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‘Sufferings Start from the Mothers’ Womb’: Vulnerabilities and Livelihood War of the Small-Scale Fishers of Bangladesh

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Abstract: Due to its deltaic geographical position and precarious socioeconomic and demographic conditions, Bangladesh is recognized worldwide for its exposure to recurring environmental hazards. Based on a 21-month long field study in two fishing villages that are characterized by distinct ecological settings and ethnic groups, this article examines the arrays of cross-scale environmental, social and institutional stressors that singly or cumulatively impact fishers’ livelihood well-being and generational poverty. Analysis of the vulnerabilities makes it clear that the degree to which poor fishers suffer from environmental stressors and calamities is determined not only by the frequency of abnormal events, but also by their internal capabilities of self-protection, resilience against those stressors, position in the social network and asset and resource ownership. Coastal and floodplain fishers identified cyclone and long-standing floods as strong drivers of poverty as their bundles of ‘safety net’ capital are usually disrupted or lost. For a majority of the fishers, income/day/family declines to as low as US\$ 0.7–0.9. Fishers lack appropriate sets of endowments and entitlements that would allow them immediate buffer against livelihood stressors. Vulnerability here is intricately related to one’s socio-economic status; poor and ‘socially vulnerable’ ethnic fishers are concurrently ‘biologically vulnerable’ too. The corollary of multi-faceted stressors is that, poverty persists as an ever-increasing haunting presence that thousands of floodplain and coastal fishers of Bangladesh are forced to cope with. It is evident that nature-induced stressors exert ‘ratchet effects’ on fishers

with low endowments who critically risk nutritional deprivation and social standing. Lucidly, most of the fishers are trapped in a form of ‘livelihood war’.

Keywords: environmental vulnerability; natural calamity; livelihood well-being; livelihood war; small-scale fishing community; poverty; coping; Bangladesh

1. Introduction

‘Military wars come to an end in a few months or years. The war of the poor for mere survival is the longest one; it starts from the very day of the ‘embryo formation’ in the mother’s womb and ends with the flame of fire in the graveyard. The ‘fetus’ knows the condition of mother’s health and ability. In this day-to-day life of practical war, the only anxiety is how to arrange the next meals for family members. Problem is that the adults get used to fasting, but the children are uncompromising for food; they keep crying the whole day and at one stage get tired and sleep. What a struggle for food for survival; not just a few days or seasons, day after day! There is no other thinking or challenges except the issue of mere survival. To be born as a fisher is a curse from God; it is something like paying for past sins...’ Brajamohan Jaladas, 56, a caste-based Hindu fisherman, Cox’sbazar, Bangladesh [1].

Development practitioners frequently refer to Bangladesh for her location within a dynamic deltaic region, natural calamities, climatic variability, immense demographic pressures on the scarce resource base, the crises of governance and yet, the resilience and coping actions of the common people. Around 65.3 million people (45% of the population) are food insecure [2] and live below the poverty line of <US\$ 1/day. Historically, its rich aquatic ecosystems and the fisheries resources therein enabled the rural working class to be engaged in a complex form of subsistence. The economy of most of the artisanal fishers is subsistence oriented, though a small segment of them carry on commercial ventures. Beyond the economic significance of fisheries resources in the economy and livelihoods, it is important to recognize that the coastal and floodplain fishing communities have developed and reshaped their ecological knowledge, cultural heritage, local level resource management institutions, value systems and economic well-being through a long interaction with their immediate environment. The small-scale fishery (also termed as artisanal fishery) in Bangladesh is open access, complex in social and economic relationships, and mostly unregulated.

Despite the productive landscape with its immense supply of water and a rich sub-tropical biodiversity, historically the fishers of Bangladesh have not witnessed significant improvement in their livelihoods. Poverty is an ever-increasing haunting presence—a grim and constant reality that thousands of fishers face on a regular basis. It is multi-dimensional with cross-scale connections to the resource base, and to social, economic, institutional and political governance, and to geographical, environmental and cultural roots. Contemporary literature has mostly concentrated on fallacies—‘fishers because poor’ and ‘poor because fishers’; however there are scholars who emphasized the socio-institutional mechanisms that keep small-scale fishers poor [3]. A renewed interest in sustainable

livelihood enhancement of small-scale fishers is needed in order to alleviate poverty and halt further degradation of the declining fisheries resources.

The primary objective of this article is to examine the linkages between the cross-scale vulnerabilities and ‘livelihood war’ of coastal and floodplain fishers of Bangladesh from the peoples’ viewpoint (*emic* lens). It is argued that the multiple sets of stressors singly or synergistically impact family well-being and livelihood resilience. Some forms of stressors are rooted in natural systems and geographic characterization that exert pressure on whole communities irrespective of class, caste, ethnicity, age and gender with differential effects. Yet, others are socio-culturally and institutionally induced, where we usually see two distinct groups: a small section of powerful players who knowingly or unknowingly create and maintain stresses, and the powerless majority who bear the consequences. The multiple sets of stressors act as ‘social selection’, whereby a small group becomes successful but a vast majority is forced to adversity. The corollary is that fishers falling below the minimum level of family income critically risk not only nutritional deprivation, but also their familial and social standing. In such an unstable stage of livelihood, fishers and their family members exhaust every option to secure food supplies; often this desperation negatively impacts the local environment and biodiversity.

2. Conceptual Framework

In the contemporary literature on rural development and poor people’s livelihoods, we see a plethora of concepts ranging from basic food security to those encompassing and cross-cutting concepts like entitlements, vulnerabilities, resilience, well-being, capabilities, community empowerment and sustainable livelihood. *‘A livelihood comprises the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household’* [4]; *a livelihood is sustainable which can cope with and recover from shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation’* [5]. The notions of ‘well-being’ [6] and ‘capabilities’ [7] provide a wider philosophical dimension along with other concurrent development issues like common people’s participation in the decision-making process, capacity building, gender mainstreaming, adaptive strategies, good governance and policy reform. We use the concept of ‘livelihood war’ to symbolize a dismal state of livelihood characterized by persistent food insecurity, prolonged hunger and a silent form of pseudo-famine, associated with internal state of defenselessness and shattered capabilities of the victims.

Vulnerability (a widely used word in both disaster and development literature) is intricately linked to poverty, both as a causal factor and a direct product. Different authors have portrayed vulnerability from risk-centric and rights-centric perspectives covering a multitude of issues like food insecurity, socio-political rights, justice, policy, market situation, gender and environment [8]. It can be defined as a high degree of exposure to risks, shocks and stresses, and as proneness to food insecurity [9]. Vulnerability thus entails two distinct dimensions: the exposure to shocks and stresses emanating from internal and external sources, and individuals’ lack of capability to take appropriate measures in the face of those risks. Vulnerability is often viewed as simply identical to a decisive dimension or condition of poverty [10–12]. It is a dynamic process and people move in and out of poverty due to vulnerability [13].

Stressors may emanate from human-induced or social dimensions including formal and informal institutions, ethnicity and class, and patron-client production relations that are sustained through some social norms and obligations. Further thoughts useful in refining the concepts of vulnerability are those of resilience and sensitivity, which originate in agro-ecology and natural resource management literature [14]. The ability of a livelihood to cope with and recover from stresses and shock is central to the theme of livelihood resilience. Those households not resilient enough to cope with short-term or long-term adversities eventually fail to make their livelihoods sustainable. Different stressors act on different groups of people with differential effects, and poor households are always prone to diverse vulnerabilities. Broadly speaking, ownership of and access to productive assets and ability to link with cross-scale institutions determines one's level of vulnerability, and subsequent entry into or exit from the poverty level [13,14]. 'Expecting the unexpected' is an oxymoron, but it asks for the tools and appropriate codes of conduct to fall back on when unexpected events happen [15,16].

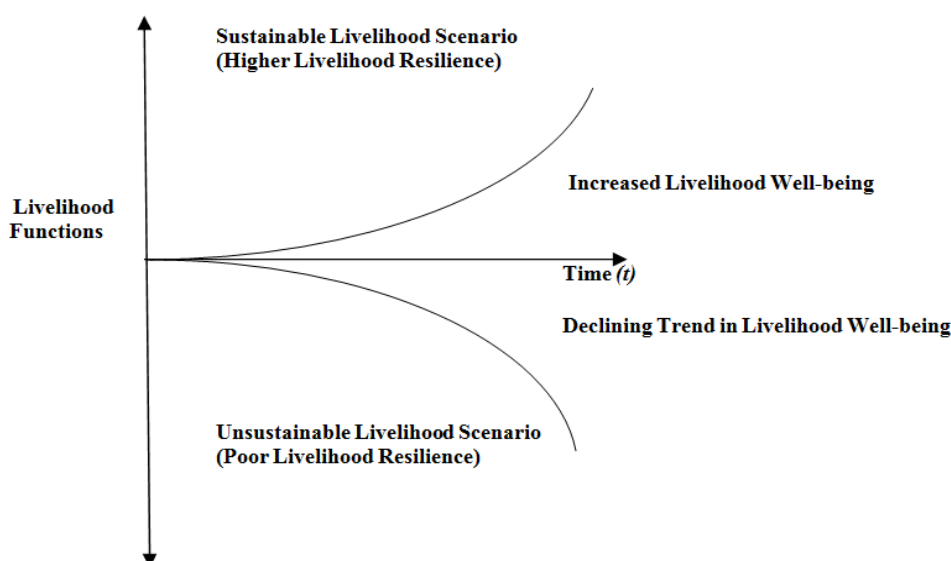
The concept of entitlement holds that food insecurity and persistent hunger are indicators of miserable livelihood, and those households are most vulnerable that fail to comply with culturally determined minimal needs over the annual cycle. Sen's concepts of differential entitlements reflect that individuals belong to certain social classes predisposed to different means of livelihoods, and hence, the exchange entitlement is reflective of one's position in the economic class structure and modes of production [17]. Conceptually, Sustainable Livelihood (SL), livelihood well-being and livelihood resilience are interconnected and complementary concepts in our understanding of livelihoods. The SL framework connotes that people's livelihoods and their assets are subject to diverse shocks and stresses, and it is important to examine how people respond strategically to offset the negative externalities. A positive situation (livelihood well-being) prevails when people are able to use their sets of capabilities and endowments to return to their normal path of livelihood. A negative situation or poorly resilient livelihood is evident when people fail to get back to a socio-culturally appropriate decent mode of livelihood over a period of time (Figure 1). 'Time' is an important determinant. Hypothetically, it tends to be infinite for the sustainable and resilient livelihoods, and moves towards zero in cases when negative situations prevail or dominate.

$L = f(t, c, s_i)$ (where L = livelihood function, t = time, c = capital or endowment sets, and s_i indicate multiple stress factors)

$L(\Delta t) > 0$ or $\Delta t(L > 0) \rightarrow \infty$ (a positive situation of sustainable, resilient livelihoods with symptoms of well-being)

$L(\Delta t) \leq 0$ or $\Delta t(L > 0) \rightarrow 0$ (a negative situation of unsustainable or poorly resilient livelihoods with symptoms of stresses)

The resilience of the aquatic ecosystems on which fishers depend for their livelihood has much to do with their food security. Built on this argument, a linear relationship between fishers' livelihood resilience and the sustainable use of fisheries resources can be put forward (again this has much to do with management policies, resource base, collective actions of communities, and so on). The resilience of both the biophysical and socio-economic systems is inherently a social issue given the dominant presence of humans in obtaining goods and services [18].

Figure 1. Diagrammatic presentation of livelihood resilience

3. Methodology

This research was carried out from January 2005 to September 2006 in two fishing villages of Bangladesh, followed by small group discussions with key informants during January–February 2010. The floodplain fishing village ‘*Volarkandi*’ is located in the Sujanagar union, Baralekha sub-district, Moulavibazar district of the north-eastern region of the country, and represents relatively new-entrant Muslim fishers, locally called ‘*Maimal*’. It has a population of 1240 (male 640, female 600, total 184 households; approximately 40% minor). The village is located within the ‘*Hakaluki haor*’- an ecologically critical area, and the largest natural wetland system of Bangladesh. The coastal fishing village ‘*Thakurtala*’ is located in the Moheshkhali Island of Cox’sbazar district along the Bay of Bengal of the Indian Ocean, and represents hereditary Hindu fishers ‘*Jaladas*’ (literally, slaves of the water). This is a ‘single caste’ village and all settlers (100%) here are so-called low-caste Hindus. It has a population of 650 (male 300, female 350, 78 households; approximately 45% minor). The village is located in between a terrain of coastal landscape and the ‘Adinath temple hill’, a sacred area for the Hindu pilgrims.

Both qualitative and quantitative methods were used with heavy emphasis on participatory techniques because they are more responsive in exploring complex phenomena (like artisanal fisheries and fishers) that are situated and embedded locally. Participatory approach enables rapid learning, and is progressive due to the scope of conscious exploration, flexible use of methods, opportunism, improvisation, iteration and cross-checking [6]. The unit of analysis in this research spans from individual to households to community; households and families are used as interchangeable descriptors assuming that the boundaries between household and family are fluid, and both refer to a physically identifiable residence organized through kinship and rules within the villages.

A baseline survey was conducted among 78 coastal and 60 floodplain fishing households; 45 coastal and 27 floodplain key informants were interviewed, and 42 Focus Group Discussions (FGD) (coastal village: 23 events, floodplain village: 19 events) were carried out. Initially, prior to in-depth field research, around three months were spent with the respondents to develop a sense of

intimacy and trust, and to learn more specifically about local cultures and fishers' sentiments. Direct observations and participation with the fishers on the fishing boats during day-and-night time fishing in the floodplains and sea were the most useful and straightforward way to learn about people's livelihood dynamics, vulnerabilities, values, and their indigenous knowledge in a natural/social setting. For talking with women in a culturally appropriate manner, the time of cooking, weaving, chasing head-lice in a group and other household activities in the open backyard areas of the homesteads was chosen. Due to the lack of any written record of birth, estimation of one's age in the village is a tricky issue. We estimated the age of the respondents based on how old a respondent was during some historical events/ markers (e.g., the 'liberation war' of 1971, 'big cyclone' of 1991, flood of 1998), followed by validation with parents or grandparents, as appropriate. This technique of 'back calculation' of age also proved useful in building intimacy with the respondents. Following research ethics of the University of Manitoba, Canada, we obtained explicit permission from the respondents of this study to reveal their names to the public. Our argument is: so long citation of participants' name is not threatening or humiliating in their societal contexts, we have a choice to refer their names. We value their indigenous knowledge and wisdom, and do believe that appropriate mention of key respondents adds to the process of social empowerment.

4. Results and Discussions

4.1. The Community and 'Emic' Expressions of Livelihood War

Most of the fishers of the study villages are highly disadvantaged, uneducated, resource poor and victims of a host of socio-culturally embedded exploitations. Fishing villages are densely inhabited; the ramshackle appearance of the thatched houses becomes worse in the rainy season. In the wider society, hereditary Hindu fishers are oppressed socio-psychologically owing to their birth-ascribed low-class status; they are exploited through the deep-rooted coercive patron-client relations dictated by moneylenders. Muslim '*maimal*' fishers are socially allotted an inferior class status through the embedded '*Ashraf-Atraf*' (High-Low) division. Hindu fishers have age-old fishing traditions and indigenous ecological knowledge, while the Muslim fishers are relatively new in the profession. Fishing villages have distinct informal social institutions ('*Sardery*'- a clan led by a Chief, predominantly dynasty-oriented male leadership; '*Samaj*'- coherent social group with commonly accepted societal norms and interests, which are linked to family lineage, kinships and patron-client relationships of the rural production systems) that play significant roles in social, religious, judicial and integrative functions.

This research assigns value to the culture-specific insider views (*emic* approach) in examining local-level livelihoods. The word 'livelihood' signifies diverse meanings to fishers trapped in different degrees of poverty, ranging from 'just a meal' to 'living with dignity' ('*jibika*'- earning for making a living, '*beche thaka*'- mere survival, '*onno sangsthan*'- earning/managing the bread, '*khaoa*'- having meals). Here are some *emic* views:

'Struggles to manage two meals a day with family members.' (Shamsul Islam, 50, extremely poor, Volarkandi fishing village, Baralekha) [19]

'Eating adequate amount of meat and other tasty foods every day, and earning petro-dollar from middle-east countries.' Abul Kalam, 35, medium rich, Volarkandi [20].

'It is a mechanism of surviving; just breathing and mere living with whatever little foods I can manage from the village and outside; a 'sharee' for wearing and a small quilt in the winter.' Padmaboti Jaladas, 65, a destitute woman, Thakurtala [21].

'A better quality food, housing and anxiety-free sleeping at night.' Shimul, 24, poor carpenter, Thakurtala [22].

'Better curries for meals, a little saving, regular income, no humiliation for caste identity, no crisis during lean period.' Mridul Jaladas, 45, medium rich fisherman, Thakurtala [23].

'Living with honor; doing something for future generations; living a better life without tension.' Sunil Jaladas, 47, moneylender, Moheskhali [24].

While the issue of decent living is an ambiguous and indeterminate concept, the issue of 'making meals'- *i.e.*, food security- has been captured widely from the response of the fishers. To the destitute, livelihood means just mere survival somehow, whereas to the socio-economically advantaged class, it is living with dignity and sustaining wealth for the future. Poverty of the poor fishers is evident from their low-nutritive meals, slum-type housing, pale physical appearance and torn clothes. For one of the destitute respondents of the coastal study village, it is not only about life but also about death, an early death which can put an end to her sufferings. Interpretations of livelihood in contemporary literature are mostly concentrated on human poverty, both in a narrow material sense of basic needs and in relative terms from cross-scale social and institutional inequalities. Poverty typologies like 'chronic poor', 'extreme poor', 'always poor', 'hardcore poor', 'poorest of the poor', 'ultra poor', 'destitute' and 'most vulnerable' are in extensive use. UNDP views poor as those with <1US\$/day; and the World Food Program define 'absolute poor' as those with an average intake of <2122 Kcal/day. Some benchmarks used by development agencies for measuring extreme poverty in Bangladesh are: subsisting on an intake of <1740 Kcal/day; possession of <0.5 acres of land; earning around Taka 300/month (around US\$ 4.5); having no or very low productive assets; and reliance on income from daily manual labor [*synthesized from* 25]. While these typologies describe some aspects of poverty, they cannot capture the numerous dimensions of poverty in the fishing villages.

To get a picture of the conditions, the anthropological approach of using an 'insider/*emic* view' was used to classify the poor. In a series of interviews and focus group discussions with the adult villagers, fishers were requested to help the researcher understand the meaning of poor in their villages. Going beyond the conventional income-based poverty measurement, they came up with a variety of innovative and unconventional ideas and indicators. Some corresponding typologies bearing different connotations are in use, such as, '*nissho*' (having nothing), '*oshohai*' (helpless), '*dustho/mora-dhora*' (destitute), '*kamla/ gour/ pounna*' (physical labor-based), '*vadhaimma/ bhodai/ bekar/ niskorma*' (jobless) and '*vikkuk/ fokir*' (beggar). Based on a series of discussions with fishers of the study villages, we could label some simple interesting markers for the rich and the poor:

Rich fishers: Have mechanized boats and multiple number of gears; moderate to good housing conditions; annual familial income above Taka 200,000 (US\$ 3077); family member(s) as remittance earner; eat 3 square meals every day, can eat meat when they want; arable land of >1–2 acres; independent of economic safety nets; better family literacy; keep maid servant; talk with 'loud voice'; can afford to eat anything they want; can enjoy soft drinks 'Coca-Cola/Pepsi/Sprite' when thirsty; link with 'big men' of the society; use toothpaste and brush; use perfume, cell phone and television; have own sanitary latrine and tubewell (private underground water supply) adjacent to their home areas;

drink tea with milk; have multiple sets of dresses; sleep on beds; eat breakfast with loaves; get social invitations frequently; spend a lot for dowry and marriages; no pending case of timely social marriage of girls; ride on rickshaw instead of walking short distance; ‘shining’ and strong body; use shoe and pants.

Poor fishers: No net or hardly one old net, no or usually old non-mechanized small boat; no arable land except homesteads or even no homestead land; very poor housing with polythene/ thatch/ bamboo; engaged as laborer in other’s boat; no regular source of income; annual familial income less than Taka 25,000 (US\$ 385 or less); presence of sick/handicapped/traumatized member; one or more 18+ girls waiting for social marriage, fail to repair houses as needed. Born, live and die in debt cycle; poor family literacy; thin; work as laborer (‘*Kamla*’) for the rich; often remain hungry; body does not shine and look older compared to age; do not have separate kitchen and necessary cooking stuff; fall sick frequently; use mango leaves or ‘neem’ wood for brushing teeth; wear torn or faded clothes; have deformed houses with leaky roof; not valued socially; do not have to use ‘toilet’ regularly as their stomachs remain empty; keep walking as they can’t afford to ride on rickshaw.

In the fishing villages, poverty has cross-scale variation ranging from the individual to the community level. At the individual level- the impoverished are those who are victims of accidents, old, physically or mentally handicapped, and attacked by diseases. At the household level- poor families are usually characterized by old persons, sick family members, deceased income earner, widow as family head, too many children (3–7), too many girls (2–4) ready for social marriage, few or no male members and less skilled/educated (high school above) members. At the community level- impoverished communities are characterized by low socio-economic profile, caste identity, religious minority status, geographical isolation, impoverished infrastructure, and poor political power. There is also a well-built temporal dimension of poverty: some are born into a vicious cycle of ‘old poverty’, while some are ‘tomorrow’s poor’, whose status might change depending on the dynamics of different stressors.

4.2. Seasonality of Income and Associated Food Security

‘I can somehow eat two meals during dry period (sudin) for five months; after that I have to forget what a square meal is. I can do nothing during monsoon months.’ Sadhu Jaladas, 56, Thakurtala village [26].

‘If I fail to give my crying son some rice, what sort of father am I? I am devalued and worthless to my children, wife and relatives. What can I do? It is about availability of jobs... There is no money without jobs and no food without money.’ Anil Jaladas, 50, Thakurtala village [27].

‘Our (common use) perennial productive ‘jalmahals’ (waterbodies) are leased to powerful leaders; small ‘jalmahals’ are shrinking due to siltation from upland areas; no fishing in dry months....our fishing territory is getting squeezed day by day.’ Kala Miah, 45, Volarkandi fishing village [28].

Fishing is broadly a seasonal occupation. This seasonality, together with the amount of catches and access rights, provides an appropriate perspective of the temporary nature of earnings from fishing. Seasonality of the fishing profession is an important determinant of livelihood functions for many fishing families. We observed that food-shock has become an almost inevitable characteristic of the majority of fishing households, imposing strong physical and psychological bearings. A household’s

food security is closely connected to livelihood security; when a family's livelihood is secure, it tends to be food secure as well. Monsoons generally limit the flow of the rural economy and access to informal jobs due to water logging, inaccessibility, and other adversities. Female-headed households become worse hit compared to male-headed households as torrential rains particularly hinder the mobility of women to on-and-off farm workplaces. Their limited mobility is linked to physical weakness, oddness with poor clothing coupled with difficulty in handling the 11–12 yards long 'Saree' that becomes heavier when soaked in rain shower, social barriers on 'walking alone', and time needed for taking care of family members.

Data contained in Table 1 reveals that for >45% and 60% families of Volarkandi and Thakurtala villages respectively, income/day/family goes down to as low as US\$ 0.7–0.9 and 0.4–0.6 during the lean period (meaning an allocation of about 10 cents per person per day). Given the fact that almost everything has to be purchased for meals with this amount of money, families face dire scarcity of food on a daily basis. Good seasons for fishing vary with different ecosystems, gear used, and groups of fishers. Monsoon is usually considered a good season for inland fishers, while dry seasons are considered good for coastal fishers. Most of the coastal fishers cannot continue fishing during monsoon due to adverse weather condition. Winter (post-monsoon months) is generally good for all categories of fishers in terms of fish availability, stable income and risks associated with fishing.

Table 1. Seasonality of income for different groups of fishers (1US\$=Taka 65 in 2006).

Major gears	Coastal area				Floodplain area				
	ESBN	MSBN	Gill net	Hook & longline	Gill net	Lift net	Traps	Push net	Cast net
Good seasons (US\$/day)	3–8	4–40	5–50	3–30	2–5	1.5–5	2–5	0.5–2	1–2.5
Bad seasons (US\$/day)	1–2.5	2–5	2–9	1.5–8	0.7–1.2	0.7–1.3	1–1.5	0.3–0.5	0.4–0.7

Source: Compiled from case studies and validated through Focus Group Discussions [29]. (ESBN- Estuarine set bag net, MSBN- Marine set bag net).

Field research revealed that income per fishing boat is higher in the coastal ecosystem compared to the floodplain ones; however income per coastal fisher drops sharply when the total profit is distributed among 10–20 crew members of the same boat. At the individual level, income is higher for the floodplain fishers as the earnings per fishing boat are distributed usually to two crew members. Especially in the lean season, everybody becomes desperate to catch fish irrespective of size and conservation values. To address their immediate livelihood needs, fishers hardly want to compromise their undersized fish for future use.

Survey results under this research depict that the incidence of zero food stock is higher in the coastal village (47%) compared to the floodplain village (29%), which is a clear manifestation of a higher level of poverty and lower level of income diversity in coastal regions. Most of the fishers in both the villages take meals with cheaper pulses and vegetables during the crisis period, and only a small section (coastal 13%, floodplain 23%) of the households has the ability to eat meat. Floodplain households benefit from their access to terrestrial agriculture and arable land during dry months. In the coastal village, conditions of food scarcity are aggravated when most of the fishers fail to set their nets

in the sea because of life-threatening bad weather. There is limited scope for alternative jobs in the island regions. Data contained in Table 2 reveals the economic situation of fishers in different months of the year. It is apparent that the monsoon is a bad period for coastal groups, while it fetches higher productivity and earnings for floodplain fishers.

Table 2. Economic situation of fishers in different seasons. (No. of respondents: $N = 30$ for coastal village, 'C' and $N = 22$ for floodplain village, 'F').

Months → Economic condition*	Percentage (%) of households											
	Baishak- Jaistha		Ashar- Shraban		Bhadra- Ashin		Kartik- Agrahayan		Poush- Magh (Winter)		Falgun- Chaitra	
	(Summer)		(Monsoon)		(Autumn)		(Dry)				(Spring)	
	Mid-April– Mid-June		Mid-June– Mid-August		Mid-August– Mid-October		Mid-October– Mid-December		Mid-December– Mid-February		Mid-February– Mid-April	
	C	F	C	F	C	F	C	F	C	F	C	F
Surplus	13	14	10	23	13	18	13	18	17	18	13	18
Equal	23	27	13	36	30	36	23	41	30	32	23	27
Scarcity	64	59	77	41	57	45	64	41	53	50	64	55

Source: Compiled from Field Survey [30]. *Surplus: Some amount is left after modest livelihood; Equal: Hand to mouth; Scarcity: More expenses than income, lending is obvious.

It is crucial for the fishers to get through the 'monga' or pseudo-famine. 'Monga' is a socio-politically sensitive and much talked-about annual event; usually it corresponds with dry pre-harvest (paddy) Bengali months *Ashin* and *Kartik* (mid-September to mid-November) when on-farm job opportunities in the rural areas dry up. Some of the victims, as part of their coping strategies, take on circular migration to urban areas for earning during this crisis period. The absolute landless and functionally landless poor people (having <50 decimal of arable land) fail to secure food because of a lack of a regular flow of money from gainful employment and a lack of macro-institutional support services. Data contained in Table 3 provides an account of meal statistics for the fishers. It was beyond the scope of this study to assess the nutritional adequacy and caloric value of the meals. Given the manual nature of jobs, fishers consider three 'belly full' meals/day as adequate for them during good seasons and two meals/day for the lean seasons; any amount or frequency less than this locally-set benchmark is indicative of food insecure condition. A basic calculation was provided by an experienced coastal fisher:

"Look, I have a simple calculation for you; every third person that you meet in the village remains hungry almost throughout the year and every second person remain hungry during the 'lean fishing periods'. It might be worse in some years when there are other troubles like cyclone." Sudharam Jaladas, 55, Thakurtala fishing village [31].

This *emic* view is informative regarding food insecurity. Using one meal/day as an indicator, we see that around 27% coastal fishers and 19% floodplain fishers suffer from chronic hunger during normal seasons. Additionally, 44% of coastal fishers and 32% floodplain fishers are forced into a state of seasonal hunger during the crises seasons. Around one-fifth of the coastal population is forced to have irregular meals or to suffer prolonged starvation. If the adequacy of meals for nutritional security and physical strength is considered (3 meals a day), then around 80% of the fishers are victims of food

insecurity irrespective of seasons. Fishers' food insecurity is strongly prevalent for around 4–5 months when demand for wage labor decreases (usually mid-April to mid-September in coastal areas and mid-September to mid-November in floodplain areas respectively).

Table 3. Meal statistics (N=30 and 22 for coastal and floodplain fishers respectively).

Food availability		O-half meal/day	1–1.5 meal/day	2 meals/day	3 meals/day	Rice consumed, gm/adult major meal	Foods/curry preference with rice (multiple choices)				
							Pulse	Vegetables	Fish, wet/dry	Meat	Others
Normal period	C	10%	17%	50%	23%	200–250	57%	63%	73%	30%	17%
	F	5%	14%	64%	18%	250–300	45%	41%	59%	27%	9%
Crisis period	C	17%	27%	36%	20%	150–200	43%	57%	33%	13%	23%
	F	9%	23%	50%	18%	100–150	45%	55%	32%	23%	14%

Source: Field survey [32], Legend: C= Coastal village, F= Floodplain village.

There has been a proposition that 200 days/year should be considered as a minimum 'employment period' for rural livelihood [33]. However, fishers consider that a working period of 275–300 days/year would suffice for fulfilling their basic necessities. Poor fishers spend 55–83% of their income for the purchase of rice, let alone the provision of other fundamental expenses. During low income periods, the percentage of income spent on purchase of rice rises to roughly 70–83% of their total income. The wide prevalence of hunger and malnutrition has a bearing on physical well-being, attendance and performance at school, reproductive health (especially of women), costs associated with health care, and ultimately the asset status of families. All these crises have long-term impacts that often carry over to successive generations. Fishers opine that cyclical and acute food shortages along with extremely poor sanitation and living conditions keep the children vulnerable to numerous waterborne and malnutrition-related diseases and physical deformities which are often hard to recover from.

Fishers become desperate as the prices of essential commodities rise. One fisherman added: 'ultimately, who wants to see his children starving? What one has got to do when family members starve frequently? What is the guarantee that I will get higher catch in the future? Today is more important than tomorrow' (Jamini Jaladas, 68, Thakurtala) [34]. In most cases, the harshness in managing day-to-day meals forces fishers to undertake unsustainable fishing practices. This study revealed that there is a linear relationship between the poverty level and mesh size of fishing gear. Poor fishers tend to use low-cost fine-meshed gear (In the *haor*, there is an exception: wealthy and powerful fishers also use large destructive '*Kapri*' net). Larger meshed nets were used even several years ago to catch larger fish as no one wanted to eat small fish. With the decline in economic status, mesh size also declines. The advantage of small meshed gear is that such gear provides assurance of at least some fish, which are crucially needed for ensuring income for day-to-day sustenance.

Food shortages seriously affect fishers' physical condition and working ability as they depend on professions requiring ample physical energy. Inadequate food affects household members differently. It is usually the size and number of non-staple food items (like fish, egg, meat) that reveal gender disparity, especially during the crisis period. Particularly the mother is forced to eat less when there is a food crisis. Also, there is evidence of depriving girls because of the prevailing perception that '*they will leave to in-law's house and sons will take care of parents as permanent residents of families*'. Women play significant roles during a food deficit period. The female economy is based on rigorous

savings through austerity and selling of products from home-based livestock, poultry, dry fish, smoked shrimps and vegetable products, which contribute 23–67% to the household income depending on the intensity of labor, availability of work and number of working women in the family (source: FGDs and participant observations with women in the study villages, December 2005, January 2010) [35].

It is often the women who plan and manage meals with whatever amount of food they have, and thus help with the survival of family members. During food deficit periods, women-led households shift their dependence to wild and backyard-grown plants. Around 59% of the female-headed households and the destitute depend on gathering ‘famine or pseudo-famine foods’, harvested from the nearby natural food systems like small wetlands or hills. They boil stems of wild plants like arum (*kachu*), ‘*maitta alu*’ (wild yam), green banana, and vegetables like gourd, radish (‘*mula*’), cauliflower and cabbage as a replacement for rice. A small amount of boiled banana twigs and green banana paste is very useful in filling up and tightening the stomach to give the feeling of ‘being content’. Rice allocation during food crises period drops to 30–70 gm/meal/person which is around one-fourth of their need (pers. comm. with Nirala Jaladas, 40, Thakurtala, Jan. 2010) [36].

4.3. Vulnerabilities Faced by Fishers: So Many Fronts to Combat

‘The limitation of other animals is that they cannot change their positions. A dog is a dog for ever... human beings can do that and take up the positions of evil animals; a man can be poisonous like snakes; a man can be a blood sucker like ‘leech’; a man can be cunning like a fox; a man can be like a man-eater tiger. You see all these animals around fishing villages.’ Kamini Jaladas, 50, Thakurtala [37].

Fishers are continually exposed to pressures or vulnerabilities which are multi-faceted with differential and chain impacts on individual’s well-being and poverty level. Each crisis is multi-dimensional in cause and effect, and many of the stressors originate outside the boundary of the villages; most of the stressors are beyond the control of the fishers. Vulnerability is intricately related to one’s socio-economic condition; the poorer the fishers, the more likely they will be exposed to multiple sets of vulnerabilities.

Focus group discussions with key informants during 2006 and 2010 revealed that fishers struggle with a host of problems that are persistent and multi-dimensional in nature. This analysis concentrates on the vulnerabilities of the poor who comprise the majority of the population within the fishing villages. However, these sets of major stresses can be grouped under four exclusive categories:

- *Nature induced stresses*: The first type of vulnerabilities originates from the very ecotype where the fishers work, *i.e.*, the natural and biological attributes like flood, cyclone, storm, water quality, fish disease/kill, reproductive failure, spatial and temporal variation of resources. For example, coastal fishing families are more prone to death during cyclone compared to upland/urban dwellers. A heavy rain in the salt-production area (causing wash out of the crop), or a disease out-break in the coastal shrimp farms (causing massive mortality) reduces the potential of women-labor engagement during the most critical survival period of monsoons.
- *Malthusian overfishing related stresses*: The second type is generated by fishers themselves in different ecosystems and regions causing phenomenal consequences for all. To mention a few: ‘*Jatka*’ (immature *Hilsa* sps.) fishing in Chandpur, Barishal and Patuakhali district areas affects

the CPUE (catch per unit effort) of Cox'sbazar-based fishermen; shrimp fry gathering from the wild along the coastal belt for shrimp monoculture affects the catch and value of marine set bag nets (MSBN); catching of Indian carp brooders in one wetland will affect availability of fingerlings in other nearby wetlands, and many other cases like these.

- *Socially embedded stresses*: The third type is socio-culturally embedded and sustained. To mention a few: fishers have to exhaust their earnings to pay a dowry; they have to pay high interest rates (100–240% per year) for loans from moneylenders; they lack the ability to compete in the fish markets which are controlled by socio-politically powerful wholesalers; they have a low social status and are subject to frequent humiliations by higher castes and social groups.
- *Institution induced stresses*: The fourth type originates from cross-scale institutional failures and policy related decisions. Some of these are: price hike, trickle-down effects of economic recessions, lack of basic amenities, lack of alternative employment, and social exclusion. Leasing rights sanctioned in favor of powerful elites adversely affect the access rights of thousands of fishers, and eventually affect the resource base of the waterbody.

4.3.1. Nature Induced Stresses

'Why should I go for erecting a new house knowing that there is a cyclone moving on my head; don't remind me of the impacts of the cyclones, it robbed everything from my family.' Vojon Jaladas, 65, Thakurtala fishing village, Moheskhali coast [38].

'If you don't directly face the doom (cyclone), you can't imagine about our sufferings.' Binod Bala, 50, Thakurtala [39].

'It is (flood) from Allah; HE decides everything; we suffer because of our sin.' Saleha Begum, 46, Volarkandi fishing village, Hakaluki haor [40].

The discussion is confined to cyclone and flood. Bangladesh (along with China, India and Indonesia) is tagged in the "extreme" category in terms of the average number of citizens at risk from tropical cyclones, earthquakes, floods and landslides, according to a new 'Mortality Risk Index' put forward by the UN International Strategy for Disaster Reduction [41]. Cyclones are the most destructive natural calamities in recent decades that caused massive fatalities and economic loss. Between 1891–2010, 180 cyclones with different magnitudes hit the coastal areas of Bangladesh. The cyclones of 1970 and 1991 alone caused approximately 500,000 and 140,000 human casualties respectively. Around 900,000 coastal people died in the last 35 years; the southeastern coast received around one-third of the total cyclones in the country. Unfortunately, sea-fishing is a risky profession and the number of early widows is higher in the coastal fishing villages compared to other nearby rural villages. Recently, Cyclone 'Sidr' (15 November 2007) and 'Aila' (25 May 2009) struck the coastal region, causing the death of around 3500 and 150 people respectively. The relatively less casualties in the latter cases are indicative of better cyclone preparedness at cross-scale levels and the resilience of the common people. The coastal study village 'Thakurtala' was not impacted in the last two disastrous cyclones.

While natural calamities apparently demonstrate an even-out effect on all, fishers with minimal assets suffer the most. Though their material loss is low compared to the rich, they often fail to regain

their possessions. The bundles of capitals of poor households are usually disrupted or lost, while the rich may even gain from the distress sales of assets by the local poor. Coastal fishers, mostly dwelling along the fragile coastline, are usually the first and worst-hit in the event of cyclones. Many families fail to recover fully from the shock for a couple of decades. In the coastal fishing villages, a moderate-to-strong cyclone means the loss of houses, loss or damage of productive assets (fishing gear/boats), as well as loss of economic safety nets (livestock, poultry, trees) and human lives. Again, they also have the stress of erecting their houses and attempting to return to normality. Here is a case:

'My husband did not want to leave homesteads in order to save cows and domestic properties; he was confident that he wouldn't die; local thugs snatched all my money and gold ornaments on my way to the cyclone shelter in the midst of darkness. When I returned the following day with my son and daughter, I found nothing was left on the homestead. My husband's dead body was found two kilometers away. ...one shock of wave turned my life to hell.' says an early widow Bidhurani Jaladas, 35, Thakurtala [42].

Throughout the coast, there are thousands of such victims for whom the memory of the cyclone on April 29, 1991 is still a nightmare. A rapid appraisal of the impact of the April 1991 cyclone with the Thakurtala villagers (conducted May 02, 2006) revealed that almost all the houses were washed away and around 90% of the fishers lost 50–80% of their domestic properties. *'I leave my homestead prior to cyclone; I become an environmental refugee in my own village as nothing is left behind for me for survival after cyclone. Fire leaves at least some charcoals, cyclone washes out cleanly'*- adds Vojon Jaladas, 65, Thakurtala, Moheskhali [43]. There is only one cyclone shelter (capacity- maximum 250 persons) in the vicinity of Thakurtala village for around 3000 people of the surrounding four villages. Reportedly, the higher-caste people of surrounding villages occupy the cyclone shelter, leaving little or no room for the low-caste fishers. The tidal upsurge in the monsoon, especially during the peak new moon and full moon phases, poses a big threat to the Thakurtala villagers; around 50% of the houses are submerged fortnightly. Because of a regular intrusion of saline water, it is hard for the women to grow vegetables in their homestead gardens. There is a saying in the village: *'the salt assaults us ('lobon panir jala') every fortnight during the monsoon'*.

In case of *haor* dwellers, fluvial floods are like curses to property and livelihoods. There is a miserable coincidence in between the harvesting period and flash floods. An added level of misery arises when food scarcity in the pre-harvest seasons is prolonged (*Monga* or *Aakal*) and the physiological reserve of the poor people becomes severely depleted. People adapt surprisingly well to such water levels although the routine activities revolving around meals, sleeping and bathing change radically. In most cases, the number of meals comes down to only one a day with semi-liquid paste (*'khichuri'*, made of rice and lentils). Sufferings augment and persist in situations when there is no place to cook (as the houses are damaged or submerged under water) or no foodstuff to cook; when pets and livestock do not have food for a prolonged period; when drinking water becomes scarce; when there is no room to sleep for weeks; when waterborne diseases spread, and civic order declines. Here is a case:

"If your son dies in 'cold attack' (pneumonia); if you are forced to cook, eat, sleep and discharge (urine and stool) on the open roof of your broken house for weeks; if you are to collect drinking water from 5 miles far every day; if you have no money to buy rice; if you

see poisonous snakes around.... then you would really know what a flood means in the life of 'haor dwellers.' Minara Khatun, 40, Volarkandi Fishing village, Hakaluki haor [44].

Natural calamities exert differential impacts on the villagers; the suffering of the elderly, children and pregnant women under any disaster situation is always worse. Case studies from the fishing villages allude to the uncomfortable fact that natural calamities impact the women more heavily in terms of mortality, susceptibility to numerous accidents and sufferings- a predicament of gender inequalities of various kinds and magnitude. It is also true that they are more sacrificing and emotional than men in holding their children and valuables at times of cyclones and floods. Women, especially pregnant and lactating mothers and adolescent girls, face special challenges due to the absence of sanitation facilities and critical health care needs during floods and cyclones. Life-saving tools (like life jacket, buoys) are not affordable to most of the fishers, and hence rarely used in the villages.

The recurring natural calamities cause serious diseases and health problems in the fishing villages, which have negative effects on family well-being (Figure 1). Fever, worm infection, dysentery, injuries and skin diseases become quite prevalent following each natural calamity. Fishers become victims of diseases and injuries while fishing in the sea; as they become injured or feeble, they are not recruited anymore by the boat owners. The resultant loss in earning capacity compels fishers to suffer more from persistent hunger. Also, the expenditure on treatment takes a heavy toll on the slender financial capacity, and such adverse situations are often tackled by cutting down on consumption of food [45]. The medical facilities around the fishing villages are extremely limited. Unfortunately, in each case of accident and fatal disease, the livelihood well-being of the affected families sharply deteriorates due to a reduction in the work force, poor sets of assets and entitlements.

To deal with recurrent calamities with insufficient capital endowments, fishers have developed a coping psychology and personal sets of strategies. Common people consider natural disasters as an 'Act of the Almighty'; such a fatalistic aptitude is apparently useful in healing their psychological shocks. Following each major calamity, village leaders organize collective actions (involving at least one youth per household) with the following priorities: collection and burial of dead bodies, treatment for the wounded, arranging 'quick food' (usually a semi-liquid paste '*khichuri*' made of rice, potatoes and lentils), repairing tube wells and latrines, erecting damaged houses and clearing fallen trees. Following each major calamity, household members refresh their experiential learnings and develop their own plan for coping actions.

4.3.2. Malthusian Overfishing Related Stresses

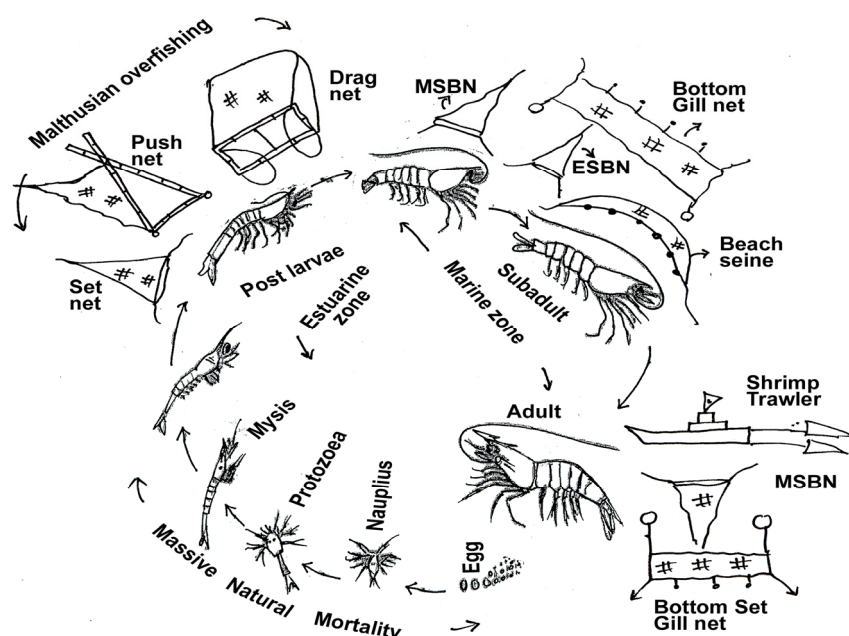
'Let me tell you my 'mathematics'. I started going to sea along with my grandfather when I was 12. Fifty years ago, my grandfather used to count Hilsa fish in 'Kowns'; 20 years ago in my father's time, I saw him counting Hilsa in 'Pons'. Those days have gone by. Now we count Hilsa in 'Halis' or one by one. See how wide the differences in just fifty years! The change in the style of 'calculation' points to the corresponding change in the financial positions of the fishers- from affluence to paucity.' (Numeric: 1 Kown = 16 Pon = 1280 pieces, 1 Pon = 80 pieces, 1 Hali = 4 pieces) Jamini Jaladas, 68, Thakurtala [46].

The discussion is focused on two important fisheries: shrimp and *Hilsa*. The coast and the sea, once perceived by fishers as a potent symbol of natural limitlessness has been transformed into overharvested

‘desert area’ in the last few decades. A similar situation prevails in the case of floodplain capture fisheries. There is a ‘chorus of concern’ throughout the world on the decline of fisheries resources, and the situation is already aggravated in the cases of coastal fisheries in Asia [47–49]. Enormous dependence of poor fishers on the resource base has caused both overfishing and perpetual poverty. The absolute loss of biological yield is alarming worldwide, but the loss of the economic benefits is certainly higher [48]. For the fishers, the issue of ecosystem health and the availability of fisheries resources is not merely a concern of biodiversity, but rather more importantly an issue of livelihood security. The relationship is straightforward from fishers’ perspectives. Loss of harvestable fish means poor income from fishing, eventually leading to desperate fishing and prolonged fishing time.

Through a series of focus group discussions with the E/MSBN (Estuarine/Marine Set Bag Net) and gill net fishers of Cox’sbazar district, it was revealed that reckless shrimp fry collection from the coast, intrusion of the trawlers, ‘Jatka’ (*Hilsa* juvenile) fishing in the coastal and riverine areas, pollution, clear-cutting of mangroves for shrimp culture, and massive pollution from industrial, municipal, agricultural, shrimp hatchery and ship dismantling yards are some of the serious causative factors ruining the catch level and income of subsistence fishers. The reduction in fish supply coupled with the increase in population and poor peoples’ capacity to purchase hold that the average fish consumption in the country has declined by 12% since 1995, and fish consumption by the poorest section of the population declined by 38% [50].

Figure 2. Exploitation of shrimp at various life stages (based on synergy of scientific knowledge and fisher’s indigenous knowledge derived through FGDs with key informants, Moheskhali, 2006, 2010). Legend: ESNB- estuarine set beg net, MSBN- Marine set bag net.



Fishing for immature fish and shell-fish is rampant in the coastal areas of Bangladesh. The ratio of the undersized fish to the total catch is usually very high in the sub-tropical multi-species multi-gear artisanal fishery. This type of catch causes large-scale mortality of larvae and juveniles of fish and shell-fish which is detrimental to the fishery in the long term. Figure 2 depicts the fishing pressures on shrimp at different stages of their life cycle, revealing a process of Malthusian overfishing. For shrimp culture in the coastal ‘gher’ (pond), thousands of poor fry catchers are engaged in fry fishing, and in

doing that, they destroy millions of other commercially important fish larvae (ichthyoplankton) and zooplankton using dense mosquito nets (mesh 1.05 mm). In catching a tiger shrimp fry (*Penaeus monodon*), larvae of 26 other types of shrimp, 29 fin-fish and 70 other zooplankton are simultaneously destroyed [51]. The Malthusian fishing trend is evident from the fact that the number of fry catchers increased from 65,000 [51] to around 1,30,000 in 2009 along the south-east coastal belt (source: Cluster survey result of local NGO-‘Green Cox’sbazar’, referred by the Daily Jai Jai Din, dated 4 Sept. 2009, [52]).

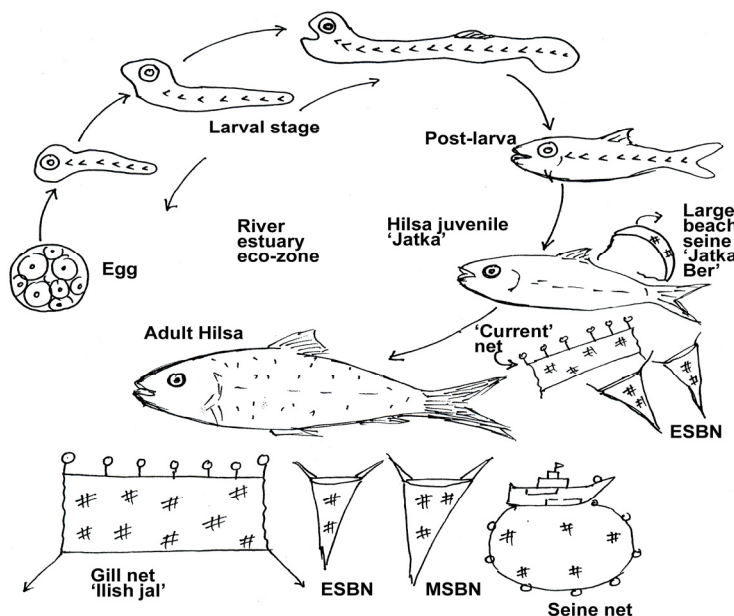
It is estimated that there are 518,130 fry catchers along the coastal belt of Bangladesh (source: Fisheries Sector Review and Future Development Theme Study: Economic Performance, June 2003, [53]), catching annually around 3000 million shrimp fry. Using the proportion of targeted shrimp larvae versus other zooplankton [51], it is estimated that 297 billion other commercially important shrimp and fin-fish fry and zooplankton are simultaneously destroyed in the coastal areas of Bangladesh. What is worse in the situation in Bangladesh is that, fry fishing has recently become a geo-political problem between Bangladesh and Myanmar. Refugees from Myanmar are heavily involved in fry fishing in Bangladesh coastal territory. On the other hand, brooder shrimps are massively harvested by industrial shrimp trawlers for operation of commercial shrimp hatcheries. There is a dilemma here. Fry catchers argue: *‘the rich trawler and hatchery owners should stop catching brooder shrimps first; one mother shrimp produces millions of fry in the wild; fry catchers catch wild shrimp fry for the sake of livelihoods; the trawler owners are not in livelihood desperation, hence they should compromise’* (source: FGD with fry fishers, Charpara slum, Cox’sbazar sea beach, February 2006, follow-up visit in January 2010) [54].

Fishing *Hilsa* juveniles (*‘Jatka’*) has been an acute problem in the *Hilsa* fishery that comprises around 25–30% of all marine catches. Because of this desperate fishing of immature *Hilsa* (Figure 3) together with some changes in the morphology and hydrology of the major rivers, the catch has tended to decline. Total landing of *Hilsa* declined by 56% compared to the catch 10 years ago [55]. It is known that around 19,258 MT of immature *Hilsa* are harvested by fishers annually [56]. Assuming a further natural mortality of 60% and an average weight of *Hilsa* juvenile of 30gm (at 70–120 mm length cohort) and an adult of 700 gm, it is estimated that Bangladesh is annually deprived of around 1,77,000 MT of mature *Hilsa* worth US\$ 2,724 million. However, some measures like banning of *Jatka* fishing and closure of selected spawning areas have shown some positive results on the catch in the past 5 years. During a discussion held in January 2010, coastal fishers asserted that, if immature *Hilsa* had not been recklessly harvested in course of backward migration from riverine zones, the CPUE and fishers’ income would have been presumably higher.

A grim situation is also noticed among the floodplain fishers relating to the health of the aquatic resources in the Hakaluki *haor*. Villagers are worried that the overall resource base, in particular the fishery and swamp forests, are eroding fast because of anthropogenic pressure and reckless use of destructive nets. The IUCN (International Union for the Conservation of Nature) ‘Red Book’ for Bangladesh suggests that almost 30% of all inland fish species (for which data is available) are vulnerable to extinction. In addition, 54 inland and estuarine fish species out of 266 present in Bangladesh are endangered [57]. Going beyond the findings of IUCN, the fishers of Volarkandi identified another 29 freshwater fish and categorized them as critically vulnerable. It is estimated that

50% or more of the perennial wetlands of Bangladesh have been drained, encroached upon, filled or otherwise lost in the past 30–40 years, negatively impacting the poor, environmental services and biodiversity [58].

Figure 3. Exploitation of *Hilsa* sps. at different stages of life cycle (based on a combination of scientific knowledge and fishers' indigenous knowledge derived through FGD with key informants, 2006, 2010). Legend: ESBN- Estuarine Set Bag Net, MSBN- Marine Set Bag Net.



The causative factors, as perceived by fishers, of the decline in fisheries are: increased sedimentation from the upstream area resulting in a short water retention period in the *haor* and less spawning success of some species; insecticide flow from the surrounding tea gardens; reckless use of some destructive gears (like 'kapri jal', 'ber jal'); drying of seasonal 'beels' (depressed water bodies) by leaseholders, thus killing all animals therein; and erection of dikes and other barriers on the spawning route of fish. They mention that their dependence shifted from 'earlier golden days of major carp fishery' to less valued small minor carps, 'beel' resident species, small predators, detritus feeders and small plankton feeders. Alarmingly, fishers reported the existence of highly predatory exotic fish like African catfish (*Clarias gariepinus*) and omnivorous South American Piranha in certain 'beels'. The impact of these predators and many other exotic species on the indigenous species deserves thorough investigation (source: excerpts from a series of Focus Group Discussions, May 2006, follow-up visit in 2010) [59].

4.3.3. Socially Embedded Stresses

'I can't run my family with the scanty income. A very hard choice for me--shall I save some money for my daughter's dowry or buy medicine for my sick husband? My daughter is growing up fast; the age after ten is 'dangerous'; so many 'evil eyes' around. A matter of 50,000–60,000 Taka (US\$ 700–900). Is there any way out for me?' Saleha Begum, 46, Volarkandi [60].

The discussions here will be confined to dowry and money lending only. It needs to be noted here that marriage is a form a social contract in the wider society of Bangladesh, and therefore requires a social endorsement from the relatives, kin, neighbors, and other villagers. All aspects of the marriage, including selection of life partner, ceremonial aspects of rituals/events, and dowry exchange are decided upon by parents/guardians. Usually, the girl has little or nothing to say about her future life partner. ‘Virginity in brides’ and ‘chastity in wives’ are considered fundamental in the socio-cultural constructions of the Bengal region. Social marriage and dowry systems are a deeply embedded socio-religious institution in typical Hindu and Muslim fishing villages. From what was once confined to the upper castes/classes in the south and other regions of India [61,62], the dowry system has gradually become a pan-Indian phenomenon pervading almost every section, class, caste, religion and, even the more egalitarian tribal communities, particularly during the past two decades [63]. The prevalence of a dowry through the transfer of endowments and entitlements to grooms is a social authentication of male supremacy, creating a sense of inequality and hierarchy from the very beginning of conjugal life. In the fishing villages, girls are usually viewed as ‘familial burden’, enemies of ‘rice pots’ and ‘family cash’, meaning they do not add to the family income but keep exhausting it.

Almost each household with a daughter faces a similar crisis. Fishing families with young girls are usually disposed to a *‘future dimension of poverty’*, as they will inevitably fall further below the present line of poverty in arranging social marriages and paying the dowry. The amount of a dowry is usually determined by: the economic endowments of the girl’s parents; family reputation and caste identity; ‘age, body shape, color and virginity of the girl’; basic education; and extra womanly qualifications like the ‘ability to cook, sew, and sing songs’. Voice, walking style, length of hair and many more traits also matter. A low level of dowry sometimes relegates a girl to getting married with someone of a lower rank (like someone already married or very old or physically handicapped). In the study villages, dowry (*‘Joutuk’*) is imposed by the groom’s family. Not only cash, the parents of the bride must also bear the huge expenses for lavish hospitality, clothes, furniture, ornaments and kitchen gadgets. Here is a comment:

‘The parents and close relatives of the male counterparts have to be satisfied about the quality of the goods...the value of dowry what my parents paid for me has gone up 12 times in my daughter’s case in around 20 years, though my daughter looks pretty than I was at her age...before the newly-wed couple enters home, the goods have to be in the groom’s house.’ Sidhu Bala Jaladas, 38, Thakurtala [64].

Dowry money is far from being ‘a rotating capital fund’ for the earning family as some imagine it to be [61]. Because of a marked gender hierarchy, transactions between the parents as past protectors and the in-laws as future providers have long survived as a bequest mode. As the historic demographic trend in the Indian subcontinent favored male dominance, the dowry system benefitted majority of the brides’ family of rural households. Theoretically, the dowry money is supposed to be invested for future security of the bridegroom, but in practice, this financial resource only created influx in bride’s parents’ financial account. Thus, families with more boys are financially benefitted. This creates a tendency among parents to have more sons than daughters, eventually leading to an increase in the size of the family. Dowry leads to the impoverishment of the girl’s parents, while not always ensuring the security for the girl in her in-laws house. Dowry has multi-faceted manifestations with negative

repercussions on perpetual indebtedness, asset base and landlessness, medical treatment, food security, education, and family harmony. The situation is so acute that many young girls and their parents dream of finding jobs as domestic servants (doing 15–18 hours of home-making activities per day, no holiday, monthly salary is around US\$7–10, foods and clothes included) in the houses of wealthy urban people with the intention of accumulating money for organizing a social marriage.

Depending on the wealth category of the fishers, it was calculated that the parents have to bear expenses of around 3–9 times their net annual income for dowry and other costs of social marriage. For the poor fishers, it is proportionately higher while the ratio is relatively less for the wealthy fishers. However, excluding other costs of marriage, the villagers reported that the total value of dowry (gold, gift, cash and consumer durables) varied from US\$ 155–770 (Taka 10,000–500,000) in Thakurtala and US\$ 230–17,000 (Taka 15,000–11,00,000) in Volarkandi based on the economic condition of the parents. In the latter case, higher dowry has been influenced by remittance money and a show off for higher social status. In this interpretation for the wealthy section of the community, a bride offered with ample cash, costly dresses and ornaments advertises to other women her socio-economic dignity. There are anti-dowry laws in the country, but social acceptance of such laws is limited.

Rural money lending system (*'dadon'*) and an associated coercive patron-client relationship is deeply rooted in coastal fishing villages. Non-government microcredit institutions (NGOs) usually do not consider fishers eligible for micro-credit loans as per need for fishing operations, because their profession is full of risk and uncertainty. In addition, they can hardly be reached by NGO personnel for loan recovery as they remain outside the village most of the time. Fishers have no access to government commercial banks as they fail to satisfy the requirements for a mortgage and an extra 'speed money' (bribe) required for a loan. The moneylenders, despite their exploitative roles, operate within the vacuum of socio-cultural, economic and political spaces. *'They (moneylenders) exploited my grandfather, my father and now me; they will do so for my son and grandson; they are like leeches that always look for blood'*- adds Sudhangshu Jaladas, 65, Thakurtala [65]. Twelve categories of money lending systems with a wide variety of conditions and interest rates were identified from the fishing villages. The amount of loans varied from a few hundred to several thousand Taka; interest rates varied from 100–240% per year (compared to 15% in the commercial banks). Poor families exhaust themselves in paying interest. In return, they get social security from the money lenders. Hindu fishers usually receive *'dadon'* from the same-caste moneylenders if the amount is small, but the Hindu boat owners (who are again money lenders within their community) consider it safe to receive loans from the Muslim wholesalers, whom they consider as 'powerful thugs', with a view to protect fishing assets and to get 'social security' in the event of sectarian violence.

4.3.4. Institution Induced Stresses

The existence and proper functioning of appropriate institutions is critical to the process of fisheries management and the livelihoods of fishers and many other stakeholders. Higher level institutions can have both negative impacts (through centralization of decision-making, shifts in systems of knowledge, colonization, nationalization of resources, increased participation in markets, *etc.*) and positive impacts (through state legitimization of local institutions, enabling legislation, decolonization and revitalization, capacity-building and institution-building) on the local and community-level institutions [66]. One of the unfortunate outcomes of the macro-institutional pressures is that the

time-honored values and local level institutional checks and balances in the artisanal fishing systems erode. There is no denial of the fact that there is a connection between the fishing rights and the functioning of the informal institutions of the genuine fishers; with the process of disconnection from the ecosystem, the sustainability of the local informal institutions is threatened. In Bangladesh, the Department of Fisheries (DoF) is primarily responsible for the management and conservation of fisheries resources. Fisheries development policies are characterized by predominantly top-down, expansionist, productionist and technology-led approaches; the contents of the policy tend to favor the interests of powerful elite groups at the expense of the rural poor [67]. Favored by the loopholes of the fisheries policies, the regulatory authority makes unilateral decisions that exert differential impacts on the fishers. Two pertinent issues are considered here for coastal fishery and floodplain fishery.

In the coastal fishery, the government encouraged massive mechanization as per ‘development prescription’ from donors and international agencies. The primitive non-mechanized mode of coastal fishing has been gradually transformed into a mechanized fishing sector. An analysis of the trend in mechanization shows that the number of mechanized fishing boats increased by >100% between the 1980s and 1990s, and the industrial trawler increased by >1000% in the last two decades [51] through support from different international agencies. Although both the mechanized and non-mechanized modes of production coexist, the mechanized sector keeps growing at the expense of the non-mechanized traditional sector. There is evidence from developing countries that unplanned and unregulated mechanization in the artisanal fishery negatively impacts the traditional fishermen’s opportunities for improving livelihoods, and that technological polarization would further aggravate social inequalities and environmental degradation [68,69]. Poor fishers, using non-mechanized boats, voiced that both mechanized boats and industrial trawlers frequently compete with them illegally in the shallow zone for harvesting the same resources. Stakeholders’ opinion survey carried out in June 2006 revealed that most of the traditional fishers are vehemently against the present trend of mechanization, whereas the powerful section of society, politicians and government staff showed positive interest for mechanization in the fishery. This issue suggests a ‘power divide’ between the competing groups. The government must not issue new license to politicians and businessmen for operation of commercial trawlers without further assessment of fisheries’ standing stock and optimum sustainable yield in its marine territory.

In the floodplain fishery, the waterbodies (*‘Jalmohal’*) were managed by *‘Zaminders’* (landlords) in the colonial and pre-independence period. With the enactment of ‘The East Bengal State Acquisition and Tenancy Act (EBSTA)’ in 1950, the *‘Zamindari’* system was abolished and the Ministry of Land of the state replaced the role of *‘Zaminders’* for management. Now, common-property waterbodies are leased out for 1–3 years in an auction system to powerful non-fishers, who happen to be the highest bidders, and are generally successful in keeping the poor fishers under their control. In the process of leasing and sub-leasing, several layers of intermediaries are created, and the actual fishers are subject to ‘rack renting’ (a form of economic subjugation), in which they are unlikely to eke out a decent living from fishing alone. With minor exceptions, most of the productive waterbodies are being managed by powerful non-fisher leaseholders. The corollary is that genuine fishers’ access to waterbodies, their income, and primary livelihoods are at the mercy of the leaseholders. Also, at the end of leasing period, the leaseholders dry out the waterbodies for total fishing, and such illegal

practices have serious negative repercussions on the ecosystems and the resource base. Ultimately, it is the fishers who pay in the long term.

Some geo-political and transboundary issues also affect the income and livelihoods of fishers. To mention a few: a dyke in the *Farakka* region of India affects the *Hilsa* population of the Padma River; desperate fishing using monofilament ‘current nets’ in the Myanmar territory affects the same stock in the Cox’sbazar/Teknaf region of Bangladesh; the reckless dismantling of the abandoned ships of the western world in the south-east coastal region of Chittagong coast affects the water quality and fish abundance in the region; the clear-cutting of mangroves for shrimp culture in the coastal region impacts the catch level of the small-scale fishers; the liberation war of 1971 forced many Hindu fishers to migrate to India leaving all properties; and so on (source: excerpts from the discussions with key respondents, September 2006, January 2010) [70].

5. Conclusions

This article examined the livelihood struggles and multiple vulnerabilities of coastal and floodplain fishers of Bangladesh. The research revealed that poverty is not only a product or manifestation of material deprivation, but is intimately linked to cross-scale factors. Unfortunately, because of the geographic location and the nature of the profession, fishers are one of the most vulnerable groups to numerous stressors. Calamities emanating from the coupled social-ecological systems and institutional arenas put forth synergistic impacts that eventually push them into a vicious cycle of pauperization.

As a result, acute food deficits and a kind of hidden hunger or pseudo-famine is persistent for a majority of people in the fishing villages. Based on Oshaug’s classification of food security, it can be concluded that compared to the floodplain study village, majority of the fishers of coastal Thakurtala village are fragile households, and there are limited numbers of enduring and resilient households [71]. Poor people face a series of stresses that make them descend into poverty (‘drivers of descent’) and they have very limited options to move up out of poverty (‘drivers of ascent’) [72]. This means that graduation from poverty requires not only sufficient income to move to a better economic status, but also the means to defend against negative forces of downward mobility [73]. It is evident that Thakurtala, being a land-scarce village, is extremely limited in its ability to draw additional income from agricultural activities except for scanty household level gardening. They are mostly dependent on the harvests from coastal areas, and the dwindling catches followed by the seasonality of fishing chain them to the ‘livelihood war’.

A households’ ability to ensure livelihood security over time is an outcome of a complex nexus of factors, such as: composition of the family, sex ratio and number of earners/dependents, endowment sets, socio-political linkages, biophysical settings, macro-level economic processes and political forces [74]. When the assets of a livelihood system are depleted and institutions are unable to adapt to change, available livelihood strategies become ‘brittle’,—resulting in reduced resilience and an increased level of vulnerability to numerous disturbances [75]. There is no denial of the fact that human well-being and the livelihood system, particularly of the poor, depend on the sustained provision of environmental goods and services. Hence, attempts to maintain ecological resilience comprising ecological integrity and biological diversity is fundamental for the well-being of the fishers [75]. Cross-scale institutions are not in favor of fishers, and there is the strong likelihood that the disparities within the fisheries sector will continue to increase unless serious attention and political commitment

are geared towards the poor fishers. In the case of Hindu fishing village, the trend of exploitation is exacerbated by the fact there has been a transformation in the ethnic composition and power structure in the artisanal fisheries sector that often tends to keep the caste-based fishers powerless, helpless and docile in a hostile rural socio-political environment.

The small-scale fishery and fishers are a major concern worldwide [76–81] from the perspective of threatened biodiversity, livelihoods and food security of the dependent population, social justice, sustainability, poverty, and resource governance. In the context of decline in fisheries resources and recent trends in climatic and human-induced stresses, it may be said that the situation of poverty in the artisanal fishing villages might be aggravated if appropriate types of resource governance are not adopted. For the livelihood well-being of marginalized fishers, the government and development agencies need to consider steps like the declaration of fishing territory absolutely for marginal fishers, adaptive management for conservation of fisheries resources, providing education and skill training for professional diversity, undertaking socio-economic empowerment programs for institutional reform, providing interest-free loan from government banks, allotment of fallow land, and construction of cyclone shelters.

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Disclaimer

Facts, analytical angles and opinions expressed in this research article are absolutely of the authors; the institutions (Government of Manitoba and University of Manitoba) we serve have no concern.

Conflict of interest

The authors declare no conflict of interest with any party or institution.

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20. Abul Kalam, 35, is a medium rich Muslim fisherman of Volarkandi village. He has access to farming land in the upland areas of the Hakaluki wetland.
21. Padmaboti Jaladas, 65, is a destitute widow of Thakurtala village. Literally, barely alive, she has none in this world. She depends on the mercy of the neighbours for a little food and a piece of white long cloth. She could not remember when she enjoyed a full meal. She already lost her vision of eye.
22. Shimul Jaladas, 24, is a poor carpenter of Thakurtala village. He is educated (up to grade eight); he played active role in mobilizing fishers of his village under FAO/UNDP supported livelihood security project.

23. Mridul Jaladas, 45, is a medium rich Hindu fisherman of Thakurtala village. He has mechanized fishing boat and six pieces of marine set bag nets. He maintains network with local influential groups for the sake of his business.
24. Sunil Jaladas, 47, is a locally influential Hindu moneylender of Moheskhali Island. Poor fishers of Thakurtala village consider him as an exploiter in the disguise of moneylending business.
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26. Sadhu Jaladas, 56, is a poor fisherman of Thakurtala village. With his partially damaged small non-mechanized boat, he can fish in the near-shore waters. He can't fish during the monsoon months as his boat is not suitable for navigating under turbulent monsoon weather.
27. Anil Jaladas, 50, Thakurtala fishing village, has a large family. He is the only earner; his income sharply declines during monsoon months when he has nothing to do in the locality.
28. Kala Miah, 45, is a Muslim fisherman of Volarkandi village. He is involved with local level efforts for the sustainable management of small waterbodies, supported by CNRS, an environmental NGO. He raises voice against the much-debated leasing process, initiated by the Local Government and Department of Fisheries of the Government of Bangladesh.
29. Data is compiled from series of case studies with the key informants from both the villages, and validated through focus group discussions. Only major gear used in the areas are considered.
30. Based on data compiled from field survey with respondents. It should be mentioned here that the period ranging from mid-September to mid-November is critical for the poor floodplain dwellers. Scope of off-farm works become substantially reduced by this time. Some of them move to capital city to find some manual works. Urban dwellers call this category of seasonal laborer as 'Mofiz', a derogatory greeting for the poor rural migrants.
31. Sudharam Jaladas, 55, is a marginal caste-based fisherman of Thakurtala village. He is widely respected for his local indigenous knowledge.
32. Data is compiled from field survey. Interestingly, consumption of fish (wet/dry) helps in mitigating requirements of protein. Some fishers started eating non-conventional sea foods (like squids), which they never ate two decades back.
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34. Jamini Jaladas, 68, is a poor fisherman of Thakurtala village; he operates estuarine set bag nets. He is desperate to ensure maximum catch in his nets. Mesh size is so low that nothing except water can escape through the nets.
35. Based on focus group discussions and participant observations with key women informants. It needs to be noted here that 'female economy' plays important roles along with 'male economy' during crises period. Women know well the art of saving money. Primarily, they earn little money from household-based poultry and backyard gardening.
36. Based on interview with Nirala Jaladas, 40, an ultra-poor fisherwoman of Thakurtala village. She has typical gendered knowledge of coping strategies during prolonged period of hunger. She recognizes the right kind of wild vegetables that can be easily boiled and eaten.

37. Kamini Jaladas, 50, Thakurtala is a marginal caste-based fisherman. He has experienced many hurdles that originate from cross-scale sources. He pointed out to the exploitation by intermediaries and moneylenders, whom he termed as ‘blood sucker leech’.
38. Vojon Jaladas, 65, Thakurtala, is experienced about the tropical cyclones. He is known for his indigenous knowledge about the formation and pathways of cyclones. He faced devastating cyclones of 1970 and 1991, which perished everything he could save in his life. He started from scrap again.
39. Binod Bala, 50, Thakurtala, claims that people from upland areas and other societies will never realize the sufferings of the coastal dwellers of Bangladesh who face natural calamities frequently. She terms the visitors as ‘disaster tourists’.
40. Saleha Begum, 46, is a Muslim housewife. She thinks that human beings suffer for their sin and misdeeds. Natural calamities are reactions to our wrong doings from the creator, she opines.
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42. Bidhurani Jaladas, 35, Thakurtala, explains the tyranny that fishers face during cyclones. In the remote areas, civic order declines, and families are vulnerable to snatching of valuables by local thugs.
43. Vojon Jaladas, 65, Thakurtala, Moheskhali, identifies himself as an environmental refugee. Read more about him under note 38.
44. Minara Khatun, 40, Volarkandi, is a housewife. She knows how to tackle waves of adversities during prolonged period of flood in the low-lying wetland areas.
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