming areas in three districts, three sub-districts (*Thana*), namely, Shyam Nagar (Satkhira), Mongla (Khulna), and Faqirhat (Bagherhat) were randomly selected, and a series of focus group discussions were conducted with representatives from key nodes of the shrimp commodity chain as well as informed people living in the shrimp farming vicinity. Though considerable research was already conducted earlier, the researcher felt it would be helpful to ask group members "who are acute observers and who are well-informed" (Blumer 1969:41) some specific questions on shrimp farming and emerging regulations that might have significant implications for the industry. Table 1 illustrates the focus group interviews.

Local and Global Ethnography

In order to explore the relationship between global regulations and local practices, the research used in-depth qualitative ethnographic techniques in an attempt to decipher the current and emerging challenges affecting the shrimp industry. Locally, in-depth participant observations formed a foundational database. This ongoing process afforded continuous insights into the way the industry is shaped by both local and global processes.. During the ethnography, along with direct participant observation, the researcher continued to talk to the local people until no new or additional information was being generated. Secondly, documents were collected from many different sources including but not limited to the Ministry of Fisheries and Livestock, NGOs documents on shrimp farming, and Sangram Archival Library in Dhaka. At the global level, the author participated in the World Aquaculture Society (WAS) Meeting (September 25—29, 2009) held in Veracruz, Mexico, and the Shrimp Aquaculture Dialogue (ShAD) in Jakarta (March 9—10, 2010), organized by the World Wildlife Fund (WWF) and the Ministry of Marine Affairs and Fisheries, Republic of Indonesia. Both meetings provided the author with important insights about the current contours and future trends of the global shrimp industry and their implications for Bangladesh.

The Recent Follow-up Research

The recent follow-up research (December 2009—January 2010) containing interviews and conversations with some officers in the Department of Fisheries, Bangladesh Frozen Foods Exporters association (BFFEA), and NGOs as well as some researchers with similar interests allowed the author to decipher whether new changes and challenges have emerged in the commercial shrimp industry. Taken as a whole, these data sources provided a robust and in-depth understanding of complex issues and questions regarding global agro-food system and their implications for the Bangladesh shrimp industry.

Regimes of Regulations and Governance

The HACCP Regime: From Public to Private Regulation

The Bangladesh Standard and Testing Institute

(BSTI), a public certification agency of the Bangladesh government, used to certify Bangladeshi shrimp before it was exported (FAO/WHO 2004; Islam 2008a). However, because of global competitive pressures for "quality shrimp," pressures that are coming from buyers as well as environmental groups, the form of regulation has shifted from the public to the private sector. The European Union buyers imposed a ban on shrimp exports from Bangladesh in 1997 because of what they called "sub-standard products." At the same time, other big buyers, such as the United States and Japan, created pressures, via the commodity chain, for using a private system of regulations called the hazard analysis critical control point (HACCP) to maintain shrimp freshness and quality (Pokrant and Reeves 2003).

The HACCP system has a long history of development and evolution. The current global food safety system (Table 2 below), under the auspices of the United Nations, began in 1945 with the organization of the Food and Agriculture Organization. The General Agreement on Tariffs and Trade (GATT) concluded in 1947 and included provisions for countries to apply measures necessary to protect human, animal, or plant life or health. Several GATT stipulations were that measures adopted by an individual country must not unjustifiably discriminate between countries where similar conditions prevail, and must not act as disguised restrictions on international trade (Sperber 2005). After that the HACCP system took a long path of evolution until, in 1997, it reached the "Codex document on HACCP principles and application," which is briefly described in Table 2 below.

While the early HACCP system was quite simple and consisted of only three principles, the modern HACCP is built upon seven principles (Table 3). These requirements of the United States and Japan, and later those of the EU buyers, led Bangladesh to restructure its institutions and management practices in order to use seven principles of HACCP. The ban was lifted when government agencies succeeded in satisfying buyers.

As pressure was channeled from the buyers through the commodity chain to implement the HACCP, many shrimp factory owners in Bangladesh renovated their facilities and converted them into modern plants. The Bangladesh government established an institution, known as Fish Inspection and Quality Control (FIQC) under the Department of Fisheries (DoF), Ministry of Fisheries and Livestock. The FIQC has three stations, and all are, as the DoF claimed, equipped with modern laboratory facilities and technical personnel. As summarized from Chowdhury and Islam (2000), activities and restructuring measures taken by the government of Bangladesh to meet the HACCP system include the following:

- Fish and Fish Products (Inspection and Quality Control) Rules of 1989 were amended in 1997 based on the HACCP system required by the buyers.
- More than 24,000 field-level people were trained on post harvest handling, transportation, hygiene and sanitation.
- Raw material suppliers of the processing plants have been brought under compulsory registration.
- Follow-up training programs on the HACCP were arranged for the personnel of fish processing plants.
- Quality of water and ice in the fish processing plants have been standardized.
- Infrastructural facilities of fish processing plants have been renovated and modified in accordance with the HACCP system.
- Concerned authority has been strengthened with proper laboratory facilities and other logistical support.

Table 2: Evolution of the Global Food System Under the United Nations

Year	Evolution of organizations/ bodies
1945	Food and Agriculture Organization (FAO)
1947	General Agreement on Tariffs and Trade (GATT)
1948	World Health Organization (WHO)
1963	FAO/WHO Codex Alimentarius Commission (CAC)
1994	Agreement on Application of Sanitary and Phytosanitary Measures (SPS)
1995	World Trade Organization (WTO)
1997	Codex Document on HACCP principles and application

Source: Sperber (2005: 506).

- The government formed a supervisory audit team to monitor the work of the competent authority.
- The government also acted to (a) improve quality of fish and shrimp raw materials through monitoring and motivational work on post-harvest handling and transport, (b) provide reasonable assurance that fish and shrimp used as raw materials were free from chemical contaminants, environmental pollutants and toxins through frequent monitoring, (c) apply appropriate steps for quality assurance by implementing quality management program based on HACCP principles, (d) control and assure the quality and safety of products through such tools as plant and process inspections, (e) provide certificate for exportable lots after physical and microbiological tests of the products, and (f) achieve and maintain a high standard of quality in all activities related to laboratory work and field inspection.

By 2000, fifty-eight licensed factories had developed HACCP-based quality assurance protection (QAP) manuals. The factory personnel started implementing the HACCP system in their respective plants by following sanitation standard operating procedures (SSOP) and good manufacturing practice (GMP) (Chowdhury and Islam, 2000). There are also extensive plant and pre-shipment inspections from time to time. Though all these are significant steps towards ensuring quality seafood, the implementation of all involves a huge cost which is not borne by the buyers. What is clear is how government agencies remain central in implementing, subsidizing, and organizing compliance with so called private standards. Though the regulations were private, the government agencies had the responsibily of implementing them.

The SSOQ Regime: From Public to Private Governance

The traditional role of the government agencies in maintaining quality and certifying shrimp following the HACCP manual precipitated a further shift from a public to a private form of governance, with the emergence of a third-party certifier. The Shrimp Seal of Quality (SSOQ) was established in Bangladesh in 2002 (SSOQ 2002; Gammage et al. 2006), and in February 2005 it began certifying the shrimp processors and hatcheries in Bangladesh for the first time, albeit on a limited scale. With the aim of what it called "fetching premium prices in the international frozen food market" (The Independent, February 18, 2005), the SSOQ aimed at certifying shrimp on the basis of five factors: (a) food safety and quality assurance, (b) traceability, (c) environmental sustainability, (d) labor practices, and (e) social responsibility (SSOQ, 2002). All are among the key issues of concern for the environmental groups, labor rights movement, and finally the buyers, such as Wal-Mart, Darden and Lyons (Vandergeest 2007).

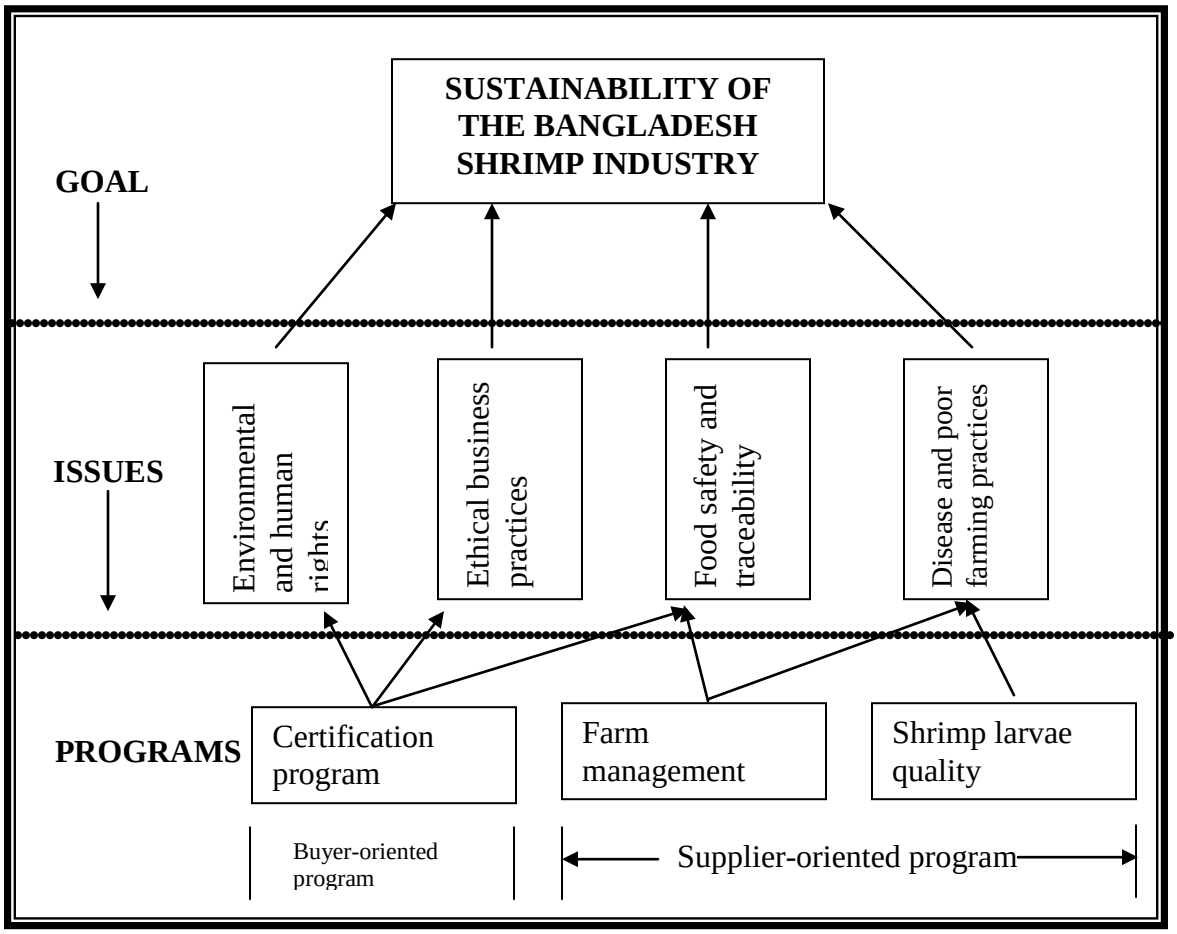
The stated objective of the SSOQ program is to achieve a sustainable improvement in the volume and value of Bangladeshi shrimp exports. The SSOQ aimed at intervening in the shrimp farming sector by introducing what it called "Better Management Practices," (BMP) (see Bene 2005) and improving the quality of the primary input, shrimp larvae. The SSOQ introduced a program to certify shrimp producers (including processors, farmers, transporters, and potentially hatcheries as well) with the aim of creating a stable supply of quality shrimp from reliable suppliers for the export market (Qudir and Kabir 2005). Figure 1 outlines the mission and program of the SSOQ:

Table 3: Evolution of HACCP Principles

HACCP principles, 1972	HACCP principles, 1997
1 Conduct hazard analysis 2 Determine critical control points 3 Establish monitoring procedures	1 Conduct hazard analysis 2 Determine critical control points 3 Establish critical limits 4 Establish monitoring procedures 5 Establish corrective actions 6 Establish verification procedures 7 Establish record keeping procedures

Source: Sperber (2005: 506).

Figure 1: The SSOQ's Mission and Program



Source: Gaillard and Quader (2004: 6).

The SSOQ formed an alliance with the Global Aquaculture Alliance (GAA) and its formed organization Aquacultural Certification Council (ACC). The SSOQ subsequently incorporated the ACC standards into its own codes. Other important global stakeholders, such as the World Wildlife Fund (WWF) and the Network of Aquaculture Centres in Asia-Pacific (NACA), also became strong allies of the SSOQ. After getting global stakeholders on board, the SSOQ started organizing seminars, symposiums and conferences in a bid to convince local stakeholders to work with it, since it faced resistance from the DoF as well as some exporters. After launching the *Seal of Quality Newsletter*, the SSOQ formed the Bangladesh Shrimp and Fish Foundation (BSFF) as well as the Bangladesh Shrimp Development Alliance (BSDA) to unite the industry and to bring all stakeholders together under a united platform (see Khan 2005; Gaillard and Quader 2004; Qudir and Kabir 2005). No resistance, however, was found from the farmers and small traders because among other reasons, they knew very little about all these technical issues, though they expressed mixed reactions when they were told about this recent development in the Bangladesh shrimp aquaculture.

As the study found, the international buyers in the chain support this regime for two main reasons. First, unlike in the past, governments are now widely seen as lacking sufficient management capacity to implement and enforce detailed environmental regulations (Vandergeest 2007). Second, lead firms need to maintain consumer trust in consuming shrimp, trust that has already been damaged by a network of environmental groups working at scales ranging from local to global. At the international level, environmental groups and consumers increasingly demanded that shrimp be produced in compliance with recognized codes of conduct regarding food safety, human rights, fair labor practices and environmental protection. The concerns manifested themselves in a number of ways. Export-

oriented shrimp industries witnessed demands for traceability as a means of improving food safety. Concerns were also raised regarding human rights in shrimp farming areas. Issues that were problematized by environmental groups concerning shrimp aquaculture in Bangladesh include illegal land grabbing; use of forced and child labor; community access rights to land, water, and other resources; and the respect accorded to the livelihoods, cultures, and religions of the various communities in the area. These concerns were raised in both national and international arenas (see EJF 2003; Bene 2005; Gammage et al. 2006; Islam 2008b).

The activities of the Environmental Justice Foundation (EJF)[2] are an important example. In May 2002, the EJF visited Bangladesh to conduct research on the shrimp industry. Its primary interest was, as quoted by Gaillard and Quader (2004:4), "to investigate the claims of environmental and human rights abuses associated with the shrimp industry." The EJF was looking for local stakeholders, primarily NGOs, "to offer training and link them with international media to gain support for their causes" (p. 4). The EJF worked with a local NGO in the Khulna Region, Nijera Kori (NK), which has a long history of contesting the shrimp industry. The NK was advocating a suspension of all shrimp-supporting activities sponsored by the government and various donors. In particular, the NK had been lobbying to freeze any farming activities in an area noted for violence reputedly related to the shrimp industry.

The conflict between hatchery operators and sellers of wild fry, as well as the destruction of mangrove forest in Bangladesh, also became contentious issues in the anti-shrimp campaign. In the aftermath of the white spot virus, farmers became increasingly dependent on wild fry, which they preferred because they were more resistant to disease. Wild fry were typically farmed when they were older and larger and had greater resilience in regard to the elements. Farmers were willing even to pay a premium for wild fry. The collection of wild fry, however, was an environmental concern because it resulted in significant losses to biodiversity. In the late 1990s environmental groups estimated that "over 90 billion seeds of other species were caught and discarded annually during the collection of shrimp fry" (quoted in Gaillard and Quader 2004:4). Though this number might be an exaggeration, it became an important issue for the environmental groups, which subsequently caught the attention of several international organizations and interest groups. Meanwhile under the pretext of environmental concern, the hatcheries, which were suffering financially, lobbied the government to ban the collection of wild fry. Although such a ban was enacted in 2000, lack of enforcement and the preferences of farmers resulted in continued collection of wild fry. As mangrove forests in Sundarban remained an important source for shrimp fry, collection of fry disturbed the biodiversity of the forest. "Wild fry did decline, however, as a percentage of total fry sold to farmers, but nonetheless 2003 figures indicated that approximately 40% of the fry used by farmers was from wild sources" (Gaillard and Quader 2004:4). Therefore, "loss of biodiversity" remained an arguable and politically effective issue for environmental groups and NGOs for their campaign against shrimp aquaculture in Bangladesh.

As the campaign of environmental groups moved from local to global, it created concern among consumers about shrimp. The campaign threatened the lead firms' shrimp business. As direct pressure came from the commodity chain, Bangladesh also moved to restructure and institutionalize its environmental and social policies and practices towards an "environmentally sound and socially responsible shrimp culture." Despite the efforts made by government and other industry participants following buyers' requirements, the industry as a whole still faced significant challenges as the campaign continued by raising novel issues such as traceability and the government's inability to manage the environment. This situation, coupled with buyers' tightening grip on chain governance to ensure their *desired* "quality" despite market fluctuation as well as changes in the local political atmosphere in Bangladesh, paved the way for a third-party certifier. As Vandergeest (2007:1162) reports, "the environmental and social controversies surrounding shrimp are an opportunity for retailers who are seeking a competitive edge in relation to product quality and corporate image." It was in this context that the Agro-based Industries and Technology Development Project (ATDP)[3] developed the concept of a Shrimp Seal of Quality (SSOQ) program. In short, through their influence on buyers, environmental groups cleared the ground for the emergence of a third-party certifier. As the SSOQ assumes an independent power, I argue that cultured shrimp is governed not only by buyers but also by a third-party certifier, as well as other NGOs.

Challenges Facing the Bangladesh Shrimp Industry

Environmental movements against aquaculture

Since the early 1990s, numerous researchers and local and international NGOs voiced their concerns and expressed mounting criticism over social, economic, and environmental consequences of commercial shrimp production.[4] They argued that industrial shrimp farming has caused social dislocation, ecological damage, and environmental destruction that is arguably worse than that from many earlier Green Revolution technologies. Some of the most serious environmental problems they indicated include the destruction of coastal wetlands, water pollution, disruption of hydrological systems, introduction of exotic species, and depletion and salinization of aquifers. They also claimed that one of the most critical social problems identified by the local people as part of the expansion of the Blue Revolution is the loss of communal resources—including mangrove areas, estuaries, and fishing grounds—that they depend on for both subsistence and commercial economic activities. Commercial shrimp farming has displaced local communities, exacerbated conflicts and provoked violence involving property and tenant rights, decreased the quality and quantity of drinking water, increased local food insecurity, and threatened human health. In 1997 the WWF, for example, documented,

> ... in many locations commercial shrimp farming has devastated fragile coastal ecosystems, causing mangrove destruction, coastal erosion, pollution of surface and ground-waters including salinisation of vital coastal freshwater aquifers, and in some cases introduced exotic species. The few cost-benefit analyses performed to date have indicated that the cost of natural resource depletion and environmental damage far outweighs the direct economic returns from the industry. ...Shrimp aquaculture, as currently practiced in many areas, provides a striking example of unsustainable use of natural resources for export markets. As well as seriously damaging the environment, it also undermines food security at the local level and reduces prospects for future development and poverty alleviation. The industry has triggered serious social conflicts in some locations by marginalizing village communities and the poor. In many cases, while a few individuals benefit from this industry, many more see their livelihoods and local environment damaged and destroyed. (WWF, 1997)

All these reports on environmental and social setbacks escalated a conflict between the proponents and opponents of industrial shrimp farming. Gradually the conflict transcended local and national arenas. These tensions and conflict subsequently gave rise to the formation of environmental and peasant-based NGOs opposed to shrimp farming, while industry groups sought to counter the claims and campaigns of the resistance coalition. All these problems generated resistance from villagers, rice farmers and NGOs. The resistance ranged from street protests to violent confrontations between the shrimp cultivators, mostly outside entrepreneurs, and the local people. Studies in Bangladesh conducted by Manju (1996), Nijera Kori (1996), and later on (Tutu 2004) documented that the confrontations resulted in adverse law and order situations, violence, serious human rights violation and even deaths. However, the local administration, police and other law enforcing agencies in almost all cases, as their studies claimed, sided with the shrimp cultivators vis-à-vis the evicted local people. Many small farmers became landless.

NGOs such as Nijera Kori, Coastal Development Partnership (CDP), and UBINIG started working to create awareness among the people with regard to the negative consequences of shrimp industry (Pokrant and Reeves 2003). This negative image of shrimp culture is still mounting. The study shows that while there were instances of severe environmental and social damages in the early years of commercial shrimp in the 1970s and 80s, the recent improvements in Bangladesh are also substantial. Nevertheless, most of the global stakeholders still have negative images of Bangladeshi shrimp, images which have been propagated by some NGOs including Nijera Kori and Environmental Justice Foundation (EJF). In order to promote the real and positive images of Bangladesh shrimp and fish industry, both the industry and the Department of Fisheries need to engage not onlywith these NGOs, but also with other stakeholders in order to move towards a sustainable shrimp culture, which

Table 4: Environmental and Social Impacts and Interventions

Practice/ Actions	Consequences for Development	Environmental and Social Impact	Intervention Recommended
Land lease by outside entrepreneurs	Use of land only to maximize short-term profit without concern for long-term sustainability	a. Deforestation b. Destruction of mangrove eco-systems (biodiversity) c. Destruction of alternative source of livelihoods	a. Ensure participation of the stakeholders in the management of shrimp farming and stricter implementation of existing laws b. Introduce zoning and declare certain parts of the country to be shrimp-free area
Lease of government (*khas*) land for shrimp culture	Traditional rice culture replaced by shrimp culture	a. Disentitlement of landless b. Intensification of poverty c. Prevalence of environmentally unfriendly practices d. Gradual degradation in the quality of land and soil-nutrient resulting from accumulation of salts affecting rice production	a. Enactment of laws ensuring participation of landless people in any use of *khas* land b. Develop land use policy and environmental guideline for shrimp culture c. Develop optimal practices for rice-shrimp mixed culture
Salt water penetration within embankment for substantial period	Increased salinity in the area		
Use of extensive methods of shrimp cultivation causing inundation of large tracts of land.	Large area remaining under water for substantial period of time	a. Destruction of homestead cultivation, fruit orchards b. Rupture in the subsistence cycle	a. Encourage semi-intensive method of cultivation b. Zoning and area mapping
Indiscriminate shrimp fry collection	Destruction of fish biodiversity and increased exploitation of preferred species	Over fishing	Develop shrimp hatcheries

is environmentally friendly, socially responsible, culturally sound, and economically and technologically viable.

From the early 1990s to the present, research conducted on Bangladesh shrimp farming (e.g., Nijera Kori 1996; Manju 1996; Rahman 1995; Ahmed 1996; Deb 1998; Battacharya et al. 1999; Islam 2002; Metcalfe 2003; Alam et al. 2005; Ali 2006; Haque 2004; USAID Bangladesh 2006) have focused—apart from various gains—on a range of environmental and social concerns of commercial shrimp. The major environmental concerns generated by certain practices of shrimp farming in Bangladesh and the interventions recommended by this research are summarized in Table 4.

While Bangladesh has seen significant progress in terms of alleviating the worst human and environmental abuses surrounding commercial shrimp (Islam 2009), both the progress and implementation are very slow. Negative environmental and social impacts of shrimp aquaculture still continue albeit on a lesser scale. The recommended interventions have not been adopted and implemented fully and on a timely fashion. With many novel challenges (discussed below) being added up with previous unresolved problems, the current shrimp culture has become even more complex and vulnerable.

Non-Tariff Barriers

Many developed and some developing countries have been offering special preferential market access schemes to least developed countries (LDCs). While these schemes have lowered tariff barriers for most of the agricultural products exported by the LDCs, non-tariff barriers (NTBs) remain a major constraint to LDCs exports (Deb 2007). For example, it has been calculated that Bangladesh and Cambodia, even though they have duty-free access to the EU market,

Table 5: Major Categories of NTBs

Categories	Description
i) Quantitative restrictions and similar specific limitations	Quantitative restrictions (QRs) are implemented through various actions such as import quotas, export quotas, licensing requirements for imports and exports, voluntary export restraints, prohibitions, foreign exchange allocation restrictions, surrender requirements, import monitoring, temporary bans to balance trade, discriminatory bilateral agreements, counter trade, domestic content and mixing requirements, mandatory certification, and allocation process for quantitative restriction.
(ii) Customs procedures and administrative practices	Several customs procedures and administrative practices such as customs surcharges, decreed customs valuation minimum import prices, customs classification procedures, customs clearance procedures, minimum custom value, excises, and special customs formalities like stamping often create barriers to trade.
iii) Non-tariff charges and related policies affecting imports	Imports may also be affected by various policies and non-tariff charges such as special sales taxes, variable levies, border tax adjustment, value added tax, antidumping and countervailing measures, cash margin requirements, and rules of origin.
(iv) Government participation in trade, restrictive practices and more general policies	Governments often provide subsidies and other aids, participate in state trading, and designate goods subject to specialized management by line ministries. In addition, state procurement policies, tax exemptions for critical imports, and single or limited number of channels for imports of food and agricultural products can act as non-tariff barriers.
(v) Technical Barriers to Trade	Governments, on various grounds, often set standards such as health and sanitary regulations and quality standards, safety and industrial standards and regulations, packaging and labeling regulations, advertising and media regulations. These technical requirements can also act as non-tariff barriers to trade.

Source: Deb (2007).

faced NTBs equivalent to an average tariff of 5.65 per cent and 7.66 per cent, respectively in 2001 (Brenton 2003). Non-tariff barriers (NTBs) or measures (NTMs) generally refer to any measure other than tariff which restricts or distorts trade. While various classifications of NTBs exist (see UNCTAD, 1994), trade policy researchers often describe NTBs under five major categories: (i) Quantitative restrictions and similar specific limitations, (ii) Customs procedures and administrative practices, (iii) Non-tariff charges and related policies affecting imports, (iv) Government participation in trade, restrictive practices and more general policies, and (v) Technical Barriers to Trade (see Table 5 for details).

Quality: Freshness and Credence

Maintaining quality as required by the buyers remains a crucial challenge for Bangladesh shrimp aquaculture. Despite various policies and programs, Bangladesh still lacks modern testing facilities, research technologies, and qualified technicians. In 1997 the EU imposed a ban on shrimp imports from Bangladesh because of the following quality problems:

- Exported shrimp did not retain the desired level of freshness. Salmonella, E-coli and other harmful bacteria and germs were found at an alarming rate in the shrimp. These germs attacked the shrimp through animal waste and polluted water.
- Flies; mosquitoes or bodies of other insects; hairs of dogs, cats, cattle, goats or mice; feathers of chickens and ducks; bamboo sticks; leaves; jute fibers and sand were found in the shrimp.
- Pieces of iron and glass, sticks of coconut and other unacceptable things were found in the shrimp bodies.
- Bodies of the shrimp became soft, spongy or bruised; color of the shell changed or became black; shell was broken or became soft or meat hung from the body.
- Shrimp of the grade lower than what was referenced on cartoons were sent. Also weights were lower than what was written on the cartoons.
- Besides, if the shrimp was found to contain any trace of insecticides or antibiotics, the product would be treated as poisonous (Karim 2000).

Bangladesh shrimp sector had to pay a huge price for its “sub-standard” shrimp. Cato and Subasinge (2003) estimate that the cost for plant upgrading in

Bangladesh shrimp industry to implement HACCP manual was $18 million. Additionally, the annual recurring costs to maintain HACCP programs and meet international standards are $2.2 million for the industry and $225,000 for the government. As the study found, while the Bangladesh shrimp sector made impressive progress in terms of upgrading its plants to ensure freshness and taste as required by the buyers (discussed before), the same malpractices still remain in certain factories. On the other hand, other "credence"[5] qualities have been added in the era of certification such as ensuring traceability, conforming to prescribed labor and human rights, and producing commodity in an environmentally and socially just manner. This research along with Alam et al. (2005) show that there is a wide gap between the quality required by the buyers and the prevalent qualities of the Bangladeshi shrimp. The country still lacks proper plans and policies to cope with the shifting demands of the global markets. Where policies are in place, lack of implementation and enforcement as well as serious shortage of technical experts are seriously obstructing the industry to meet the "quality" required by the buyers.

Gender Issues and Labor Standards

One of the components of the certification schemes is that shrimp should be produced in a manner that does not violate human and gender rights and should adhere to local and international labor standards and regulations. It has been found, however, that the production and processing of shrimp in Bangladesh is highly feminized and negates local and international labor regulations. The research found that the *feminization* of the workforce in the shrimp processing factories is characterized by the *marginality* of females, who receive lower wages and social prestige than their male counterparts. The female workers are largely concentrated at unprotected nodes of the local supply chain, which are flexible, part-time, temporary, casual, and informal, without an employment contract or its associated rights (Islam 2008b).

Some factories have many permanent workers with no legal and written appointments. Most of them are appointed orally. In these factories, most permanent workers do not have any extra rights such as bonus or health insurance, and their salary ranges from US$ 1 to 3 per day. Many of them work at least 12 hours each day, but on paper 8 hours of work is shown. During peak seasons, they often have to work more than 12 hours. The reasons behind an oral contract, as the study found, are: (a) to deprive them from other facilities, such as health and other social protection and (b) to keep them in such a position so that they cannot take any legal action/claim. Casual workers are more vulnerable. They cannot claim anything as they do not fall within the legal framework of "worker" according to Bangladesh labor law and work under third-party contractors who also exploit them.

Apart from lower wages, the study found that the female workers in the processing factories suffer from various illnesses such as fungal infection, cuts and bruises in their hands. The females often work in unhygienic working conditions. There is no regulation of occupational health and safety in the factories. In the case of any work-related accidents, the female labors are not covered by any insurance policies. They rely on the mercy of their employers. On very rare occasions, they are compensated with a mere one-off payment for a workplace accident. There is no provision for sick or maternity leave. Most employers operate on the basis of "no work, no payment." While the HACCP training modules recommend the use of gloves, the study found that workers are only given gloves during the final stage of packaging. Management mentioned that the female workers are reluctant to use gloves because they slow down the work. However, one worker reported otherwise, stating that "We want gloves, but it is not provided to us as it slows down the work and involve a little cost for them."

As there is an apparent gap between labor standards in certification regimes and actual labor practices in the production and processing segments of the chain, Bangladeshi shrimp is becoming unpopular among the consumers, and hence many buyers feel reluctant to purchase them. This one of the reasons why Bangladeshi shrimp has about 10 per cent lower price/value in the global markets. During the WAS Meeting 2009, a US consumer reported, "I used to eat Bangladeshi shrimp. After I saw a report in CNN, I stopped buying." On compliance with local and international labor rules and standards, a local production manager revealed, "We do not follow any labor rules, though we have them on paper." Sometimes officers from the Ministry of Manpower come to inspect shrimp processing factories. Most of them are also corrupt. "They [the officers] become very vocal at the very beginning, but upon serving cold drinks and giving cash money [bribe], their voice becomes very soft" the production manager added. Though this scenario is not prevalent in all

processing factories, and there are various signs of progress in recent days, gender and labor issues still remain crucial for the Bangladesh shrimp sector.

Corruption and Malpractices

During this research, owners/ managers of processing factories were reluctant to disclose any information, and most of their answers were very selective, positive and diplomatic. After long assessment and critical scrutiny, various practices of corruptions, discrepancies, and abnormalities were found. Most factories maintain ideal paperwork for inspection that may not correspond to the actual practices. For every container, a sample of shrimp is to be tested in Singapore as recommended by the EU delegates who visited the factories in October 2005. With one test result, some factories sometimes sell few more containers by duplicating the test result. It was found that in order to get government subsidy, some factories generate fake paperwork.

"Pushing water or other substances into the shrimp's body to increase weight still remains a common practice in processing factories" claimed a factory worker. "We do not do it for every shrimp. Let's say, we push water into 10 kilos of shrimp and mix them with 500 kilos so that it cannot be detected. By pushing water, the weight of one kilo shrimp can go up to one kilo and 100 grams" he continued. Some factories manipulate the weight of the processed shrimp to get more revenue. "Often, on a box that has 1.5 kilos of shrimp, we write 1.8 kilos" revealed a processing worker, "since shrimp is frozen with water, it's difficult for the buyers to measure the actual weight" he added.

According to government regulation, after processing shrimp has to be boxed with the factory's label. However, very few factories were found to practice this regulation. "Buyers send us the type of box (size, color and written labels on it), and we prepare it accordingly here. It saves buyers from extra cost of re-packaging" said a manager, "Since shrimp goes in big containers, the government officials cannot detect this malpractice. If it is known, a little bribe solves the problem," he continued. Though these are not a common phenomenon in all factories, few malpracticing factories are damaging the whole industry. The government agencies not only lack a serious mechanism to curb such corruption and malpractices, ironically sometimes the government officers themselves indulge in and sustain such practices for individual gains.

Viruses and Other Calamities

One of the major challenges facing the industry is a widespread viral disease that has been responsible for declining production since the early 1990s of the marine shrimp known as "Black Tiger," or "Bagda," which dominates the export market. The other main variety of Bangladesh shrimp is actually a giant fresh water prawn known as "Galda," which is immune to this viral disease. The Bagda proliferates in tidal basin areas along the Bay of Bengal coastline in brackish water, while the Galda can flourish farther inland in ponds. The disease known as White Spot Syndrome Virus (WSSV) was detected through tests in a laboratory set up by the SSOQ program. The tests found the incidence of WSSV at over 70 percent (Gillard and Quader 2004). Although WSSV is harmless to the human consumer, it cuts down shrimp production in the farms drastically. This virus has been affecting the industry for years; however, a full control mechanism has yet to be developed. This makes the industry extremely vulnerable and many farmers have become destitute and bankrupt after being affected by this virus.

Currently Bangladeshi shrimp exporters, already hit by the global economic crisis, had temporarily stopped shipping fresh water shrimp after a harmful drug was found in some shipments. The voluntary six-month suspension was imposed after European Union (EU) nations returned 50 container loads over the past months because tests showed traces of the banned antibiotic nitrofuran. In the first nine months of the current fiscal year 2009-2010, shrimp shipments slid 13 per cent to US$ 356 million. The exporters have asked the government to bail them out, saying the livelihood of many of the country's 1.5 million farmers are at stake. It is estimated that over 50,000 farmers in the impoverished nation of 144 million people would be affected by the export ban (FIS Singapore 2009). Though the ban has been temporarily eased, the trouble still remains as the source of this harmful drug has yet to be traced.

Almost every year, various natural disasters also seriously affect the industry. The FishSite (January 20, 2008) revealed that nearly 400,000 shrimp farmers face an uncertain future two months after Cyclone Sidr struck Bangladesh's southwestern coastal belt. Some 6,000 shrimp farms and hatcheries in the four southern districts of Satkhira, Khulna, Bagerhat and Patuakhali were washed away. In Morrelganj, Sharankhola and Mongla sub-districts of Bagerhat District, over 90 percent of some 5,000

shrimp enclosures were destroyed by the cyclone. Farms in the affected region are well-known for their Black Tiger shrimps that grow in salt water and are cultivated on 130,000 hectares of land, while freshwater shrimps are cultivated on another 40,000 hectares of land. "We have suffered an estimated loss of about $36 million," said Kazi Belayet Hossain, president of the BFFEA in the capital, Dhaka. Individual shrimp farmers, many of whom lost everything and were already heavily in debt, now face a particularly bleak future, with many wondering how they will care for their families. Extremely poor, many had borrowed money from shrimp exporters and need to repay them. "We need interest-free bank loans so that we can provide more loans to the farmers," Belayet Hossain said, adding that the government should also offer direct support to the farmers immediately. "Bagda is doing well, though sometimes it is severely affected by natural disasters such as Sidr and Aila. It's a huge problem. We are poor and are gradually building our industry by combining all of our limited effort and energy. When it develops a bit, the natural calamities wash it away. It's a great tragedy for us" laments another officer at DoF.

Other Challenges

Apart from all these pressing problems, the study found that lack of hatcheries, low productivity, high price for shrimp feed, lack of government loans, lack of technical help, rural tensions on water management, land grabbing, refusal to pay lease money, shrimp theft and various other forms of corruption are among the major problems. The study also found that there is an apparent tension between the Department of Fisheries and the SSOQ. As the SSOQ adopted codes from the ACC, the SSOQ would have a lot more clout. However, as the tension between the Department of Fisheries and the SSOQ persists, it hinders a sustainable future for the Bangladeshi shrimp. Bangladesh will continue to get lower prices in the world markets unless and until it's shrimp is certified by a trusted private certification agency. Though some private certification schemes such as Global Gap is working on a very limited scale, development of full-fledged private certification regimes in Bangladesh is very unlikely because of the resistance from DoF and BFFEA. The resistance comes largely because of power-tension where both organizations do not want to surrender their long-exercised power to the private agencies.

Conclusion, Discussion and Recommendations

The study presumes that third party private certification will operate fully in the next few years following a trend of the global agro-food system in which a trusted label of quality matters more than anything. While a third-party certification regime is still in its nascent stage, myinvestigation suggests the following significant points which have important implications for the Bangladesh shrimp industry as well as other agro-food and export-oriented industries:

- As issues of quality, environmental sustainability, traceability, social responsibility etc. have become an integral part of global agro-food system, buyers are tightening their grip on the commodity chain. This however creates a paradox: actors closest to the buyers are often privileged, while others in the chain including small producers are feared to be precluded or marginalized.
- Along with Humphrey and Schmitz (2001), the study suggests that the greater the extent to which the lead firm specifies non-standard parameters, the greater is the likelihood that it will also have to arrange for enforcement, carrying out this activity directly, or contracting others to do it. The emergence of a third-party private certifier is a clear indication of this tendency that will play a pivotal role on buyers' behalf sidelining but paradoxically engaging the government/public agencies.
- The emergence of third-party certifiers, which Busch and Bain (2004) call "the private regulation of the public," is a new feature in the global export-oriented industries. There is some incentive for lead firms to shift parameter setting and enforcement from their own to the third-party certifiers. This process, however, shifts the burden from buyers to the supplier, as the costs of this certification are normally borne by the supplier, not the buyer. Therefore, the new certification regime will again privilege the buyers and leave the producers/suppliers with new costs, responsibilities as well as vulnerabilities.
- Previously it was argued that as the competence of the suppliers/producers increases, chain governance through the

buyers can be expected to loosen, provided that increasing competence of suppliers is accompanied by the emergence of local agents who can monitor and enforce compliance with general or buyer-specific standards (Humphrey and Schmitz 2001). However, shifting regulations and the emergence of a third-party certifier have diminished this possibility. As the lead firms have a growing tendency to opt for linkages to fewer and larger suppliers to ensure traceability, it leads to a significant shift in governance: more tightening grip and direct control of the commodity chain by the lead firms, while leaving a significant part of governance to the private certifiers.

- Brands and label play an increasingly important role in enterprise strategy. Humphrey and Schmitz (2001:27) suggest that "branding and chain governance tend to go together." This is true in case of Bangladeshi shrimp. Price and demand of shrimp in the global market largely depend on what particular agency certifies it. Shrimp in Bangladesh is still largely certified by the "Inspection and Quality Control Division" of the government and therefore gets lower price in the global market as this public agency is not a renowned certifier that the consumers can trust. The SSOQ scheme that incorporated many codes from Aquaculture Certification Council (ACC) argues that it can increase the price up to 10 percent for Bangladeshi shrimp in the global market as it has a trusted label. However, this private scheme is almost dead due to, among other reasons, the resistance from and non-compliance of DoF and BFFEA.

Despite policy recommendations as well as policy adoption, traces of some of the previous challenges affecting the industry still persist because of lack of implementation. While the government of Bangladesh made significant progress in implementing some of the suggested solutions, there is much more to do effectively and efficiently. The study estimates that Bangladesh can sustainably earn about US$2 billion yearly from its shrimp industry. While many neighboring countries such as China, Thailand and India are genuinely working with pragmatic plans and policies to capture the lucrative shrimp markets, Bangladesh—despite having enormous prospects—is now grappling to survive with numerous problems and malpractices. As issues of quality, environmental sustainability, traceability, social responsibility etc. have become an integral part of the global agro-food system, buyers are tightening their grip on the commodity chain. Consequently, actors closest to the buyers are privileged, while others in the chain including producers are precluded or marginalized. Bangladesh has yet to fully harvest the opportunity by addressing and following the trends of the current global agro-food system.

Experience shows that the role of global trade standardization regime sometimes exacerbates growing poverty and insecurities in the developing countries. Stiglitz and Charlton (2005) show that standard economic assumptions are wrong when it comes to many developing economies. The pace at which poorer nations open their markets to trade should coincide with the development of new institutions — roads, schools, banks and the like — that make such transitions easier and generate real opportunities. Since many poor nations cannot afford the investments required to build these institutions, rich nations have a responsibility to help. Without these institutions in place, trade by itself can do more harm than good. This is one of the reasons why the shrimp sector in Bangladesh is helping only a fortunate few. According to Stiglitz and Charlton (2005), every developing country that has succeeded in achieving rapid growth has protected its market to some extent until it was ready to dismantle trade barriers. China's growth, for example, escalated in the 1970's, before it lowered its barriers. For making shrimp profitable to all social strata including small- and medium-scale farmers, Bangladesh has a somber lesson to learn here.

The study provides the following recommendations for the Bangladesh shrimp industry. First, the negative image of Bangladeshi shrimp is still mounting. Despite making recent improvements, most of the global stakeholders still have negative images of Bangladeshi shrimp. In order to promote a positive image of the Bangladesh shrimp and fish industry, both the industry and the DoF should not only engage with the NGOs, but also with other global stakeholders. Representatives from BFFEA should attend important international forums like WAS annual meetings, Boston Seafood Show, and many other regional meetings not only to promote Bangladeshi products but also to establish a sustained business relationship. The WAS meetings and similar other meetings are attended by, among others, various technical experts and scientists. Bangladesh

can take crucial technical help and lessons from the experts to combat various problems including white spout virus that have significantly affected the Bangladesh shrimp industry.

Second, the industry as well the government should take lessons from other countries to know how they have managed to deal with and eventually solve similar problems. Third, for academic and industry purposes, many researchers in different parts of the world are conducting studies on various dimensions of the industry. The government and the private sectors should reach out to these researchers and understand the "pulse" of the industry in the context of the neoliberal restructuring of the global agro-food system. Fourth, the WWF has been organizing a series of dialogues to come up with standards. Bangladesh, being one of the top producers of commercial shrimp and other fish species, must play a vital role to serve its best interests. In the global agro-food system, private certification is becoming a norm. Giant buyers have already committed to buying only privately certified seafood and other buyers are increasingly moving in this direction. Bangladesh must engage with different private certification schemes including Aquaculture Certification Council (ACC), Global GAP, International Social and Environmental Accreditation and Labelling Alliance (ISEAL), and WWF to get the best price of its shrimp. Fifth, there are many global NGOs (like Oxfam Novib) which are looking for partners to work with in order to address various problems facing the industry. Bangladesh can find out and work with its supportive partners both locally and globally. Finally, missing one opportunity does not mean there is no other to avail. Bangladesh should be abreast of the shifting regulations governing the industry, global market trends, power dynamics, global commodity networks, and so on. Evidence shows that in the era of globalization, producers with higher levels of knowledge and information are more privileged than those with less knowledge and information.

In sum, the Bangladesh shrimp sector needs immediate policies, programs as well as proper implementation and enforcement mechanisms to establish research institutes to study intensive shrimp culture, increase productivity, and invent cures for viruses. There is also a crying need to establish more hatcheries to supply shrimp-fry to the farmers at a lower cost; to provide loans for the farmers; to create a shrimp-friendly environment; to adhere to the ACC standards or other trusted labels; to remove corruption and various other malpractices; to adhere to quality standards—both freshness and credence—as required by the buyers; to negotiate and consult with NGOs who are opposing shrimp culture; and to be abreast of the shifting regulations. While some policies are in place; they lack effective implementation and execution at all levels of the production and value chain. Serious shortcomings of the testing facilities in the country and the qualification of the technicians need greater attention and investments from the government and the international bodies. If the nation fails to protect this sector in a sustainable manner, both the environment and millions of employment opportuities will be at stake. The shrimp markets will not wait for Bangladesh to recover and repair itself, but move on to other sources for their supplies. For commercial shrimp farming, the country has already paid huge environmental and social costs in the past; it cannot afford to pay any more by losing its global markets.

Acknowledgements

The paper results from three separate research supported the International Development Research Centre (IDRC), the Social Science and Humanities Research Council (SSHRC) of Canada, and Nanyang Technological University (NTU) of Singapore. The earlier version of this paper was presented at the *Harvard University Conference*, organized by Bangladesh Development Initiative, Democracy and Development in Bangladesh Forum, and The Ash Institute for Democratic Governance & Innovation, JFK School of Government at Harvard University, June 13 & 14, 2008. The author thanks the editor and the anonymous reviewers for their thoughtful comments and suggestions.

Endnotes

1. For example, upscale supermarkets in Western Europe wished to purchase shrimp that could be traced from their frozen food sections all the way back to the hatchery through the entire value chain. Insuring such traceability required complex paper trails which were difficult to fashion in the long, weakly integrated shrimp value chain present in Bangladesh.

2. The EJF is an activist organization based in the United Kingdom that researched and exposed environmental issues.

3. ATDP is an agribusiness assistance project of the

Government of Bangladesh and is funded by the U.S. Agency for International Development (USAID) (Gaillard and Quader, 2004).

4. For details, see Clay (2004), Boyd and Clay (1998), Shiva (1995), Philips et al. (1993), CAP (1995), Clay (1996), Sernbo and Kloth (1996), WWF (1997), Vandergeest et al. (1999), Scott (2000), Nijera Kori (1996), Manju (1996), Ahmed (1996), Deb (1998), Battacharya et al. (1999), Islam (2002), Metcalfe (2003), Alam et al. (2005), Ali (2006); and Haque (2004).

5. The "quality" now includes both ''experience'' characteristics, such as freshness or taste, that can be detected directly by consumers after purchase, and ''credence'' or non-material characteristics that cannot be detected by consumers, such as the environmental and ethical conditions of production (See Vandergeest 2007).

References

Ahmed, F. (1996). *In Defense of Land and Livelihood*. Ottawa, Canada: Sierra Club.

Alam, S. M. N., Lin, C.K., Yakupitiyage, A., Demaine, H, & Philips, M. J. (2005). Compliance of Bangladesh shrimp culture with FAO code of conduct for responsible fisheries: A development challenge. *Ocean and Coastal Management*, Vol. 48, No. 2, pp. 177-188.

Ali, A. M. S. (2006). Rice to shrimp: Land use/land cover changes and soil degradation in Southwestern Bangladesh. *Land Use Policy*, 23(4): 421-435.

Asaduzzaman, M. & Toufique, K.A. (1998). Rice and Fish: Environmental Dilemmas of Development in Bangladesh. In *Growth or Stagnation? A Review of Bangladesh's Development 1996.* Dhaka: Centre for Policy Dialogue, University Press Ltd.

Battacharya, D., Rahman, M, & Khatun, F. A. (1999). *Environmental Impacts of Trade Liberalization and Policies for the Sustainable Management of Natural Resources A Case Study on Bangladesh's Shrimp Farming Industry*. Dhaka, Bangladesh: Center for Policy Dialogue.

Bene, C. (2005). The Good, the Bad and the Ugly, Discourse, Policy Controversies and the Role of Science in the Politics of Shrimp Farming Development, *Development and Policy Review* 23(5): 585-614.

Blumer, H. (1969). *Symbolic Interactionism: Perspective and Method*. Englewood Cliffs, NJ: Prentice Hall.

Boyd, C. E., & Clay, J. (1998). Shrimp aquaculture and the environment. *Scientific American*, 278(6): 59-65.

Brenton, P. (2003). Integrating the Least Developed Countries into the World Trading System: The Current Impact of EU Preferences under Everything but Arms. *Policy Research Working Paper Series* 3018. The World Bank.

Busch, L. & Bain, C. (2004). New! Improved? The transformation of the global agrifood system. *Rural Sociology*, 69 (3): 321-346.

CAP (Consumers Association of Penang) (1995). Aquaculture: Problems and Issues, Dossier Compiled by Consumers Association of Penang, Penang, Malaysia.

Cato, J. C. & Subasinge, S. (2003). Food Safety in Food Security and Food Trade Case Study: The Shrimp Export Industry in Bangladesh. *2020 Vision for Food, Agriculture and the Environment*, Focus 10, Brief 9 of 17, September 2003.

Chowdhury, S. N., & Islam, M. R. (2000). HACCP Implementation and Quality Control in the Fish Processing Industry of Bangladesh. *Agribusiness Bulletin*, 45(25): January Issue.

Clay, J.W. (1996). Market Potentials for Redressing the Environmental Impact of Wild Cultured and Pond Produced Shrimp. Report Prepared for World Wildlife Fund, Geneva.

Clay, J. (2004). *World agriculture and the environment*. Washington: Island Press.

Deb, A.K. (1998). Fake Blue Revolution: Environmental and Socio-Economic Impacts of Shrimp Culture in the Coastal Areas of Bangladesh. *Ocean and Coastal Management*, 4: 63–88.

Deb, U. K. (2007). Non-Tariff Barriers in Agricultural Trade: Issues and Implications for Least Developed Countries. *ARTNeT Policy Brief*, No. 12, May 2007.

EJF (Environmental Justice Foundation) (2003). Dying for Your Dinner: Western Demand for Shrimp

Promotes Human Rights Abuses in the Developing World. Retrieved from www.commondreams.org/ news2003/0626-04.htm

FAO/WHO (2004). Bangladesh Country Paper. *FAO/WHO Regional Conference on Food Safety for Asia And Pacific*, Seremban, Malaysia, 24-27 May.

FIS Singapore (2009). Shrimp exports halted as EU finds harmful drug. Retrieved from http://fis.com/fis/worldnews/worldnews.asp?l=e&ndb =1&id=32419

Gammage, S., Swanburg, K., Khandkar, M, Islam, M. Z., Zobair, M. & Muzareba, A. M. (2006). *A Gendered Analysis of the Shrimp Sector in Bangladesh*. Dhaka: Greater Access to Trade and Expansion, USAID.

Gillard, T. K. & Quader, S.M. (2004). *The Shrimp Seal of Quality Programme: Cases for Management Education*. Washington: Emerging Market Development Advisors Programme), USAID.

Haque, A.K. E. (2004). *Sanitary and Phyto-Sanitary Barriers to Trade and Its Impact on Environment: The Case of Shrimp Aquaculture in Bangladesh*. Manitoba, Canada: International Institute for Sustainable Development.

Henson, S., & Reardon, T. (2005). Private agri-food standards: Implications for food policy and the agri-food system. *Food Policy*, 30(3): 241-253.

Humphrey, J., & Schmitz, H. (2001). Governance in Global Value Chain. *IDS Bulletin*, 32 (3): 19-29.

Islam, M. S. (2002). The Rhetoric of Environmentally Sound Shrimp Aquaculture in Bangladesh. *Major Review Paper*, Graduate Program in Sociology, York University, Canada.

Islam, M. S. (2009). In search of 'white gold': Environmental and agrarian changes in rural Bangladesh. *Society and Natural Resources*, 22: 66-78.

Islam, M. S. (2008a). From pond to plate: Towards a twin-driven commodity chain in Bangladesh shrimp aquaculture. Food Policy, Vol. 33, No. 3, pp. 209-223.

Islam, M. S. (2008b). From sea to shrimp processing factories in Bangladesh: Gender and employment at the bottom of a global commodity chain. *Journal of South Asian Development*, 3(2): 211-236.

Karim, M. (2000). Preserving Shrimp Quality. *Agribussiness Bulletin*, Vol. 61, 25 February 2000.
Khan, A. (2005). USAID project to boost Bangladesh shrimp exports through certification. *Seafood.com news*, Asia Pulse Pte Limited, (August 11, 2005 issue).

Manju, T.H. (1996). Political Economy of Shrimp Culture in Bangladesh. Report Prepared for Grameen Trust, Dhaka: Grameen Bank.

Metcalfe, I. (2003). Environmental Concerns for Bangladesh. *South Asia: Journal of South Asian Studies*, XXVI (3):423–438.

Nijera Kori (1996). The Impact of Shrimp Cultivation on Soils and Environment in Paikgacha Region, Khulna (Limited to Polders 20, 21, 22, 23 and 29). Report prepared for Nijera Kori by Environment Study Centre, Dhaka.

OCED (Organization of Economic Cooperation and Development) (2006). *Recent History of World Aquaculture and Shrimp Culture- Part II, Exploring South-South Cooperation in Sustainable Shrimp Farming in West Africa*. Conakry (Guinea), 6-8 June, 2006.

OCED (2003). *Liberalizing Fisheries Markets: Scope and Effects*. Paris: Organization of Economic Cooperation and Development.

Philips, M.J., Lin C.K., & Beveridge, M.C.M. (1993). Shrimp Culture and the Environment: Lessons from the World's Most Rapidly Expanding Warmwater Aquaculture Sector. In R.S.V. Pullin, H. Rosenthal and J.L. Maclean (eds.) *Environment and Aquaculture in Developing Countries*, Bangkok: ICLARM.

Pokrant, B. & Reeves, P. (2003). Work and labour in Bangladesh Brackish-Water Shrimp Export Sector. *South Asia: Journal of South Asian Studies*, XXVI (3): 359-389.

Public Citizen (2005). *Fishy Currency: How International Finance Institutions Fund Shrimp Farms.* Pennsylvania: Public Citizen.

Qudir, S. M. & Kabir, K. (2005). Shrimp Seal of Quality; Integrated Approach to Addressing Challenges of Bangladesh's Shrimp Industry. *Post IAMA Workshop*, World Bank &USAID, (June 29-30, 2005), the Allerton Crowne Plaza.

Rahman, A. (1995). Shrimp Culture and Environment in the Coastal Region. Working Paper New Series, No. 8, Dhaka: BIDS.

Roheim, C. A. (2004). Seafood, Trade Liberalization and Impacts on Sustainability. In M. Ataman Aksoy and John C. Beghin (eds.) *Global Aquacultural Trade and Developing Countries*, pp. 275-29, World Bank: World Bank Publications.

Scott, D. (2000). The Environmental and Social Impacts of Commercial Shrimp Farming. Reports, November 8, 2000.

Sernbo, K., & Kloth, J. (1996). Prawn Farming: A Study of Intensive Aquaculture. Report prepared for Swedish Society for Nature Conservation, Stockholm.

Shiva, V. (1995). The Damaging Social and Environmental Effects of Aquaculture. *Third World Resurgence*, 59: 22-24.

Sperber, W.H. (2005). HACCP and Transparency. *Food Control*, 16(6): 505-509.

SSOQ (Shrimp Seal of Quality Organization) (2002). *The Seal of Quality Program: Questions and Answers on the Seal of Quality Program*. Dhaka, Bangladesh: SSOQ.

SSOQ (2004). Shrimp Seal of Quality (SSOQ) Certification Standards. Shrimp Seal of Quality. Dhaka, Retrieved from http://library.enaca.org/certification/publications/SSOQ_Certification_Standards_March_15_2004.pdf

Stiglitz, J. E., &Charlton, A. (2005). *Fair Trade For All: How Trade Can Promote Development*. Oxford: Oxford University Press.

The FishSite (2008). Bleak Outlook for Bangladesh Shrimp Farmers. Retrieved from http://www.thefishsite.com/fishnews/6137/bleak-outlook-for-bangladesh-shrimp-farmers

Tutu, A. A. (2004). *Commercial Shrimp Farming in Bangladesh: In Respective of Environment, Land Rights and Labour Rights*. Khulna, Bangladesh: Coastal Development Partnership.

UNCTAD (1994). Directory of Import Regimes, Part I Monitoring Import Regimes (UNCTAD/DMS/2(PART 1)/Rev. 1, Sales No. E.94.II.D.6). United Nations: New York.

USAID Bangladesh (2006). *A Pro-poor Analysis of the Shrimp Sector in Bangladesh*. Arlington, USA: Greater Access to Trade Expansion, Development & Training Services, U.S. Agency for International Development.

Vandergeest, P. (2007). Certification and Communities: Alternatives for Regulating the Environmental and Social Impacts of Shrimp Farming. *World Development*, 35(7): 1152-1171.

Vandergeest, P., Flaherty, M., & Miller, P. (1999). A Political Ecology of Shrimp Aquaculture in Thailand. *Rural Sociology*, 64: 573-596.

Wal-Mart (2005). New certification for Wal-Mart shrimp another example of environmental leadership, Retrieved from http//walmartstores.com/GlobalWMStoresWeb/navigate.do?catg=26&contId=5786 (Wal-Mart,Home,Our Company,News Room,News Releases,2005 News).

Wal-Mart (2006). Wal-Mart takes lead on supporting sustainable fisheries. Retrieved from http//walmartstores.com/GlobalWMStoresWeb/navigate.do?catg=512&contId=6045 (Wal-Mart, Home,Our Company,News Room,News Releases,2006 News)

WWF (World Wildlife Fund) (1997). *WWF Position Statement on Shrimp Aquaculture*. Washington, DC: World Wildlife Fund for Nature.

Md Saidul Islam, Ph.D.
Assistant Professor, Division of Sociology
School of Humanities & Social Sciences
Nanyang Technological University
HSS 05-44, 14 Nanyang Drive
Singapore 637332
Tel: (65) 6592-1519 (Office);
(65) 8182-4184 (Cell)
Fax: (65) 6794-6303