Political ecology of environmental crises in Bangladesh

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Abstract: Bangladesh suffers from a range of crises affecting its human and non-human environments. The issues are widely discussed, with corrective policies proposed and implemented, but the results so far have not been satisfactory. The main reasons for this failure of governance can be traced to the fact that environmental problems are examined mainly on the basis of neo-malthusian, neo-colonial and apolitical modes, and they are rarely contextualised in a wider framework. The present thesis is something of a new departure. It assesses three different types of environmental crises in Bangladesh, namely (i) shrimp farming and its consequential impacts on local environment and society in the south-western and south-eastern parts of Bangladesh, (ii) the impacts of deforestation and afforestation issues on women in the Modhupur forest located in the central parts of the country, and (iii) degradation of food safety and quality issues in Bangladesh. The theoretical frameworks of political ecology and feminist political ecology are deployed in assessing these problems. The research is mainly based on secondary data collected in the UK and Bangladesh. Limited field data were also collected through group discussions with the women of Modhupur about the impact of deforestation and afforestation and informal interviews with government and NGO officials on the food quality degradation issues. I was able to collect literature on shrimp cultivation and on deforestation issues from Bangladesh but struggled with data collection on the food quality crisis. Academic research on food quality issues are almost absent although plenty of articles have been published in the news and print media.

The results suggest that the problems are not simple but rather the outcome of a number of multifaceted factors which are deeply rooted in the economic, social, political and cultural settings of Bangladesh. Attempts for capital accumulation and profit maximization by different actors are found to be the major factors behind the environmental breakdown in all the case studies. It is revealed that the issues examined in this study have had profound impacts on the natural environment and also on the vulnerable sections of society, especially women. The three crises are narrated, the actions of different actors are identified, contextual driving forces for the individual case studies are explored and the local to global links of the issues are established.

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List of Abbreviations

ADB	Asian Development Bank
BAPA	Bangladesh Paribesh Andolon (Bangladesh Environmental Movement)
BBS	Bangladesh Bureau of Statistics
BCAS	Bangladesh Centre for Advanced Studies
BSTI	Bangladesh Standard and Testing Institute
CAB	Consumers Association of Bangladesh
CAC	Codex Alimentarius Commission
DDT	Dichlorodiphenyltrichloroethane
DoF	Department of Fisheries
DoE	Department of Environment
EBSATA	East Bengal State Acquisition and Tenancy Act
FAO	Food and Agricultural Organisation
FBCCI	Federation of Bangladesh Chambers of Commerce and Industry
GATT	General Agreement on Tariffs and Trade
GoB	Government of Bangladesh
HACCP	Hazard Analysis Critical Control Points
ISO	International Standards Organization
IPH	Institute of Public Health
IMF	International Monetary Fund
JFM	Joint Forest Management
MoEF	Ministry of Environment and Forest
NTFP	Non-timber Forest Product
SAP	Structural Adjustment Programme
SAL	Structural Adjustment Loan

Thana	Third Level Administrative Unit of Bangladesh
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNICEF	United Nations International Children's Emergency Fund
WASA	Water Supply Authority
WHO	World Health Organisation
WTO	World Trade Organization

Declaration of Copyright

I confirm that no part of the material presented in this thesis has previously been submitted by me or any other person for a degree in this or any other university. In all cases, where it is relevant, material from the work of others has been acknowledged. The copyright of this thesis rests with the author. No quotation from it should be published without prior written consent from the author.

Signed,

Date:

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Nandini Sanyal
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Chapter 1
Introduction

1. Introduction

Environmental crises, in the form of the depletion of natural resources, the degradation of the quality of land, water and air, and the breakdown of natural cycles and regenerative power due to the overwhelming exploitation of nature, are burning concerns in many parts of the world, particularly in the South, and the issues have attracted much scholarly attention in recent times. Hitherto, geographers have a long tradition in environmental knowledge production and environmentalism has emerged as one of the core themes in modern geography (Matthews and Herbert 2004). Environmentalism, through its evolutionary conceptual framework, has progressively been transformed into a broad means of scrutinizing the interaction between humans and the natural environment (Liverman 1999; Beaumont and Philo 2004). On the one hand, the earth's surface, its physical structure, its biophysical processes, and its non-human living world of flora and fauna, have been research foci for physical geographers and natural scientists. The study of the interaction between the physical environment and human society is inexorably significant in Geographical agendas, in the form of investigating the biophysical environment and its impact on humans and, vice versa, how human actions affect the physical environment (Matthews and Herbert 2004). Within the realm of environment-human interactions the 'unbounded' character (Eden 1998) of the environment is transformed by decisive economic, social, cultural and political factors that vary in time and space (Dryzek 1997; Castree 2002), and these deserve significant attention in order to understand human-environment relationships.

Political ecology, in this context predominantly lying within the discipline of geography, has shown much potentiality during the last two decades for the investigation of the human-environment interface. Political ecologists have commonly sought to understand this interface by making connections between ecology and political economy, mostly in third world countries (Blaikie 1985; Blaikie and Brookfield 1987; Peet and Watts 1996a; Bryant and Bailey 1997). While examining environmental changes in context, they have investigated the influence of different variables deriving from economic and political processes acting at a number of scales (from local to global), which often work in an interconnected manner (Bryant 1992;

Zimmerer and Bassett 2003; Robbins 2004). Further feminist political ecologists have introduced a feminist perspective to political ecology and have largely focused on gender relations as the critical factor in defining human-environment relationships (Agarwal 1992; Rocheleau *et* al. 1996a; Carney 1993; Schroeder and Suryanata 1996). Political ecologists have concentrated on environmental issues of many countries in the global south but have so far published relatively little on Bangladesh. This country is ripe for study, being challenged on the one hand by major natural hazards such as cyclones, flooding, arsenic poisoning in ground water and on the other by many human-induced environmental crises such as cumulative degradation and depletion of the country's limited forest resources, and land degradation due to shrimp farming. Recently, another new dimension has emerged in the form of food adulteration, which has become a threat to human health and safety and also to the environment as a whole. At the national scale current environmental management practices in Bangladesh demonstrate the authority and control of government agencies and of policy makers but other important actors, such as local land users, who often play a vital role in the management of traditional environmental systems, are seldom recognized (Bryant and Wilson 1998). In addition, the country is struggling with its fragile local and national economy, a malfunctioning state (Atkins *et* al. 2006), a society beset by endemic corruption, lack of accountability and transparency in the affairs of state (Zafarullah 1987; Khan 1996; Khan 2003), and a lack of participation by marginalized groups. Moreover, gender is a critical factor in the social context of Bangladesh. Due to deeply rooted gender discrepancies, as well as a strong patriarchal societal structure, a lack of control over the material resources (Cain *et* al. 1979), and many other social and cultural constraints, women as a group remain in vulnerable conditions. Consequently their relationships with nature are often determined by unequal access to, use of, and control over, natural resources. From this point of view, environmental crises in Bangladesh need to be assessed in a different way, so that the social dimensions, including gender aspects, can be explored along with the physical aspects.

This thesis aims to scrutinize selected environmental crises in Bangladesh using the theoretical framework and general approaches of political ecology and feminist political ecology. It focuses on three case studies: (i) shrimp farming and its consequential environmental and social impacts in the south-western and south-eastern parts of Bangladesh, (ii) the impact of deforestation and afforestation (social forestry) on

women in Modhupur sal forest located in the central parts of Bangladesh, and (iii) deterioration of food quality and safety issues. In the first case study, brackish water shrimp culture, as an induced aquaculture practice in the study area, is examined in order to identify the contributory forces, actions and processes of the stakeholders at different scales (such as local/regional business people and a government interested in encouraging foreign currency earnings) and their effects on the human and non-human parts of the environment. It focuses on how a lack of balance in exploiting natural resources in the name of economic development and maintaining social stability has pushed the whole physical and social system/network to the point of irrecoverable injury. In the second case study the gender dimension of forest clearance and social construction of plantations (agro-forestry, woodlot plantation etc.) in the area is scrutinized in order to disclose the displacements of women from their rights over, access to and use of the natural environment. The application of feminist political ecology helps to assess the consequences of deforestation and poorly planned afforestation schemes on women's lives. Recent degradation of food safety and quality, involving actors and activities, their motivations and interconnections in food quality concerns, are assessed in the third case study.

The thesis has been written primarily by consulting secondary literature collected both in the UK and Bangladesh. In addition, field data was collected through focus group discussions with women in Modhupur, and semi-structured interviewing of government and NGO officials on the deterioration of food quality in Bangladesh.

The case studies chosen here are important in the Bangladesh context, each having had a substantial impact both environmentally and in socio-economic terms from the local to the national. Hitherto, existing traditional Bengali environmental management practices have been evaluated mainly in economic terms, ignoring many socio-ecological aspects, including the environmental sustenance and social justice. These issues are very important considerations for the subsistence of the people in a country dominated by an agriculturally-based rural economy. Political ecological tools have already successfully been used in many other parts of the world to contest apolitical approaches, by exploring the marginalization of nature and deprivation of the weaker groups of society and understanding nature-society interactions, and it seems reasonable

to expect they will also be extremely useful to assess environmental and related social crises in Bangladesh.

2. Aims and Objectives

In the context of the three contemporary environmental and social crises outlined above, the research aims to investigate the impacts of these issues in terms of local environment and society. In addition, this research also attempts to explore the contextual factors that have influenced these environmental and social crises. In order to fulfill the main aims of this research the following research objectives are put forward:

(i) To investigate how the consequences of the crises are attributed to the local environment and society.

(ii) To explore the main underlying socio-economic and political forces deriving from a wider scale which exacerbate the environmental degradation.

(iii) To identify the involved actors and analyze their roles.

2.1 Research Questions

The research questions are framed to achieve the objectives of the research. The questions also help to indicate how to set the arguments within the wider array of the theoretical framework. The research questions were not separated as per the case studies but rather compiled as a single set because the case studies are similar in their wider environmental context and are assessed using identical theoretical support. The research questions are as follows:

(i) What is the state of the problems and how can they be narrated within the existing socio-political set up?

(ii) What are the major underlying forces that propel the expansion of shrimp farming, deforestation and food adulteration in society?

(iii) What are the flaws in the policy agendas that create grounds for environmental degradation and deprivation of certain groups in society? How are the policies influenced by power and politics?

(iv) What are the micro-politics and practice of power at the local scale and what are their consequences?

(v) What are the roles of international multi-lateral organizations in shaping the environment?

(vi) Who are the privileged sections in the society who benefit from resource exploitation? And how are the traditional livelihoods of ordinary people affected?

(vii) How are women as a group marginalized due to certain processes of environmental degradation? How in particular have they have been expelled from the benefits of the social forestry programmes?

(viii) How do certain types of environmental and social degradation cross the boundaries of socio-economic space?

(ix) What is the role of civil society in the environmental movement in Bangladesh?

3. Research Methods

To attain the objectives of the present research initiative, the study is conducted mainly by consulting secondary sources. As the researcher is based in the UK, she had access to abundant literature. In addition, many published and unpublished documents, articles, government and NGO reports, newspaper clippings derived from Bangladesh have been consulted.

The researcher was unable to visit Bangladesh for field data collection due to financial restrictions but she received assistance from Bangladeshi colleagues (see

acknowledgements for names). On her behalf they conducted small group discussions with the local women of Modhupur on deforestation and afforestation issues and the impact on their lives. The author provided a set of unstructured questions/discussion points as the basis for these group discussions. I also discussed the main issues of what I was interested to know with my colleagues over the telephone and maintained close contact with them during the field work period. My colleagues are social scientists having extensive field data gathering and interpreting experience. The field visit was conducted during May 2005 and the main respondents groups (3 groups comprising 3/4 women in a group) included local women living in the forest area. The outcomes of the group discussions were noted and passed to me by email. I made phone calls to get clarification on certain points that were not clear to me, and I also used my previous field experience in the same field area to compare and validate the information sent by them.

Also, prior to coming to the UK, the author conducted a number of informal interviews with government and NGO officials (please see appendix 1 for the list of person interviewed) on food safety and quality issues. Due to the absence of academic research on food quality issues in Bangladesh, I have depended mainly on daily and weekly newspaper articles and the unpublished reports of NGOs. Though many conventional researchers are often critical of the use of unpublished sources, in this context Robbins (2004) argues that they often contain important information. Finally, I have also drawn upon on my own extensive experience of field observation from living in Bangladesh.

4. Justification for the work

Many environmental and social crises in Bangladesh have been explored apolitically without considering important contextual factors. The existing state-centered environmental commentary commonly points to immediate issues such as population pressure, the ignorance of farmers, and the irrational and destructive activities of the local people as the major causes of environmental degradation. Such interpretations of the sources of the crises then form the basis subsequently of policy prescriptions, which more often than not fail to make any positive impact. Sometimes, policy is suggested and guided by multilateral financial and technical agencies as part of development projects. But the crisis narratives of these international organizations are often far from

the mark and their remedial agendas are framed according to their pre-defined options which sometimes ignore complex spatial variations in cause and effect. In addition, neglect of the gender dimension and other vulnerable groups is another common attribute of the existing environmental management policies and practices.

5. Organization of the thesis

The thesis comprises six chapters. Chapter one describes the general background to the research including the major aims, objectives, and research questions. This chapter also includes an account of the methodology adopted, accompanied by a section on the rationale of the work and its geographical significance.

Chapter two consists of a detailed literature review of the theoretical framework of political ecology with a special focus on forestry issues. This chapter also contains a brief description of the understanding of different groups of women scholars about nature-society interactions, which are mostly encompassed within the wider conceptual framework of feminist political ecology.

Chapter three presents the case study on shrimp farming in the coastal region of Bangladesh. After making a general statement on the crisis, the chapter focuses on the impact of shrimp farming on local environment and society. The chapter discusses how the traditional livelihood of people broke down due to the integration of an agri-based society into the global economy.

Chapter four investigates deforestation and the remedial afforestation programmes of the Modhupur sal forest. This chapter discusses the pattern of deforestation in the area and its impact on women. It also attempts to trace the underlying causes of deforestation, drawing upon political ecological explanations. It argues how the unequal distribution of power and lack of gender balance in afforestation programmes have marginalized a section of the community.

Chapter five contains an examination of the food safety and quality issues of Bangladesh. The chapter starts with a general discussion on common perceptions about food safety and quality. Subsequently it reveals the currently depressing picture of food safety and

quality and explores the potential health risks. This chapter also attempts to present a political ecological analysis of food crises in Bangladesh.

The final chapter summarizes the major findings of the work and its implications and advocates further political ecological analysis of nature-society relations in the Bangladesh context.

6. Conclusion

This chapter has outlined the background and set the scene for the thesis. It argues why theoretical frameworks are necessary to capture most of the dimensions of research problems that traditional attempts have generally failed to describe. It has outlined how the application of political ecological and feminist political ecological frameworks in assessing environmental crises in Bangladesh has so far been very limited. This approach can contribute to uncovering the distant but key forces of problem instigation. It can also be used in problem identification as well as pattern and process recognition. In this context, the thesis, using three distinct case studies will suggest that the issues are distinct in their own perspective but also similar in a wider context because many of the underlying processes are common to all the three cases. Therefore, finally the chapter is suggesting a fundamental shift in our attitudes to problem viewing and adopting solutions.

Chapter 2
Literature Review

1. Introduction

This chapter presents the theoretical background of the work. The case studies on shrimp farming and its consequential environmental and social impacts (chapter 3) and deterioration of food quality and safety issues (chapter 5) were mainly examined using political ecological framework, while the impact of deforestation and afforestation (social forestry) on women (chapter 4) was assessed based on feminist political ecology. Theoretical discussion on some selected political ecological and feminist political works relevant to my case studies are presented in the following sections. The discussion facilitated me to put the crises in wider contextual framework so that the dimensions of the problems can be properly understood.

2. Political Ecology: Theoretical Understandings

2.1. Introduction

Recent environmental problems can be considered to be the result of the global structuring of socio-economic conditions and the rearrangement of political power in the world. The scale of crises (local, regional) are varied and the problems themselves so diverse that they demand careful scrutiny. Recent theoretical discussions/debates have shown the issues to be contested, and there are even voices suggesting that the so-called environmental crises are sometimes exaggerated (Chapman and Thompson 1995) and sometimes wrongly identified by national and international experts (Fairhead and Leach 1995; Rocheleau *et* al. 1995; Jarosz 1996; Guthman 1997). These uncertainties are reflected in policy prescriptions, which in turn employ solutions that do not always achieve consensus and which may themselves add new dimensions to the existing problems. For instance, a programme for modernizing cattle breeding programme in Orissa (in India) in 1978 by introducing Jersey cows and fodder production finally resulted in the extinction of both local breeds and local trees by the 1990s. This exacerbated local poverty rather than solving it (Sainath 1996, c.i. Robbins 2004).

Scholars from different fields (viz. Anthropology, Geography, Sociology, Physical Science) assess environmental problems from different perspectives. Many traditional government agencies and some researchers investigate crises superficially without considering root/background contexts (Ghani *et* al. 1999c). Their naïve and apolitical explanations (such as population growth, entrenched poverty, local traditions, etc.) in regard to environmental degradation seem too weak to explain the complex multi-faceted causes of it. While physical scientists seek to solve the problems with the use of science and technology, political ecologists link socio-political factors to the wider context of the environmental problems. They have been contributing significantly for the last couple of decades within the realm of Geography through the identification of the root causes of environmental problems. These include socio-economic conditions, involving the power relations (and their impacts) of crisis management, representations of voices/choices of the locals in problem solutions, etc. They also study the bio-physical change of environment itself.

Political ecology originated in early 1970s with roots in political economy and social science and it gradually progressed, sharing the research field with cultural ecology and radical development geography (Bryant and Bailey 1997), having strong influence from Marxist thought. It is not a homogeneous field. Differences exist among political ecologists in their interests and approaches to the evaluation of environmental problems. Among them, some scholars assess environmental problems in line with political economy (Blaikie 1985, Blaikie and Brookfield 1987; Bassett 1988a, 1988b); neo-Marxists emphasize production relations as the cause of environmental changes (Watts 1983a, 1983b; Watts and Bohle 1993; O'Keefe *et* al. 1977; Wisner *et* al. 1982); and poststructuralists stress the hegemony of knowledge and truth building in perceiving problems (Escobar 1996; Rangan 1996; Peet and Watts 1996b; Rocheleau *et* al. 1995, 1997; Parajuli 1991, Rahnema 1988). Besides, contributions from women scholars in both northern and southern countries have opened an additional window for examining the woman's perspective on the environmental debate. They mainly focus on women's access to and allocation of resources, their level of control and rights, their special knowledge for survival by managing a healthy environment, and their struggle and movements to protect and maintain ecologically sound environments (Rocheleau 1995,

Rocheleau *et* al. 1996a, 1996b; Rocheleau and Ross 1995; Agarwal 1998, 2000, 2001; Schroeder 1997; Braidotti *et* al. 1994; Shiva 1989; Carney 1993).

2.2. Political ecology: Definition

Political ecology embodies a number of definitions that vary depending on the area of emphasis. For example, Blaikie (1985), Blaikie and Brookfield (1987) and Peet and Watts (1996a) focused on political economy, while others emphasize the political processes (Bryant and Bailey 1997, Stott and Sullivan 2000) that instigate environmental change. Blaikie and Brookfield (1987) offer a useful working definition of political ecology:

> "The phrase 'political ecology' combines the concerns of ecology and broadly defined political economy. Together this encompasses the constantly shifting dialectic between society and land-based resources and also within classes and groups within society itself."

Bryant (1992) proposed three critical areas of inquiry for understanding the analytical framework of 'Third World Political Ecology'. These are - the contextual sources of environmental change, conflict over access, and the political ramifications of environmental changes. Zimmerer (2000) defines political ecology as the study of both the combination of bio-geophysical and broadly social processes. Therefore, we may summarize from various definitions and research initiatives that political ecological works embrace an examination of the bio-physical changes, contextual socio-economic processes and the political implications of the relationships between the two.

2.3. Common assumptions of political ecology

Bryant and Bailey (1997) in their book *Third World Political Ecology*, mentioned three linked assumptions that work in the background of many political ecological works. These assumptions are as follows : 1. political ecologists accept the notion that the costs and benefits associated with the environmental changes are mostly unequally distributed among the actors; 2. This unequal distribution of environmental cost and benefit on the other hand either reinforces or reduces the

existing inequality in the socio-economic conditions; 3. The unequal social and economic impact of environmental changes also has political implications, resulting in the altered power of actors in relation to other actors.

2.4. Mode of explanation

In analyzing any environmental crisis, political ecologists proceed by posing a central question (such as what is the main cause of deforestation, or why is land degrading?), followed by a series of explanations of the crisis. Political ecologists, in analyzing the environmental crisis, assess the influence of different variables which act at multiple inter-related scales deriving from the socio-economic conditions (Robbins 2004). They widely analyze how the local environmental situation is conditioned by the regional and consecutively guided by global politics and economics. Cultural ecologist Andrew Vayda (1983) previously termed this 'progressive contextualization'. He suggested that the procedures involve focusing on significant interactions and then explaining these interactions by placing them within progressively wider or denser contexts.

2.5. Development of political ecology

Since the early period, political ecology progressed by sharing insights from a range of critical theories such as common property theory, green materialism, peasant studies, discourse theory, feminist development studies, critical environmental history, postcolonial studies etc. Scholars from different backgrounds have contributed in its advancement, so the interests of political ecologists are diverse and they have contributed to a wide range of environmental issues (such as the impact of cash cropping, deforestation, land degradation, water issues, hazard studies etc.).

The expansion of export crops and decline of subsistence agriculture has been a matter of debate among political ecologists for a long time (Wisner *et* al. 1982, Watts 1983a, 1983b, Grossman 1984). This export crop production and commercialization of the local economy has caused the failure of subsistence food production by diverting labour and land, downgrading of productivity, displacement of local food producers on to more marginal lands, break down of social harmony and decline of natural resources and even large scale environmental change (Frank and Chasin 1979, Barbier 1989, Nietschmann 1973, Hecht 1985)

Frank and Chasin (1980) in their book, *Seeds of Famine*, described the impact of the expansion of cash crop on the Sahel region which grounded the context of the spread of drought and famine in Niger. The colonial government and later on the post independent successors initiated commercial peanut cultivation with a view to export earning and at the same time to generate a steady supply of input to Europe. But due the unsuitable ecological conditions for peanut cultivation, progressive intensification of peanut cultivation caused cropland degradation by rapid decline of soil nutrients and moisture. This turned the rangeland to desert and destroyed farmers' own coping mechanisms, which finally resulted in the spread of drought, desertification and famine in the Sahelian region. In addition, impact on cash cropping can directly be located in crises of equity in allocation of resources, wealth, income, power and possession among different groups in society in terms of class and gender (Carney 1993; Schroeder and Suryanata 1996; Schroeder 1997; Maxwell and Fernando 1989).

Grosman, (1993) taking a political ecological approach (political economy and cultural ecology), analyzed the relationship between the expansion of export of banana and the decline of food crop production in St.Vincent island in Caribbean region. He found that the decline in subsistence food production in banana producing areas is related primarily to the contrasting political economic contexts of the production and marketing of local food crops and bananas produced for export. Changing dietary preferences and problems in local wage labor also impacted on local food production.

In the early period of the development of political ecology, a great deal of research, especially the work of radical geographers, focused on hazard and disaster. During that period, the common understanding of natural disaster remained within the view that it is the result of extreme geophysical processes and its impact on human society largely depends on the type, intensity, magnitude and other aspects of the processes (Burton *et* al. 1978). Subsequently, with the apparent recognition of the vulnerability of modern society to natural disaster, a response mechanism was proposed (Hewitt 1983). A public policy-oriented approach supported by geophysical, planning and managerial activities (in some cases rearranged human activities such as land use zoning, introduction of building codes) and emergency

measures such as relief and rehabilitation works, disaster plans were suggested and implemented. After that, scholars from the physical and social sciences joined the expanding field of disaster studies and the contribution of social science rested on studying crisis behavior, emergency measures, etc. (Hewitt and Burton 1971 c.i. Hewitt 1983).

At the same time (since the 1970s) a counter debate was pushed forward about impacts on human livelihoods, which later proceeded as the concept of vulnerability of human communities (Watts 1983b; Watts and Bohle 1993; Wisner *et* al. 2004). Subsequently the naïve environmental determinism, technocratic optimism and the positing of simple causality in disaster studies was largely rejected by radical geographers due to its ignorance of the social, political and economic influences on hazards (O'Keefe *et* al. 1977). In contrast, a group of scholars (Susman *et* al. 1983, Wisner *et* al. 1982, O'Keefe *et* al.1977, Watts 1983a, 1983b) initiated the process of studying disaster by analyzing the interaction of political economic structure and ecological processes. Following the Marxist way of understanding, their main focus was on the penetration of capitalism and marginalization of the people and environment. In defining disaster from a third world perspective, Susman *et* al. (1983) considered the issue of vulnerability and the impact of underdevelopment on it. The authors consider that underdevelopment is the consequence of the penetration of capitalist formations into the economic and geographical structure of the underdeveloped countries, the result of colonial histories of oppression and extraction and the disintegration of the existing mode of production. Thus underdevelopment is created within the poorest class by the rich class and similarly by rich countries imposing on poor countries. According to this argument, the marginalization of society and the increase of disaster-proneness of the people is the outcome of underdevelopment. It is these forces that cause the marginal poor of Bangladesh to stay on the 'charlands' or poor Hondurans to stay on steep slopes. Similarly, Wisner *et* al. (1982) and Watts (1983a, 1983b) studied the global food scarcity of the early 1970s and drought and famine of northern Nigeria. Both authors attempted to analyze hunger, drought and famine historically and materially, in terms of dynamics of production and reproduction cycles at the local level. Similarly, vulnerability is also the consequence of the changing pattern of rural production and reproduction systems (Watts 1983b).

Following the same Marxist approach, P. Blaikie (1985) mostly focused on land-based degradation and conservation. Blaikie and Brookfield's (1987) path-breaking work, *Land Degradation and Society*, gave a new momentum to political ecological work. In explaining land degradation the authors followed the approach of regional political ecology, which encompasses interactive effects at different geographical scales and hierarchies of socio-economic institutions. In *Land Degradation and Society* the authors presented some important key issues such as land degradation as social origin, plurality of views, significance of the role of land manager, relationships between society and land degradation and the pressure of production on resources and the necessity for the integration of the approach of both natural and social scientists. In analyzing land degradation, the authors described three concepts of marginality and showed how economic, ecological and socio-political marginality are linked with each another and consequently each of them can be the cause of instigating other type of marginality. The authors analyzed the role of land managers and the contextual social and political system and the major thrust went on the social and economic causation of land degradation. By doing that the authors explained how the role of land managers is conditioned by the impact of the contextual socio-political circumstances and at the same time it is also influenced by the global economy.

Thomas J. Bassett (1988b) investigated the conflict between peasants and herders in northern Ivory Coast, taking a political ecological approach. In exploring the conflict, he made an intersection of Ivorian political economy including the economic development policy of government with the local agriculture production system, which set the underlying key processes and conditions behind the conflict between 'Senufo' peasants and migrant 'Fulani' pastoralists .

Similarly, cultural ecology (ecological anthropology) has contributed to the evolution of political ecology since the 1970s. Cultural ecologists attempt to integrate the local cultural traditions of certain groups in an area with their environmental management practices. Farming, herding and hunting groups around the world, whose environmental practices, generally considered as primitive, inefficient and environmentally malign, were in the main revealed to be sustainable.

The adaptive practice of Swidden (shifting cultivation) has come under careful scrutiny by cultural ecologists and they have rejected the cynical comments of development experts and concluded that such farming is effective, efficient and environmentally benign (Conklin 1954, Dove 1983). The cultural ecological approach is distinguished mostly for its attention to the initiatives of local people taken according to their own ecological knowledge, their application through environmental practices, and their contribution to the production and reproduction of landscapes. Turner (1993) investigated the socio-cultural and environmental dynamics of pastoral society in the West African Sahel region. He challenged the conventional view that bio-climatic factors are the cause of overstocking. He further explained the boom in cattle population in Masina (inland Niger delta/ Mali) during 1960s in terms of socio-political conditions. He argued that rise in cattle population occurred due to inoculation programmes, and due to an increase in local demand for cattle due to the changing balance of power between two ethnic groups, the Fulsse and the Rimaysse. Zimmerer (1993) initiated the process of investigating environmental degradation by interpreting the degradation narratives of local people. He studied the soil erosion problem of Chochamamba, Bolivia by collecting the degradation narratives of three separate groups in the society by making them speak for themselves. Most of the peasants blamed peasant ignorance for soil degradation except some young peasants and rural trade union workers who stressed the link between soil erosion and government policy. Different perceptions among the three groups were the outcome of different livelihood experiences and differing efforts at shaping conservation programmes and related development measures. Thus the cultural ecological approach has systematically contributed to the progress of political ecology.

The concern of environmental degradation and economic development in the third world has been an issue of debate since the 1970s. From the mainstream environmentalist viewpoint, the transition to sustainability becomes pressing as the global life support system is time limited - the resources of the environment are not ever-lasting (Goodland *et* al. 1993). Thus, sustainable development was put forward as a means of promoting the preservation and conservation of nature in both northern and, later on, in southern countries (Adams 2001). The concept of sustainable development started to be adopted after the United Nations Conference

on the Human Environment in Stockholm and the United Nations Conference on Environment and Development at Rio in 1992.

But the mainstream northern environmentalist paradigm of sustainable development has been strongly contested by poststructuralist theorists, who have increasingly perceived it as a further example of the expansion of western reason to achieve and exert power over and subjugate non-western men and women through western knowledge in the name of developmental languages (Watts 1993, Escobar 1992a, 1992b, 1996). In this context, a large portion of the world's population living in certain parts of the world are represented as under-developed, poor, backward and powerless by western viewers from their own position and perception in order to bring them under the process of development (Rahnema 1988). Hence, the process of development works as a way of recolonising them under western hegemony. Both Peet and Watts (1996b) and Escobar (1992a, 1992b) thus, referred to the concept of sustainable development as a hegemonic discourse which often seeks to influence and change the cultural content, social norms and practices of a society to a universal one through western forms of power and knowledge. On the other hand it also embodies the notion that the earth can be managed for human purposes like any materials through capitalization (Parajuli 1998). Thus, capital accumulation as well as relentless economic growth can ensure the development of the inhabitants. But, this concept fully ignored the outcome of the process of economic development on environment. In that context, Escobar (1996) acidly argued that the sustainable development discourse sought to bring together two contrasting issues of economic growth and environmental preservation involving capital, treating nature as input of the economic process, under the management of western science and technology, while many other relevant issues including the market mechanism have not changed, but finally this discourse has not proved any potentiality for long term change.

Escobar further asserted that the planning and managerial role, based on a western model of science and development, can be characterized with the attributes of a universal representation of a problem and its solutions (here the popular slogan can be mentioned 'act locally, think globally'). This model of development is reluctant to recognize the needs and aspirations of the local people. In the context of the

Chipko movement in India, Shiva (1989) calls such a model of development as 'maldevelopment' because it does not portray the spirit of the women in the movement to protect their different forms of knowledge and forestry practices; rather it proposes reforestation projects (of exotic species) under the western hegemony of development. Besides, growth is proposed through the incorporation into the world capitalist economy, where the non-traditional items of most remote areas of third world appear as 'resources' to be managed without considering the local context. For example, frogs' legs have become an export item of Bangladesh (BBS 2002) and this has caused an ecological imbalance in the crop fields and a noticeable increase of insects, which in turn led to greater pesticide imports. Besides, some authors are skeptical of the process of economic development, which is usually regarded as the means of eradicating underdevelopment and poverty in the third world. But, in contrast to the dominant view, poverty is regarded by many as the outcome of the very process of economic development which is supposed to curtail it (Yapa 1996). In particular, the epistemology of development is perceived by them through an examination of the green revolution – the spread of improved seed in what appears to have been a means of dominating both nature and people. The production of improved seed embodies varieties of interlinked (technical, social, ecological, cultural, political and academic) relations and marginalization is constructed socially in every relation (Yapa 1996).

In contrast to the mainstream model of development, recently a thread of 'anti-development' became prominent and much of it can be traced though ground level practical experiments and initiatives of numerous grassroots people and the emergence of new environmental and social movements in many third world countries (Sheth 1984; Corbridge 1991; Escobar 1992a, 1992b). It is often found that these social and environmental movements are organized beyond the existing political and legal systems, challenge the conventional economic growth and statistical indicator-based mainstream model of development and propose alternatives to mainstream development concepts. Social and environmental movements in this respect, incorporate livability, sustainability, equality and social justice as new parameters of development (Parajuli 1991). Many of these environmental and social movements primarily originated in grassroots people's struggle for their sustenance, wellbeing of health and environment, rights of access

to and use of forest and other communal resources. Progressively, they have been extended to numerous forms of opposition and resistance of hegemony involving local men and women, such as struggles for protecting rights of tribal people, peasants movements, women's movements for rights and identity, protests for maintaining certain cultural norm practices etc. Thus, the social and environmental movements involve a wide range of people irrespective of class, caste, ethnic and gender division. In this context, radical theorists locate much potentiality of forming new political forces in them as theses movements are constructed through the active participation of a wide verity of people of the society (Peet and Watts 1996b; Escobar 1992a). Through their action the new social and environmental movements largely reject western modernity and knowledge-based models of development which usually do not reach the actual disadvantaged and needy groups, on the contrary, the poor are often found to be the victims of processes of development (Shiva 1989, 1991). In addition, as being the representative of the common people, new social movements also challenge the dominating power from any internal and external sources. This often focuses on the role of modern states and their authoritative power as a regulatory force through maximizing capitalistic accumulation, legitimization and appropriating democracy, while declaring themselves as the representatives of the civilians (Parajuli 1991).

Most of the proponents of alternative development rather advocate for regeneration and rearticulation of local conditions, culture and knowledge at the grassroots (Sheth 1984; Parajuli 1991). In contrast to establishing universal scientific western knowledge they address the necessity of indigenous knowledge based on the diversified local conditions and life experience of the inhabitants (Briggs and Sharp 2004).They advocate regeneration and the rise of power and knowledge of the common people to resist the imposed power and assert that it would support the women, the peasants, ethnic minorities and other marginalized people to survive and to overcome many formal obstacles and structures in their lives (Rahnema 1988).

The debate and discussion of integrating the voices and knowledges of local people has started with the works of post-colonialism. Apprehension of western domination and authority over knowledge has been a focus of attention of many postcolonial theorists and they have started to construct practical strategies to resist domination.

Writing about the voice of the Asian women, Spivak (1988 c.i. Peet and Watts 1996a) argued that the way of knowing of non-western women is being neglected and overthrown by the western colonial relations of oppression. Hence subalterns can never express their own view but are always interpreted by others. Similarly Scott (1985) has highlighted some of the resistant action of the powerless poor against oppression in Malaysia, which he called the 'weapons of the weak'.

Political ecology has thus evolved by relating to a wide range of human environmental studies. However, despite the progress of political ecology, there is still confusion and controversy among scholars. For example, Moore (1993) alleged that much of the political ecological work is not sufficiently political in nature. Bryant and Bailey (1997) have stressed the need for integrating politics ('putting politics first') of all types that impact on environmental changes at different scales. On the other hand, Vayda and Walters (1999) and Bassett and Zimmerer (2004) complain that ecology is neglected in contemporary political ecological research; politics has more prominence ('politics without ecology') instead of the main concern being the assessment of environmental change. In sum perhaps we should say that it is the progress of the field as a whole (its strength, depth and dimensionality) that should be considered. It is obvious that political ecology does not rely on "a question begging research" (Vayda and Walters 1999); rather it welcomes the plurality of views and approaches that open new opportunities to examine contemporary environmental crises.

3. Deforestation, people and conflict

3.1. Introduction

In recent times wide-scale tropical deforestation emerged as a global public concern. The loss of trees and their role as a carbon sink are among the most important issues in the rhetoric of global warming, but other aspects of cultural and ecological degradation have also been prominent, for instance in the 1992 United Nation's conference on 'Environment and Development' in Rio de Janeiro. Since prehistory, forests have been a source of livelihoods, with their many life sustaining provisions: habitat, fuel wood, timber, fruits, vegetables, roots, game, shade and other forest products. Non-forest dwellers have also benefited from the indirect

support of the ecological balance. Besides, forests are vital banks of biodiversity, with those in the tropics having countless species of flora and fauna and micro-organisms.

Many researchers assumed that deforestation in the tropics and sub-tropics is due to poverty and the rapid increase of third world populations mediated through a growing consumption of fuel wood and the encroachment of forest land for cultivation and livestock grazing (Allen and Barnes 1985, Salam *et* al. 1999, Ali 2002). Others assert that the forestry and sustainability crises are created by the increased commercial extraction of forest resources under market-driven forest management practices (Bandyopadhya and Shiva 1986b, Shiva 1989, Guha 1989, Gadgil and Guha 1995).

Political ecology is a somewhat different and particularly fruitful approach that explores the changes in nature and cultural practices in relation to broader processes of socio-political and economic transformation, from the local to the global context. Amongst other matters, contemporary political ecology works on forestry have looked at local effects (state control, local commercial influence); global influences (commercialization of economy, export crop production, colonial hegemony of forest management practices); understandings of mal-development in terms of 'constructed' crises and 'constructions' of truth; and the increasing role of grassroots social movements. An example of political ecological work on forestry in Southeast Asia was published in a special issue of the journal *Global Ecology and Bio-geography Letters*. The authors (Bryant 1993, Rigg 1993, Stott 1993) aimed to investigate the deforestation by exploring a complex of social, political and ecological factors. In adopting the political ecological approach, the authors echoed Blaikie and Brookfield's (1987) call to use inter-disciplinary discourses to address the interface between the environmental and political dimensions. They argue that the present forest loss is not only an ecological problem demanding technological solutions; rather it is generated from the political and economic crisis that requires major changes in political attitude and economic policies. In this context, they argue for a 'paradigm shift' in scientific understanding.

Some of the papers in the *GEBL* special issue examine the impact of European science and forestry practice (the growth of the bureaucratic state, the rationalization of land use and ownership) on the south-Asian forest. Bryant (1993) studies commercial teak extraction and the contextual forest management politics in colonial Burma. He looks at how rapid commercial wood extraction compelled a policy mechanism to initiate state control, and to regenerate timber plantations known as 'taungya' with the help of Karen shifting cultivators, by making forest reserves and successively imposing restrictions on all types of indigenous practices, such as shifting cultivation and the traditional 'kutch[1]' method (Bryant 1993). These restrictions and obligations affected the local people economically, culturally and spiritually and inspired resistance movements involving incendiaries, labour strikes or slowdowns, non co-operation with forest officials, theft, illegal grazing of cattle, and breaches of forest laws.

In the same volume, Whitmore (1993) illustrated the ongoing contribution of European science to an understanding and interpretation of the Southeast Asian tropical rainforest. Lohman (1993) studied the social and political implications of the forest colonisation process in Thailand. He showed that forest clearance has been encouraged by a loose property system in the pre-colonial era, coupled with state-instigated commercial logging that from the nineteenth century was export-orientated, and facilitated by the construction of physical infrastructures. Rigg (1993) and Lohman (1993) also suggest that political and economic changes, in the process of the commercialisation of rural economy and the intrusion of cash crop production, have contributed to the erosion of forest lands. The Thai elites have generated indirect political and economic advantages for themselves through this forest colonisation and clearance. For instance, the migration of poor to the clearance frontier has acted as a 'political safety valve' (Lohman 1993). In Indonesia a similar process has been formalised through an official transmigration programme, whereby more than 6 million poor Javanese and Balinese were promised land if they settled in the outer islands (Bryant *et* al. 1993). The effect of a more acute geopolitics on deforestation was instanced in Northern Thailand during

[1] Kutch: water extract of the sha tree (Acacia catechu) which was used for tanning and dying fishing nets, canvas sails, leather and also for chewing with betel leaf.

1970s when the army set up defence volunteer villages in the reserve forest to guard against guerrillas resulting in heavy clearance (Rigg 1993).

Rigg (1993) set Thai deforestation more broadly in the context of the local political economy. Due to a booming agriculture and rapid population growth, cash crop production impinged more on forest land than traditional subsistence cultivation. He investigated at the village level the changing ways of forest use through the changing rules of land ownership and access, and found that wild land, which was once an open-access community resource, has been transferred to a restricted-access, closed resource and its resource quality has been degraded.

In Sarawak, in Malaysian Borneo, Colchester (1993, 1994) investigated the struggles of native peoples trying to maintain their land rights in the face of a government-promoted timber industry involved in uncontrolled logging in the tropical rainforest. As a consequence, economically marginalised native people resisted, demanding the reassertion of their ancestral rights and setting up barricades against the loggers. The political elites sought to dissolve the native resistance by mass arrests. Like Bryant, Colchester (1993) also showed that the root of the social and environmental crisis in Sarawak lies far back in the colonial period when the imperial government and merchants (national and foreign) took over the native people's land in order to meet the wood demand of western markets and the greed of local politicians opened the forest for uncontrolled logging.

In another study, Bryant (1996) examined the discourse of forestry in colonial Burma. Foresters then saw teak extraction as 'progress', and 'conservation' was a matter of ensuring the commercial supply of teak. They simply ignored opposition from local cultivators or politicians. Problems with deforestation were blamed on population growth or the shifting cultivation, fire setting practices, and forest use of the indigenous people.

In order to explain present-day environmental crises western experts sometimes make reference to a mythical past of competent community institutions once better capable of maintaining the forest environment and a homogeneous society more willing to share the rewards evenly. This is often then followed by explicit criticism

of contemporary, dysfunctional forest practice and the conclusions may inform policy. Fairhead and Leach (1995) contested such environmental narratives, which embody western prejudices about African society and environment and fail to unearth the real environmental situation. In two cases of (Kissidougou and Zamia) in Guinea (using vegetation history, oral history and published writings) they constructed sharply contradictory deforestation narratives which revealed that in both study areas there was no noteworthy forest in the past, rather only grassland and bush. The area of forest has actually increased.

Therefore, the misinterpretation of crises and consequential policy prescriptions may create other, new kinds of problems. Rocheleau *et* al. (1995) described an example from Kenya. Since the late 1980s Ukambani came under repeated scrutiny and intervention by national and international experts for its series of crises (i.e. human and livestock epidemics, overgrazing, soil erosion, low productivity, underdevelopment, etc.) and these crises have been extrapolated as a regional problem. But the author presented a contrasting account of local crises, which have been influenced by global economic, political and social rephrasing. The authors assert that the outsiders' environmental narratives are ill-informed and their suggested response mechanisms so poorly designed and ineffective that they have 'constructed' new crises.

Jarosz (1996) presented another example from colonial Madagascar where western experts blamed shifting cultivation, the setting of forest fires and overgrazing as the cause of the destruction of tropical forest. Deconstructing these claims, she presented a different environmental narrative related to revenue generation by the colonial government, export crop production in the most fertile land, and migration for wage work. She found that, although shifting cultivation was banned in colonial times, the forest still disappeared.

In the same way, environmental decision-making and policy prescriptions suggested are often based on some sets of theory that can be highly contested. Many aspects of them may be strict in rule (and do not allow space for any required change) and consequently can be invoked as the basis of aid based interventions.

In Nepal, Erik Eckholm (1975) (c.i in Guthman 1997) has popularised the view that an unprecedented recent spread of ecological degradation is associated with a recent growth of population, and that upland deforestation and soil erosion is the cause of downstream flooding. But Guthman (1997), following Escobar's (1996) line of theoretical argument, and analysing the historical and political context, suggested that the Himalayan environmental crisis is socially constructed. She argued that the production of knowledge about the Himalayan environmental crisis is inexorably socially and historically embedded and, at the same time, power-laden. On the same lines, Forsyth (1996) emphasized the importance of integrating local indigenous knowledge with global scientific knowledge and he called the 'hybridity of environmental research'. He tested the Nepal environmental narratives in northern Thailand and found that upland farmers there deliberately avoid erosion by increasing frequency of cultivation of flatter slopes rather than steeper slopes, and consequently the problem of erosion is overstated. He concludes that the local communities are well aware of environmental risk.

An interim conclusion is that effective environmental management requires, first, a recognition of the importance of local knowledge; second, an appreciation that forest policies and management practices must take account of the politically and socially constructed nature of all knowledge; and, third, an understanding that, in the contemporary world, tropical forestry is inextricably embedded in a set of forces that include the global reach of international capitalism, and an increased burden of debts in poor countries, with the result that balancing environmental sustainability and economic development is a great challenge.

Many scholars are skeptical about western models of development, especially the concept of sustainable development, which is so popular among development practitioners. Escobar (1996), for instance, finds that this modern development discourse is merely the latest addition to a long history of western expansionist motives to create systems of power in a modernized world. He mentioned that this hegemonic development discourse appropriates social practices, meanings, norms and cultural elements into the modern realm of explicit calculation, subjecting them to western forms of power and knowledge. Shiva (1989), referring to the Indian context, identified similar notions and she calls it 'mal-development', which does

not consider or value rural people, their traditions and subsistence indigenous settings. Rocheleau and Ross (1995) cited an example of the introduction of Acacia (*Acacia mangium*), an exotic species plantations in the Dominican Republic, and alludes to the fact that trees and people have become major players in what Schmink and Wood (1992) have called a 'greening of the discourse' on development. The acacia plantations acted as tools of multiple power relations and as a means of material and ideological struggle (as a tool of modernisation) within the state agencies and in NGOs. Amongst rural people this interacted with gender at the household level, with class, occupation and organizational affiliation. This also acted as an instrument of present and future transformation in property relations, livelihoods, and the reconfiguration of landscapes.

Similarly it can be said that the economic development process of Brazil has triggered the deforestation of Amazonia. Recent statistics on deforestation show that the 20% of has now been destroyed since extensive forest clearance started in the early 1970s (*The Independent*, 20 May 2005). The Amazon basin is increasingly home to large ranchers, small farmers, loggers, and large-scale soya producers. Different researchers have explained this deforestation from different perspectives. Moran (1993) looked at the impact of road construction, whereas Binswanger (1991) argued that the policy provisions (general tax policies, special tax incentives, rules of land allocation, land taxes, and the agricultural credit system) of the Brazilian government have accelerated the process by increasing the demand for land. He further added that the increased land demand made urban investors and corporations compete aggressively for land at the frontiers of settlement and in areas of well-established settlements and this resulted in unequal land ownership holdings (as large farms buy up smaller ones) and a reduction of chances for the poor to become farmers. Hecht and Cockburn (1989) investigated the causes of deforestation in the Amazon by following a chain of explanation based on the regional political economy of Brazil. In line with Binswanger (1991), they also mentioned that deforestation has been driven by the influence of the state through the provision of subsidies to ranchers and other producers (Hecht and Cockburn 1989). They added that military rulers in the 1960s sought to impose their authority through economic development by introducing industrialised methods of agriculture, so creating a crisis of land access for the poor. The elites created a

subjugated peasant class and distributed land and labour not only to ensure economic growth but also to control the local populace. This imposed land tenure system caused massive deforestation, and opening up the Amazon through infrastructure construction involved land reform by providing land to unemployed workers.

Though many national and international NGOs, and academicians internationally have all appealed for the protection of the Amazon, the outcome has so far been frustrating. The present government elected in 2002 promised to protect the environment of Amazon but practically it was very difficult for them to hold to that promise in the face of international debt repayments and the need to maintain economic growth. Instead they have tacitly conspired with the loggers and ranchers to continue their development activities. The Brazilian foreign minister recently commented that 'Promoting preservation when at the same time promoting economic growth and better social conditions ..... is a very complex....challenge' (*The Independent*, 20th May 2005).

3.2. The forestry of India and Bangladesh

3.2.1. Forestry in India

Forest resources in India have been increasingly subjected to degradation and destruction. Historically, India's forest policy and legislation have contributed significantly to the process of deforestation. Traditionally, from ancient times forest land has been at the centre of the subsistence of many communities in India. Forest people and those on the margins of the forest depend on it for their food, shelter, fodder, fuel, grazing land and other forest products. Conflicts back to the colonial period and Gadgil (1995) have shown that the assertion of state monopoly rights over forests and the exclusion of forest communities has marked the organizing principles of forest administration. There has been opposition to commercial forestry since its inception in 1864 and this has ignited conflicts with local people. Guha (1983a, 1983b) examined the development of historical (colonial and postcolonial) forest policies, management and legislation and their relationships with the society, where strategies are driven by a nexus of power relations. Forest communities and their traditional rights are found consistently to have been

marginalized by forest policies, causing tensions between social groups contending for access to resources and the levers of power.

Guha (1983a, 1983b) focused on the resource extractive and commercially motivated attributes of the colonial forest policy. He presented a brief account of how forests served the colonial government, which then caused forest depletion. He further added that during the early colonial period of forest conservancy was established with a view to ensuring a steady supply for military purposes and commercial export. Subsequently forests became a source of revenue-generation in a number of ways: agricultural expansion by clearing it; the East India Company's infrastructure development projects; and the use of its raw materials for maritime expansion, fuel for locomotives, and wood required for the two world wars. Moreover, non-timber forest produce (such as resin and turpentine, tanning materials like kuth, essential oils) were also transferred to Britain.

Another important feature of the colonial forest management policies was the application of European scientific models of forest management entangling codified information, standard techniques and rigorous management in order to maximize the growth of trees for hard wood extraction, harvesting and the regeneration of commercially valuable species (Shiva 1989, Sivaramakrishnan 2000, Guha 1989, Peluso 1992). Referring to the colonial (scientific) forest management techniques and silviculture in mixed deciduous forests in Bengal, Sivaramkrishnan (2000) noticed that the application of scientific forestry in the nineteenth century simultaneously increased state control over forest resources and exerted a broader domination over the traditional local people. After the establishment of the Forest Department in 1864, the state created monopoly rights for consolidation and demarcation of the forest under the 'Forest Act 1865'. This forest demarcation and classification were conducted with a view to distributing the jurisdiction of forest land among government departments (forest, revenue) and different definitions were developed to extract resources from each category. Guha (1983a) wrote that categorization and demarcation gradually led to the seizure of the customary rights of the rural people to use forest resource, and defined their use as no more than a 'privilege', at the mercy of the local authority. The progressively dwindling rights

and consequently loss of control over the natural resource evoked many revolts in tribal communities from the early period of forest administration.

Haripriya Rangan (1995) investigated the deforestation of the Garwal Himalaya and focused critically on the power and politics deployed by the different groups in society for extracting resources. A dispute was initiated in 1893 around the reclassification of 'wasteland' (land demarcated for community use) as "Reserved Forest". Subsequently several reclassifications were made as a solution to earlier disputes and they redefined the territory of resource use among the government agencies (Forest Department, Revenue Department) and other groups (small-scale extractors, local community traders, petty traders, villagers). Each redefinition of 'waste' land caused the area for public use to shrink and was opposed by in various ways, such as litigation, arson, and theft. In response, the colonial government and representatives of the community in 1921 initiated yet another classification, and this caused still more devaluation of forest land.

After independence, the new forest policy (1952) of India reproduced all the characteristics of the colonial policy of 1927. The new policy was influenced by a new rhetoric of economic growth but the other system of forest administration remained largely the same (Jewitt 1995). With the rapid growth of industrialization in India, state policy legitimised the expanded industrial and fuel wood demand from forest. In this context Guha (1983a) asserted that 'before 1947, our forests served the strategic interests of British imperialism, and after independence, they served the needs of the mercantile and industrial bourgeoisie'. The new demand forced the Forest Department to redirect its earlier conservative view of forest management to adopting a production-oriented approach and this was enacted through the large scale plantation of quick growing, high yielding tree species to replace the slow growing species (Guha 1983a). In order to get an account of Indian forest policy, Table 1 borrows from Shehar (2000) and is updated with the main features of forest policy in the Pakistani and independent Bangladeshi periods.

Table 1: Major legislative mechanisms in forest management.

Indian Regime		**Pakistan/Bangladesh Regime**	
Major Legislation	Consequences	Major Legislation	Consequences
Indian Forest Act, 1865	First attempt to assert state monopoly on forests	-	-
Forest Act, 1878	Facilitated legitimization of acquisition of forests by the state; halted grazing, shifting cultivation, collection of wood and other products; guards could levy fines and impound cattle	-	-
Forest Policy, 1894	Rights and privileges of local people restricted	-	-
Forest Act, 1927	No legitimate right over forest resources for local	-	-
Forest Policy, 1952	Reinforced state's right to exclusive control over forests, administrative interests	Forest Policy, 1955	First forest policy in Pakistan period, aimed to manage forest with commercial motive. Provision of wildlife conservation was set.
Wildlife (Protection) Act, 1972	Growth in protected areas; exclusion of local communities; listed a number of punishable offences	Forest Policy, 1962	Forest management focusing on five areas (i.e. forestry, watershed management, farm forestry, range management, soil conservation) was framed.
Forest (Conservation) Act, 1980	Prohibits use of forestry land for non-fore stry purposes	Forest Policy, 1979	First forest policy in Bangladesh regime aimed at forest quality improvement and horizontal expansion (in off-shore islands and degraded forest lands) of forest lands.
Forest Policy, 1988	Emphasis and priority for conservation	Forest Policy, 1994	It adopted a 20 year Master Plan, aimed at improving environment conditions and to assist economic and social development (through social forestry).

Source : Sekhar (2000), Mustafa (2002), <http://www.bforest.gov.bd/act.php>

Furthermore, a massive road construction programme has facilitated increased extraction in remote forests while fragile mountain ecosystems have also deteriorated due to the imperfect and hasty construction of roads. The real benefits to the hill people are not notable. They worked as forest labour, but the improved communication has facilitated an influx of tourists and mountain climbers as a result of which ecological degradation and deforestation has accelerated.

The commercial interests of both India and foreign countries to export wood and wood products has involved a policy shift to replace a significant percent of the mixed tropical species with desirable species such as eucalyptus, tropical pines and teak. Guha (1983b) commented that one aspect in the deterioration of the Himalayan ecosystem has been the policy of encouraging pine at the cost of broad-leaved species. Revenue generation from minor forest produce has increased and the exploitation of tribal people by mercantile interests is more pronounced all over the country. In addition, the method of extraction has been detrimental effect to the local ecology. During the 1970s, when a remarkable decline in forest cover was first identified by satellite image analysis, the authorities were pressed for a new Conservation Act of 1980, which proposed to stop the use of forest land for non-forest purposes like roads, dams and buildings (Hazra 2002). However, forest communities have experienced a progressive loss of their control over their habitat and this has sparked different social movements struggling to regain community control over land and forest. An example is joint forest management (JFM) which started in 1990.

3.2.2. Forestry of Bangladesh

Historically, the forestry regimes of Bangladesh have embodied relentless depletion both in terms of quality and area. According to latest Forest Department statistics, the forest area covers 1.52 million hectares, 10.3% of the country (www.bforest.gov.bd), but real accounts would be much lower than this. An example can be mentioned to show how misleading the statistics of Forest Department are. Presently it claims about 18,000 hectares (MoEF 1999) of Sal (*Shorea robusta*) forest coverage in Modupur thana[2], but an unpublished PhD thesis

[2] Thana: third level administrative unit in Bangladesh.

(Islam in progress 2006) using high resolution satellite image shows that only 1,000 hectares remain. The Forest Department either does not have technical capability, institutional and financial support to generate good quality data, or they may be deliberately hiding the real situation due to institutional failure and corruption. Whatever the cause, the mass of people and civil society are not aware of the real statistics of forest area.

Usually, while investigating the cause of deforestation in Bangladesh, many traditional authors identify population growth in respect to increasing demand for fuel wood, agricultural land, shelter and in the hilly areas the shifting cultivation of the tribal people of Bangladesh as the main cause of deforestation (Huda and Roy 2001, Salam *et* al. 1999). On the other hand, forest officials mainly blame illegal encroachment by the local people and their over-exploitation of forest resources (Ghani *et* al. 1990a). Donor agencies, like the World Bank and the Asian Development Bank, articulate similar views. When investigating forest management practices, Khan (1998, quoted by Mostafa 2002) found that deforestation in government forests has occurred due to the inadequacy of the bureaucratic custodian approach. Moreover, if we consider the forest policy trend of Bangladesh, it can be said that it has been influenced by changes in political regimes throughout the past two centuries but still it bears the stamp of the hegemony of colonial forest management practices. Ironically, after partition, the core of the Pakistan forest policy of 1955 was a neo-colonial the expansion of state territory and the spread of bureaucracy by increasing manpower and managing all forests through rigid departmental plans (Hussian 1992). In fact, in both the Pakistan and Bangladesh periods, policy change has been minimal and forest management has reproduced the extractive motive. In the management of hill forests of Bangladesh, a practice of clear felling coupled with plantations has been adopted to upgrade poor quality natural forest using more valuable species with a greater volume, especially the single dominant teak, which accounts for approximately 70% of the plantation trees (Siddique 1986, Salam *et* al. 1999, Gain 1998). However, Rithaler (1992) noted that this clear felling practice has had an adverse impact on the quality and quantity of forest in Bangladesh. Rubber and other tree monoculture in both the central sal forest and the Chittagong Hill Tracts have contributed to the replacement of natural forest with the exotic species, which have less ecological worth and have less

significance for the sustenance of the local people, in what Shiva (1989) has called the 'death of Prakriti' (in English the 'death of nature'). Also, in the 1960s, environmental transformation by the construction of the Kaptai Dam caused deforestation in the hills (Sopher 1963).

In the coastal areas, the rapid expansion of shrimp farming has put pressure on the coastal forest. The Sundarban mangrove forests, which have been declared as a 'reserve forest' and a 'world heritage' site, are threatened in this way. In 1980s a large area of mangrove in the Chokoria, Maheshkhali vanished due to shrimp cultivation (Alam and Rashid 1996, Gain 1998).

In the central sal forest area, the main part of the forest has already been depleted. The Forest Department blame the local people for their illegal tree felling and encroachment of forest land for cultivation. On the other hand, the local people accuse the Forest Department of illegal logging and cooperating with organized tree thieves for bribes. The government has initiated different forestry projects for commercial fuel wood production and exotic species plantations for pulp industries (wood lot, agro-forestry), and these have given a big impetus to sal forest clearance in the central part of Bangladesh (Gain 1998). Moreover, land tenure problems have caused problems for forest tenants, due to the general dysfunction of government institutions (Atkins *et* al. 2006). Conflicts have arisen between the local forest people and government forest officials, and the main victims have been tribal peoples and poor Bengali forest dwellers.

3.3. Social forestry: A discussion

The apparent indifference of modern, scientific forestry to the subsistence needs of forest dwellers, coupled with theoretical debates over Hardin's 'tragedy of the commons' (Hardin 1968), has prompted a number of researchers, planners, donors, and development agencies to suggest the need to increase community involvement in management practices (Ghai and Vivian 1992). Proponents of participatory forest management suggest that community-based forestry can pioneer a new approach to social justice, equity, development, empowerment and environmental sustainability by transferring decision-making into the hands of local communities (Colchester 1994, Kumar and Kaul 1996, Peluso 1993a). It is even emerging as a panacea in

many third world countries such as JFM[3] in India, social forestry in Bangladesh, community forestry in Nepal. In Bangladesh, social forestry has emerged since 1980s as an integrated strategy to combine the aspects of forest resource management and rural development involving local people in forest management. It is planned to meet rural people's needs for forest products on a sustainable basis, and at the same create employment opportunities (www.bforest.gov.bd). The Forest Department, along with NGOs, like RDRS, Karitas, ASA, and Proshika, and with foreign financial assistance (ADB, UNDP, FAO, World Bank), have adopted social forestry as one of the components of a poverty reduction strategy and as a means of emphasising the involvement of women.

Social forestry is also practised in other Asian, African and Latin America countries, yet, despite increasing national and international interest in it, it remains challenging to maintain a good balance in practical implementation and theoretical understanding of community participation. In many instances, it seems that real participation is absent. Besides, in many instances, the concept of community is obscure. First, the structural formation of communities in Bangladesh is greatly influenced by power and by various social relations (economic condition, class, caste, ethnicity and gender). For example, minority peoples, women, and poor people are often marginalized from the community formation. Second, the selection of community representatives may be non-democratic and power-laden and so decisions taken are frequently one-sided and self-serving, and, third, it is difficult to apply the same concept of institutionalization everywhere in every society. The nature and characteristics of community in one society vary and this influences the nature of resource management.

Problems have arisen where participation is proposed within existing institutional arrangements because state forest officials have proved reluctant to devolve power to forest communities. In this connection, Gauld (2000) has critically examined the way in which community-based forestry is constructed and understood among government policy makers in the Philippines. He found that strong state control over

[3] JFM: Joint Forest Management, where village community and government share the responsibility and benefits of protecting and regenerating degraded local forest.

forest management was maintained in practice. In Peluso's (1993b) study, foresters were reluctant to increase local people's access to or control over forest resources unless they were employed as forest labour. They simply could not see communities as partners.

Implications derived from the Indonesian context suggest that the results of community-based forestry policies have been insignificant in achieving the targeted goals and rather have increased social and ecological marginalization. Neupane (2003), referring to a recent study (Malla 1997) of Nepal, stated that, despite some improvement in the physical condition of community forests under a scheme there, there has been only limited improvement to the livelihoods of the poor and issues of equity were neglected throughout the programme.

In theory, JFM in India has been a positive step towards the decentralization of decision-making, involving local people and building up an institutional framework for the meaningful conservation and management of forests. It is a partnership-based forest management programme involving forest departments and rural forest users in regenerating degraded forests, including state-owned forests. Since its inception in 1990 it has come under the scrutiny of development planners, donor agencies and academics. Many of them are very much optimistic about it because of its notions of creating social capital and reducing poverty. At the same time, some scholars are sceptical about its real net gain (Sivaramakrishnan 2000, Sarin 1993).

Joint Forest Management is not new in India. If we look back to the early form of co-management, since the time of forest classification (state forests, village forests, private forests, reserve forests) according to the Forest Act 1878, peasant needs were supposed to be met from the village forests which were to be managed by village communities. But in practice this option was rarely exercised by government forest officials, except in a few isolated instances (Guha 1983a, 1983b). In the colonial period co-management usually worked towards the appropriation and centralisation of resource management.

In the present context, the 'jointness' of JFM is at the forefront of questions about conflicts over institutionalisation, especially on the issue of participation. It has been

framed in a top-down manner where the state (the Forest Department) defines the rules and conditions of partnerships, the distribution of benefits and the overall agenda, with the result that there is a very limited participatory role for villagers (Sundar 2000, Kolavalli 1995, Menon 1995). Some writers have even argued that such people-centered, bottom-up programmes are merely a means of lessening state obligations towards resource management without ever involving local communities in decision-making (Sarin 1998, Mukherjee 1995).

This seems to be the case in Bangladesh (Salam *et* al. 2005). Khan and Begum (1997) investigated participation in the Chandra sal forest, Gajipur, Dhaka and observed that bureaucratic top-down decision-making has been present in every phase of the project design and management. Farmers have virtually no decision-making freedom in the selection of beneficiaries, choices of species, site selection and silvicultural techniques. All of them are prescribed by the professional foresters. True collective planning has never been addressed and farmers are never been consulted for their opinions at any stage. Anyway farmers are sceptical about the benefits of the sharing process as they do not have any formal papers by way of a benefit-sharing agreement. Similarly, in India's JFM, the Village Forest Protection Committees have not been involved in planning and decision-making at any stage and this situation discourages them from participating in day-to-day management processes (Sekhar 2000).

Khan (1998) has made other comments about the social forest policy of Bangladesh. It does not consider regional variations and other contextual factors such as land tenurial arrangements, institutional structures, social relations, market mechanism, benefit sharing arrangement and inter-agency coordination (Khan 1998, Khan and Begum 1997). Besides, there is striking disparity among men and women's participatory status. In a patriarchal society like Bangladesh, the issue of equity and equality in women's interests, their access to resources, services and benefits have been commonly determined by the social structure and power relations of the society. According to cultural traditions, men in general control the major resources. Women have limited access to resources such as land credits, information services, modern tools and technology and training (Ahmed and Larrman 2000). Even in income-generating activities carried out by women, in many instances characterised

as of low productivity, they are paid less than men. Women are socially and culturally not permitted direct commercial activity and they have to depend on men for marketing and the handling of money due to their own social segregation. In this connection, although social forestry has brought some opportunities for women to be involved in income-generation work, it has scant implications for their land rights and marketing activities, which are traditionally dominated by men. Similarly, in India, both Sarin, and Agarwal (1995, 2001; 1997b, 2001) have asserted that gender disparity is very common in JFM. Women, as a group, are still generally excluded from the decision-making process. Women's participation in VFPCs and their decision-making role is very limited. In the same way, Gupte (2004), referring to Indian villages, shows that gender inequality due to societal traditions limits the ability of women to participate in policy-making, even when they are not formally excluded.

In conclusion, more flexibility is needed in social forestry schemes that would allow the community to take part in the programme-design phase, negotiation about benefit-sharing and participation in decision-making at different stages. Such programmes could be made more effective by involving local NGOs, which could play a mediatory role in minimizing the other social hindrances like gender bias and class, caste and religious discrimination. Attitudinal changes within the forest agency, accompanied by some interventions in the underlying power relations, can improve the patron-client relationship between the forest department and the involved community. The issue of building partnership with the community can be helpful to remove the psychological distances among the stakeholders which might help to derive some fruitful result from it. So, I echo Peet and Watt's (1996a) comment that 'development can only occur if the affected participate in the design of the proposed policies, and the model which is implemented thereby corresponds to the local people's aspirations.' Improving participation and ensuring equity can be positive steps towards decentralization, but if power continues to be centralized, all social forestry projects will treated with suspicion by the people.

3.4. Conflicts, resistance and social movements: a review

Environmental crises and subsequent resistance by social movements are present in both developed and less developed countries though the context might be different.

Discussion of environmental issues in industrialised countries is mainly in connexion with quality of life but in third world countries (in Asia, Africa and Latin America) it is more to do with survival (Rocheleau *et* al. 1996a). In third world countries during the last twenty years, environmental movements have initiated a new political struggle for safeguarding the interests of the poor and marginalised groups and this has often been expressed in terms of the close association of rural people with nature, their means of maintaining their livelihood systems, and their right to access natural resources.

Peet and Watts (1996a) discussed three theoretical foundations (i.e. Marxism, historical materialism and dialectic theory in social and environmental change) through which much of the work of theorizing social movements began. According to classical Marxism, a class is a group with a collective identity and collective agency which have been intensified through a political struggle that forces social and environmental transformation. From the materialistic viewpoint, the transformation of nature by the productive forces is characterised and organised by social relations and inequality of power, creating certain forms of consciousness, ideologies and politics that have particular effects on nature. This mode of production defines the relation between the natural environment and society. In a dialectical view, societal dynamics emerge from the contradictory oppositions in material reproduction and conflicts between the forces of production and a limited natural environment, which may result in crises and also cause the formation of classes which, in turn, are the primary ground of struggle.

Recent theories of social and environmental movements have shifted from classical Marxism. Presently, emphasis is given to economic factors, including the influence of globalization, the widespread impact of capitalist structures. People specify their own responses in line with these influences based on their own experience and histories. Besides, Scott (1985) has argued that class does not take up the total explanatory space, especially in the peasant society, where kinship, neighbourhood and ritual links and other social relations mediate class (Scott 1985). In addition, the advent of information networking and technological advancement has added a new momentum. It has widened the circumference of society and opened up the scope for cross-cultural integration in environmental protest movements. For an

example, internet technology has brought the Tropical Rainforest Movement closer together and this is now working as a united force.

In third world countries, common people (including poor farmers, forest people, shifting cultivators, tribals, low castes, petty traders, hunters and gatherers, and other groups) have resisted when their livelihood systems, their rights and control of over natural resources, and their cultural practices have been interrupted by any external force or agencies. The struggle has given them opportunities to act as politically-integrated but still socially distinct groups (across class, caste, ethnicity and gender).

In the Asian context, the origin of environmental movements can traced to the colonial resource extraction and exclusion of native peoples from their ancestral rights of natural resource use and access. (Bryant 1993, Gadgil and Guha 1995, Colchester 1993). In the post-colonial period, people have resisted against resource extraction by the state and commercial resource extraction by political elites (for example Chipko in India, the people of Sarawak, Malayasia, and the Mistiko of Honduras and Nicaragua). Besides, recently people have also mobilised against large-scale development projects (big dams, the plantation of exotic species, etc.). They have resisted through non-cooperation, breaches of the law, illegal forest firing, theft of resources, street demonstrations, media campaigns (including on the internet), petition submission, signature campaigns, academic debate, etc..

The famous Chipko (tree hugging) movement has brought a new momentum to the environmental movement of India. 'Chipko' developed in the Uttarkhanda Himalaya in the context of protests against the state-sponsored commercial logging with a view to preventing the violation of the customary forest rights of villagers. In 1970, a devastating flood in the region triggered a number of landslides and the associated damage to life and property made the villagers to realize the relation between deforestation, floods and slope instability. Confrontations between the villagers, timber contractors and forestry department personnel started in 1972 with a series of incidents near Gopishwar in Chamoli district. In early 1973 the villagers were unsuccessful in persuading the government contractors to stop tree felling they then adopted a Gandhian-style of non violent resistance through embracing the trees

and this was finally successful. After that the idea Chipko spread to other villages of the Garwal Tehri. In Reni village, women of the Bhutia tribe used the same tree hugging approach to protect trees from felling operations. Gadgil and Guha (1995) commented that 'Chipko' has brought a sharp focus to a wide range of issues concerning the country's forest policy which also impinge on the environmental debate as a whole.

Chipko has been hailed by western and Indian environmentalists due to its success of grassroots mobilization against ecological destruction. It has inspired criticism of many development activities which are considered ecologically unsustainable and don't meet the traditional needs of peasant subsistence (Shiva 1989, Gadgil and Guha 1992). In another example, people resisted commercial plantations in Karnataka (known as the Plack and Play movement). Peasants protested against the state allotment of communal pasture land to a polyfibre industry for the commercial plantation of fast-growing eucalyptus trees for use in the paper, pulp and rayon industries. In 1987, they symbolically uprooted the eucalyptus seedlings and replaced them with local species that yield products useful for satisfying their own needs (Kanvalli 90, 1991, cited in Gadgil and Guha 1995, Colchester 1994). Clashes between the subsistence and industrial uses of forest products have drawn protests from reed workers in Kerala, bamboo workers in Karnataka, and rope makers using wild grasses in the Siwlk Hills of Uttar Pradesh who opposed government policies promoting a paper industry.

Also inspired by Chipko, movements have been taken place all over India against government hydraulic dam projects which planned to displace thousands of people from their villages, and agricultural and forest lands. Similarly in Bangladesh, the construction of the Kaptai Dam began in 1952 in the valley of Karnafuly and its tributaries, depriving 85,000 tribal hill people (mostly Chakma) and transforming the environment. Opposition was unorganized at first but subsequent government plans to encourage the immigration of poor landless Bengali people from rest of the country gave a focus for action. This scheme was responsible for the suppression (politically and morally) of the tribal people, the disruption of their traditional cultural practices, and massive deforestation due to the creation of new Bengali settlements and cultivable lands. This situation spiraled out of control when political

unrest gave the government an excuse to establish a military camp and burn tribal settlements in the area. This in turn was resisted by armed paramilitary groups in the hill tracts.

Another forest group to have mobilized to protect their land rights in Sarawak are the Dayak people, organized against commercial loggers. They established barricades across roads to restrict the activities of the logging company. The politicians tried to crush the native resistance by mass arrests. In the colonial era they had been the target of the British Navy's gunboats as 'pirates', and after independence as poachers in the national parks (Colchester 1993). In Moranga, Madagascar, peasants have chosen to stay in prison or pay fines rather than stopping their traditional shifting cultivation. Illegal burning of forests and prairies became a symbol of protest against the Madagascar authorities (Jaroz 1996). In Bihar, India, the struggle between the commercial plantation and communal use of forest has been symbolised as a conflict between the 'teak' and 'sal' trees. The Ho tribal people have been losing their rights in the forest and have protested against the forest department through a 'forest cutting movement' in spite of having an ancestral tradition of respecting the forest.

Finally, in Bangladesh, the state monopoly over forest resources and its irrational attitude and behaviour towards forest dwellers, coupled with its neglect of their culture and traditional rights, have brought about conflict. This is now common in the sal forest in the central region and hill forests. Poor tribal people have been the main victims through forced expulsion from their ancestral land, illegal court cases and sometimes armed conflict.

4. Women, environment and development: focusing the contemporary trend

4.1. Introduction

Since early 1970s women's relation to the environment emerged as an additional focus in the existing women and development discourse and during the last two decades women, environment and development (WED) as a theme has increasingly attracted much scholarly attention. The initial debates and discussions on it can be traced in the feminist agenda (of the 1970s) with the emergence of ecofeminism in

northern countries. Since then the discourse of WED progressively encompassed several strands with significant differences as diversified feminist scholars and activists have analyzed women's relationships to environmental problems from different viewpoints. One school emphasizes the managerial solutions for minimizing negative effects of the process of economic development by targeting women as recipients of development assistance and at the same time considers the effects of development on the environment. Usually development agencies take this proposition in their practice. The other group finds the model of western development is essentially flawed as the development initiatives result in negative outcomes on southern women, men and environment (Shiva 1989, Mies and Shiva 1988, Rocheleau and Ross 1995). In this context the analysis of the women and nature relationship is a critical issue to understand the discussions and debates on the theme.

The linkage between women and environment emerged as a significant issue and came under major focus in both feminist debate and the agendas of development organizations. Some feminist groups find no gender differences in human-environment relations unless they are influenced by the impediment of uneven political and economic structures. On the other hand, other feminist scholars working on women, environment and development trace gender differences in human-environment interaction (Merchant 1996; Mies and Shiva 1993; Shiva 1989). This concept has been highly contested by some scholars for whom gender relations remain the prime focus (Agarwal 1997, 1998, 2001; Jackson 1993a, 1993c; Warren and Cheney 1991).

Another group of scholars has discussed gendered land tenure system, gendered property relations, the gendered distribution of natural resources, and access to and use of environmental resources which have been differentiated within different spheres of society (i.e. household, community level) interacting with social relations (class and gender) in the process of development (Carney 1993; Wangari *et* al. 1996; Fortmann 1996; Freidberg 2001; Mackenzie 1995; Rocheleau *et* al. 1996; Rocheleau and Edmunds 1997; Schroeder and Suryanata 1996).

Okoko (1999) explored how environmental degradation due to oil exploration (spillages) was a major factor in the out-migration of able-bodied men to urban areas, and it resulted on the livelihood pattern of female family members in Ibeno, Niger delta. He discussed how the absence of a male bread winner increased women's work load and female child labor but the existing patriarchal land tenure system restricted the women's land ownership. In other words, they were never able to get their identity established and their efforts remained unrecognized and unvalued.

It can be argued that women in the rural areas of third world countries, traditionally acting as household managers and organizers of family provisions, have been major users of environmental resources (collecting food, fuel wood, water, medicinal plants and some other raw materials) for family sustenance. [4] As such, environmental destruction can have a more detrimental effect on them than for men. For an example, changing water regimes and related ecological degradation can have adverse gendered impacts, particularly on poor women (Crow & Sultana 2002), as shortages may require more of their time, physical energy and involvement in different types of risks in order to collect it from distant places. Similarly, as the household managers, women suffer first due to deforestation, land degradation, desertification, soil and water pollution, hazardous waste disposal, lack of access to safe drinking water, lowering of the fertility of agricultural land, loss of biodiversity, climate change, natural disasters, etc.. In this context, it can be argued that women's relationship to the environment cannot be seen as straightforward since it is defined and shaped by social relations (gender, class, caste, and ethnicity)(Agarwal 1992, Rocheleau *et* al. 1996, Leach and Mearns 1991).

In line with the above-mentioned arguments, it is important to raise questions about how far the development planners in a third world country like Bangladesh value the linkage between women and environment in the existing politicized and gendered environment where women have limited political representation, limited rights on land and property, scant authority over decision-making, and a lack of proper education to enable them to access new technology and other training.

[4] Here I am acknowledging the labour of men in fuel wood collection.

Generally such inequalities remain unexplored and unaddressed and continue over time in the policy domain of Bangladesh, where half of the population (women) bear the major portion of the subsistence workload and mostly remain neglected. From that point of view, in this study, I would like to explore the processes through which access to user rights and control over environmental resources are defined and maintained by the existing power structure and social mechanisms.

Moreover, it is often asserted that women are motivated more than men to work for the enhancement of the sustainability of the environment, and this encourages development agencies to promote women's involvement when allocating aid in environmental projects (Momsen 2004). But in many instances it is found that women are added to the development projects on the basis of 'business as usual' (Buckingham 2004), which does not help to address gendered inequalities (i.e. lack of political representation, inequality in decision-making, pay differences, unequal benefit-sharing in development projects, etc.), rather new work is added to their daily labour. Sometimes women's involvement is suggested in policy planning but practically gender equity is ignored in implementation. Both Agarwal (1997) and Sarin (1998) observed inequitable gendered participation in Indian community forest management. Similarly, the proposal of the massive Flood Action Plan (FAP) in Bangladesh neglected to incorporate any women's involvement or to accommodate their interests in flood prevention activity as well as water management. In this study it is also my contention to see how power-laden development initiatives, especially forestry projects, consider women's participation at different stages of policy planning and implementation.

4.2. Themes in women, environment and development discourse

Starting from the welfare approach in early 1970s, through different phases of evolution, feminist thinking on environment has emerged as a strong field in social science with significant contributions by scholars, activists, international organizations and different international conferences. Rocheleau *et* al. (1996a) identified a series of schools of thought within the environment and gender paradigm, including ecofeminism, feminist environmentalism, socialist feminism, environmentalism, feminist poststructuralist and feminist political ecology. A brief

discussion follows to help an understanding of the issues and arguments within the said framework.

4.2.1. Ecofeminism and feminist environmentalism

Ecofeminism emerged in 1970s, with an increasing consciousness of the connections between the domination of women and domination of nature, mainly among feminist scholars in North America, and it became very important in shaping views on women and the development. Different authors defined it in various ways. Sturgeon (1998) simply described it as movement that makes connections between environmentalisms and feminisms – precisely it embodies theories that articulate ideologies that acknowledge that injustices based on gender, race, and class are related to the ideologies that sanction the exploitation and degradation of the environment.

Ecofeminism embodies diverse strands of thoughts and distinct variations can be observed in its typology. Marchent (1996) classified it in categories such as liberal, cultural, social and socialist feminism, where all of them have contributed to the ecofeminist perspective in different ways.

Liberal ecofeminism, the earliest form of feminism rooted in liberalism, predominated until the 1960s. Liberal ecofeminists sought to solve the disorders relating to women and environment by altering human-nature interaction through the better use of science, conservation and environmentally sound social reproduction by seeking appropriate laws and regulations within the existing structure of governance.

Cultural ecofeminism can be characterized by the perception that women and nature both have been mutually associated due to their biological reproduction (Ortner 1974). These connections potentially act as the source of female power and ecological activism and both are devalued by patriarchal society and the influence of western science and technology. The epistemology of science and technology has been seen as deeply masculine and exploitative to (female) nature. Merchant (1996) argued that the ancient identity of nature was as a nurturing mother, but the

scientific revolution and the rise of market-oriented culture in early modern Europe undermined the female earth, which was central to organic cosmology. Cultural ecofeminists often celebrate the relationship between women and nature through spirituality and ancient rituals centered on the worship of a Goddess.

Social and socialist ecofeminism, on the other hand, grounds its analysis in relation to production and reproduction in a patriarchal capitalist society. Scholars of this persuasion recognize that women's role in production and reproduction (agricultural production, gathering of food, fuel and medicinal plants, child bearing and rearing low paid workers) makes them interact with nature and at the same time be dominated by men. Like women, nature is also dominated through the existing capitalist relations of production by patriarchal society and economic structures. Thus, women having a close affinity with nature can recognize environmental crises due to sharing a common experience of oppression and this helps them to argue in favor of the environment.

Ecofeminist actions address and oppose assaults on women and the environment in both the north and south and propose alternative thinking. Specifically, in the north, when radioactive material, toxic waste and hazardous chemicals threaten the biological reproduction of the human species, women have seen it as being hazardous for their own bodies and their children's health and took steps to resist it. When direct access to food, fuel and clean water were imperilled by different activities such as cash cropping, exotic species cultivation, excessive pesticide use by agribusiness, women in third world countries have stepped up to protect their traditional way of life and protested about ecological damage done by commercial industries and multinational corporations. For example, a Kenyan women's tree planting movement (the 'Greenbelt movement') was initiated with a view to getting access to fuel wood and water for subsistence. Besides, its wider objectives were to combat desertification by planting trees for the conservation of soil and water which had been threatened by the development programmes of colonial governments. After the Sandinista revolution, Nicaraguan women campaigned against the extensive use of pesticides (e.g. DDT). The 'Chipko' movement in Garwal, north India is another prominent example, where the village women opposed commercial logging by hugging trees. The work of the prominent ecofeminist, Vandana Shiva

(1989), has been influenced by the Chipko movement and it has added extra momentum to contemporary women's environmental thinking. The main focus of her views lies in ecological sustenance and alternative development perspectives in the south, where she tries to find deeper meanings in the concerns of ecology and femininity.

Shiva argued that the western model of development is a symbol of violence to the integrity of the organic, independent earth. In her book "*Staying Alive*" (1989) she portrayed science as a masculine and patriarchal project that necessarily entails the subjugation of both women and nature. She argues that for third world women, productivity is a measure of productive life and sustenance; the survival of life is at the centre of the notion of the productivity of nature. Referring to concerns about forests in India, she mentioned that the patriarchal 'reductionist' model of western science is based on the motive of capitalist profit maximization and caused the degradation of ecology. It has no embedded concern for the subsistence perspective of women, thus the devaluation of women and the degradation of nature both are structured by the patriarchal scientific model of development.

Shiva played an important role in shaping the discourse of women, environment and development in the international arena. According to her perception, nature is the source of all life; a symbol of the feminine principle. She further called it 'Pakriti'(nature) and characterized it as a creative, active, productive and powerful force in respect of the creation, renewal and sustenance of diversified lives on earth. Deriving the root of her thinking of nature from Hindu philosophy, she perceives nature as an expression of the dynamic energy; powerful 'Shakti' (power) from which all existence arises. Any disruption in natural processes and cycles ('death of Pakriti') simultaneously causes the marginality and devaluation of women, so ecological crises are at the root of the death of the feminine principle. Having nearly the same way of thinking, Mies and Shiva (1993) also asserted that the reproductive works (providing basic necessities for family survival) bring women closer to nature. Finally both of them suggest that the recovery of the feminine principal of nature is the only way of survival for both women and nature.

However, Shiva's notion of the unitary characteristics of nature and women, and the recovery of feminine principles has been challenged by many feminist scholars. During the last 20 years much of the criticism of ecofeminism focused on essentialism and on the validity of a shared experience between the human and non-human, biological determinism, and the absence of a material, social and historical context (Buckingham 2004, Agarwal 1997, 1998, 2001; Jackson 1993a, 1993b, 1993c).

In contrast to ecofeminism, both Agarwal (1997, 1998, 2001) and Jackson (1993 a,b,c) analyzed women-environment interactions by focusing on gendered participation in natural resource management, the gendered division of labour, gendered property rights and gender equity issues, which in turn structure the effects of environmental change on people, and their response to it. Agarwal proposes an alternative theoretical position of "Feminist Environmentalism" based on regional patterns of gendered difference of divisions of labor, property ownership and power (Agarwal 1997, 2001). Women are very important stakeholders in natural resource management in the rural economy of developing countries through their reproductive works. But women's participation in policy formulation and practice is still neglected by the power and structure of the patriarchal society even if they are not formally excluded. Agarwal (1997, 1998, 2001), Sharin (1998) and Gupte (2004) studied forest management in India and noticed women's exclusion and highly inequitable participation in micro-level forest protection groups under the JFM. This exclusion of women affected their family welfare, efficient functioning of the institutions, and the scope for women's empowerment, and deprived them of economic benefits. Women lost their user rights to the forest that they had customarily enjoyed, and their work load increased due to the need to collect fuel wood from further away. From the feminist environmental viewpoint, an alternative transformational approach has been suggested which would involve a complex of interrelated changes in the production mechanism, the use of technology, and the class and gendered distribution of products and tasks. Above all, there is a need to challenge and transform notions of gender itself (Agarwal 1998). Similarly, Braidotti *et* al. (1994) and Leach *et* al. (1995) emphasized the importance of understanding the processes of resource use and their structuring by gender relations. Sach (1997) on the other hand stresses the importance of differences; the

necessity of exploring local knowledge, rather than universal truths, which is especially useful for investigating women's understanding of the environment. However considering multiple views and diverse arguments of different strands in feminist thinking, Rocheleau *et* al. (1996a) instigated political ecology as another, new strand wrapping up much of ecofeminism but simultaneously considering some of the criticisms of it.

4.2.2 Feminist Political Ecology

By drawing on diversified views of gender and environment, a new conceptual framework has emerged, 'feminist political ecology', comprising some of the elements of feminist cultural ecology, political ecology with those of feminist geography and feminist political economy. The central idea here is summarized by Rocheleau et *al.* (1996a): men and women's experiences, responsibilities and interests with respect to nature differ due to gender differences in human-environment interactions and these gender differences are constructed socially, interacting with people rather than biologically, resulting in divergence in terms of culture, class, race, and place and, at the same time, variation with the different changing conditions of individuals and societies. The main approach of feminist political ecology examines the very definition of environment and gendered discourse of environmental science, environmental rights and resources, using feminist critiques of science as well as the analysis the actions of feminist and environmental movements.

Rocheleau *et* al. (1996a) discussed three common critical themes that feminist political ecology addresses:

- gendered science of survival;
- gendered rights and responsibilities;
- gendered environmental politics and grassroots activism.

Theme 1: Gendered science of survival – This theme explores the ways through which women's understanding and use of the science of environmental processes and systems is different from men's. This can be viewed as different possibilities among men and women in defining their relationships with nature. Women have their own perceptions of knowledge for survival through production and

reproduction; their understanding of the science and technology of a safe environment at home and workplaces differs to that of men. The gender implications of science and technology are perceived through the different political and environmental struggles of the women for survival and a better environment in every day life. Northern women's movements against nuclear waste, chemical waste, radio active waste, pesticides and herbicides, Kenyan women's rejection of exotic tree plantation schemes, and many other rural women's struggle to protect trees, have questioned professional science and technology and challenged its definition of environment and ecology by presenting their own alternative perspectives of environmental issues in personal health, home and work places. Feminist political ecology thus deals with the intersection of gender, science and environment in academic and political discourses in everyday life (home, workplace) and in social movements that have opened up a new focus on this issue (Rocheleau *et* al. 1996a) .

Theme 2: Gendered rights and responsibilities – Gendered environmental rights (*de facto, de jure*) over resource use, access to resources, and the responsibility of procuring as well as managing resources for the household and the community, often reflect human-environment relations. This theme reflects men and women's distinct rights and responsibilities in production, in maintaining the quality of environment, in resource use and control, and in creating a healthy biophysical environment. This division of power to interact with the environment and to regulate others' actions determines the quality of life and the nature of the environment. For example, the land tenure reform in Kenya as initiated by the colonial government and later on by the newly independent state, excluded women from resource access and use, and forced them to find strategies for their survival (Wangari *et* al. 1996).

Theme 3. Gendered environmental politics and grassroots activism - Women all over the world have been at the forefront of grass roots movements, new social movements, and political organizations involved in environmental, socioeconomic and political struggles. The collective struggles of women have influenced the redefinition of policy agendas, the recognition of women's voices, their identities and work, and this has been reflected in the recent emergence of women's

participation in public fora, including internationally. These movements have some implications for reconstructing women's identities in society.

Human beings depend on the production and reproduction of ecosystems, and these are not politically neutral (Robbins 2004). The restructuring of environmental systems causes break downs in its productivity and support to the community. Women are major victims of environmental marginalization and they are forced to participate in collective struggles for the sustenance of nature and their families. Rocheleau *et* al. (1996) considered five major issues, as listed below, which have led women to become involved in collective movements.

- Declining ecological and economic circumstances
- The impact of structural policies
- Consciousness-raising and political awareness
- The political marginality of most women
- The role of women's movements

Feminist political ecologists try to explore the nature and forms of women's activism relating to policy and environmental management issues, access to and distribution of resources, and assessing political change and environmental sustainability.

4.3. Women and environment relations in Bangladesh

In Bangladesh, gender relations in Bangladesh, like in other patriarchal societies, is culturally constructed, socially fashioned and historically carried on for generations by cultural practices. It is also defined and shaped under the strong influence of religious taboos. Concurrently, cultural practice is also influenced by the religious norms and it determines a negotiated sphere suitable for women. This sphere is not free from the influence of male family members (household/outer work place). In this context, Wood (1997) has explored the domain (private/public) of women in Bangladesh where they could exercise some power. Along with women's labor and management responsibilities in the private sphere, which is the source of some *de facto* power, they can be engaged in public trading in small livestock, and in barter

and credit deals with neighboring families, but the latter is often restricted by 'purdah' and the veil. The exercise of power in public therefore remains essentially within the cultural norms of femininity driven by patriarchal rules, where power is in effect distanced. In addition, the working sphere is also conditioned by the other social relations such as social class, economic conditions, ethnicity and religious divisions. For example, in recent times lower class women in rural areas of Bangladesh have been compelled by economic necessity to come out of the home to join in agricultural or construction work as day laborers. Sometimes they find escape routes in urban low pay industry/service sectors (garment industries, house keeping jobs in affluent families, etc.). These spheres provide them neither with sufficient financial security nor with physical security. Still they find and enjoy some level of liberty through these provisions but obviously within the male-dominated array of norms.

The women of Bangladesh widely depend on natural resources but their incessant depletion is putting them in the position of expending more time and effort. In this particular study I would like to focus on the deforestation of Sal forest in the central part of Bangladesh. The forest of this region is under continuous pressure in terms of area and quality. Women are dependent on it for fuel wood and other forest products. The Forest Department is trying to regenerate the forest with some exotic species through different participatory projects and they are restricting the common use of and access to the forest by local women. It will be interesting to see how women are involved in these projects. Further discussion will be found in the case study chapters.

5. Conclusion

Political ecology has already been established as a strong strand of the analysis of contemporary environmental crises around world. Like other third world countries, Bangladesh is also prone to many types of environmental degradation but, hitherto, fin most cases the investigations of crises and the solutions prescribed have not been satisfactory and fruitful. Research has often been performed superficially, without considering root causes and subsequently the policy prescriptions recommended for it cannot help to solve the problem but rather waste time, money and effort. Women

are one of the most vulnerable and neglected groups in society and environmental degradation impacts badly on them. Conventional policy prescriptions make insignificant room for them, so the application of political ecology and a feminist political ecological framework can offer much potentiality in analyzing the causes and consequences of gender marginalization in policy-making.

In this particular literature survey I have tried to give a general overview on political ecology and of some of its concepts and theories that are directly relevant for analyzing the environmental crises of Bangladesh in my specific case studies. After surveying a large amount of literature, it is clear to me that political ecology is very efficient in explaining crisis conditions and in finding the contextual causes derived from socio-economic conditions and political implications at different scales. But, as a solution of crisis conditions, political ecology is yet to break ground in offering efficient guidelines that could be implemented on a practical basis. Poststructuralist theorists have proposed alternatives to development (not development alternatives) and a large portion of them arise from the grass root movements, but, by their very nature, grassroots movements are usually sporadic and in many instances unstructured. Although they have much strength, by comparison with the juggernaut of modern capitalism, they appear comparatively weak. For example, the impact of 'world rainforest movement' is insignificant by comparison with the forces responsible for the deforestation of the Amazon. Furthermore, the inclusion of local voices as alternatives might not be democratic at all times and can, of course, be politicized. Although it has much potentiality in future for offering some structured and efficient alternatives, particularly if based on a local contextual framework, we must therefore beware of academic romanticism and continually bear in mind practicalities on the ground.

Chapter 3
Shrimp Farming in Bangladesh and Its Consequences on Environment and Society: A Case Study of Coastal Bangladesh

1. Introduction

Maintaining a balance between economic growth and environmental sustainability is a great challenge for many third world countries. The desire for quick economic gain leads governments to encourage the intensive cultivation of export-oriented cash crops like tea, coffee, cocoa, cotton, sugar, ground-nut, banana and rubber in many African, Asian and Latin American countries. Debates over the production of food crops versus cash crops have been a concern of scholars and policy planners in both developed and developing countries. Proponents in favour of expansion of export crops recognise it as not only the easiest means of economic growth at both local and national levels but also the potential means of employment creation in populated areas (Balassa 1978). Others note that food security implies the assurance of both adequate food availability and access of population to that supply. In this context, cash crop sales can enhance the purchasing capability of food by raising the income levels of those with jobs (Weber *et* al. 1988). In addition to the prospect of household income augmentation, cash cropping can have an indirect impact on household activities, for instance boosting food production through more capital investment (Govereh *et* al. 2003). In addition, government agencies in many third world countries find it to be a convenient way of earning foreign currency for the repayment of foreign debt. On the other hand, in some developing countries, where planned expansion of export crop production has occurred, mainly backed up by government policies and sponsored by foreign technical assistance and funding, it has taken place on the fertile land that once grew food crops (Barbier 1989). Thus it undermines the local subsistence food production, pushing it on to marginal land (Stonich 1991). Hence, it could be the cause of marginalisation of poor people who depend on local subsistence production. In addition, environmental degradation is the obvious consequence of over-use of the productive capability of nature. Therefore, the expansion of reckless commercial cash cropping in a subsistence economy without adopting adjustment mechanisms can instigate complex changes involving its people, environment and society.

Shrimps have become one of the most profitable export crops of recent times. With increasing demand from developed countries, shrimp farming has dramatically expanded in the coastal areas of the tropics and sub-tropics, especially in Asia and Latin America during the last three decades. In Bangladesh, shrimp cultivation predominates in the south-western and south-eastern coastal areas, which were previously engaged in subsistence agricultural crop production. But, with the increasing expansion of irregular uncontrolled commercial shrimp farming, the production system of the area has recently undergone a process of dynamic change, with impacts on the environment, people and society of the region. The government's policy is to foster shrimp farming through trade liberalization policies on the one hand and absence of policies to resolve obscured property rights on the other, and the lack of law enforcement has made the situation complex and violent. From this perspective, the present study assesses environmental degradation and social dynamics in relation to shrimp cultivation in the southern region, in the light of the political economic condition of Bangladesh. It also explains how local production is influenced by global demand. This is done particularly by examining the processes of the expansion of shrimp farms within the last three decades, their relationships with the local production systems, changes in access and use of land resources, and their impact on local environment and society.

2. Background: Shrimp farming in Bangladesh

The greater portion (80%) of the shrimp farming areas of Bangladesh lie in the south-western deltaic part covering Khulna, Bagerhat and Satkhira districts. The rest of the area remains in the south-east, on the coasts of Cox's Bazar and Chittagong district (Figure 1). The Sundarbans, the mangrove forest, is situated outside the shrimp growing area. The shrimp farming lands are mostly flat and the average elevation is less than 3 metres. The area is criss-crossed by many small rivers and tidal creeks (Figure 1). Salinity tends to increase from north to south, and decrease during the rainy season (June-October) due to high rainfall. The main crop, the rain-fed, transplanted Aman rice, is cultivated during this period and shrimp farming starts after the harvest in January. Deb (1997) noted that the area under commercial brackish water shrimp cultivation has expanded in the last three decades in response to huge global demand and a steady standard price rate in the international market.

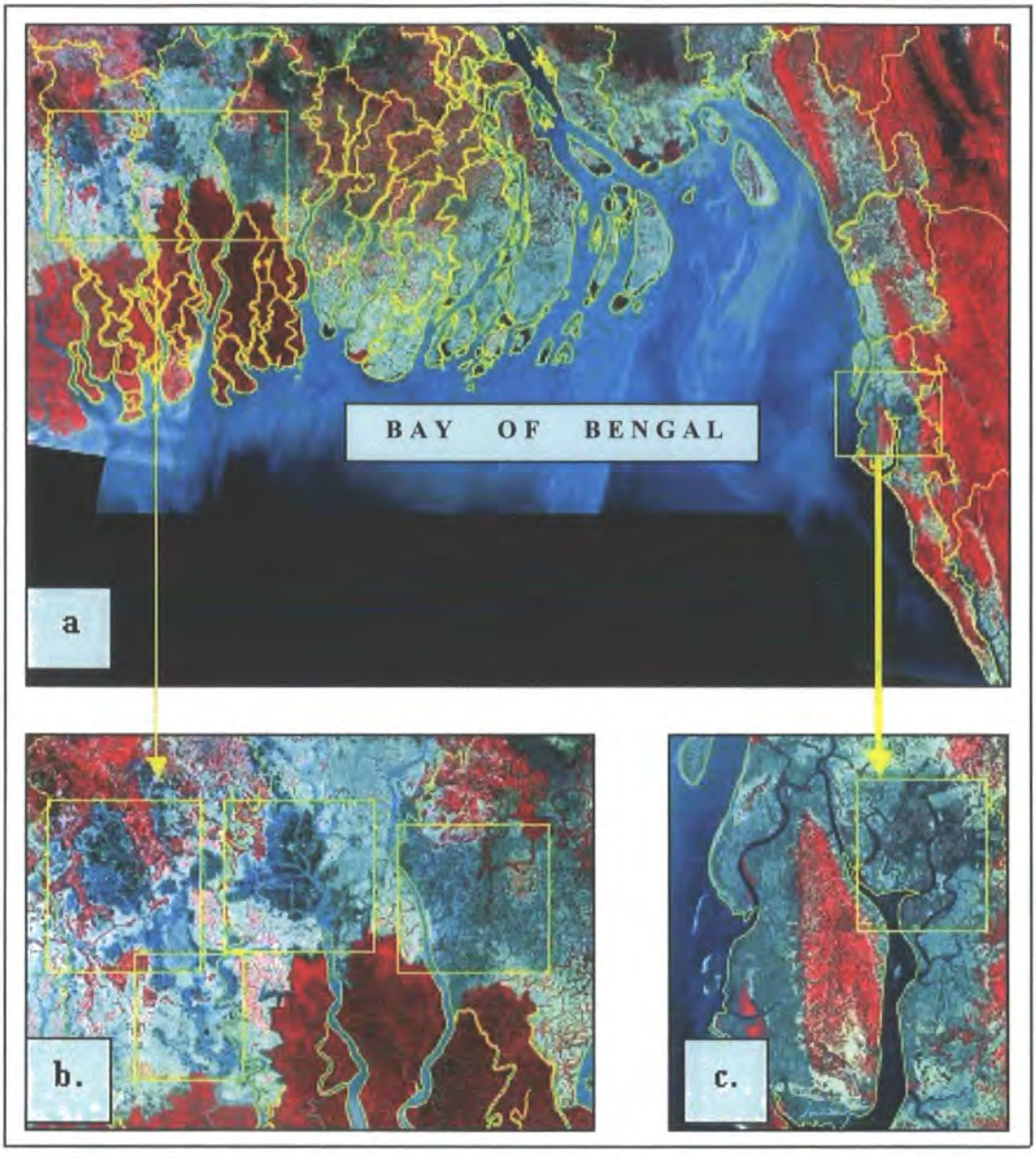

Figure: 1- Satellite images showing the major shrimp farming areas of Bangladesh. (a) coastal areas, (b) south-western shrimp farming zone, (c) south eastern zone. Source : CEGIS, Bangladesh.

This boom in shrimp cultivation happened in an uncontrolled and uncoordinated way. The area devoted to it expanded from less than 20,000 hectare (only Chittagong and Cox's Bazar district) in 1980 to about 140,000 hectare in 1995 (covering the south-west and south-east regions) (Table 2). Production increased from 18,624 tonnes (in 1989-90) to 63,164 (in 1998-99) (DOF 2001, cited in Ahmed *et* al 2002). Figure 2 shows the percentage of shrimp production.

Table 2. District wise aerial expansion of brackish water shrimp farming in hectare

District	1982-83	1984-1985	1993-94	1999-2000
Cox's Bazar and Chittagong	19,539	24,468	27,385	29,715
Khulna	12,817	13,456	30,187	29,551
Bagerhat	11,013	22,158	40,740	47,710
Satkhira	8,001	13,240	23,924	29,544
Total	51,370	73,322	122,236	136,520

Source: Rahman 2002 and statistical year book 2002

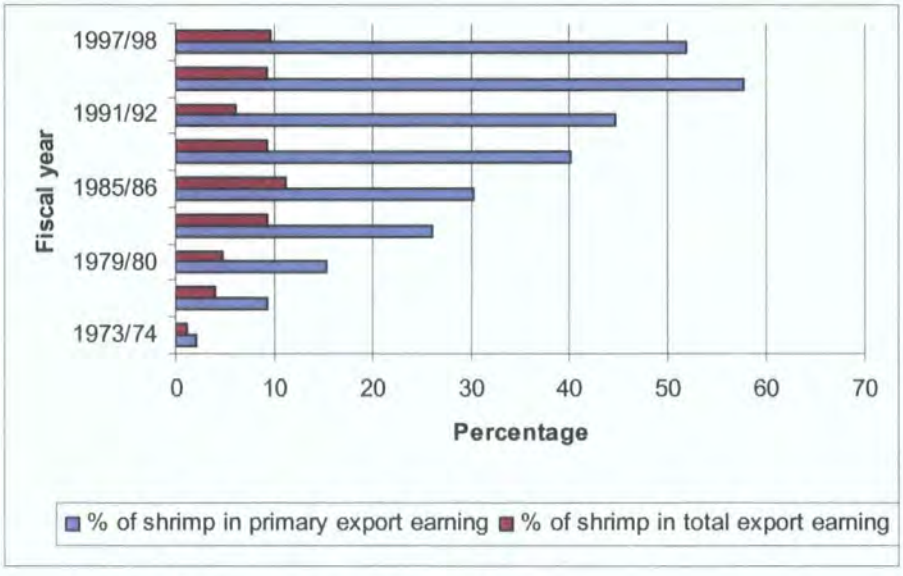

Figure: 2 Export earning from Shrimp
Source: Unnayan Shamannay 2001

Both fresh water prawn and brackish water shrimp are exported from Bangladesh, while brackish water shrimps comprise the larger portion of exports. Fresh water prawn is cultured in a number of areas (low lying swamp and waterlogged land) in Khulna and Bagerhat district. Brackish water shrimp farming, on the other hand, is unfeasible in many of these areas due to the siltation or course changes of the nearby main water systems (rivers/canals) from which brackish water is supposed to be canalized to the shrimp fields (Ito 2002). Fresh water prawn cultivation is also becoming popular with agricultural crop production in other neighboring districts such as Jessore, Narail, Gopalganj, Pirojpur, Noakhali.

In both types of shrimp/prawn culture earthen enclosures are built covering one or more plots of agricultural land to make a pond shape. Fresh water shrimp ponds are filled

with rainwater and in brackish water shrimp farming, tidal water is collected from the nearby canal by cutting the dyke/embankment. Usually a sluice gate is used to control the water level of the enclosure. The inlet and outlet sluices are commonly prepared with wood and bamboo or using cement pipes in intensive shrimp culture. Most shrimp farming in Bangladesh is organized along a spectrum from extensive to semi-intensive, and the structural arrangement of the ponds and management techniques used are not at the cutting edge of technology. Having said that, some intensive shrimp culture is practised with high external inputs and modern arrangements.

3. The Political Ecology of shrimp farming

Since the emergence of political ecology, various scholars have adopted its perspectives in examining environmental crises in different ways. Debate varies, such as Bryant and Bailey (1997) emphasising 'putting politics first' in political ecology, whereas Basset and Zimmerer (2004) lament that the field has become 'politics without ecology.' Both Escobar (1996) and Peet and Watts (1996a) urge the stronger appreciation of insights from poststructuralist philosophy. But in the jargon of theoretical debate, Blaikie and Brookfield's (1987) 'concern of ecology and broadly defined political economy' might be a better way of understanding environmental crises. Political ecologists have a tradition of finding the root causes of environmental crises following a mode of explanation that evaluates the influences of multiple interlinked variables acting at a number of nested scales, derived from the contextual socio-economic conditions and political influences (Bryant and Bailey 1997; Bryant 1992; Robbins 2004).

Regarding the examination of environmental degradation due to shrimp farming in Bangladesh, the central questions are 'who is degrading the environment'? and 'What type of impact is it having on environment and society'? Answering these questions, we find that some local rich farmers with self interest, local powerful elites, and also a number of voracious businessmen who do not live in the area, are in the forefront as actors responsible for the changing scenario. National government is a patron, in the name of economic growth, through its reforming policy measures. Moreover, the environmental crisis due to shrimp farming needs to be scrutinised for its links with global issues. International demand for shrimps is fulfilled at a cost of the environment and ecology of many third world countries, like Bangladesh dislocating ordinary people

from their subsistence occupations, creating inequities and breaking down social harmony, though the contribution of this sector to strengthening the national economy cannot be fully ignored.

Another important actor in this nexus is the influence of multilateral institutions such as the World Bank, International Monetary Fund, and Asian Development Bank. Their primary concern has been in assisting development programmes through technical suggestions and financial assistance but their suggestions and activities in many instances have, it is alleged, often accelerated the destruction of the environment in many third world countries (Bryant and Bailey 1997).The policy prescriptions provided by these institutions to promote economic growth in third world countries are said to have instigated uncertainty, environmental destruction and social inequity and marginalisation of the poor people, despite the economic escalation of some limited groups (Peet and Watts 1996a; Yapa 1996; Escobar 1996).

In this context, I would like to investigate the consequences of shrimp cultivation on the physical and social environment and to examine the context of environmental change due to the role of different actors at different scales (local, regional, national and global), taking a political ecological approach as a theoretical framework. Besides, I will examine the environmental degradation due to shrimp cultivation within a wider national and international context. Simultaneously the local level dynamics of shrimp cultivation will also be assessed. These local level processes of change are the manifestations of the broader national and international political economy. By investigating different issues, it becomes clear that environmental degradation due to shrimp farming needs to be understood by analysing the political economy of shrimp farming.

3.1. State policy, shrimp farming and integration to global economy

Environmental change needs to be investigated in the context of state policy, interstate relations and global capitalism (Bryant 1992). State policy is crucial for the long-term sustainability of the environment, but in most cases the relationship between the state and the well-being of the environment appears to be conflicting because the primary role of the state is to encourage national economic growth although at the same time it is the principal defender of the environment (Walker 1989; Escobar 1996). Often

economic determinism undermines the well-being of the environment and fragile ecology of countries such as Bangladesh and negligible remedial measures are taken by the state to heal the wounds of environment and society.

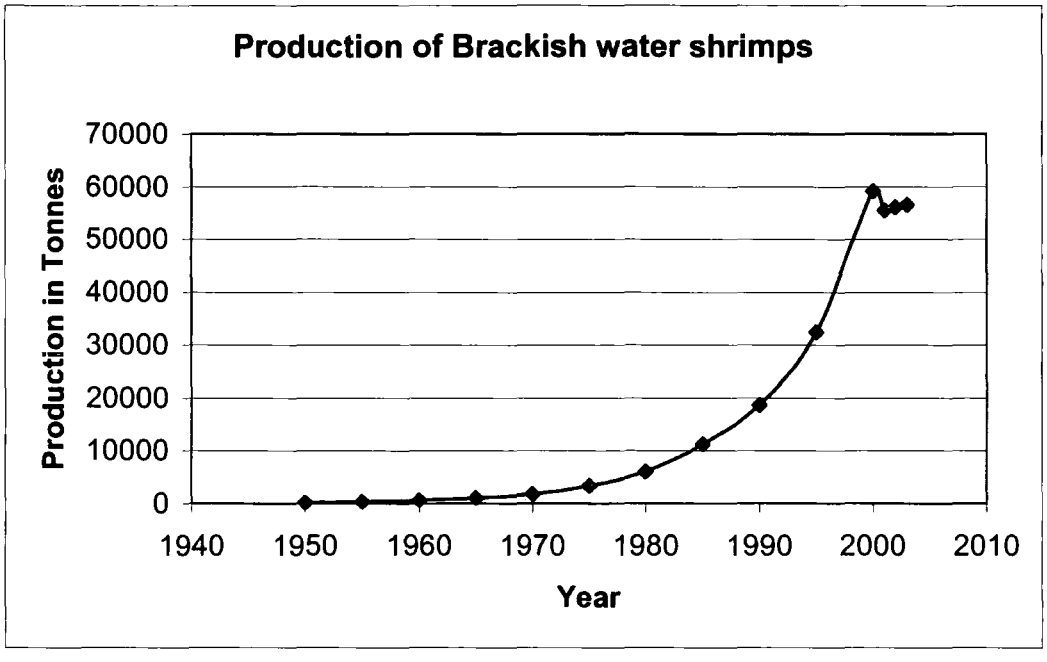

Figure 3: Production of Brackish water shrimps farming in Bangladesh
Source: FAO Fishstat.

A wide range of research work has suggested that state policies have contributed towards environmental degradation. For instance, in forestry research, various researchers have pointed to flaws in government policies with regard to deforestation issues. Repetto and Gillis (1988) examined the shifting of policies of Malaysia and Indonesian governments which have accelerated deforestation. Lohman (1993) and Rigg (1993) showed how commercial logging, expansion of agriculture and the intrusion of a cash economy under the national and international influences acted as a cause of massive deforestation and land degradation in Thailand during the nineteenth and twentieth centuries. Guha (1983a, 1983b, 1989), Gadgil and Guha (1995), and Shriramkrishnan (2000) have discussed the exploitative commercial forest policy of India, which has been at the centre of forest depletion since the colonial era. The expansion of shrimp farming in Bangladesh is shown in Figure 3, but a slight fall in shrimp production is evidenced from the statistics, this change might cause due to some local factors and anomalies not due to a major shift in government policy.

Aquaculture in the southern coastal region of Bangladesh is not a new phenomenon. Before the implementation of coastal embankment projects, people used to capture shrimp from the low lying areas, rivers, beels[5] and ponds and sell them locally. But after the early 1960s various embankments were constructed to protect the agricultural land from tidal saline water intrusion and increase rice production. As a result, the traditional subsistence aquaculture system came to an end. Water logging gradually became a problem, as drainage to the sea was now blocked, and this encouraged local farmers to introduce fish culture by making enclosures. Since the early 1970s, coastal shrimp farming has expanded into the mangrove swamps and embanked areas, with a particularly dramatic expansion in the 1990s.

Demand in the international market and a steady standard price have persuaded farmers to convert large enclosures to permanent shrimp 'gher' (shrimp field) within the embankment areas. In earlier times the practice was fully traditional and limited to the coastal region. There were no external inputs such as fertilizer, chemicals, lime, and no shrimp fry were added. Fully export-oriented commercial shrimp farming is a development of the 1980s, when the government initiated important policy reforms under the structural adjustment programme (Bhattacharya *et* al. 1999). Gradually Bangladesh was exposed to the global economy due to the implementation of these adjustment policies. In this context, Table 3 shows the expansion of shrimp export from Bangladesh. Hence, capital (foreign exchange) started to intrude into the mechanism of shrimp farming, and new, intensive processes saw the uncapitalised characteristics of nature and society transferred to a capital-centred system. Parajuli (1998) has called this the "naturalisation of capital" and simultaneously the "capitalisation of nature" under economic globalisation. Appadurai (2001) sees globalization as the process of expanding the previous logics of empire, trade and political domain over many parts of the globe. Many traditional products of remote parts of the world now appear as a means of economic gain, and more and more new areas where previously subsistence agriculture predominated have undergone a process of intensive shrimp farming degrading the local environment and breaking down social harmony.

[5] Beel – A large surface waterbody that accumulates surface runoff water through internal drainage channels. Beels can dry up in winter but during rainy season they expand into broader and shallow sheets of water.

Table 3: Shrimp export from Bangladesh.

Year	Earning (Million US$)
1972-73	2.9
1980	33.0
1985	90.0
1992-93	155.48
1993-94	197.87
1994-95	261.0

Source: Rahman (2002)

The debt repayment crisis of many third world countries reinforces the process of environmental degradation. International development banks (e.g. World Bank, Asian Development Bank) and multilateral development institutes (like the International Monetary Fund) suggest cuts in some sectors that seem lesser priorities to them, often social and health spending, and propose the revision of economic, trade and other policies. Since 1979/80 the government of Bangladesh has reformed its economic and sectoral policies in order to achieve rapid economic growth through the market-oriented management policies. It submitted the country to World Bank and IMF-induced Structural Adjustment Policies, which restructured the major economic sectors and stressed links with the global economy. There was encouragement for the expansion of non-traditional export crops such as shrimp, frogs' legs, etc., by reducing hindrances to expanding export and providing incentives to increasing the production of export crops. In Latin America, in a similar process, the exports of natural resources like fisheries, forestry items, and agricultural goods accelerated during the 1980s (Dore 1996). Barbier (1993) in the context of deforestation in south-east Asia, explained how the ambiguity in public policies such as domestic macro-economic policies (fiscal and monetary policy, exchange rate devaluation, debt repayment ratio), sectoral policies, and trade policy can impact on the expansion of wood demand, which in turn can cause huge deforestation.

Taufiq (2000) summarised the incentives given by the government of Bangladesh for the promotion of an export-oriented growth strategy in the shrimp sector. These are: zero tariff access of imports, fiscal incentives for exports, income tax rebates, speedy

customs clearance, cheap credit, leasing of private and "khas" land on favourable terms, institutional support for setting up downstream factories, etc. (Taufiq 2000). Besides the policy of trade liberation, shrimp export was inspired by the allocation of structural and sectoral adjustment loans (SAL and SECAL) provided by the World Bank and IMF (Bhattachariya *et* al. 1999). During the period of the expansion of shrimp farming in the 1980s, various international development agencies and NGOs have contributed in promoting shrimp as an export item. The relationships between international aid and socio-ecological disruption of many third world communities have been a focus of debate and criticism. Many state policies which cause environmental degradation are supported by international assistance. For example, during the 1980s a patch of established mangrove forest of 8500 hectares in the south-east part of Bangladesh was totally wiped out due to the establishment of export-oriented shrimp farming (Figure 4)(Gain 1998). The project was financed by the Asian Development Bank, the World Bank and the United Nations Development Programme. Similarly, international aid agencies have also contributed to the construction of hydro-electric dams in many third world countries for electricity generation. Although electricity and power generation is directly connected to the facilitation of economic development, the consequence for poor farmers is the drowning of their land and livelihood.

Many instances show that when policy reform instigates a transformation away from subsistence production towards a market driven expansion, the productive forces, production mechanisms and cropping patterns can undergo critical changes and these can in turn impact severely on the deterioration of the local bio-physical and social environment. Frank and Chasin (1980) and Watts (1983a, 1983b) investigated the connection between ground-nut and cotton cultivation in the Sahel region and the spread of drought. They concluded that the transformation in production and reproduction relations at local/regional level sometimes are underlying causes of huge environmental catastrophes, hunger, famine and large-scale social marginalization (Wisner *et* al. 1982; Watts 1983b; Watts and Bohle 1993). But in the Bangladesh context, Bhattachariya *et* al. (1999) observed that the environmental protection issues were incorporated in the SAP's policy framework papers for 1990/91-1992/93. Also, environmental concerns were emphasized by the World Bank when it promoted shrimp culture through a credit of $20.6 million for a 'shrimp culture project' in 1985. But, in practice, government bodies remain reluctant to implement environmental protection

policies. Short-term economic benefits nearly always appear to be more important than long-term ecological sustainability. Moreover, the bureaucracy within the state departments in Bangladesh, and their vested interests to derive power, control and monetary benefit, encourage them to act irresponsibly and so cause environmental destruction. Corruption of political leaders (at national and local levels), social elites and businessmen are also responsible for environmental break down.

3.2. Impacts of shrimp farming on the bio-physical environment

Brackish water shrimp farming entails various long-term consequences for the local environment. Most of these consequences are not easily reversible but their full impact is not yet known. In a developing country like Bangladesh, relevant empirical data are lacking to measure it. In spite of many drawbacks, recently a number of environmentalists and NGOs have brought the issues to the light for further scrutiny. For instance, as mentioned earlier, the cropping pattern of the greater portion of the shrimp farms in Bangladesh is extensive to semi-intensive and requires large ponds, taking up a substantial surface area. As a result, encroachment of the nearby agricultural fields is a common feature. By comparison, Ito (2002) has found that pond size is smaller and less intrusive for the fresh water prawn farming that is found further inland.

Salinity intrusion and related land degradation is one of the most important environmental consequences of shrimp farming. According to Blaikie and Brookfield (1987), the meaning of land degradation may have multiple views and interpretations. If we consider salinity intrusion and highly saline land from the perspective of the shrimp farmer, then the interpretation of land degradation appears flawed because these are the ideal conditions for them. But in agriculturally-based regions, salinity intrusion is a long-term hindrance to crop production. Unfortunately the present author did not have an opportunity to make measurements of salinity but authors such as Deb (1997) and Islam (1999) have investigated salinity in soil and water of the shrimp farming areas of Bagerhat, Khulna and Satkhira districts and its negative impact on the decline of crop production, reduction of vegetative cover and scarcity of cattle fodder. Their conclusion was that there is an adverse quantity (up to 500% increase) of salt in the soil as well as in water bodies (up to 22 ppt), which is deleterious for both crop and fish production. During the monsoon period when the salinity of water is less due to rainfall, extra salt is

added to the shrimp ponds to bring the salinity to a standard level for shrimp production. This salt is deposited in the upper level of the soil and forms a plough-pan on or near the surface. It impedes the mobility and activities of microorganisms and decreases soil fertility.

The relationship between shrimp farming and mangrove forest has always been conflicting in every export-oriented shrimp-producing country. Mangrove is a uniquely fragile ecosystem in the tropics and sub-tropics. It offers various economic and ecological benefits such as firewood, timber, food items, and acts as a breeding ground for various fish and other aquatic species. It is a habitat for many flora and fauna. In addition it works as a transitional zone between land and sea and plays a vital role in protecting coastal people from storm surges and other natural calamities. It has provided life sustenance to many coastal people. The mangrove ecosystem is greatly threatened by aquaculture, especially by shrimp cultivation, all over the shrimp-producing areas. Primavera (1997) recorded that 20-50% of destruction of mangrove forest worldwide in recent times is due to shrimp and fish culture. Primavera (1995) also asserted that about 50% of mangrove loss in the Philippines has occurred due to brackish water shrimp cultivation. Similarly, the impact of the promotion of export-oriented tiger shrimp farming in Thailand cleared out nearly 30% of the mangrove area in the period 1980-1986 (Lohman 1993). As already indicated, shrimp farming in Bangladesh has shown adverse impacts on the mangrove forest in the south-east region. Because of commercial

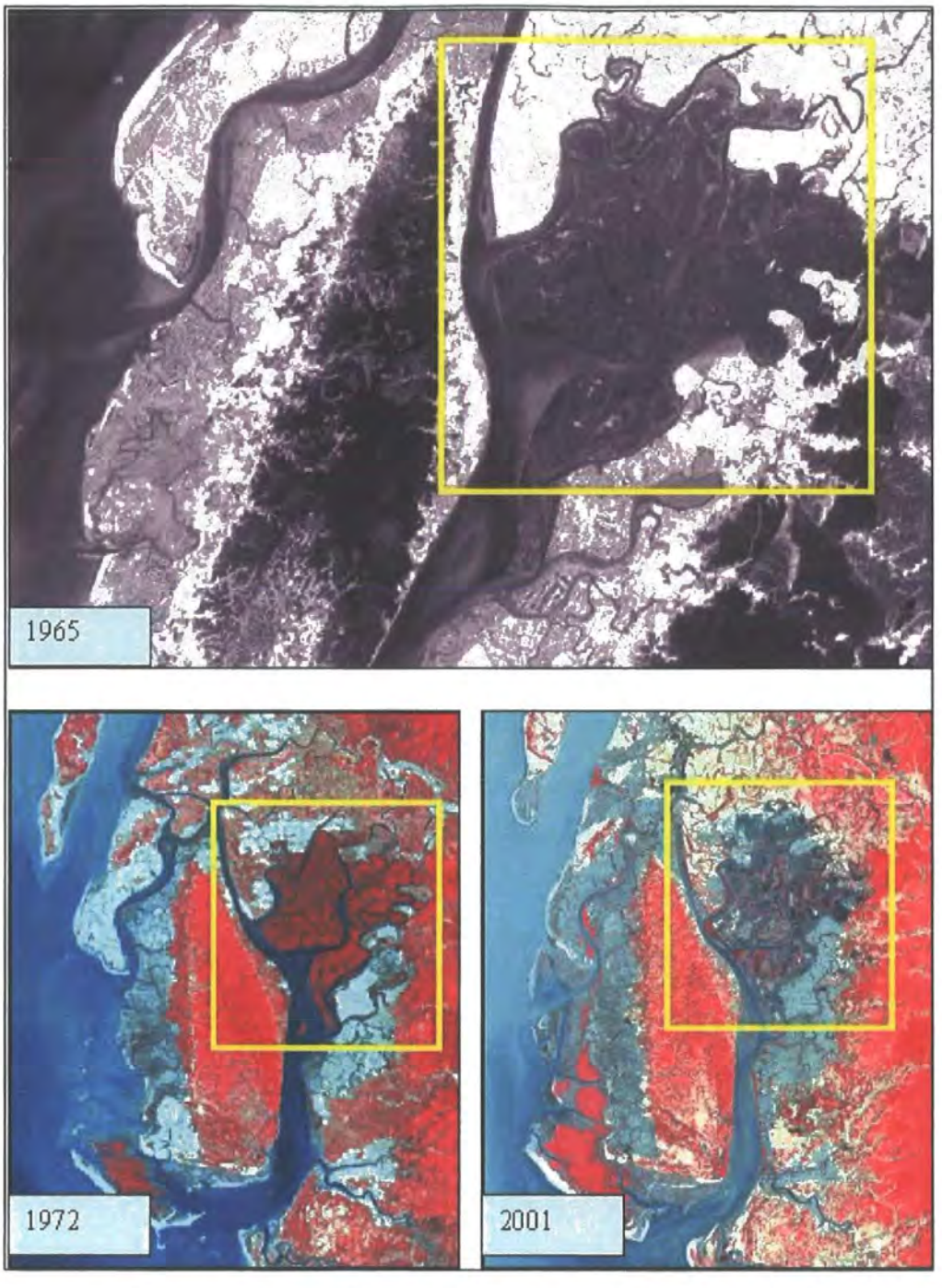

Figure 4: Satellite images for 1965 (Corona), 1972 (Landsat TM) and 2001 (Landsat ETM) showing Chakaria mangrove area. The natural mangrove forest (in 1965 image) has been completely cleared out and replaced by shrimp farming (in the 2001 image).

shrimp culture in the flat mangroves, an area almost 8,500 hectares (mentioned earlier) in the Chakaria Sundarbans has been totally wiped out (Figure 4) (Gain 1998). The government of Bangladesh, under its coastal afforestation projects, is trying to regenerate mangrove forest in the extreme southern part of Maheshkhali thana (Cox's

Bazar district). After plantation, a big patch of this forest has again been cleared out by powerful elites for shrimp cultivation. The event was repeatedly reported in local and national newspapers. The local administrative authority could not take any initiative against it because the shrimp farmers are so powerful. The thana forest officer of Maheshkhali in 2003 also mentioned to this researcher that shrimp fry collection is the main hindrance of mangrove regeneration. Seedlings may need to be planted three to four times for one to survive, as the fry collectors move into the planted forest during low tide. The Sundarban mangrove on the south west coast is also under threat of shrimp culture as shrimp farming is expanding by replacing the forested areas.

The fry for shrimp farming is supplied mostly from the wild fry collected from natural water-bodies such as river mouths, seashore, canals, beels, and other low lying areas. Fry collection techniques involve the use of small mesh nets and the collectors discard other juvenile fish and other aquatic species when they get back to land. As a result, unregulated over-extraction of shrimp fry can gradually result in the reduction and extinction of many fish species which reminds one of the extinction of pearl fisheries in Cumana, Venezuela during the 1800s (Alexander von Humboldt 1852, cited in Robbins 2004).

3.3. Local politics and crisis in society

Shrimp cultivation in the southern part of Bangladesh has contributed positively to the local and national economy. But at the same time it has become the cause of various types of social uncertainties and tensions. The economic benefits mostly come to a small number of people and the negative consequences are borne by the rest of society. In the shrimp farming areas, peasants used to practise subsistence agriculture and some were share croppers. Recently, agricultural land use was converted to shrimp fields through a contractual leasing system, and the sharecropping and mortgage system disappeared due to shrimp farming (Ito 2002). Due to the flow of capital in this sector, many small farmers were forced to sell their land and in some cases forcibly evicted. Some local peasants have been coerced into leasing out their lands to the powerful shrimp cultivators. So, the land ownership and rights of small farmers have declined. The government incentives, mentioned earlier, have fuelled the expansion and, as a result, the shrimp cultivation industry has been transferred from the hands of local farmers to the hands of large owners and the urban class of businessmen. In some cases

where local small farmers are engaged in shrimp culture, they do it for their urban counterparts. Thus, most of the self sufficient local, small farmers have in effect become landless contractual day labourers. This mechanism creates a new class system in the rural community consisting of urban businessmen, political leaders, and other socially powerful people and landless peasants. There are certain similarities to the processes of the green revolution technology (Yapa 1996; Shiva 1991), and export cash crop production (Stonich 1991), where social inequality is created by the concentration of power and assets within an elite group.

3.3.1. Breakdown of traditional livelihoods and increasing poverty

In a traditional society farmers make their livelihood within their known setting and arrangements. Their skills and local knowledge help them to cope with any minor disruptions to their system. Even the farmers who do not possess any land also get benefits through sharecropping systems. These traditional agro-based systems provide a sense of security to both the landowners and landless farmers. Other than for cropping, the land is also used for communal grazing. But the transformation of this existing land use pattern to shrimp cultivation has disrupted the traditional livelihood pattern of poor farmers and caused declining family income. These landless people are often forced to migrate to urban slums, living in acute poverty and misery (Alauddin and Hamid 1995). Pokrant (2002, cited in Ahmed *et* al. 2002) referred to the benefits of increasing employment generation and the upgrading of wage rates, and the growth in purchasing power of the local people, but the income generation is not steady and sometimes not continuous all year round. This change in occupation and land use patterns leads them towards poverty which can be called 'constructed poverty' created by the processes of economic development (Yapa 1996). Besides, under economic and sectoral policy reform, leasing out of public khas[6] lands to powerful shrimp farmers has caused poor people to be deprived of the potential benefits of public lands (Table 4) traditionally available to them.

[6] Khas land – Untitled public land.

Table 4. Shrimp farming areas, in total and area leased out (hectares)

District	Leased out khas land for shrimp cultivation	Public property used in shrimp cultivation
Cox's Bazar	3711.76	895.07
Chittagong	556.60	19.01
Satkhira	450.27	50.66
Bhola	173.90	
Khulna	12.62	3.28
Bagerhat		36.87
Total	4905.14	1004.86

Source: unpublished official records, Ministry of Land, Bangladesh, 1999.

3.3.2. Impact on women and children

Since the early 1980s, with increasing changes in global political economy and growing integration of third world countries to the global economy, significant changes can be traced in the lives of women. Women of many third world countries have been involved in commercial production-oriented activities. Kabeer and Simeen (2004) stated how the process of trade liberalization has brought opportunities for the women (of a particular class) in Bangladesh to take part in income generation work which was previously very limited for them. Despite the possibility of earning cash income, the involvement of women in shrimp farming has become an issue of debate as to whether it has brought sustainability to their lives or it has added a greater work load and instability. Women's participation in commercial shrimp farming lies mainly in natural shrimp fry collection, but they also work in construction and repairing the earth enclosures for making shrimp ponds, removing weeds and other aquatic plants from pond water, and adding lime. Women also work in shrimp processing units.

Halim (2004) finds that women normally collect shrimp fry in the morning hours and late evening but during the peak fry collection period and full moon time shrimp fries are caught at any time and work may involve the whole night. Shrimp farming has obviously impacted on their lives. With the change in the physical environment, the provision of safe drinking water and supply of fuel (cow dung, leaves, wood) appears limited. This situation demands more time and effort from poor women to collect

drinking water from far away as they cannot make their own fresh water pond or tube wells (Ahmed 1996). Furthermore, the decline in agricultural activity has also impacted on the lives of women, as in earlier times women were engaged with diversified tasks related to agricultural production such as weeding, harvesting and processing works. But presently they have to spend a long periods of time standing in water for shrimp fry collection or to carry mud to make enclosures.

A large number of boys and girls between the ages of 5 to15 years are also engaged in shrimp farming with women. It is a matter of regret that women's participation in shrimp farming might have some impact on raising the household income but very little improvement has been experienced in their underlying gendered condition. Both women and children are victims of wage discrimination. Women are often refused extra facilitates such as sick leave, security of job and a friendly working environment in their jobs in shrimp production and processing units (Halim *et* al. 2001; Halim 2004).

Women and children working in shrimp farms are prone to many diseases, such as skin diseases, coughs, colds and injuries to hands and legs as they either pass most of the time in water or in unsafe shrimp processing units. Working in shrimp farming also impacts on children's attendance at school (Delap and Lugg 2000). Moreover, due to the decline in enforcement of law and order, women and girls working in shrimp farming sometimes become the victim of verbal and physical harassment. Both Ghafur *et* al. (1999) and Halim *et* al. (2001) referred to the incidence of sexual abuse of women by *gher* owners, *gher* guards and male trade agents. In addition, Halim *et* al. (2001) also reported about women trafficking and the practice of forced prostitution in shrimp farming areas.

3.3.3. Social disruption, violence and conflict

The overwhelming changes in landuse patterns in shrimp farming areas have resulted in changes in the livelihood patterns of the local people. Overall these changes have undermined the subsistence small farmers and their livelihood strategy. Breakdown in livelihoods has caused social uncertainty and tensions which sometimes end in violence, kidnap and murder. Access to and control over lands has been at the centre of conflict between the powerful and powerless. It is assumed that conflicts have persisted since the early period of commercial shrimp cultivation in the early 1970s but in fact over the

course of time the situation has worsened as more capital has been invested and more benefits expected. It was mentioned before that a large portion of investment came from the urban business entrepreneurs. These outsider rich businessmen are strong and influential and have connections to the local and national politics as well as with the administrative bodies. Their interests are looked after by the local rural elites and gangs of musclemen, who act as enforcers on the ground. The transfer of control of rural land resources from local peasants (afterwards rural elites) to the capitalists (i.e. urban businessman), is a key element that characterises the nature and the pervasiveness of conflicts. The outsiders have adopted all violent means available to capture the agricultural lands forcefully to cultivate shrimp.

It is frustrating to observe that local administration (police and bureaucrats) favour the rich and powerful rather than protecting the rights of the real land owners. The outsider rural political leaders who hold the local powers and dominate the societal system also support them to gain maximum benefits from shrimp farming. Moreover, some reports (http://ejfoundation.org/calltoaction.html, http://www.eurocbc.org/page777.html accessed on 14/5/06) inform us about many incidents of conflict between the powerful shrimp farmers and local people (both women and men) who are holding anti-shrimp notions and resist their activities like grabbing people's land and bringing it under shrimp cultivation. In most cases the conflicts end in physical assault, killing, and court cases. In 1990, the killing of Ms Karunamoi Sardar in Paikgacha, Khulna, among other victims, shows a strong example of the violence. Karunamoi with other local men and women came to resist the powerful shrimp farmers and their gangs from acquiring agricultural lands in order to open a new frontier of shrimp farming in their areas. Following agitation by local people, the gang fired and she was killed and several others were severely injured. The gang members took away her dead body and it was never found (http://www.icsf.net/jsp/publication/samudra/pdf/english/issue_17/art05.pdf, accessed on 15/4/06). Gadgil and Guha (1995) referred to the iron triangle consisting of businessmen, bureaucrats and politicians; their joint role in third world countries are responsible for exploiting nature. This argument is also true for shrimp cultivation issues in the Bangladeshi context, where vested interests of powerful businessmen are causing social tensions and ecological breakdown with the support of politicians and bureaucrats.

3.3.4. Civil society, local people and movements

Intensification of social and environmental crises in many parts of the third world and concomitant failure of state authorities to take a strong position against environmental degradation has instigated grassroots social movements. Different social organisations and NGOs have often influenced the formation and activities of these organisations. Recently common people in some shrimp growing areas of Bangladesh are coming out to resist the aggression on their land and livelihoods. Such movements often appear as dominant critiques of the present development models applied in third world countries (Escobar 1996). Arturo Escobar (1992a) has further identified the nature and characteristics of grassroots and social movements. They are the pluralistic struggles or the position of a group of people to acquire some sort of non-conventional power and holdings through which they can apply more authority and freedom over the decisions and initiatives with which their livelihood mechanisms are integrated. There are many examples of the success of grassroots movements in the third world where people have mobilised to protect their land, forest, cultural practices and traditional livelihoods.

The 'Chipko movement' in Uttaranchal, India, the tree planting initiatives in Kenya, the Plack and Play movement in Karnataka, India, the struggle of the native Dayak people in Sarawak, Malaysia, and peasant resistance against state authority for banning shifting cultivation in Madagascar (Shiva 1989; Gadgil and Guha 1992; Kanvalli 1990, 1991 cited in Gadgil and Guha 1995; Colchester 1994; Jaroz 1996) are examples of people's resistance and movement. Often such movements have managed to exert pressure on the respective state governments to rethink their development plans. In some areas of southern Bangladesh people are mobilizing against shrimp cultivation due to its adverse consequences on environment and society. One national NGO, 'Nijera Kori', is involved in mobilizing the poor, especially the landless farmers, to help them to get leased out 'khas' lands from government authorities for agricultural production. This NGO also makes people aware of the harmful results of shrimp farming. It also works for awareness-building among women and men about their rights and responsibilities. It has had a large degree of success and polder 22 in Paikgachha, Khulna is, as a result, is still shrimp cultivation free.

In spite of this success, it has become hard for Nijera Kori employees and supporters to work in the wider periphery because of strong opposition (including in many instances violence, torture, and murder) from the powerful shrimp cultivators and their allies. On

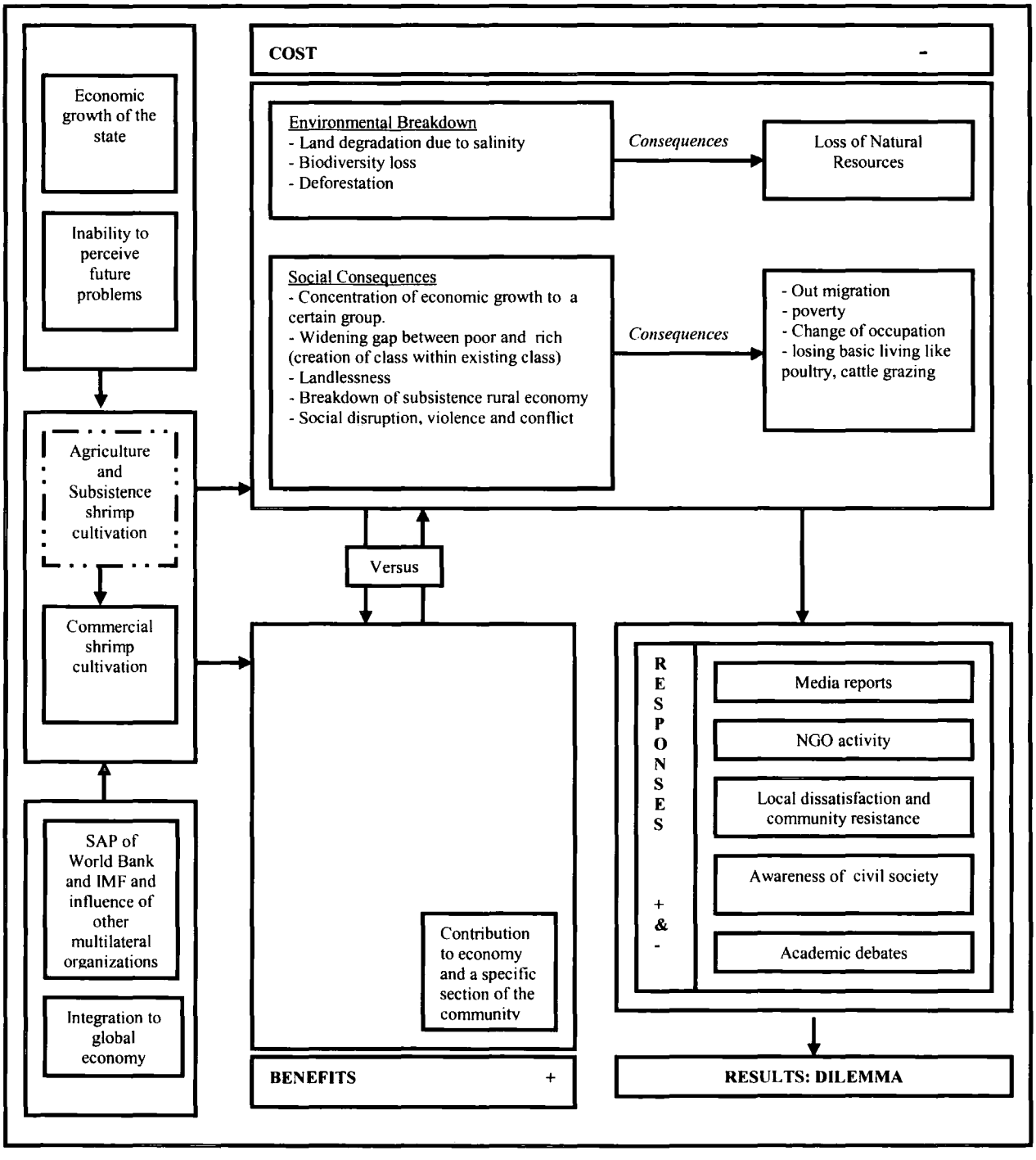

Figure: 5 Shrimp farming in Bangladesh and its consequences.
Source: Author

the other hand, the tantalising profitability of shrimp cultivation allures the people. In one sense, it is a positive sign that people are acting in favour their long-term livelihood strategy but the protection of the environment and ecology is also a priority. Published and electronic media also contribute towards awareness-building regarding the adverse impact of shrimp cultivation. Plenty of newspaper articles have appeared in the last couple of years with various kinds of social and environmental anomalies due to shrimp cultivation. The issues and complexities of shrimp cultivation in the Bangladeshi context are summarised in Figure 5.

4. Discussion

Investigation of the processes of human-environment interaction and its consequences for the bio-physical environment, society and people has been a long tradition of geographical research. Various national and international researchers and NGOs have given attention to environmental and social degradation due to commercial shrimp farming. But in many instances the policy prescriptions suggested by scholars play an insignificant role in the practical politics of environment sustainability, especially in cases when the public, state and commerce all concurrently overlook it (Castree 2002). In spite of this, many important issues are coming to light in the conflict and controversies between supporters and opponents of shrimp farming. With increasing global expansion of shrimp farming, a strong association can be noticed among the multilateral organizations such as the World Bank, IMF and ADB, other international agencies such as FAO and UNDP, state authorities, political leaders, business personnel, and local elites. On the other hand, for a long time a number of global environmental organizations have formed different international platforms to protest against the commercial shrimp farming (Stonich and Bailey 2000). These include Greenpeace, the World WildLife Fund (WWF) and the Environmental Defence Fund (EDF), along with other private foundations and associations, development assistance groups, human rights groups, and other less well-known NGOs and scholars from different disciplines. These groups support the activities of local activists, numerous grassroots level organizations and NGOs, who confront and take part in resistance against shrimp farmers, local elites and their allies at field level, with a view to ensuring environmental justice and sustainable rural livelihoods.

In response to the growing opposition from various corners, some encouraging results can be traced in different countries. For example, in dealing with the present and future adverse negative impacts of shrimp cultivation on environmental and society, the Supreme Court of India has imposed a set of restrictions on existing shrimp farms and their future expansion. It has also prohibited the conversion of agricultural land, mangroves, wetlands, forests and community waste lands to shrimp cultivation under the Environmental Protection Acts 1986 (Aquaculture Authority News, September 2002). In 1986, the Honduran government also issued a one-year suspension of the expansion of commercial shrimp farming on the Pacific coast of the country due to its destructive impact on the coastal environment, and escalating social conflict and violence.

The arguments and debates on the adverse impacts of shrimp cultivation in the coastal areas of many third world countries has made international bodies pay attention to the fact that economic efficiency is not sufficient to maintain the overall well-being of society without having a sustainable environment. Recently an international consortium has developed involving the World Bank, the Network of Aquaculture Centre of Asia-Pacific (NACA), the World WildLife Fund (WWF), the Food and Agricultural Organization of the United Nations (UN) and the United Nations Environmental Programme (UNEP) (2002) who have jointly sought to reconcile some of the environmental and other issues for the better management of shrimp farming to ensure the sustainability of the shrimp industry. This group has progressed towards the formulation of a set of 'International Principles of Responsible Shrimp Farming' with a view to formulating better management techniques. Although this group is still pursuing, advocating and financing shrimp cultivation, their recent adaptation of guidelines should in due course reduce environmental crises associated with commercial brackish water shrimp farming if it is really applied in the field. The group has not fundamentally changed their positive attitude towards commercial shrimp farming but their recent steps bring a little hope as a first step towards sustaining a balance between economic benefit and the concern of environmental sustainability. Still, it has totally ignored several important social issues, including clashes and conflicts among different groups, marginalization and the increased vulnerability of the local poor community, social unrest, harassment of local men and women, abuse of women and children, and, above all, activating the responsible groups in implementing

law and order. On the other hand, it is also arguable that it is not the sole responsibility of foreign organizations to take care of all relevant issues. The state should be responsible, accountable and prudential in achieving the aims of their actions in terms of people's well-being. The national authority should have long-term perspectives and policies to handle the crises and slowly reduce the dependency of the national economy on the destructive shrimp production by searching out alternative ways to offset the financial gap. There is a need for an attitudinal change among the government bodies, which define and dictate their positions and actions in relation to shrimp production. If the government realizes the necessity and significance of the long-term benefits of environmental systems, it would not be very hard to work out how to achieve the goals.

5. Conclusions

Environmental crises and the impact of shrimp cultivation have become synonymous in the Bangladesh environmental debate. The impact of shrimp culture is diverse, as it includes land degradation due to salinity intrusion, deforestation, biodiversity loss, cause of disease, cause of rural landlessness, and the breakdown of law and order. On the other hand, its contribution towards the national and local economy cannot be ignored, although most of the financial benefits accrue to a small portion of wealthy people, adding to the widening gap between rich and poor. Shrimp farmers do everything they have to (forceful eviction, kidnap, murder) to maximize their financial benefits. State agencies and its apparatus have always favoured those who are producing shrimps because of the highly desired foreign currency. Even international donor bodies have acted in favour of shrimp cultivation, at a cost of substantial deforestation in the coastal areas. This study has focussed on the issues of shrimp cultivation within the theoretical framework of political ecology, where the role of different actors, the impact of state policies, the state of the environment, social dissatisfaction, resistance and movement of the poor are interlinked to illustrate the root causes of the problem.

Shrimp cultivation can be less harmful if it is pursued in a cautious and prudent manner. For example, there are some areas within the coastal region where lands are low-lying and waterlogged (and thus remain unused), and some areas are highly saline near the coastline. Such areas could be used for shrimp cultivation since they have no other purpose. Also, it seems that the farming of freshwater prawns is less harmful in

environmental terms than brackish water shrimp cultivation, and there are examples of good practice in this sector. Problems are created mostly in areas where actors become reckless in their deeds and the state apparatus is unable or unwilling to be vigilant. State policy defines how to make (and to what extent) a balance between economic growth and environmental/social harmony, but problems erupt when the state acts blindly for economic reasons and when small elements of the government (i.e. politicians and bureaucrats) become vested interest holders, leading to dysfunction (Atkins *et* al. 2006). This dysfunction supersedes the sole problem of shrimp cultivation. It also reminds us that making success stories sometimes depends on the efficiency and prudential planning of the government. It can be argued that the problem is also a part of global politics. The existing literature on shrimp cultivation in Bangladesh generally examines its problems apolitically and in a descriptive manner, and efforts to find the origin of causes are mostly neglected. In this context, the political ecology approach to scrutinize the problems might help for a better understanding of its underlying themes. On the other hand, it is the responsibility of different actors (state, aid agencies, local people and NGOs) to decide how far they are willing to sacrifice environmental concerns and social concerns for maximising economic benefit. We have to be careful about the issues of long-term productivity of land now, rather than prioritizing only short-term economic benefits; otherwise there would be no other option other than the approach of the risk society (Beck 1991).

It is interesting to note here that some economists and main stream development experts, for example Ling *et* al 2001 and Thomas *et* al. 2001 (both the references are cited in Ahmed *et* al. 2002) have conducted cost benefit analyses of shrimp farming of Bangladesh. Most of the authors present an economic analysis based on the cost of establishing hatcheries (construction/cleaning of old ponds), production costs (procurement of shrimp fry, liming, fertilizer, feed, labour, rent of land), cost of harvesting, transportation, processing and marketing with reference to different types of farming system or cropping pattern. Some authors (i.e. Bhattacharya *et* al. 1999) include the cost of land degradation due to salinity, cost of destruction of mangroves and cost of health hazards, etc. In this regard, my argument is that one cannot precisely measure the cost of environmental degradation, since the environmental and ecological functions are not tangible things to be priced and computed. It is noteworthy, in this context, to remind ourselves of the words of Marx (Capital, vol 1, cited in Peet and Watts 1996a):

"...even society as a whole, a nation, or all existing societies put together are not owners of the Earth. They are merely its occupants, its users; and like good caretakers they must hand it down improved to subsequent generations."

Following his notion, it can be asked who is the owner of nature and how could any person or institution have the authority to measure the value of the earth? Besides, how can one measure the actual value of the earth, which acts as the source of the present and future life cycles, not only for human beings, but also for all other fauna and flora which share the ecological cycle?

Chapter 4
Deforestation and Afforestation and its impacts on Women: A Case Study of the Modhupur Sal Forest

1. Introduction

In the global south men and women both interact with nature for satisfying their daily needs and meeting their family responsibilities, but significant disparities can be noticed in their relationships with nature. Women's distinct daily routine tasks, their gendered responsibilities in ensuring the wellbeing of their families and above all their struggle for survival, all together define their interaction with, and their specific interests in, particular natural resources and ecological processes (Agarwal 1992). Natural resources such as forests and wetlands provide sustenance to subsistent rural people in Asia, Africa and Latin America. Poor people, especially rural women from lower income households who have very limited alternative income-generating opportunities, often find collecting from nature as the only means to meet their livelihood requirements. Comparatively well-off women find it an extra option for topping up their family livelihoods. Even in times of great economic stress due to seasonal variations in the crop cycle or calamities, natural resources on communal land or wastelands work as a bounty of food, fuel and other marketable products (Jodha 1986; Berkes 1989; Agarwal 1990; Prashad and Rao 1997; Hyde and Kohlin 2000). Explicitly for women, trees and forests offer multifunctional household products such as fuel, food, fodder etc., whereas men are more interested in cash income through the commercialisation of timber or the plantation of exotic species for quick profit (Dankelman and Davidson 1988). In many African countries like Kenya, due to the changes in production relations, more male involvement in cash cropping, growing male urban migration or switching to wage labour, subsistence agriculture has come under the authority of women (Mackenzie 1986). Therefore, along with the vital role in subsistence agriculture, their other responsibilities such as home management, active participation in soil and water conservation and preparedness and response to natural calamities indicates that African women are not only the victims of environmental crises but also take on active managerial roles that are increasingly reflected in the literature (Wangari *et* al. 1996).

Moreover, since the 1980s, the debate and discussion on women, environment and development has portrayed the position of rural women as efficient environmental managers due to their special knowledge about the natural resources as well as their

close interaction with the environment through their daily tasks. Thus, the scholars of WED addressed the rural women of the third world as important, active actors prospective for the process of sustainable development (Braidotti *et* al. 1994). The United Nation's Conference on Environment and Development also readdressed women's contributions in national ecosystems and environmental management (Johnson 1993).

Women in Bangladesh, as in other southern countries, are active in interactions with nature in order to satisfy the subsistence needs of their families. The forest is one of their main environmental resources. Although Bangladesh is a forest-scarce country, the remaining forests offer sustenance to many forest-dependant women as well as men living in the forest area. The deciduous sal forest is one of the principal kinds of natural forests in Bangladesh, lying mainly in the central parts of the country. The forest women living here collect fuel wood, food, fodder and other necessary items from the forest for household subsistence and for sale. Unfortunately, during the last three decades these forest patches have been severely degraded and depleted. Islam (2006) has estimated the total area under actual sal tree cover at present in Modhupur thana to be about 10,000 hectares, as against satellite images from 1962 showing about 4,000 hectares of forest. Also, the quality of remaining forest has decreased severely. Many rare types of flora and fauna already have disappeared. The causes of deforestation are complex and diversified and the consequences are widespread. Forest-dependant men and women of the area are marginalized due to the degradation and depletion process in different ways. On the other hand, the government, with the help of foreign aid, has sought to solve the forest crises through plantation programmes, including agroforestry, woodlot and rubber plantation schemes incorporating the local people of the forest area. Women as a group have been largely neglected by these plantation programmes, which have tended to curtail their access and rights to the forest resources.

The present case study investigates the dynamics of deforestation and afforestation programmes in the Modhupur sal forest with special reference to the gender perspective. This enriches our understanding about the nature-society relationship which has resulted in a space of unequal distribution of power and resources, and the deprivation and marginalisation of nature for a specific group in society. In that regard, I will focus on the underlying root causes of the crises in the Modhupur forest, where most research

initiatives have been conducted by Bengali researchers (Iftekhar and Hoque 2005; Alam *et* al. 1999). Their apolitical approach to the issue has left the problems unaddressed. By contrast, the political ecology approach of assessing the crises of natural resources shows great promise. Feminist political ecology in particular offers a space of debate and discussion where gender equity and justice (environmental and social) issues can be re-evaluated and alternative measures can be proposed. The case study starts with a brief discussion of feminist political ecology within the broader perspectives of political ecology and then continues with an empirical investigation of the specific situation.

2. Women, Deforestation and Development

Mary Douglas (1991 cited in Jackson 1993a) asserted that both environment and society are closely interlinked; thus, environmental reality cannot be separated from social reality. Environmental degradation such as land degradation would certainly affect both land-dependant men and women adversely. But it is quite likely that women would be affected by the land degradation in quite different ways than men because men and women often have distinct positions, rights and responsibilities in the society. Men may look for alternatives to cope with the changed situation, and in certain instances they may help the women to overcome and adjust to the changed situation, but this does not always happen. Women often have to struggle with their gendered responsibilities on their own. They, particularly the poor and marginalised women, bear the sufferings of environmental degradation directly as a result of the consequential resource scarcities. Ironically, there is a long-standing neglect by the policy planners, and other relevant professionals from different disciplines, of women's work, their desired land use patterns, their various responsibilities, and even their role in the development process (Rocheleau 1995; Mathai 1986).

Furthermore, both men and women often have different perceptions of the environment in terms of their use, access to and control over the means of production and the options to them in their condition of poverty. Feminist scholars in recent times have largely focused on gendered knowledge, gendered property rights and gendered use, access to, control over the environmental resources, which often have been determined by the power relations in intra-household or community contexts interacting with other social relations (class, caste and ethnicity)(Agarwal 1992; Jackson 1993b; Jockes *et* al.1995).

Agarwal (1989) extended the analysis of the struggle of the women over access to resources and touched on the underlying gender-based inequalities covering up a number of issues, starting from intra-household gender based inequalities in accessing basic needs such as food and medical facilities, and in accessing employment opportunities, and moving on to the disproportionate burden of the ecological crisis in India borne by women.

In the African context, economic practices leading to the exclusion of women from ownership, control or access to natural resources, and the impact of environmental deterioration on women, has led to the recognition of gender as significant to environmental issues. In the Gambia, the expansion of irrigated rice production and the transformation of wetlands for the purposes of domestic food security has resulted in a complex crisis condition at household and community level, intersecting with the household production system, a gendered division of labour and the system of property rights. Ultimately, men gained control over the land and blocked the women's customary cropping rights and gradually undermined their control over the product of their own labour (Carney 1993; Carney and Watts 1990). Similarly, in Kenya, colonial and postcolonial national agricultural policies advocating the intensification of agricultural production, and the increasing integration of the local economy into the capitalist relations of production, have changed the traditional land tenure system. Progressive individualization of land tenure has curtailed women's usufruct land rights (Mackenzie 1986). Land registration, the privatization of land, and the progressive fragmentation of holdings impacted through the marginalization of the poor and women, and in the aftermath, there has been a severe deforestation and degradation of soil and water (Wangari *et* al. 1996). But Kenyan women, using their own local skills and knowledge, have initiated a means of coping with environmental degradation by getting involved in tree plantation through agroforesty, water management and soil conservation (Wangari *et* al. 1996). Some authors have warned that putting emphasis on women's special agro-ecological knowledge might cover up some other important factors such as the gendered division of labour, socio-economic characteristics, cultural restrictions, and gender disparities at the household and community level that hinder women's ability to vocalize and use their agro-ecological knowledge (Jewitt 2000). Agarwal (1992) and Jackson (1993b) suggest considering women's agro-ecological knowledge materially where it is shaped by divisions of labour, property and power.

Also, recently, the necessity of the true participation of ordinary people in environmental management and protection has been addressed by many scholars and it is now taken as an essential prerequisite for the achievement of the goal of sustainable development (Ghai and Vivian 1992).

3. Study Area and Methods

The case study focuses on issues related to deforestation in the sal forest of Modhupur thana of Tangail district, Bangladesh. According to the Ministry of Environment (1999), the total forest area in the thana is about 18,471 hectares. The forest is primarily dominated by sal (*Shorea robusta*) along with other native species. The area is dissected by an intricate network of low-lying channels (locally known as 'baidh') and in between the baidh there are hillocks (locally called 'chalas'). The chalas are covered with forest while the baidh are used for agriculture. People have been living in the forest areas from time immemorial with the support of fertile land and the forest resources. The area is inhabited by Garo tribal communities with some comparatively recent Bengali settlers. In recent times the forest came under massive deforestation for various reasons and government agencies, mainly the Forest Department, have implemented different measures for forest development (in their sense). Modhupur thana has been chosen in this study because a number of crises and controversies have been reported in relation to deforestation and afforestation of the area, with consequential impacts on nature and the local community. Mainly secondary sources were consulted to conduct the research in addition to some field information collected through group discussions (these group discussions were conducted in May 2005 by some of my colleagues on my behalf). In the broad sense a political ecological approach has helped to assess the problem while feminist political ecology has provided the real impetus to evaluate the impacts on women and their responses.

4. Community Dependence on Forest Resources in Modhupur

The images of forests to the rural communities in tropical counties are cultural rather than natural (Rietbergen 1993), while the western concept of forestry is obviously the production of wood, what Robbins (2004) calls the 'wood industry'. The communities living in and around the forests in the tropics use forests not only for their products, but

also for their homesteads, farming, cattle grazing and so on. The rural communities see forests as their protectors from various kinds of adverse situations that may stretch out from natural disasters to economic setbacks. Even if the people settle in a barren land, they always try to develop groves around their hamlets. Shiva (1989) mentioned that the diversity, harmony and self-sustaining nature of the forest has influenced the development of the civilizations of the Indian sub continent. The forest resources in Madhupur are no different from that perspective. The use of forest lands for agriculture by the tribal people started from the Zamindar (feudal landlords) period, when they were allowed shifting cultivation on the chala land without degrading the forest quality (Gain *et* al. 1994). The 'baidh' area in the forest was used for wet rice cultivation. Shifting cultivation was banned later on but agriculture in the forest land has remained the main occupation of the forest dwellers.

Both the Garo and the Bengali people depend on various forest products because their small-scale agricultural activities are not often enough to generate sufficient income for their average household expenditure. Forest resources provide them alternative options for maintaining their livelihoods. Dependency on forest products has become inevitable for the survival of landless poor women in this district. Moreover, forest resources offer different employment-generating opportunities for them.

Shoria robusta, locally called sal, is the predominant species in the Modhupur forest. But, because of the rapid degradation, aerial coverage of the 'sal' forest has shrunk overwhelmingly. Well matured hard wood sal trees can be found in only in few small patches scattered over the study area mixed with some other tree species. The sal tree is in great demand for house building materials. Other native tree species found here include the amloki (*Phyllanthus embelica*), ajuli (*Dillenia pentagyna*), boyra (*Termanalia belerica Roxb*), haritaki (*Terminalia chebula*), koroi, (*Albizzia procera*), chapalish (*Artocarpus chaplasha Roxb*), arjun (*Terminalia arjuna Bedd*), palash (*Beutea monosperma*), banyan (*Ficus religiosa*) amra (*Spondias pinnata*), etc. (Nizamuddin and Rasheed 1992, Gain 2002). In addition, some climber plant species such as the satamuli (*Asparagus acerosus Roxb*) mongolia lata (*Spatholobus roxburghii*), kumari lata (*Smilax macrophylla*) chuprialu (*Dioscorea alata*) mete alu (*Dioscorea bulbifera*), different understory herbs like swati (*Pennusetum setosum*), kata note (*Amaranthus spinosus*), apang (*Achyranthus aspera*), sechi sak (*Alternanthera sessilis*) and various

grass varieties such as sungrasses (*Imperata arundinaea*) and thatch grasses (*Arundineacea cylindrica*), ulu (*Imperata cylindrica*) are widely common in the area (BCAS 1997). Moreover, in the degraded forest area some exotic species like eucalyptus, minjuri, akashmoni and mangium are planted by the Forest Department due to their fast growing characteristics.

Forest products collected by the forest communities include timber in the form of trunks, fuel wood (dried twigs and leaves), different kinds of food items (fruits, honey, seeds, herbs, rhyzomes), medicinal plants, gums, resins, etc.. As for the sal, the trunks of other trees such as the koroi, chapalish, ajuli, mahogany etc. are used for house building and furniture making. Moreover some other hard wood trees are used for making agricultural implements.

Women are not generally engaged in collecting timber and men do the task of felling trees when they need and carry them out of the forest. Women and children spend a significant portion of their daily working time in collecting fuel wood (Figure 6) including twigs, bark, roots, dried creeping vegetations, bushes and leaves to satisfy their requirement of household fuel. Moreover, there are some opportunities of earning cash income by selling this material in the nearby village markets, town centres and brick fields.

Figure 6: Tree felling and taking away by men (Left), Fuel wood collection by women (Right), Source: Author

Besides, leaves of the sal tree are widely used for covering growing pineapple saplings. Women generally carry collected wood as a head load or on their back, but it is also not uncommon for women to carry their heavy load of collected fuel wood in a group by

sharing a hired rickshaw van or other vehicle. Moreover, many poor women engage themselves in collecting different types of herbs as leafy vegetables, different types of indigenous fruits, nuts, the rhyzomes of chuprialu, mete alu (a kind of wild potato) to meet a substantial portion of household food needs or earn an income by selling it (group discussion on 3rd May 2005). Fruits, bark, herbs and nuts of some medicinal plants like amloki, boyra haritaki, arjun, amra etc. are collected by the women, also for income. These products are sometimes used for making herbal medicines by the villagers using their indigenous medicinal knowledge, but most of the time the produce is transferred to the cities to meet commercial demand for herbal raw materials.

Table 5: Discrepencies in forest statistics in different sources

Sources	Sal Forest in Hectares		
	Total in Bangladesh	Modhupur Thana**	Area under sal tree coverage in Modhupur Thana
Ghani *et* al 1990b*	95, 772	17,381	7, 230
Choudhury 1995*	98, 551	14,796	3,408
MOEF 1999*	-	18, 471	-
BBS 2002*	120,000		
Islam 2005	-	7,000	600-700

Note: * indicates the sources derived from Forest Department, ** indicates forest land including wooded area, degraded area, encroached and social forestry plantation.

5. Deforestation and Degradation of forest Resources

Forest statistics in Bangladesh are uncertain and figures vary according to the compiling organization (Table 5). MOEF (1999) state that the total notified forested area in Madhupur thana is about 18,471 hectares, while Islam (2006) contested these declared statistics and reported a massive deforestation in the area. In Bangladesh there is a lack of actual statistics based on current forest inventories and that contributes to the uncertainty. In the past the area was covered with dense forest mainly dominated by sal trees along with other native species.

Forest clearance for building homesteads and making agricultural land is not new in Modhupur and dates back to the Zamindar period. Massive deforestation has again speeded up since the independence of Bangladesh. The Forest Department and some other researchers (Huda and Roy 2001; Salam *et* al. 1999; Ghani *et* al. 1990a, 1990c) in general blame the local community for clearing out the forest. They claim that a large part of the forest was degraded due to high population pressure, forcing forest encroachment by the local Garo and Bengali people. Also frequently mentioned are overgrazing, soil erosion, forest fires and increasing demand for fuel wood. In contrast, local people informed me that a group of corrupt forest officials are engaged in huge illegal felling (group discussion 2005). These allegations and counter allegations have led to mistrust and antagonistic relationships between the Forest Department and the local community (Farooque 1997). But the deforestation narratives in Modhupur are not as simple or straightforward as portrayed by either of these interest groups. Various multifaceted causes involving different actors have contributed to the clearance of forests.

One of the main underlying causes is the unresolved, complicated land tenure system in this forest area. A brief discussion on that historical legacy will help to understand the contextual scenario which has fuelled forest degradation. In addition, government initiatives and imprudent policy planning have complicated the crisis and fuelled deforestation. These issues are discussed in the following sections.

5.1 Property Right Regimes in Madhupur Sal Forests and Consequential Conflicts

Property rights regimes in the study area are multi-dimensional and shaped by a number of laws and acts drafted and enacted by different governments (British, Pakistan, Bangladesh). The current tensions and conflicts in the woods that contributed to deforestation in the area have resulted from unclear land ownership issues which are obviously the outcome of cumulative impacts of historical legacies.

In the sixteenth century the forest resources in Modhupur were controlled by the representatives (called Jaigir) of the Mughal emperor based in Delhi. The ownership of forests was later transferred from the Jaigirs to the Maharazas (Zamindars) with the

enactment of a sunset law[7]. At the end of the Raj, the British government proposed a Private Forest Act Bill 1945 to regain the forest lands (Bhuian 1994), and this bill was enacted in 1949. According to Bhuian (1994), the prospect of the introduction of this Private Forest Act, along with the partition of India in 1947 and the enactment of the East Bengal State Acquisition and Tenancy Act 1950 (EBSATA), was unfavourable for forest conservation and resulted in huge damage to the forest. Thus, with the imposition on the ground of the EBSATA in 1950, the forest became the absolute property of the new Pakistan government (Burling 1997).

These two acts (the Private Forest Act Bill 1945 and the EBSATA 1950), with the aid of Forest Act of 1927, assigned the respective District Commissioners to settle the dispute over land rights in the forests. But these settlement operations have not been completed during the last four decades. This is partly because the custodian approach of the Forest Department has failed to draw the sympathy, trust and cooperation of the forest dwellers for the conservation and sustenance of the forest resources.

It is not well documented when the 'Garo' people came into the sal forest area but one claim is that they have been living in the Modhupur forest for generations (Gain 1998; Farooque 1997). The Garos received lands from the Zamindars during their period of rule for temporary use in exchange of certain rent (under a system called patta). Those who had cultivated lands for a long time under patta and made regular payments of rents were subsequently given full ownership (pattan). They are also entitled to sell their cultivable low land (the baidh land) under this pattan system. Rental receipts from the representatives of the Zamindars are the only documents that they have to claim their historical rights in the land. In support of their claim they also refer to the law which entitles a person to claim the right of ownership through holding possession for a long time.

5.2 Government policy planning and deforestation

Historically, the forest policy and legislation in the Indian sub-continent was essentially resource-extractive and commercially-motivated and it acted as the background cause of

[7] This law was introduced by Lord Cornwallis. According to a date fixed by the colonial British, the revenue had to be deposited with the government treasury by sunset on a due date, failing which the property would be auctioned.

huge forest degradation. The exertion of power and authority over the national forest dates back to the colonial period. The state monopoly over the forest, the deprivation of local communities from their user rights, and the use of scientific models of forest management for maximising the growth of trees for harvesting commercial valuable species, were all organising principles of colonial forest management (Gadgil and Guha 1995; Sivaramakrishnan 2000; Guha 1983a 1989; Peluso 1992). During the Pakistan and Bangladesh period no significant changes can be noticed in these resource-extractive forest policies. The concern of ecological sustenance has either been neglected or is of secondary importance to the commercial appeal of timber (forest policies of 1955, 1962, 1979, Mostafa 2002). To be fair, the recent forest policy of 1994 does in theory show a significant shift towards people-centred agendas, though it still acts unfavourably towards the forest. Different infrastructure and installation development programmes of the GoB have impacted on deforestation. For instance, a major link road between two district headquarters was routed through the Modhupur forest, thus giving easy access to illegal loggers, as has happened on a much larger scale in other tropical forests like the Amazon (Moran 1993). Besides, the forest has been treated as a suitable place for establishment of different installations by government agencies. There is an agricultural research institute and defence installations, such as an area for target practice, all of which required the clearance of large numbers of trees (Farooque 1997). Recently the Forest Department began the construction of an eco-park for tourism purposes, igniting much controversy in the area. This project requires the eviction of Garo communities, creating friction with Forest Department. Finally, the project activities have temporarily been suspended due to protest marches and the shooting of one person by the forest guards (*The Daily Star*, 6 January, 2004).

Large scale organised forest depletion occurred in 1986/1987 when the Forest Department leased out 6,070 hectares of forest land to a private agency for an experimental rubber plantation (Burling 1997; *The Daily Observer* 20 April, 2000). Gain (1998) documents the eviction of local Garos to make this rubber plantation, without any compensation. Moreover, Gain (1998) and Burling (1997) have shown that the government initiated different forestry projects backed up with the financial and technical help of the ADB and UNDP, including agroforestry and woodlot projects aimed to rehabilitate the degraded forest area, but unfortunately, these projects caused further degradation and sometimes the complete clearance of patches of ancient forest.

The woodlot plantations were supposed to be in degraded forest areas only, but in many instances good quality forests were cleared out by the Forest Department for their implementation.

Instead of efforts by government agencies to protect the existing forests, their profit-maximisation attitude in forest management has taken front stage. In this regard, Burling (1997) noticed logging under the supervision of the Forest Department and this, according to the local villagers, is a major cause of the disappearance of, not only the old trees, but also of young trees. Burling (1997) also asserted an illicit relationship between employees of the Forest Department and the wood thieves. In my fieldwork also, the villagers (in group discussion) focused on the corruption of the employees of the Forest Department and mentioned that, due to this illegal relationship, thieves can easily carry away the illegally cut wood using ox-carts or rickshaw vans in the early morning or the dead of night. The dishonesty of the employees of the Forest Department in Modhupur has been reported many times by the news media (*The Daily Ittefaq* 15 February 1998 and 28 November 2001, *The Daily Sangbad* 16 February 1998 and 15 September 1999). But the central government agencies have not taken any notable action against the continuous malfunction of the Forest Department and the progressive disappearance of the natural forest continues. In many cases village people are actors themselves in the process of deforestation as they extend their agricultural and homestead lands into the forest and clear fell trees. This process has been proliferated after the resettlement of the Bengali people in the forest area, once after partition in 1947 and again after independence in 1971 (Farooque 1997). But there is a need to find the factors at a macro level that force the local people to act in the way they do. The donor agencies are not free from accusation as they are the financiers of many so-called development initiatives in the forest.

6. Forest regeneration under social forestry schemes

During the last few decades a people-centred bottom-up paradigm can be noticed in the natural resource management regimes in many developing countries (Chambers 1994; Agrawal and Ostram 2001). This necessitates a major transformation towards the decentralisation of existing state-centred, top-down management practices through the participation of local communities (Beiyaminsen 1997). Regarding the context of forest

management, this is usually called community-based forest management/social forestry, which involves a mutual sharing of the responsibility of protecting and regenerating the forests through participation of communities in partnership with state agencies.

The apparent rhetorical shift is the result of increasing evidence of the malfunctioning of government agencies and stultifying bureaucratic attitudes in managing forest resources and consequential disappointing results in massive forest degradation and the deprivation of the local communities of their user right (Agarwal and Gibson 1999; Behera and Engel 2004; Agarwal 1997). The new paradigm gained momentum following the United Nation's Conference on Environment and Development, including Agenda 21, which recommended the decentralisation of natural resource management practice. It further suggested the establishment of opportunities for co-management, ensuring the participation of all categories of people in the community (including youth, women and indigenous people) in the formulation and implementation of forest-related programmes, taking into account local needs and cultural norms (Johnson 1993). This instigated the emergence of a new notion of local people as active participants who understand local conditions and who possess special indigenous knowledge, moving away from an image of them as either destroyers of the forest or as passive recipients of development aid. It is also hoped that participation by local people can offer them increased access to and control over the essential resources and decision-making processes (Mitlin and Thompson 1995). Such approaches are also advocated by many international donor agencies, national governments and NGOs. It is reflected in their policy prescriptions recommending the sharing of power, autonomy and the responsibility of forest management through cooperation.

In Bangladesh a venture into social forestry emerged during the past two decades in order to integrate local people into forest management. The Bangladesh Forest Department started a small programme with its own resources in Betagi and Pomora (in 1979 and 1980 respectively) in Chittagong (Islam 1994), and the first social forestry aid project started in the north western part of the country in 1980-1981, with the financial assistance of Asian Development Bank and the United Nations Development Programme (Salam *et* al. 2005).

The programme was extended under the name of "The Thana Afforestation and Nursery Development Project" (TANDP, 1988-1994). Agroforestry and Woodlot plantation schemes were implemented under the TANDP in both unencroached and encroached sal forest areas. Bose (1994) found that from 1987/1988 to 1993/1994 more than 3,070 hectares of encroached degraded sal forest were brought under these schemes, employing different types of agroforestry models. Agroforestry is a particular agricultural production system which combines the production of trees and agricultural field crops, and sometimes the cultivation of fodder. Woodlot schemes are composite plantations of trees, with or without agricultural field crop and/or forage crops. The species of trees proposed for agroforestry projects are mainly divided into three components. In short term cropping, the varieties are chosen so that seasonal and/or annual food and/or forage can be obtained. The idea is to plan for an immediate economic return to the participants. In mid-term cropping patterns, species are chosen in such a way that they start giving a return after the short term crops have finished. Tree species are selected to alleviate the energy crisis of the local people. Different Acacia varieties (i.e. *Acacia auriculiformis, Acacia mangium*) and *Eucalyptus camaldulensis*, *Albizia procera,* with some local varieties, are planted for 5-7 years (Ghani *et* al. 1990b) in both woodlot and agroforestry projects. The benefits that the participants are supposed to get from projects are fuel wood as a by-product of intermediate thinning, and finally the participants will get 50% and 40% of the tree crops from agroforestry and woodlot plantations respectively.

7. Women and Deforestation in Modhupur

I mentioned earlier that women living in the forest area depend on it for their daily supply of fuel wood for their family's subsistence needs. Some specific types of non-timber forest products are seasonal but the poor women depend on the collection and sale of fuel wood to the nearby market all the year round. In the past when the forest was in a good shape they could collect firewood (dry tree branches, leaves) in the close vicinity of their homesteads; now they have to go further afield. It is also very common in the woods that women are engaged in collecting different types of non-timber forest products like different fruits, leafy vegetables, wild roots (mainly cassava), nuts, and gums. They tend to work in groups, often for 3-5 hours at a stretch, and they share their personal happiness and sorrows and sometimes it helps to swap information and plans.

After meeting their household needs, the surplus is sold in the markets, and sometimes middlemen visit to purchase these products for their urban clients.

Undoubtedly the nature of the impact of deforestation on women will vary depending on their socio-economic status and also upon the other alternative options of livelihood they have in hand. To illustrate their level of desperation, some poor women nowadays collect dried bushes and even pull out the roots of trees that have been stolen by illegal loggers.

Due to cumulative forest clearance, as mentioned earlier, collecting fuel wood and other forest products used to be possible in the comparatively dense forest lying in some small patches nearby to their homes. Now the women need to travel 2-3 kilometres for fuel wood collection, expending more time and energy than before. According to my group discussions, those losing opportunities in the forests move to the urban slums and work in industry, or travel to local brick yards, or they have to become day labourers on the agro-forest properties of others. This disintegration from their society, friends and, most importantly, from their jobs in the forest they know well often leaves them in permanent melancholy and causes a loss of self confidence. After losing their forest income they may find themselves dependent upon others. But some positive things can also be marked as a result of this breakdown. A lot of female students (mainly from the Garo tribal families) are enrolling in the schools in the area with the financial aid of different churches and the charities that recognize the problems of the current situation.

Conflicts between local families and the Forest Department are common over deforestation. The Forest Department files cases against the male members of the family for illegal tree felling (often fake according to my respondents) and they go into hiding to avoid arrest. In these circumstances, it is the women who are forced to take on the entire burden (financial and social) of sustaining their family. They work as daily labourers to earn money for the family and sometimes to meet the expenses of court cases.

8. Linking Women with Afforestation (Social forestry) Schemes

In recent times, the theoretical debate over social forestry concepts has raised many optimistic implications for the development of rural women through their empowerment and poverty reduction by ensuring their active participation in plantation programmes. The Asian Development Bank in their policy indicates such promise for poor women. The national social forestry policy of Bangladesh (adopted in 2000) also mentioned the incorporation of destitute women into social forestry programmes. But, unfortunately, those government programmes in agroforestry and woodlot plantations practised in Modhupur have failed to integrate women as direct participants. Roy and Halim (2001) mentioned that women are hardly found in the area to be formally registered as active participants and were not included in the allotment process in their own names. This claim is also reflected in the representation of the women in the guidelines proposed for this social forestry projects (FAO/UNDP Project BGD/85/085, Ghani *et* al 1990b). A brief quotation from the guidelines will show the view of forest planners and development agencies (as they are the funders) about the participation of women in social forestry.

> *"..... there would be 70,000 participants with as many families. So it is reasonable to expect that at least there should be 70,000 wives. There would be grown up daughters as well. Traditionally the womenfolk in the rural areas spend a lot of time in collecting fuel for cooking food. Once the project gets going it is expected that they would have spare time. They would be able to work in nursery establishment, small animal rearing and also in processing some of the raw materials like bamboo, cane etc. In addition when the men folk are away the women can take their turn in keeping watch over the plantations. In this way the women can very well contribute and raise the income level of their families. This would raise their status and standing in society."*

Roy and Halim (2001) note that women work in their husbands' or male relatives' fields, considering it as their daily household routine task. Field information (group discussion) also supported this. They are mostly engaged in sowing and planting seedlings, weeding, occasional watering, harvesting vegetables in agroforestry projects and taking care of the plants in woodlot plantation sites. But, unfortunately, not being

the registered participants in the agroforestry and woodlot projects, women are deprived of reaping the actual economic benefits from the projects. They consider their tasks as beneficial for the whole family. It is also not unusual that women are engaged as wage labourers working in crop processing activities in other participant's field. This dejected condition reduces their ability/power in decision-making processes and, in turn, results in losing their authority in social forestry programmes. Thus, the unequal allocation and distribution of power in the social forestry programmes hampers their rights and claims over forest resources (Carney and Watts 1990).

Ironically, women are still in a delicate condition in terms of their socio-economic status in Bangladesh. On the one hand, the structure of the patriarchal society and, on the other hand, the lack of property rights and, above all, the inherent gender imbalance in every aspect of life, hinder the representation of women in the public sphere. Khan (2001) identifies some contextual grounds behind the limited formal participation of women in forestry projects in Bangladesh. He recognised the factors such as women's lack of sufficient mobility, lower educational status, insufficient access to information and less control over resources. He further mentioned the absence of effective gender policies and unfavourable working conditions for obstructing women's significant participation in the forestry sector. In this regard it is worthwhile adding some other important factors that he missed out, such as the impact of different social and cultural taboos, the lack of a political voice, religious bigotry, and the seclusion of women from public spaces, as responsible for their current situation. Moreover, the lack of gender analysis in different development project evaluations as well as in the academic research domain in Bangladesh has left the door open for government officials and donor agencies to neglect the role of women in natural resource management. Women often remain unseen in policy prescriptions, with the exception of some minimum lip service. The National Social Forestry Policy (2000) of Bangladesh reluctantly recommended concern of the involvement of women in social forestry projects. But, in practice, institutionally there are no special arrangements for achieving these goals, and conditions are better in NGO-run forestry projects (Khan 2001; Ahmed and Laarman 2000).

Gender equity is also not yet fully maintained in the Indian Joint Forest Management Programme. Both Sarin and Agarwal (1998, 2001) alleged insignificant participation of

women in the Indian JFM. Even if there are some Indian states where the presence of women is included in the executive body of forest protection committee, in reality they have very limited participation in decision-making or any other important tasks (Sarin 1995). The Indian government is trying to recover the situation, and it is evident that some states like West Bengal, Haryana, Mdhyapradesh, Rajasthan and Karnataka are heading towards women-inclusive JFM projects (Agarwal 2001). For an example, in 1990 in West Bengal, one person per household was registered as the member in the general body of JFM, but this was modified in 1991 to include women as regular members (Agarwal 2001).

In order to empower the local communities as well as to reduce poverty and maintain balance in the ecosystem through the management and regeneration of forest resources, the basic principle of equity, justice and sustainability must be maintained. Thus, social forestry must ensure the active participation of both women and men. Women as being indirect beneficiaries via their male partner's participation and their silence in decision-making and choice has led them to remain in the same subordinate position in the working sphere. This seclusion also leaves society with a disproportionate distribution of benefits. Moreover, without ensuring the women's active participation in agroforestry programmes, the opportunity is lost of employing the special indigenous knowledge and experience of women as major users and managers of natural resources.

The literature has identified the main hurdles against the success of social forestry. These is a lack of actual participation, complexities in constructing partnerships between the state and local communities, the reluctance and hesitation of the Forest Department to transfer the control and power to local communities and a lack of gender balance (Shekhar 2000; Kumar and Vashisht 2005; Saigal 2000; Gauld 2000; Gupte 2004; Khan and Begum 1997). The participation process currently practised in Modhupur is not free from the above-mentioned problems. The representation of the community in Modhupur is politicised and power laden. It is not the case that all of the poor and destitute families in the area are included in social forestry programmes as set in the social forestry guidelines of Forest Department (Ghani *et* al. 1990a). The processes of selecting participants are often influenced by other factors such as class, ethnicity and power and bribery. In group discussions (May 2005), women alleged that recently some powerful Bengali people have become the main recipients of project plots

and destitute tribal families are neglected. Even some outsider rich businessman have taken the opportunity of getting plots in social forestry, but the social forestry guidelines suggest that the plots should be allocated to the forest dwellers living in close vicinity to the forest. It is also indicated there that the allocation of the plots should be based on the socio-economic status of the families. Corruption and bribery have caused an intensification of the crisis. As a result, the allocation and distribution of plots simply marginalizes the poor and women.

On the other hand, the schemes have restricted access to the forest for public use. So it can be argued that the cumulative deforestation and, on the other hand, forest area restrictions (through the schemes) both have detrimental effects on poor women. Women complain about the shrinking of free space for cattle-raising due to the social forestry programmes (Group discussion 2005). Moreover, the species, mainly exotic varieties (*Eucalyptus camaldunesis, Accacia manzium, Accacia auriculaeformis*), planted in woodlot and agroforestry projects, along with a small percentage of indigenous species for a certain period (7 years) in order to supply fuel wood for commercial purposes, cannot supplement the multi-functional benefits derived from the natural forests by the local community. Shiva (1989), referring to exotic forest plantations in India, calls such type of forest management 'maldevelopment' because it destroys the regenerative power of nature. She further added that ecological degradation - the destruction of the natural productivity of nature due to the 'reductionist' commercial forestry - undermines the issues of sustenance of women in the third world. As women of the third world depend on nature through their production and reproduction of life, as well as their social role of providing sustenance, any violation of nature is directly linked to their marginalisation and displacement (Shiva 1989). Rocheleau and Ross (1995) and Rocheleau *et* al. (1996b), regarding the Acacia (*Acacia mangium*) plantation in the Dominican Republic, showed how it worked as the tool of multiple power relations and symbols of struggle among different actors interacting with gender at different scales (household level, federation). The opportunity for collecting firewood (dry leaves, twigs etc) and other food items by the women is now very limited due to the different characteristics of the exotic species on the one hand, and, on the other hand, their access to the plantation is rejected by the plot users. The species are pre-selected under the authority of the Forest Department according to the guide book prepared for social forestry (Ghani *et* al. 1990a, Gain 1994). Local

people are not usually consulted about their desired species. Shah and Shah (1995) mention a successful social forestry programme run in Dediapada and Vlia village in Gujrat, India, where local people, especially the women, are consulted for the selection of plant species to enrich the diversity of species with women's special agro-ecological knowledge. Finally, in order to achieve the long term sustainability of social forestry programmes, the involved government agencies should ensure a balance between men and women in participation.

9. Conclusion

Women's relentless struggle for maintaining their daily sustenance and the long-term well-being of their families, and the maintenance of a healthy environment (both in household and work place) have recently begun to receive attention. Women's efficient contribution in resource management, as well as their active participation in economic and social development, have come under scholarly scrutiny in both the academic and development arenas. The increased awareness of women's work has resulted in development programmes targeting women as the recipients of international development aid, and their incorporation into the development projects as *de jure* community participants, etc.. But, ironically, still a great deviation can be traced between the conceptualization and theoretical debate on the well being and development of women and its practical implementation. Development policy prescriptions in many cases are gender-blind and have failed to reflect the inherent gender inequalities that have marginalised women, and this justifies the necessity of focusing on the underlying gender inequality and social marginalization of women (Moser 1989; Kabeer 1994; Momsen and Kinnaird 1993).

Deforestation in the Modhupur 'sal' forest has marginalised women and affected the environment in different ways. Due to the increasing deforestation and the consequential crisis and conflicts, women are losing their access to and control over natural resources. On the one hand, deforestation-related crisis has impacted on their household security and as well as their social peace and harmony. On the other hand, due to increasing clear-felling of the natural forest, the overall environmental sustainability and ecological balance is under threat. If the present rate of deforestation

continues, it won't take much longer to wipe out the whole forest and push the people towards further destitution.

In addition, government initiatives have failed to achieve their aims to improve the fragile ecological and economic condition of the people, and have rather increased the uncertainty and frustration. This lesson suggests that investment in natural forests dominated by native varieties could make an important contribution to addressing the ecological crisis as well as social needs. In addition, multidimensional support from natural forests may help the women with provisions for their sustenance. But, if it is the case that there is no alternative to adopting social forestry programmes using global models, then they must be fine-tuned with the ecological and cultural characteristics of the place where they are practised. For instance, native species, chosen in consultation with the local inhabitants, could replace the exotic species. Women should be consulted, in particular, because of their special agro-ecological knowledge. Their participation should also be ensured in every step of social forestry projects. The lessons could be learned from the successful community forestry programmes in India like Arabari in West Bengal, Sukhomajri in Haryana and Harda in Madhya Pradesh (Saigal 2000). Although the JFM all over the India is not yet successful, it is still a good example of natural resource management for Bangladesh to follow.

Proper gender analysis as well as gender-sensitive policy planning and its transformation to practice is a desperate need in Bangladesh to ensure women's place in development programmes. It could raise the awareness of women about their specific rights and responsibilities and also could encourage them to take part in decision-making activities, as well as to be conscious about their material benefits. Above all, in a country like Bangladesh, where women constitute half of the total population and play significant role in agro-ecological development, without addressing them, fulfilling their need and ignoring their voices, no real development can take place. The actual needs of women must be identified for securing the long-term development perspective. The assurance of the access to, control over and equal distribution of natural resources can ensure the long term sustenance and wellbeing of women.

Moreover, as for the long term perspective, government agencies should take steps to make alliances with the local people through negotiation. In social forestry programmes

the representation of community should be in such a way that considers the internal divergences of society so that the equity and justice issues can be considered. In addition, alternatives choices of livelihoods should be opened up to reduce the dependency on natural resources. Finally, donor agencies also could take some responsibility to ensure the transparency and accountability of government agencies so that just and equitable programmes are deployed.

Chapter 5
An Analysis of Food safety and quality issues in Bangladesh

1. Introduction

Anxiety over food safety and the quality of food we consume has received greater attention internationally in recent times (Hanak *et* al. 2000; Unnevehr 2003). Consumers around the world are becoming more aware about food issues as the linkage between dietary preferences and health are increasingly being recognised. They are demanding a guarantee of safe and better quality food, notably in the developed countries due to increased affluence and the empowerment of their 'citizen consumers'. Gradually concerns have shifted from food availability to food quality. In addition, progress in the medical and nutritional sciences has facilitated access to information about what constitutes a healthy diet and the nutritional status of individual food items, and improvements in the technologies and techniques of mass communications have influenced people's perceptions of and demand for food (Kinsey 1993; Unnevehr and Jensen 1999).

In the Less Economically Developed Countries the issue of food quality has hitherto been of less significance, although in Bangladesh public scrutiny on this topic is just beginning to emerge. In an agriculturally-based, poor country, where the struggle for an adequate production of staple foodstuffs for its rapidly expanding population has been the biggest challenge for the state, issues of food quality and safety have seemed of lower priority and have not received sufficient attention from governing institutions. Public health and safety are political issues, but for food they are not sufficiently explored in Bangladesh. Even scholarly interest in this subject is rare, which is perhaps surprising given its prominence in other countries.

A major portion of the food items in Bangladesh, including cereals, starchy tubers, vegetables and fruits, meat, fish and poultry items, milk and milk products, fats and oils, drinks, salt and many others are widely reported to be adulterated, of degraded quality and sometimes unsafe for human health (*The Daily Ittefaq*, 13/10/2001, 17/2/2002; *The Daily Janakantha* 15/11/2001; *The Daily Ajker Kagoj* 5/6/2003). Excessive and improper use of pesticides, insecticides, chemical fertilizers and the use of growth

hormones, ripening sprays, dyeing colourants in fruit, vegetables and crops at different phases of production, processing, preserving and marketing make them unsafe for human consumption (*The Daily Star* 29/06/2003; *Ajker Kagaj* 11/12/2003; *The Daily Janakatha* 27/05/2003; *The Daly Itefaq* 19/10/1999. Food handled in the dirty and unhealthy conditions of restaurants, street stalls and other small processing units (like sweetmeat shops) increase the risk of outbreak of microbial diseases (*The Daily Janakantha* 15/11/2003; *The Daily Ittefaq* 15/12/2003). In addition, overuse and misuse of additives and toxins in the fields causes deleterious impacts on land, water and the natural life cycle of other organisms. Widespread food adulteration increases the risk of a negative impact on human health either in the short term or the long term. Unfortunately, attention to these issues is restricted to popular media articles, while academic analysis is scarce. Notable exceptions include research reports on the results of laboratory tests regarding chemical and microbial contamination (Proshika 2003; IPH 1994), while Islam *et* al. (2003) studied the impact of the socio-economic status and awareness of food hygiene on the quality of street vending food.

Given this context, the present research initiative aims to use the conceptual framework of political ecology (discussed in section 3) to examine the state of the food safety and quality degradation in Bangladesh and accordingly intends to assess the underlying causal factors. Concern for the environment, and its semantic equivalent *nature*, has come under academic scrutiny (Castree 2002, 2004; Braun and Castree 1998; Eden 1998) during the last few decades with the rise of environmentalism and green development (O'Riordan 1981; Adams 2001) both in global north and south. If we consider the broader definition of environment, food systems are relevant because human beings directly interact with nature through the production and processing of food (Atkins and Bowler 2001). Simultaneously, through its consumption, production, processing, marketing and commercialisation, especially with the process of recent globalisation of food, the relations of food with different aspects crosses regional and national boundaries and encompasses a wider spatial space where the activities of different actors impact on food safety and quality issues. Political ecology, in that context, shows great promise, offering a broad conceptual framework for studying the forces and activities of the actors impacting on the nature-society relationship, primarily linking the concern of ecology with broader political economy (Blaikie 1985; Blaikie

and Brookfield 1997; Peet and Watts 1996a). It is especially important for food systems in developing countries, which operate closer to nature.

This aspect of food safety and quality in the present research has been explored using the theoretical framework of political ecology backed with secondary materials collected from both Bangladesh and international sources. It is notable that due to the scarcity of academic writings on food quality issues in Bangladesh, daily and weekly newspaper articles on food quality deterioration were the main source of information in this study. In addition, some interviews with government and NGO officials were conducted to elicit their views on the deterioration of food safety and quality. The chapter is organized with a general discussion on food quality and safety issues at the outset, followed with a description of the nature of food quality problems and ending with a political ecological interpretation. I have tried to synthesize most of the dimensions of food concerns in the hope that some concerned groups (researchers, government managers and administrators, policy planners) might take the necessary steps to improve the situation.

2. Perceiving food quality and safety

Food safety is one of the quality attributes of food and it is one of the most desirable attributes to consumers around the globe (Antle 1996; Atkins and Bowler 2001; Swinbank 1993). Moreover, recently it has received political attention and, in view of the public health issues, it has become an important consideration in global food trading. Since the 1980s the statistics show an increasing number of food-borne diseases and salmonellosis in developed countries involving micro-organisms and toxins, and the WHO and other concerned agencies have highlighted the problems with food safety, and subsequently there has been raised public anxiety over safety issues in farming, food processing, transport and trade (Sockett 1993; Loader and Hobbs 1999; Henson and Caswell 1999).

According to the guidelines for strengthening national food control systems (2003) published by FAO and WHO, the term 'food safety' refers to concerns about all the elements that make food injurious. Hazardous events can range from short-term food poisoning due to poor food handling practices in unhealthy environments to long-term

chronic diseases owing to the consumption of toxic chemicals for an extended period. Thus, because of the potential risk of health hazards, consumers around the world are increasingly becoming anxious, not only about food safety but also about other components of overall food quality. Therefore, in theory, ensuring better quality food is a prime concern to consumers, producers and food traders alike. In practice, there are very substantial spatial variations in both the demand and supply of 'safe' foods and also in the ability and willingness of consumers to pay for them. Consumers in the North are becoming increasingly aware of food hazards as they are informed about the relationship between food habits and wellbeing, and recently ethical issues have added new dimensions. According to Ulrich Beck (Beck 1998; Mythen 2004), a key threshold was the explosive issue of "Mad Cow" Disease or BSE in the UK in the 1990s, which affected consumer confidence across Europe, not just about the safety of eating beef but, more fundamentally, about trust in the politicians and civil servants who made public pronouncements that 'beef is safe to eat' and, ultimately, about trust in every aspect of the food system.

The concept of the quality of food is not simple and straightforward, rather it is intricate and multidimensional, containing both subjective and objective components and also varying across persons, time, space and situation (Lawless 1995; Bowbrick 1992). Therefore, single and simple definitions of food quality are not always adequate (York 1995). In a simple definition, food quality includes an array of attributes which determine the value of the products to the customers (FAO and WHO 2003). These attributes can be either quantifiable or qualitative, positive or negative. With respect to the requirements and acceptance of consumers, food quality can be determined by sensory attributes such as colour, flavour, texture, visual appearance, physical composition, chemical properties, amount of microbiological and toxic contaminants, processing method, place of origin, and other external properties like packing, labelling and shelving (Molnár 1995; FAO and WHO 2003). Peri (2006) presented an effective model of food quality, categorizing a wide range of attributes depending on the required elements necessary to satisfy the needs and expectations of consumers and traders (figure 7).

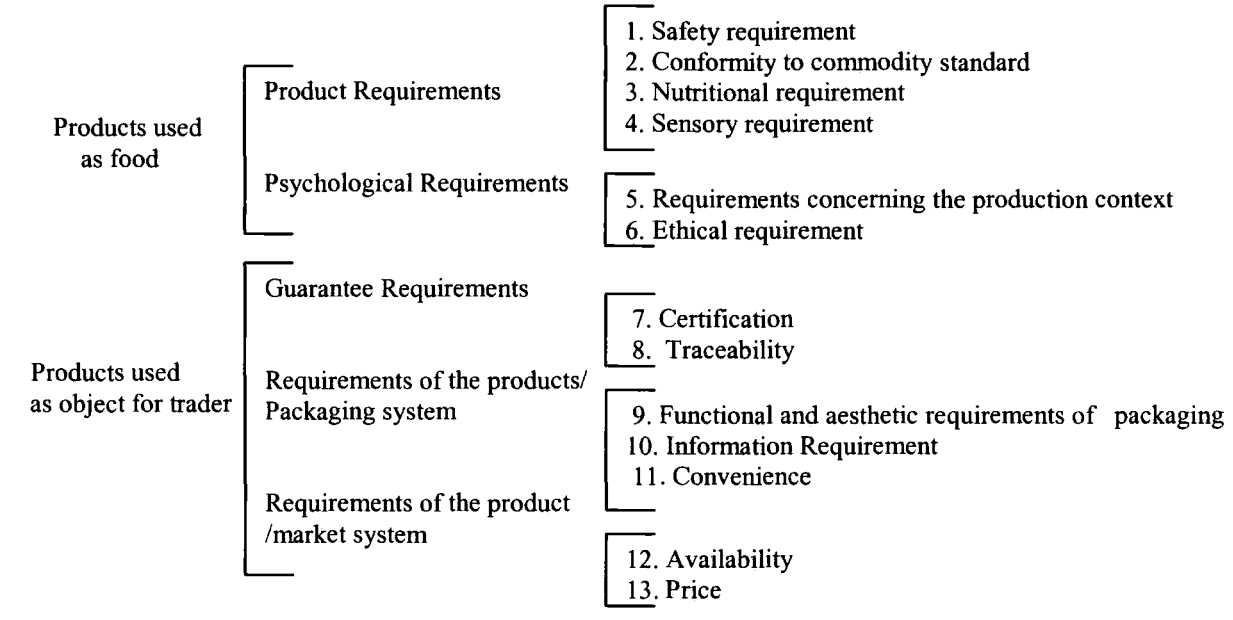

Figure 7: An analytical model of food quality adopted from Peri (2006).

In addition to conventional food quality issues such as taste, colour and physical properties, recently in many developed countries like the UK, ethical aspects of human and animal welfare and aesthetic issues have been raised as new components of consumer values (Wandel and Bugge 1997). In this respect many consumers prefer food grown, raised and processed in environmentally friendly ways, such as with fewer agro-chemicals, fertilizers, herbicides, pesticides, insecticides, growth regulators and free from genetic modification (Schröder and McEachern 2004). Thus the production and consumption of organic food is increasingly popular due to its environmentally benign profile, improved animal welfare (e.g. free range poultry), greater food safety, healthy eating and higher quality (Jones *et* al. 2001). Having said that, some authors are critical of many of the positive attributes the organic food system and dubious about the nutritional advantages and sufficiency of organic plant nutrients etc. (Avery 1999). However, organic food is still yet to thrive in comparison to large farm based agro-production. Until recently it has represented a very small portion of agricultural production and consumption (Atkins and Bowler 2001).

As mentioned earlier, the concept of food quality is complex, so the associated measures used to control and regulate it are not simple either as they involve diversified factors which influence distinct stages of the food chain. Henson and Traill (1993)

identified a number of issues which could be major risk factors in food hazards, as follows:

- food-borne poisoning organisms
- heavy metals
- pesticide residues
- food additives
- naturally occurring toxins
- veterinary residues
- nutritional imbalances.

In higher income countries, food safety and food quality are regulated by the state and by private agencies. Even the supermarkets follow their own regulatory mechanisms. In the context of global food trading, recent trade agreements have also sought to regulate food safety by implementing sanitary and phytosanitary (SPS) measures under the auspices of the General Agreement on Tariffs and Trade/World Trade Organisation (GATT/WTO) (Hooker 1999). The introduction of these measures took place mainly because the wealthy parts of the world like Europe, USA, Canada, Australia, and Japan import foodstuffs from third world markets (Kinsey 1993), where controls are weak. These strict regulations cannot eliminate all potential hazards, however, and new kinds of risk factors arise in the food chain that are beyond the reach of existing frameworks/mechanisms. For example, the risk factors of GMOs and GM foods are not adequately understood (Tait 2001; Clare 2005; Henson and Caswell 1999).

In the recent past, a number of high profile outbreaks of food borne microbial diseases have alerted consumers to the failure of the food producers, processors and manufacturers to ensure adequate food safety. With a view to bringing food-borne pathogens under control, governments of many developed countries like those in the EU, the USA, Canada, and New Zealand have in the meantime taken a critical approach to food safety and initiated 'Hazard Analysis Critical Control Point' (HACCP) systems for particular food items such as red meat, sea-food and poultry (Unnevehr and Jensen 1999; Caswell and Hooker 1996). HACCP is a process control related approach which seeks to identify the potential points of hazards occurring in the production process. These critical control points are then monitored carefully and hazards are controlled by

taking preventive measures when monitoring shows any deviation from expected values (Unnevehr and Jensen 1999; Caswell and Hooker 1996). There have been controversies about the effectiveness, economic justification, and harmonization of HACCP in different countries for the same food commodity (Hathaway 1995; Swinbank 1993), but industry and the regulatory authorities continue to recognize it as an effective approach for producing safe food due to its potentials to minimize sanitary crises. The Codex Alimentarius Commission (CAC) of the FAO and WHO adopted the application of HACCP systems in its code guidelines in 1993 and revised all of the relevant Codes of Hygienic Practice to include recommendations for the application of the HACCP principles (FAO 1998).

However, the overall legislative and institutional mechanisms involved in maintaining and ensuring food quality can be categorized in three broad types that operate at different levels. These are:

- International Standards and regulations (like ISO, Codex guidelines etc.).
- Government Acts and Regulations.
- Standards and certifications set by professional bodies and business enterprises (mainly private entities).

The CAC is responsible for developing and maintaining various standards, guidelines and recommendations for food (especially international trade items) in order to protect public health, and to ensure fair trading practices. In addition, Codex standards are the officially accepted food standards of the World Trade Organization. Codex generally sets guidelines as to sampling and test procedures, along with setting national standards. Sometimes importing countries change their standards and these may vary from Codex standards. For example, the European Union proposed aflatoxin (fungal contamination) standards in 1998 that did not comply with the standards set by Codex and this initiated disagreements and ignited disputes with member states of the WTO (Otsuki *et* al. 2001). In addition to the Codex, the ISO (International Organization of Standardization), a network of the national standards institutes of 156 countries, plays a major role in formulating and certifying food quality standards at the international level. The ISO, currently offers twenty guidelines (http://www.iso.org/) to cover most of the aspects of assuring food quality.

Government regulations usually include setting standards, regular inspections, product testing, certifications, product liability and other activities seeking to ensure product quality, while private regulatory systems consist of self regulation mostly maintained internally to ensure product quality, and various forms of certification authorized by other parties (Henson and Caswell 1999). National governments often incorporate some of the directions and recommendations of international regulatory bodies while developing their own policies, rules and regulations. When public sector initiatives are insufficient, private sector mechanisms sometimes fill the gaps in keeping food quality standards up to date (Reardon and Farina 2001). Reardon and Farina mention two specialized examples that help to make the point: McDonalds in Brazil have private agricultural health standards for lettuce seed that must be used by its suppliers; and similarly Nestle also upholds its own standards while importing coconuts from Brazil. In Bangladesh, the FBCCI (Federation of Bangladesh Chambers of Commerce and Industry), the apex body of business enterprises, maintains a quality forum (including food quality) to support, guide and certify producers and manufacturers with its own standards, as well as to help its members get certification from the ISO, Codex, etc.. The ban on shrimp imports from Bangladesh imposed by the EU in July 1997 on the grounds this commodity did not meet the stringent provisions of its HACCP regulations (http://r0.unctad.org/trade_env/test1/meetings/standards/mustafizur.doc, accessed on 10 February 2006) upset the country as this sector provides about one tenth of its total export earnings (BBS 2001). This ban was considered by the government and the private sector as a warning to comply with international food quality standards. There are efforts from some individuals and groups in Bangladesh who produce and sell food items at maintaining standards set by themselves, popularly labelled *home-made*, *indigenous, organic,* etc.. In fact, the rules or standards are developed in line with customary agreements, where foodstuffs might have additives or not; but the quality is more or less mutually accepted by both the consumers and producers.

3. Political Ecology and food quality issues of Bangladesh

Political ecology is concerned with environmental changes (Bryant and Bailey 1997; Zimmerer 1993, 2000; Zimmerer and Bassett 2003; Turner 1993) and, at the same time,

is widely engaged in finding the underlying causes of these changes within a broader contextual framework rather than pointing out only the immediate apolitical factors. In investigating the contextual sources it has mostly focused on socio-economic and political forces at different levels ranging from the local to the global scale (Bryant and Bailey 1997; Robbins 2004). It predominantly includes the influence of the activities of local actors and at the same time focuses on the outside agents extending the influence of globalisation and worldwide spread of capitalism. The state as an actor, its policy prescriptions and their deleterious impact on the environment, is a major area of work for political ecologists (Basset 1988a, 1988b).

Political ecological works since its inception have become enriched with insights derived from various theories emerging in both Geography and other social science disciplines and sub-disciplines in the context of nature-society relationships. Poststructuralist theorists like Escobar (1992a, 1992b,1996); Peet and Watts (1993, 1996b); and Parajuli (1998) have critically focused on the contemporary model of development and taken an interest in the power of the new social and environmental movements of the South as an alternative to mainstream development theory. Some social scientists like Ulrich Beck (1991, 1995) have introduced the concept of risk and hazards in the study of nature-society interaction. Beck has argued that the changing form of nature-society interactions has taken on a fundamentally different form, the 'risk society' in his terms. He further argued (Beck 1991, 1995) that these risks are the outcome of the processes of modernization and industrialization and the impact of this new form of environmental degradation is not spatially limited and not confined to particular communities. Risks are potentially global in their nature. Political ecological works in the meantime have extended their scope to a wide range of ecological crises of the third world countries, including land degradation, soil erosion, deforestation, hydro-politics, pollution, drought and famine. But political ecologists have published little on food issues and nothing on food in Bangladesh. Thus, political ecology could be an appropriate tool for interpreting the food crisis in Bangladesh. In this regard, the following subsection starts with a discussion on the state of food adulteration in Bangladesh followed by the political ecological analysis of food crises.

3.1. Nature and Types of Food Adulteration in Bangladesh

Food safety and quality issues have become a major concern in Bangladesh at a time when the country has gained self-sufficiency in food grain production. It is now argued that adequate food production cannot always ensure security for a nation but the way it is produced, preserved and consumed is the real concern for the security of human health as well as ecological well-being. Food can turn out to be unsafe at any phase of the food chain, starting from the primary production level right through to consumption.

There are many factors in the food chain that could contribute to potential hazards in foods, including improper agricultural production and processing; misuse of pesticides and fertilizers; lack of hygiene maintenance; lack of preventive measures and controls in food processing and in preparation tasks; use of contaminated and low quality raw materials and polluted water; misuse of food additives and colours; and poor storage and transportation systems (FAO and WHO 2003). In the case of animals, contamination can start from their pre-slaughter treatment, including their living conditions, and may include secondary contamination during the cutting and processing of meat for retailing (Sinell 1995). In Bangladesh, most of the above mentioned problems are to be found, resulting in the mass degradation of food quality. Frequent reports in the print media on food adulteration highlight this depressing picture of food. The only government agency which is entitled to ensure the standard of consumable goods, the BSTI (Bangladesh Standards and Testing Institute), admits that 45 per cent of the total food items sold at market are impure and, according to the Dhaka City Corporation, 54 per cent of marketed food items in the capital are adulterated (*Weekly Purnima* 12/09/01). Bangladesh suffers from the most severe food adulteration crisis among the south-Asian nations, since compared to an adulteration rate in India of 10 percent, in Nepal 15-18 percent and in Sri Lanka 20-30 percent, in Bangladesh the rate is 45-50 percent, according to a study report prepared by two NGOs (*New Age* 2/11/2004; ci in http://www.sos-arsenic.net, accessed on 05/11/05; *The Independent* 11/12/2001). Such a high rate of adulteration indicates poor quality but also safety hazards. Sometimes foods contain bacteria or parasites while others might become toxic due to the growth of mould or fungi, which secrete natural toxins. Nowadays arsenic poisoning is another dimension with respect to food hazards in Bangladesh. *The Daily Star* of 6th June 2002 reported that arsenic (from contaminated groundwater) has been traced in rice, tomatoes, onions and beans and leafy vegetables at levels of 5.30 mg/kg,

7.2 mg/kg, 93.30 mg/kg, 5.1 and 1.9 to 4.5 mg respectively by testing 1000 samples of crops, cereals and vegetables collected from 50 thanas in 15 most affected regions in Bangladesh. Cooked foods were also tested in the same way and the levels of arsenic were found at 0.35 mg/kg in rice, 0.81 in vegetable curry, 0.33 in spinach, 0.39 in fish curry and 0.27 mg/kg in pumpkin. The maximum allowable limit of consumption of arsenic through food by a person is 0.2 mg per day. Food adulteration issues in Bangladesh are diverse and multi-dimensional; a brief summary is presented in the following by each category of food item.

3.1.1. Adulteration in Fish and Meat

Bengali food culture is characterised by a high consumption of fish and much of this is fresh water fish from rivers or ponds. The sale of poisoned and decomposed fish is a widely discussed issue locally. Many water bodies generally used as dumping grounds for urban and industrial waste are utilized as fisheries, rendering the fish toxic. In addition, the residues of chemicals, such as fertilizers and pesticides used in agriculture are washed into water courses and contaminate the fish. Chemical preservatives like *formalin* and *formaldehyde* are used in fish to keep the appearance of a fresh product (*Daily Star* 22/06/2005). DDT is commonly used in dried fish to prevent insect attack (*The Daily Ittefaq*, 16/1/99; http://www.sos-arsenic.net, accessed on 05/11/05). In June 2003, the Fisheries Department found a toxic antibiotic, *nitrofural diajol*, in shrimps ready for export (*Ajker Kagoj* 05/06/03). The lagoons at the 16 sewage works of the Dhaka Water and Sewerage Authority (WASA) have been leased out for fish farming. The practice was stopped for a short time as a result of mass protests by city dwellers and the media and later the government took some steps against it. But recently fish production and marketing has started again in those polluted lagoons (29/09/03). Another report was published in the *Pratham Alo* (19/09/03) on the use of poison in open waters (e.g. small rivers) by fishermen employed by a powerful local leader. A case was filed but nothing happened against him.

Nor is meat always safe for human consumption. Quality declines during transportation if the animal and poultry become stressed due to heat or overcrowding (figure 2). There was a rumour in 2001 about poisoning in the poultry industry by aflatoxin-infected poultry (*Fortnightly Chinta* 2001). In cities, animals are often slaughtered on the streets and sometimes besides dirty dustbins (*Daily Star* 26/10/03). There are only six

designated slaughter houses in the Dhaka City Corporation area for a population of 10 million people. A veterinary officer is supposed to monitor every slaughter house and to stamp the carcasses to indicate that these animals have been slaughtered as per the certified health standard, but, unfortunately, this system is inactive in Dhaka city area. Sometimes rotten meat is mixed up with fresh meat and one type of meat is substituted for another (such as black goat meat with sheep meat) types. When animals or poultry die during transportation, their meat is sold by the traders after mixing it with fresh meat.

Figure 8: Transporting poultry to the urban markets. Source: Pratham Alo, 15th December 2003.

3.1.2. Salt

UNICEF has prescribed and financed the fortification of salt with iodine in Bangladesh to prevent goitre. They have also prescribed guidelines for packing iodized salt. But in reality very few companies in Bangladesh produce salt with the correct percentage of iodine and many traders do not add any iodine at all (*Daily Ittefaq* 13/01/99; *Daily Jugantor* 28/06/02, 03/10/02). According to the packaging guidelines, the polythene packets should be humidity-protected and 20 per cent of the packet volume should be kept empty to maintain the standard of the salt. But most companies do not follow these guidelines. As a result, the iodine deficiency problem has not been eliminated.

3.1.3. Edible oil

Edible oils like mustard oil, soybean oil, butter oil and ghee are generally impure in Bangladesh and are frequently adulterated by admixture with other oils (*The Independent* 12/10/2002; *Daily Ittefaq* 4/01/1999). Many shocking new methods of adulteration have been reported. The toxic ingredient elilisothio sayanide, for instance, has been mixed with unrefined soybean oil to make an artificial mustard oil which is then supplied to the market by the fraudsters (*The Daily Sangbad* 3/11/1999). Health experts suggest that adulteration in oil is one of the major causes of food poisoning in Bangladesh and the adulterated mustard oil can cause serious health hazard to human (*The Daily Sangbad* 3/11/1999) (http://www.sos-arsenic.net, accessed on 05/11/05). Butter oil is simulated by mixing potato with discarded cow fat. Sometimes animal fats, which are used in soap manufacturing, are mixed with butter oil. The BSTI reported in 1999 that almost 98 per cent of the edible oil product in the market is impure (*Vorer Kagoj*, 11th November 2001; *The Daily Ittefaq*, 26th April 2003). According to the Dhaka Metropolitan Police, there are 80 factories in Dhaka responsible for the adulteration of edible oils. These factories do not give their address on the labels of the products. A reputed NGO in Bangladesh, Proshika, conducted a study on the quality of soybean oil in 2003 (Proshika 2003). Samples were collected randomly from different places, including some well known brands and open container oil. In their study, excessive *peroxide* and *acitile* values were found to be high in most samples. They also contained high levels of saturated fatty acids, which is injurious to human health. (*Daily Ittefaq* 26/04/03). Dalda, a vegetable-based fat mostly used for cooking, is another example in the list of often adulterated foods (http://www.sos-arsenic.net).

3.1.4. Vegetables

There has been a flood of newspaper articles about the use of non-food colours (mainly industrial textile dyes), and the improper and excessive use of pesticides in the cultivation of vegetables and other crops. Artificial colours and toxic chemicals are used in almost all kinds of vegetables to make them colourful, bright, attractive and 'fresh'. Tomatoes are coloured with red dyes and green colours are used for green tomatoes; both are suspected to be injurious for human health (*Vorer Kagoj* 11/12/03). In addition, different types of plant-stimulating hormones, and growth regulators such as itherel, are applied to tomato plants to make the tomatoes grow quicker or ripen early. Also, chemicals like *dythen-M-45, tilt* and *fungicide* are used to delay the decay of tomatoes.

Chemicals are used to make leafy vegetables like spinach and amaranth to look fresh and attractive. Bitter gourd and cucumbers are treated with green colours and red potatoes are also dyed to catch the customer's eye. Insecticides and pesticides, such as *dymecron, sumithion, DDT, nagaj, sankuranm, tin-g-agosiyn, nuvacras, rasathin 90 g, and diajinan 60* have different prescribed periods which are supposed to expire before supplying to the market. But, due to the ignorance/carelessness of the farmers and their desire for quick returns, vegetables are sold before the elapse of these prescribed periods (*Daily Jugantar* 27/05/03).

3.1.5. Fruits

A great portion of the fruits like mango, banana, pineapple, papaya and others are being matured and ripened artificially by using excessive calcium carbide and *Ithofen* (*Daily Jugantar* 18/10/99). Farmers from Modhupur, Ghatail and Sakhipur thanas allegedly use plant hormone spraying *ethrel 48 SL, COM-TOM 40 SL, crop care* and *Ripen* and other chemicals for ensuring the rapid growth and early ripening of fruits (*Daily Star*, 8/12/ 2004). Bananas are ripened generally by using *ithofen* and sometimes by heating. In some cases pesticides and insecticides are sprayed in orchards without maintaining precautions. Sometimes the fruits are sprayed again after harvest to lengthen their storage period.

3.1.6. Sweetmeats

Adulterated and sub-standard milk powder is often found imported from foreign countries and freely sold to the markets in cities and secondary towns. Such adulterated, low-grade, date-expired, imported powder milk is widely used to make sweetmeats and other milk-based products. According to the Institute of Public Health (IPH), *all* of their tests on sweetmeat items carried out during the last ten years found adulteration (*Daily Ittefaq* 11/1/99). There are even reports of radioactive powdered milk. Normally acetic acid and citric acid are used to make sana (the solid extract of milk used for sweetmeat preparation), but there have been incidents of the use of sulphuric acid (*Daily Jugantar 13/12/03*) in milk to separate the sana. Saccharine is frequently used instead of sugar, artificial toxic colours instead of proper food colours, and animal fat to preserve the milk fat content (*Daily Ittefaq* 11/1/99). It is common for sweetmeats to be prepared in a dirty and unhealthy environment, often river or dirty ditch water is used. It is interesting to note that sweetmeats are not included on the BSTI's product monitoring list.

3.1.7. Bread and Biscuits

Low grade bread and biscuits, prepared in dirty and unhealthy conditions are sold in markets. This is normal all over the country, except for a few reputable companies. Low quality wheat flour, oil, dalda, date-expired milk, and rotten eggs are all reported to be used in the production of biscuits, cake, pies and bread. Dirty water is used to process the ingredients. The unhealthy environment of the processing area, as well as the dirty condition of the labourers, all are responsible for the poor quality of these products. Among thousands of factories, not many have been certified by the BSTI (*Daily Ittefaq* 5/1/1999). An officer of the BSTI has admitted to this researcher that bread and biscuits are produced in unhealthy environments, and that injurious bacteria have been found in them. In some cases even parasites like intestinal worms are spread.

3.1.8. Ice-cream

Most ice-cream produced in Bangladesh is impure and of a very low standard. According to city corporation inspectors, it is produced in unhygenic, dirty conditions and sometimes contains coliform bacteria. There is no testing system and most ice-cream is produced with excessive amounts of chemicals and with dirty water. *Zinc oxide, chalk power* and *arrowroot* are added for cosmetic reasons. Injurious non-food dyes have also been found in ice-creams. Saccharine is used instead of sugar and in some instances rotten coconut, cake, biscuit, or bread is used for flavouring. Low grade powder milk, matha (milk extract) and stale sweetmeat remnants are also used. According to the 'Pure Food Rules 1959,' milk with at least 10 percent fat content should be used in making ice-cream. But this is seldom followed in the industry according to samples tested in the IPH laboratory (*Daily Ittefaq* 6/1/99). In addition, there are many pirated brands of ice-cream sold on the market. Rahman *et* al. (2003) conducted a bacteriological survey on breads, biscuits, ice-creams and sweetmeats based on 250 biscuits, 50 bread, 200 ice-cream and 400 samples of sweetmeat randomly collected from Dhaka city. Sweetmeat is found to be mostly (96.75%) adulterated item among them.

3.1.9. Beverages/Drinks

The soft drinks market is another disastrous and shameful regime. The use of toxic elements, unhealthy colourants, date-expired products, and the presence of *coliform* bacteria and other contaminants, are all issues that have been raised with regard to the quality of drinks items. Date expired drink products are imported from countries like

Malaysia, Singapore, India and Pakistan by disreputable businessmen. The use of *carmoisene, tartrazine, brilliant blue, sunset yellow, ponceau 4R*, and *erythrosene* as food colours in Malaysia is still legal, though many countries have banned them, so drinks imported from this quarter bring potential health risks even if it is not date expired (*Monthly Ganashayastha*, Nov-Dec 2001). Bottled water sold in markets is not always safe. *The Daily Ittefaq* (18/09/2002) has reported the presence of coliform bacteria in bottled water of reputable companies. *The Financial Express* (23/10/1999) found that canned Coca Cola without expiry dates on the labels are being indiscriminately dumped into the country, mostly from Malaysia and Singapore. Fruit juices imported from the same sources are similarly suspicious (*Daily Janakantha*, 08/10/2002).

3.1.10. Foods prepared and sold on special occasions

During the fast of Ramadan some specialized food items are sold all over the country. Most are prepared and sold publicly using low standard ingredients and non-food colours. For example, *Jelapi* (a type of sweet item) and other items are fried in oil mixed with mobil (a mineral oil lubricant). Frying oil is used repeatedly and becomes unhygienic. Dalda and soybean oil is mixed with impure ghee, and beshan (chick-pea powder), which is used for coating and is made from vetch (a low quality bean) (*The Daily Matribhumi* 1/11/2003). During Ramadan food items are made attractive with toxic colourants as they are cheap and readily available (*Pratham Alo* 15/11/03). Another special food item called semai (sweet noodles) is reported to be adulterated and is sold under the brands of unknown companies without the approval of the BSTI (*Pratham Alo* 21/11/03). Sometimes labels are copied from the products of well-known companies (*Pratham Alo* 13/11/03). This food item is often dried on river banks in filthy conditions. The raw material may be of low quality, cheap flour, with palm oil instead of soybean oil, and dalda instead of ghee. Some traders make this their seasonal business and may not have a licence to trade.

3.1.11. Foods sold by restaurants and street vendors

Cooked foods served at restaurants and hotels are often unfit. There are almost 5000 restaurants in Dhaka city, excepting the star marked and Chinese restaurants (*Daily Ittefaq* 07/01/99). The kitchen and food processing areas of these restaurants are often unhygienic, although the service area may be comparatively tidy and clean. In 2001 the *Daily Ittefaq* (dated 04th November 2001) reported that cooking utensils, cutlery, plates

and glasses were not cleaned properly or regularly, and that cooked foods are left uncovered. It is common in hotels and restaurants to recycle any left over foods for the next day. The quality of street foods is very poor as well. Islam *et* al 2003 carried out a study of 200 street vendors randomly selected form elite areas, middle class areas, slum areas and bus/train/ launch terminal areas in Dhaka city and they painted a grim picture of street vended food (*Bangladesh Observer* 18/11/03). Almost half of the stalls were situated next to open drains and 60% are located on the footpath. A big portion of these stallholders do not maintain a basic standard of hygiene and their uncovered food becomes coated in dust and covered with flies. The IPH during 1997-2001 tested altogether 24,204 different samples of street vended and weaning food and the result identified overall 49.5 per cent of samples as adulterated (Table 6) (Khan and Rahman 2002).

Table 6: Bacterial test results of street vended and weaning food

No of food samples	Percentage	Micro-organisms
27	52	E. coli
33	63.5	B. cereus
7	13.46	Salmonella
3	5.76	V. cholera
21	40.38	C. perfringes
24	46.15	S. aureous
4	7.69	Faecal coliform
5	9.61	Yeast growth

Source: Khan and Rahman 2002

The IPH (1994) published another research report in 1994 on street vended food, based on the 52 test samples, and the results showed that *all* of the samples were contaminated with micro-organisms.

3.2. Actors involved in food hazard crises

The national economy of Bangladesh is predominantly based on agriculture, with a contribution from the agricultural sector of forty percent to GDP and sixty percent to employment (FAO 1993). The country's food regimes involve a wide range of actors, from farmers, retailers, wholesalers, petty businessmen, small industrialists, large-scale businessmen and foreign food traders. In Bangladesh most of the above mentioned

actors are somehow actively or passively involved in food adulteration and poor standards at different stages, while a big portion of the various frauds are committed on the farm or in the elementary processing phases in small manufacturing industry.

Secondary business enterprises also play a significant role in this process by keeping a close link with farmers, while the activities of the large-scale businessmen in many instances are less visible probably due to their political power and affluence. Unfortunately the country's legal institutions, politicians, bureaucrats and law enforcing agencies help the actors to create a ground suitable for their illegitimate activities. Here the arguments of Gadgil and Guha (1995) for India are relevant, as they mentioned a network of politicians-bureaucrats-businessmen who create an atmosphere that favours illicit activities at the cost of environmental degradation. In Bangladesh the same constellation of actors can be traced, using their power (both monetary and muscle) and political leverage. The central force behind all the pervasive intentional and unintentional fraudulent activities of the major actors is profit accumulation, which is the organising principle of economic development. Furthermore, this capitalistic model of economic development and the concomitant recent rise in consumerism are largely stimulated by the expansion of capitalism worldwide. This process of wealth creation, as well as economic growth, has resulted in both wider-scale and local level environmental degradation in many third world countries (Atkinson 1991 and Adams 2001). Underdeveloped countries, like Bangladesh, are in many instances trying to follow capitalist consumerism and the western model of economic development – the continuous urge to accumulate – and this is driving the underlying forces of an ecological crisis (Atkinson 1991). Both Escobar (1996) and Peet and Watts (1996b) mentioned that such economic development practice treats nature and society as commodities and evaluates them in terms of its exchange value, assuming them to be inputs into the process of economic development. In this sphere of economic development, different individuals, groups and institutions of society (i.e. economic institutions, business enterprises and government mechanisms) all act towards maximizing profits using inputs from nature. This constellation of actors develops its own rhetoric and arguments that serve the purpose of sidelining the real causes of the problem. This economic development model seldom cares for ecological well-being and sustainability. Following the same line of argument it can be said that vulnerable sections of the community and nature pay the cost.

Blaikie (1985) and Blaikie and Brookfield (1987), in the context of both soil erosion and land degradation in third world countries, have focused on the land user's rational choices and decisions, which are largely influenced and determined by external factors - the broader social and political economic pressures, extending from local and national to the global level. As a result, land managers having no option other than to make excessive demand on resources and the resulting excessive pressure of production based on natural capital is transmitted through degradation of the environment (Blaikie and Brookfield 1987), in which I would include food. Therefore, an apolitical analysis of the actions of the poor farmers and retailers in Bangladesh, who use excessive chemicals in different forms in agricultural or in fish production, is inadequate for identifying the real forces that propel them to do so. These underlying forces need to be scrutinised through broader perspectives of political economic relations. Here we cannot ignore the impact of deeply rooted poverty as a major factor behind the deterioration of food safety and quality. Authors like Hecht (1985) and Hecht and Cockburn (1989) remind us not to place over-emphasis on the relationship between poverty and Malthusian processes and argue instead that poverty is generated through the process of surplus accumulation. Others, such as Peet and Watts (1986b); Watts (1983a,1983b) and Franke and Chasen (1979) argue that poverty is only a proximate cause of environmental degradation. In the wider context, the concept of poverty should be analysed with respect to production and reproduction relations as well as the underlying structural inequality at both local and global levels. Thereafter, the large-scale food adulteration in Bangladesh and the fraudulent activities of the farmers, retailers and traders needs to be analysed by focusing on the structural poverty of rural Bangladesh. The solution necessitates a fundamental transformation in the relation of production and reproduction systems, interlinked national and international market mechanisms, world trade policy and many other components of the structure of the political economy (Adams 2001). These arguments indicate that the immediate causes of food adulteration, as identified in conventional modes, are far from the reality, and the problems should instead be mapped out as components of wider forces and as impacts of global structural imbalances.

3.3. Impacts of food adulteration on human health and environment

The lack of investigation in Bangladesh of the residuals of different additives such as pesticides, toxic colours, chemicals, sprays and growth hormones in the food chain and

the poor understanding of the short and long-term impacts on human health have resulted in ambiguous perceptions about food issues. Thus, people are often confused about additives in the food chain, their direct impacts and the threats to human health. Even the gap in measurement and quantification of the impact of the various toxic chemicals (including pesticides, insecticides and herbicides) on the physical environment (i.e. land and water resources) also raises many perceptual uncertainties with regard to environmental degradation on a broader scale. Blaikie (1985) mentioned that such uncertainties often arise from the difficulties of deriving large-scale, long-term accurate measurement of the properties of different environmental phenomena. This vague understanding often limits the real examination of the present as well as the chronological trend of environmental crises. Even though information appears to be accessible, in many instances the ambiguity involved with the quality and reliance of the data, and selection of appropriate scales hinders the real understanding of many environmental hazards ranging from land degradation to food hazards (Blaikie and Brookfield 1987).

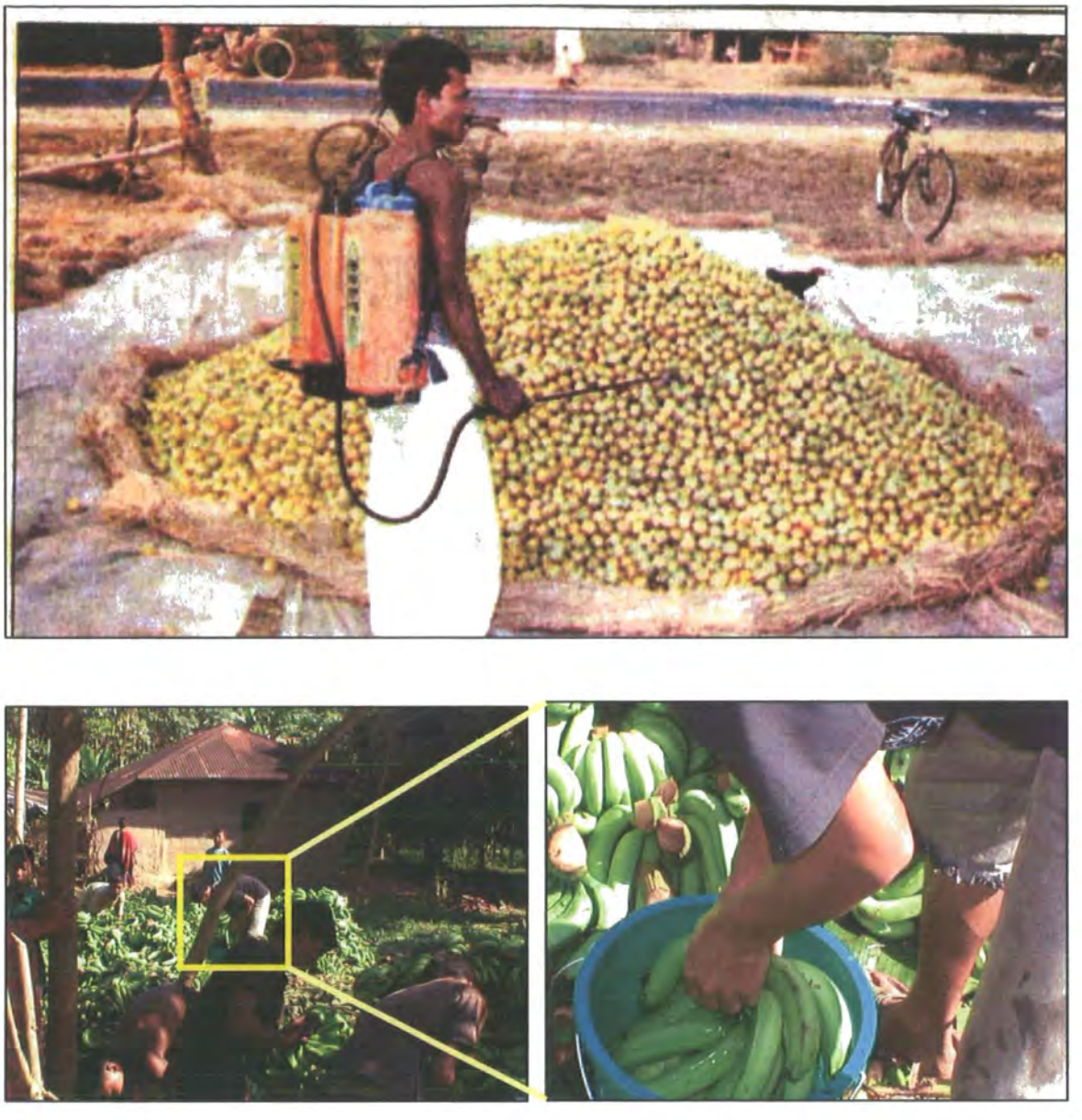

Figure 9: Artificial ripening of tomatoes using chemical sprays (upper), source: *Prothom Alo*, 11th December 2003. Injecting hormones in bananas (below), source: author.

Similarly, it can be argued that without studying the immediate and long term impact of food additives on human health, the tendency of partisan arguments of different groups cannot be resolved. For example, a specialist at the Bangladesh Agricultural Extension Department has claimed that the chemicals used in crops and food in different phases are not fatally injurious for human health (*Daily Jugantar* 18/10/99); rather he suggested that their positive impact on the food production should be highlighted and that farmers should be encouraged to use various chemicals to guarantee of enhanced production. In contrast, Dr Jafarullah Choudury (Chairman of Ganoshyastha Kendra, a leading NGO working in the medical and public health sector in Bangladesh)

commented that consuming unsafe food and chemical residuals is responsible for their accumulation in different parts of the body and could be extremely dangerous for human health over a longer period. Ironically, the use of food additives and their consequential impacts on human health are widely discussed issues in developed countries. So, governments and regulatory bodies in those states have been critical about the use of various kinds of pesticides, insecticides, herbicides and fungicides and as human beings are not only affected by direct contact, but are also at risk of many diseases through the consumption of food containing the residues of the additives (Anonymous, Lancet 1991). Recently the WHO has estimated that 220,000 deaths in third world countries happen annually due to severe acute poisoning (Anonymous, Lancet 1990). In Bangladesh, the adoption of policies encouraging the expansion of food production has resulted in an increase of pesticide use from 7,350 metric tonnes in 1992 to 16,200 metric tonnes in 2001 (Dasgupta *et* al. 2005). The use of certain toxic chemicals like *DDT,* and *endrin* are banned in many countries, but many other toxic chemicals (among the controversial 12 most toxic chemicals, widely known as the 'dirty dozen') are openly sold in Bangladesh markets without any state intervention (www.Banglapedia.search.com.bd, accessed on 18/3/06). The uncontrolled use (overuse and misuse) of these toxic chemicals, and the consequential short-term and long-term health risks, demand intensive scrutiny. In addition, the presence of toxic chemicals even in small quantities can have an adverse effect on the ecosystem, especially trees, birds, fish and other organisms (Gupta 2004). Excessive use may pollute the air, and also water courses through runoff from fields. There may even be long-term accumulation in the environment, for instance in the soil and groundwater.

The British Medical Association in 1990 (cited in anonymous 1990b) suggests that the effect of pesticides on human health can be acute or chronic, and Trevino (1999) has argued that many pesticides, insecticides, fungicides and herbicides are carcinogenic and mutagenic. A number of scientists have discovered long-term consequences of minute amounts of pesticide concentration on the human body and see strong relationships between high rates of chemical use in agriculture and the incidence of various types of cancer such as malignant lymphoma, leukaemia, multiple myeloma, testicular cancer, liver and pancreatic cancer, lung cancer, breast cancer and brain cancer (Trevino 1999; Dyer 2003; Dasgupta *et* al. 2005). These authors also find that pesticide exposures can result in birth defects, neuropathy both immune and non-

immune detoxification, the abnormal growth of children, liver and kidney damage, genetic damage, stillbirths and miscarriages, and the disruption of the proper functioning of the nervous system, initially through over-stimulation of the brain and later the paralysis of neural transmissions. Pascale (2006) established an association between the toxicological effects of pesticides and chronic respiratory symptoms and asthma based on asthmatic and non-asthmatic patients in Lebanese hospitals. Authors such as Corsini and Bochetta (1986) and Babeaw and Roy (1985) relate the incidence of Parkinson's disease to pesticide exposures. Gupta (2004) discussed the long-term, low dose exposure of pesticide residues on human health and linked them to the risk of various diseases such as immune-suppression, hormone disruption, diminished intelligence, reproductive abnormalities and cancer. Mishra *et* al. (1982) identified the damage to conjunctiva, cornea and associated structures and observed a high incidence of macular degeneration in Indian workers who were engaged in spraying organophosphorus and inorganic arsenic pesticides for long periods.

Several physicians have indicated that food additives and even the chemical odours of food can alter the activity and behaviour of human beings. In this context, Crook (1982) based a clinical study on 182 hyperactive patients and declared a potential linkage between food additives including food dyes and hyperactivity. Similarly, many other authors, such as Rose (1978) and Feingold (1976) have established a relationship between the intake of food containing artificial food colours and flavours with hyperactivity and learning disabilities. Therefore, from the above discussion, it can be concluded that, since the artificial food colours and flavours which have been certified for human consumption are not free from health risk, then in the Bangladesh context, the application of colours (which are not food colours but rather for textile dyeing) presumably would not be safe for human health. Similarly, the use of many other chemicals like *formaldehyde* in fish (*Daily Star*, October 5, 2004), the application of *ethylene oxide* and *calcium carbide* in

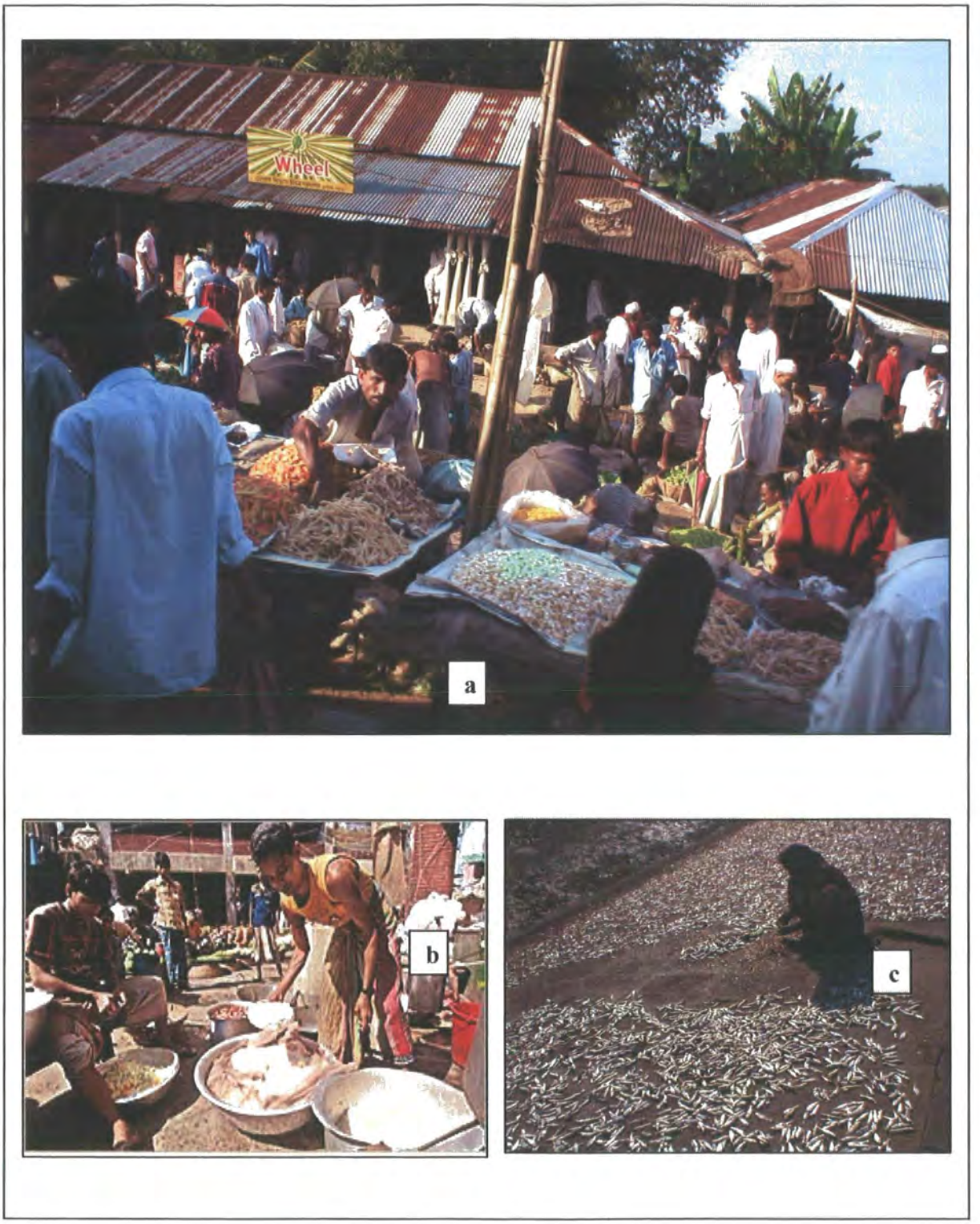

Figure 10: Exposed food vending in open markets (a), preparing food in the backyard of a restaurant in Dhaka (b) and fish drying on the banks of a canal (c). Source: Author.

fruits (*The Bangladesh Observer*, December 8, 2004), *urea* fertilizer in puffed rice (http://www.sos-arsenic.net accessed on 05/11/05), and the use of *burnt lubricants* in bakeries (*Daily Star*, September 9, 2005) are bound to increase the risk of many

diseases. Microbial contamination in food and water is another important dimension in the food quality crisis in Bangladesh. The WHO has long since been reporting the increase of food-borne diseases worldwide, including salmonellosis, as an important health concern, with special focus on the worst affected Least Developed Countries.

Water is a significant carrier of microbial organisms. Researchers like Potgieter *et* al. (2005); Lama *et* al. (2004) and Sebata *et* al. (2002) have focused on the food and water borne bacteriological impacts that cause diarrhoeal diseases. Potgieter *et* al. (2005) observed a high frequency of E. Coli, Salmonella, Shigella and C. Jejuni in local foods and high concentration of coliforms in drinking water and established a link between the presence of these bacteria and occurrence of diarrhoeal disease. Lama *et* al. (2004) mentioned that there is a close link between environmental temperature and food contamination leading to diarrhoeal diseases in the tropical third world. Therefore, in the Bangladesh context the lax nature of food sanitation is bound to be responsible for a heightened incidence of diarrhoeal and other food borne diseases. The Institute of Public Health (IPH), in collaboration with the WHO at a national seminar on food safety, indicated that bacterial gastroenteritis (mainly diarrhoeal disease), viral gastroenteritis, protozoal gastroenteritis and sometimes liver and kidney damage, cardiac disease/failure, paralysis and brain damage are all common food borne diseases in Bangladesh (Ali *et* al. 2001). They also mentioned that shellfish and vegetables grown on sewage are common carriers of typhoid and paratyphoid. Food exposed for sale is liable to be infected by typhoid and paratyphoid organism as flies can transmit these bacteria from infected material to exposed foods. In this context, Figure 10 shows an example of exposed food processing and selling.

3.4. Role of Government Institutions and Legislative Mechanisms to ensure food safety and quality

Maintaining food safety and ensuring better quality food is a mounting demand all over the world, as food issues are directly related to human health and well-being, as well as to the long term sustainability of the environment. Government regulatory mechanisms in developed countries have sought to enforce various strict rules and regulations, but the picture of food governance in Bangladesh is quite depressing. There is no single government institution fully responsible for handling it; rather a couple of institutions are partially involved to monitor and regulate food quality (Khan and Rahman 2002). In

theory food quality regulatory mechanisms are directed according to the national food laws, regulations and standards and governance issues encompassing food quality are largely confined to the authority of government bodies. In this context, Figure 11 presents a list of involved government regulatory mechanisms. The "Pure Food Ordinance 1959" and the "The Pure Food Rules 1967" are the prime basis for tackling food adulteration issues. Government agencies also consider 'National Food and Nutrition Policy' as a supporting tool to maintain food safety issues. The 'Pure Food Rules 1967' provide mandatory standards for a list of 107 generic food items while the BSTI (Bangladesh Standards and Testing Institute), on the other hand, controls 50 food items. These concerned government agencies do not have inspection powers unless particular food items are included in their lists. This restriction obviously exposes the public to potential health risks because in reality there are many food items available on the market without having any required certification from the designated agencies. There is no separate surveillance programme on food safety and the existing responsibility is shared among different institutions. The Public Health Department of Dhaka City Corporation maintains a small wing for monitoring food safety and the quality of street vended foodstuffs only, and examining hotels and restaurants is outside their jurisdiction. Figure 11 shows a list of main law and regulations and involved institutions in food safety and quality issues.

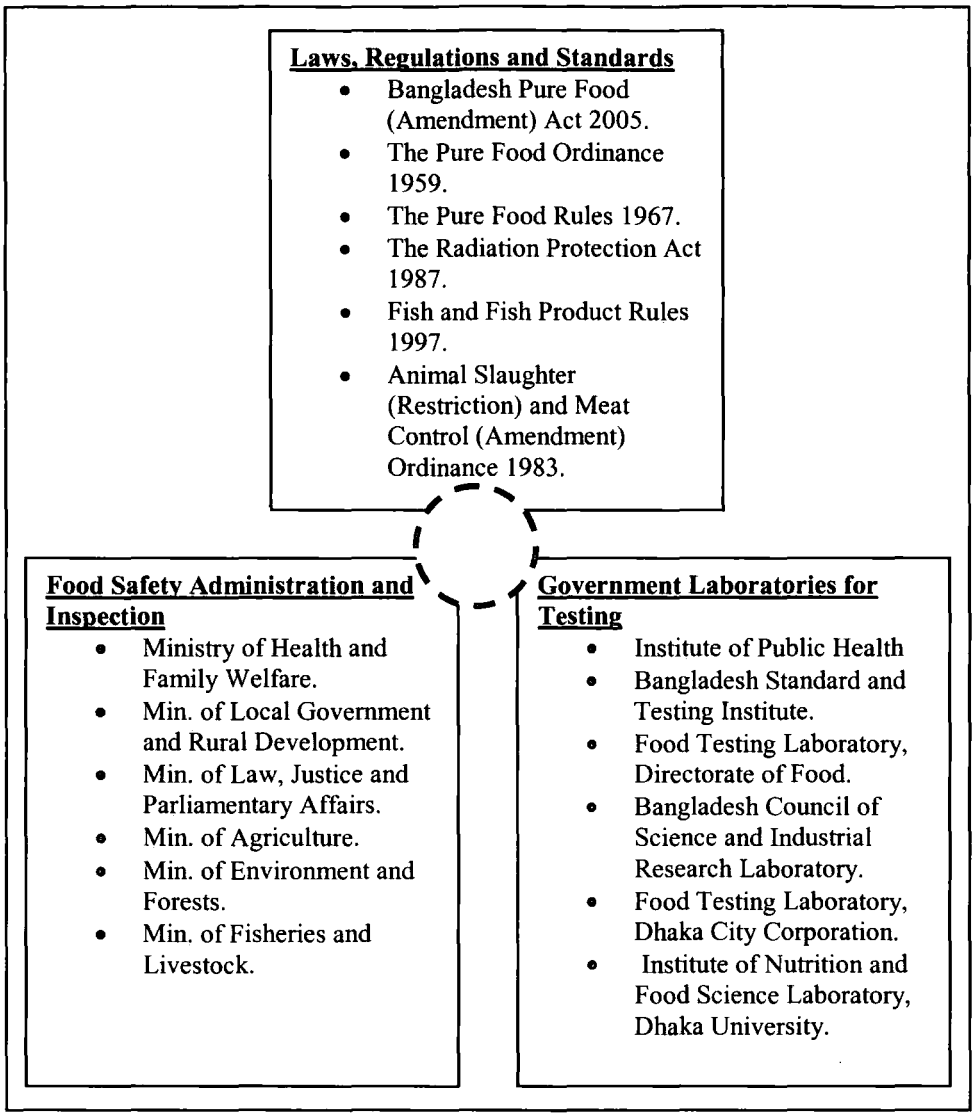

Figure 11: Food Safety and Quality Control Framework in Bangladesh. Source: Author

Dhaka City Corporation is responsible for monitoring and assuring food quality in the city through its public health department. In an interview, the Chief Health Inspector of Dhaka City Corporation told me about his impossible task, with only 10 health officers and 20 health inspectors working to protect the ten million people of Dhaka city. Even so, monitoring food quality is not his prime job, but frankly a very insignificant part of his vast and multi-dimensional responsibility.

The main food safety and regulatory legislations 'The Pure Food Ordinance 1959' and 'The Food Rules 1967' are not up-to-date and are fairly weak in their application. According to 'The Pure Food Ordinance 1959', the stipulated action against food adulteration is very light, and thus has an insignificant impact upon food fraud. The

Chief Health Inspector of Dhaka City Corporation reported that sometimes corrupt businessmen pay fines without going to proper trial. Besides, the lack of inter-institutional liaison and integrated policy prescriptions leaves the food quality crisis unaddressed. In this context, the food laws also fail to indicate how the regulatory mechanisms encompassing a wide range of elements interacting with each another could be applied together for an effective management purpose.

The Public Health Department tests some samples of food in their laboratory, along with its many other duties. Table 7 shows yearly food samples tested by Public Health Library and the percentage of food adulteration.

Table 7: Yearly food samples tested at Public Health Laboratory from 1997-2002.

Year	Total no of samples tested	Total no of satisfactory samples	Total no of Adulterated samples	Percent of satisfactory samples	Percent of Adulterated samples
1997	5785	2791	2994	48.24	51.75
1998	5554	2722	2832	49	51
1999	5003	2814	2189	56.24	43.76
2000	4582	2199	2383	47.99	52.01

Source: *The Daily Star*, 15 September 2002.

It is widely reported that food quality testing laboratories in Bangladesh are old-fashioned and struggling with a lack of trained manpower and funds. Besides, the lack of enforcement of the law and the carelessness of the concerned government bodies help to remain the issues unaddressed. For example, when the markets are known to be full of adulterated food, that products are not properly certified by the regulatory institutions, that suitable labels specifying expiry dates are not used, and that information is withheld about the chemical composition of foods on sale, the BSTI, the prime responsible organisation, remains silent (*Daily Janakantha* 15th November 2001). My interview with the Secretary General of the Consumers Association of Bangladesh mainly focused on the activities of the government regulatory bodies as well as the food quality testing institutions (like IPH, BSTI etc) and traced their weakness in governance of food issues. In his view, the above-mentioned unresolved controversies help corrupt businessmen to maintain the same fraudulent activities. Moreover, he also mentioned the widely discussed issue of corruption among government officials at all levels including the food inspectors, and even the laboratory analysts who illegally manipulate the test results. Businessmen maintain unfair links (underhand personal dealing, bribery

etc.) with them, hence the public institutions act in favour of the fraudulent commercial enterprises. Therefore, lack of accountability and transparency in the affairs of the state regulatory bodies results in poor governance performance and low grade public services (Khan 2000).

Beck (1995) used the phrase 'organised irresponsibility' to explain the perception and activities of the political and legal systems of modern societies about mass environmental hazards. Beck wondered how these institutions of modern societies can see the potentially devastating impacts of large-scale environmental hazards, while simultaneously neglecting their social origins and consequences and vacillating about taking crucial steps of control. Regarding the degradation of food safety and quality issues of Bangladesh, the same line of argument can be applied to analyze the views, attitudes and roles of politicians and civil servants in the concerned state departments responsible for regulating and maintaining food quality. In addition, the present depressing social dynamics, which include lawlessness, mass corruption and the decline of traditional ethical values lead us to hold out little hope for improvements in the short term.

In 2005 the government of Bangladesh adopted an amendment to the Pure Food Ordinance 1959, 2005 revising some of the weakness of the earlier version and incorporating few new points. The amendment redefined the definition of food and clearly specified the names of individual food items which were previously in generalised categories. The amendment recommended to form a new legislative body named *National Food Safety Advisory Council* (NFSAC) involving different concerned government ministries. This council is mandated to advise on food safety issues including setting standard and other policies, making assessment for required manpower facilities etc. It also suggested the empowerment of representatives of local authorities (six city corporations, municipalities) (selected by government) to work against food adulteration. In this connection, it advocates the appointment of one/more new public food analysts.

The amendment essentially banned the use and sale of toxic chemicals and ingredients and other additives such as calcium carbide, formalin, use of textile dye and other flavorings which have the potential for causing harm to human health. The punishment

provision of food adulteration has also been strengthened. The maximum limit of it is set a fine of 300,000 taka (Approximately £2,500), and imprisonment for three years for second and subsequent offences. Many critics of this amendment have commented that the amended punishment level is not sufficient enough to exert any impact on the widespread levels of food adulteration (*Daily Star*, 29/09/2005; *Pratham Alo* 21/09/2005). (http://www.weeklyholiday.net/2005/211005/front.html). In addition, the amendment also skipped many other important issues such as the improvement of testing facilities and their effective frequent use; reduction of corruption from different levels among government officials, and increased coordination and cooperation among the concerned government departments.

3.5. Role of Civil Society, Print Media and Environmental and Social Movements on Food Quality issues

In the context of many environmental crises in third world countries, the emergence of new environmental and social movements show much potential as an undefined and unstructured platform for social resistance and opposition. Many authors like Corbridge (1991); Peet and Watts (1996a); Parajuli (1998) and Escobar (1992a, 1992b, 1996) trace it as an alternative to the traditional development model and recommend it as a theoretical and practical transformation of the notion of development, economy and modernity that is presently based on the western hegemony of power, truth and knowledge building. These social and environmental movements are diverse in their forms and characteristics and embody a wide range of people and institutions from different professions, NGOs, environmental organisations, tribal people, urban dwellers, and women's organisations in the name of civil society and grassroots organisations (Peet and Watts 1996b). The environmental movement often holds the potentiality for new political actions as it involves a wide range of people, irrespective of class, cast, ethnicity and gender and ensures their wholehearted participation (Peet and Watts 1996b; Robbins 2004).

A number of examples show that many of these environmental movements are organised by the local grassroots with a view to preserving natural resources when environmental well-being is threatened by particular forces (Ghai and Vivian 1992). Thus, it often appears as the struggle for survival and sustenance, maintaining environmental justice and well-being, preserving cultural norms and practices,

protecting specific ideologies and retaining particular ways of life and the moral economy of third world people (Colchester 1993; Shet 1984; Shiva 1989; Ishiyama 2003). Similarly, environmental and civil society movements in Bangladesh, particularly in the context of the deterioration of food quality, present another example of raising voices against food adulteration and appealing for a safe and healthy life and environment. Though the inception of the civil society movements in Bangladesh against food adulteration is very recent, it has been the only single means of raising issues of deterioration of food quality in the public sphere. In

Concern over use of toxic chemicals in fruits, vegetables

STAFF REPORTER

Speakers at a sit-in rally yesterday demanded immediate measures against unscrupulous traders who are contaminating vegetables and fruits with harmful chemicals for obtaining undue profits in violation of the existing laws of the country.

Held under the leadership of Bangladesh Paribesh Andolon (BAPA), the sit-in rally was organised by some environment concerned organisations and individuals at Khamarbari adjacent to Farmgate in the city.

The speakers alleged that a section of farmers was using harmful pesticides and fertilisers for production of vegetables.

See Page 4 Col 3

Bangladesh Poribesh Andolan organised a human chain in the city yesterday to protest against the use of toxic substance in vegetables and fruits.— Independent photo

Figure 12: Protest of the grassroots people against chemical use in food. Source: *The Daily Independent*, 6th January 2004.

this context, we must acknowledge the role of the print media (mainly daily newspapers and magazines) which have played a significant role in bringing the activities of the various actors and current status of food quality issues to light. Concurrently the active participation of several NGOs and environmental organisations, namely the BAPA (Bangladesh Paribesh Andolon), the CAB (Consumers Association of Bangladesh), Proshika, and Ubinig, has helped to raise awareness of the common people regarding the recent food quality deterioration and its potential link to the risk of health hazards and environmental degradation.

These organisations, through regular street demonstrations and processions, arranging seminars and press conferences, have made appeals on a regular basis to bring an end to fraudulent activities, and the news media have reacted to such stimuli and have begun to report widely on the issues. Figure 12 shows an example of a street rally against the use of chemicals in fruit and vegetables.

The CAB has extended its activities towards raising the consciousness of consumers about their rights and responsibilities through arranging seminars, workshops, conferences, group meetings, campaigns, street rallies and publishing a bulletin regularly (the *CAB Bulletin*). These organisations simultaneously have pressurised the government to formulate up-to-date food laws and to enforce them against the individuals and organised powerful actors who are involved in food adulteration and contamination. Similarly, authors like Shiva (1989); Gadgil and Guha (1992); Colchester (1993); Jaroz (1996); Rigg (1991) and Swain (1997) have discussed different environmental and social movements like Chipko in India, the Dayak movement in Sarawak, the peasant movement in Madagascar, and anti-dam movements in many third world countries. Many examples can be found where political forces exerted by these movements have compelled governments and other institutional bodies to rethink and in many cases to stop environmentally detrimental practices. But, on the other hand, we must recognise that social movements frequently might have insignificant impact, especially where the opposition is socially and economically powerful. For example, the CAB prosecuted in court a condensed milk company because their product had no milk in it, but was made with animal fat mixed with chemicals. This case did not move far because the powerful industrialist illegally bribed the law-enforcing institutions. The President of the CAB also told me that he had been personally threatened by thugs hired by this industrialist, who insisted that he postpone the suit.

However, in spite of many antagonistic activities of this nature, a few organisations have developed their own agenda as a form of resistance against environmentally and socially hazardous activities. For example, Ubinig, a Bangladeshi NGO, promotes organic agricultural products (locally produced without chemical fertilizers, insecticides, or growth hormones) as a symbol of protest against traditional, commercial, chemical-based agriculture. They stress the significance of traditional agricultural products and promote crop varieties that may become extinct. This social

movement is called 'Nayakrishi Andolon' (new agricultural movement) [http://www.spinifexpress.com.au/fasiapub/bangladesh/ngp.htm#nayakrishiandolon, *Bulletin on Nayakrishi Andolon* 2003, accessed on 15.2.06].

Recently, due to the incessant urge and pressure of civil society and mass protests by the environmental movement, the state authorities have recently started to act against fraudulent activities in the sale of street food and in restaurants. A special group of invigilators has been formed to monitor the quality of cooked food in restaurants and food shops. This group has some instances of imposing penalties on large shop owners for fraud and bad practice. So we may say that the adoption of the Pure Food (amendment) act 2005 has been a response to public concern about food adulteration and a positive step towards an atmosphere of ensuring safer food. Now the question is whether this new law will be implemented or not. Even if it works, at what level and scale and on whom? The answers to these questions are as yet unknown.

4. Conclusion

In recent times food adulteration and the mass-scale deterioration of food safety and quality have been much talked about issues in Bangladesh. It is widely reported that during the last couple of years people have been living in a poisonous environment because of the contaminated food they eat. The degradation of quality has extended to almost every food sector, including food grain, oil, fish, meat, bakery items, sweets, sugar, vegetable, fruits, juices, and even (bottled) drinking water. The national print media paints a grim picture of the multidimensional scenario of food safety and quality deterioration issues, which not only exposes the whole of society to the risk of many diseases (ranging from simple to chronic) but also contributes to the degradation of the quality of the environment. However, absence of long-term research in Bangladesh on the impacts of food adulteration on human health, as well as the impact of toxic chemicals on land and water, hinders the proper understanding of their hazardous consequences. The present chapter consulted literature published in the developed world on the impact of food additives on human health and we have derived information about the risk of various diseases like cancer, birth defects, damage to the liver and kidneys, genetic damage, reproductive abnormalities, asthma, Parkinson's disease etc.

The multifaceted scenario we have discussed with regard to the decline in food quality involves different groups of actors. The failure of state agencies to provide effective governance of food quality is one of the prime causes of the spread of food adulteration. In this regard, Figure: 13 summarises the major dimensions involved in food quality degradation in Bangladesh.

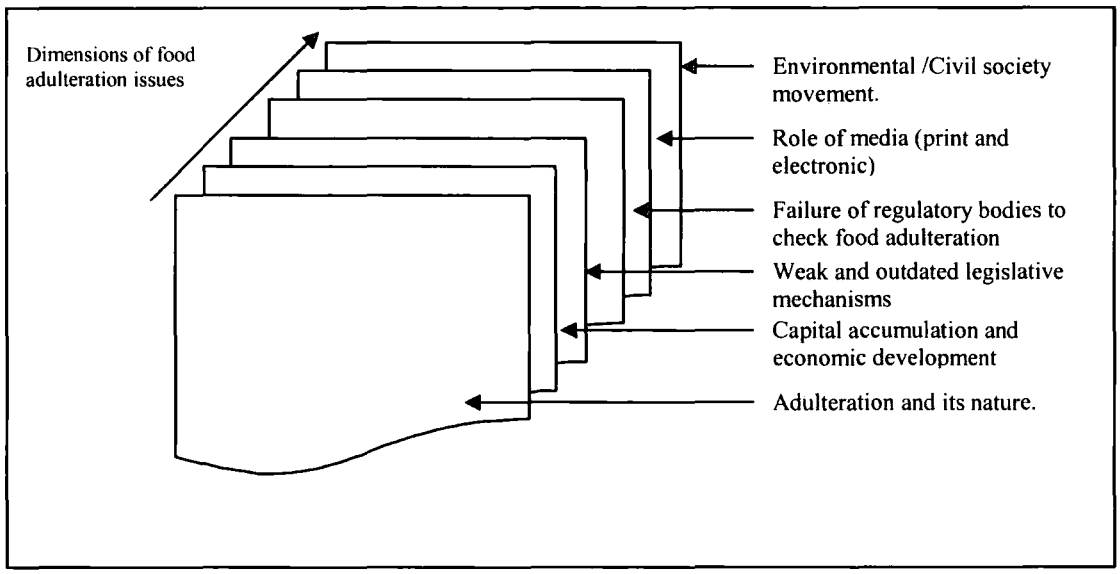

Figure 13: Dimensions of food quality degradation in Bangladesh, Source: Author

This involves a wide range of issues like weak legislative mechanisms, loose, insufficient and inefficient monitoring, checking and control activities and corruption at different levels that enable dishonest farmers and businessmen to continue their frauds. The power of capital and politics generally configures the whole system, with profit and greed as drivers. In addition, the lack of awareness among consumers and large-scale poverty are also factors protecting the criminals and the careless.

On the other hand, the people's extreme frustration about food adulteration issues ultimately has at last pushed them to organize environmental and social movements against food corruption in the last few years. This has spurred certain government bodies to act rationally and it finally progressed towards the passing of the amendment of the old food safety law in Parliament in September 2005. The increasing number of spot-checks undertaken by the law enforcing agencies against food frauds are also positive signs. However, there is a lot to do in order to bring food adulteration under control. If and when the nature and extent of the problems can be measured, the processes and patterns of risks defined, and the root causes identified, then it may be

possible to ensure accountability. Hope lies in a wide range of bodies undertaking an effective role, from grassroots organizations to government officials.

Chapter 6
Summary and Conclusion

1. Introduction

This research project has aimed to investigate three environmental issues in Bangladesh and their implications for environment and society, and it has also sought to examine the potential underlying causes that instigated these environmental and social changes. Consulting mainly secondary data sources, along with limited field information, the study was accomplished by deriving insights from the theoretical framework of political ecology and feminist political ecology. The findings of the research suggest that these theoretical strands are appropriate for assessing how brackish water shrimp farming leaves deleterious impacts on the land, breaks down the traditional agriculture-based society, and marginalizes poor groups in society. Both the political ecological and feminist political ecological approaches have also been helpful in analyzing the deforestation and afforestation issues which have deprived women of their rights and access to natural resources in central Bangladesh. In addition, food quality degradation was found to have had similar effects in terms of gender and other social relations. The causes of these crises are mostly rooted in delicate socio-economic conditions of the country and further linked also to global politics and global economics.

This concluding chapter mainly summarizes the major findings of the study and discusses their implications. In addition, the chapter also reassesses the aims and objectives of the study and justifies their relevance in terms of the research findings. Finally, the chapter concludes by arguing for a balanced society where the relevant stakeholders would behave and act rationally with a view to maintaining a fair balance between ecological sustenance, social justice and economic development.

2. Findings from the case studies

The nature of the environmental and social crises investigated in this thesis are distinct in their respective concerns. But the issues can be fitted under the same banner for scrutiny while considering the wider environmental and socio-economic context. The underpinning factors of these crises are found to be almost identical, though the immediate causes are slightly different. For this reason the major findings of the

research are outlined in separate sections, as follows. Finally, an overall discussion on the findings will allow us to understand the pattern, cause and consequences of the crises.

2.1. Shrimp farming and its consequences on environment and society

The major findings are as follows:

- Shrimp culture has caused mangrove forest clearance and biodiversity loss in the South East part of Bangladesh. This destruction of mangroves has contributed to the destruction of breeding grounds of many fish and aquatic species. It has also impacted on the local communities who maintain livelihoods by collecting shrimp fry from the waters. The loss of mangroves also deprived the communities of benefits from food, fuel and other non-timber forest products. In addition, communities are left exposed to the threats of natural hazards such as cyclones and tidal surges in the coastal areas due to the absence of mangroves.

- Shrimp cultivation has caused saline intrusion (both surface and underground) and triggered consequential land degradation.

- Shrimp cultivation has caused breakdown of subsistence agriculture and the eviction of poor farmers from their occupation.

- Small peasants are forced to sell their agricultural land to large shrimp farmers, some facing threats and torture.

- Workers in shrimp cultivation, especially women and children are obliged to work in a wet saline environment for long hours.

- Shrimp farming has caused the breakdown of traditional livelihood systems, and provoked social uncertainty and tensions, sometimes turning to violence.

- It has increased the gap between rich and poor, created social inequality and formed patron-client relations.

- Shrimp farming activities are mainly conducted by urban businessmen in association with a newly emerged class of local elite farmers and local politicians. The government supports it with the help of policy reform, and it is sponsored and financially backed up by international multilateral organizations and financial institutions.

2.2. Food safety and quality degradation

The major findings can be outlined as follows:

- It was revealed that almost every category of food is adulterated and degraded in Bangladesh.

- Food quality is degraded by the ill-treatment and overuse of pesticides and insecticides by farmers and the use in the food processing and retail industries of toxic chemicals, non-food textile colours, chemical sprays, hormones and other kinds of additives. Sometimes food quality degrades due to the unhygienic environments of food production/preparation.

- There is a knowledge gap among experts and state-administrators in Bangladesh about the short and long term health impacts of food additives and degraded quality foods. This uncertainty creates an ambiguity in society about its consumption.

- The actors behind the food quality degradation include farmers, retailers, both large-scale and petty businessmen and industrialists at the forefront, while the government regulatory institutions, law enforcement agencies, and politicians are inactive. Government

regulatory mechanisms are too weak to tackle food adulteration issues.

- The main driving force of food adulteration is the quick profit accumulation by different groups.

- The study also focused on civil society movements and the contribution of print and electronic media, which have been mainly responsible for bringing the issue to light and have also contributed to public awareness and pressurized the government to pay attention to the issue.

2.3 Deforestation and afforestation in the Modhupur sal forest and impacts on women

The major findings can be outlined as follows:

- The causes of deforestation are identified in this study as a result of poor forest management planning by the state. Other causes such as infrastructure development, the installation of an air force firing range, unresolved property right issues, the widespread practice of corruption, and a lack of accountability and transparency of government officials, have all impacted on the deforestation process.

- The study revealed that the deforestation process has deprived women of receiving various types of support (fuel wood, food, fodder, and other non-timber forest products) from the forests. Forest products, including fuel wood, are also sold by some of them to boost their meager incomes.

- The forest is considered by women as a place for social gatherings and exchanging views and information during their group work. The deforestation has deprived the women of this convivial space.

- The afforestation also ignores women's entitlement to the social forestry projects as well as depriving them of benefits from them. The on-going social forestry projects (in the name of agroforestry woodlots) restrict their rights and access to the use of forest land.

3. Limitations of the Research

The research was mainly based on secondary source materials, with limited field work. An extended period of thorough field work would have helped to capture further, subtle dimensions of the problems discussed. The research would have benefited from the collection of in-depth empirical data to support the arguments, though some secondary sources were consulted. For example, field test results on the impact of shrimp farming induced salinity increases on surface water, on underground water, and on soil at different seasons, along with impacts on flora and fauna, would help to understand the issues in greater depth. This data gap was most extreme in the food quality research. I was not able to collect my own data and there is very little data, official or unofficial, on this topic in Bangladesh. The same applies to gaps in understanding the health impacts of food adulteration and clearly this has very significant implications beyond the Academy. Finally, the authenticity and consistency of some of the secondary data collected from Bangladesh is doubtful, and government monitoring and research institutions are reluctant to respond to enquiries or to disseminate their information.

It has been mentioned above that environmental problems in Bangladesh are generally assessed through neo-colonial, neo-Malthusian and apolitical terms and that underlying forces of change are not identified or researched. Therefore, the applications of political ecology and feminist political ecological framework hold much potentiality in assessing environmental crises in Bangladesh beyond my own examples (such as the arsenic crisis, pollution-related research, water management, and studies of natural disasters and hazards) so that the patterns and processes can be more exposed.

4. Discussion and Conclusion

The crises analyzed here are not straightforward but are rather the outcome of a number of multifaceted factors which are deeply rooted in the economic, social, political and cultural settings of Bangladesh. The processes of rapid economic development and of

individual profit maximization have appeared as the major factors behind the worsening of the environment and society. These aspects contributed in all the cases studied. The notion of profit maximization at a cost of environmental degradation is not unique to Bangladesh; rather it can be traced to many parts of the global South. For example, Amazonian deforestation as a result of state-patron capital accumulation has been mentioned by many authors (Hecht and Cockburn 1989, Moran 1993, Hecht 1985, Walker *et* al. 2000). Growth maximization, particularly in the Bangladesh case, through shrimp farming, has changed the local environment and society.

The activities of state agencies appear to be conflicting. On one side there is the encouragement of activities creating economic wealth and using nature as a production-input and many of them are environmentally harmful. On the other hand the state works as a protector of the environment and human health (Walker 1989). A good example is that the expansion of shrimp farming was directly inspired and sponsored by government policy reforms (Bhattacharya *et* al. 1999) in Bangladesh but, at the same time, the state environment department decries about land degradation (http://www.moef.gov.bd). This dual role of state agencies has caused environmental and social breakdown in Bangladesh, like many other South East Asian, South Asian and Latin American countries (Repetto and Gills 1988, Peluso 1993b, Lohman 1993, Rigg 1993, Guha 1983a, 1983b, Gadgil and Guha 1995, Dore 1996, Schmink and Wood 1992, Bryant 1993, 1996).

The role of international financial and multilateral institutions also does not always appear as benign to the environment. The debt crisis of third world countries and the policy prescriptions of these institutions for economic development under the structural adjustment policies (SAP), in many cases, have resulted in environmentally deleterious activities (Adams 2001, Kendie 1995). Shrimp farming in Bangladesh is financially supported by sectoral and structural adjustment loans from the World Bank and the IMF (Bhattacharya 1999, Taufiq 2000). Research on shrimp cultivation and its impacts suggest that the environment and society both bear the short and long term effects of it. The poor and vulnerable sections of the communities especially bear the greater portion of the negative impacts. Similar instances of environmental degradation and marginalization of grass roots societies can be identified in many other countries as a result of multilateral organization-promoted activities (Reed 1992, Kendie 1995, Hecht

and Cockburn 1989, Hurst 1990). The practice of unregulated and excessive use of pesticides in Bangladesh (http://www.moef.gov.bd) originated due to the implementation of Green Revolution schemes promoted by the technical mentors (like FAO) of these multi lateral institutions. Their prescriptions have also seriously impacted on soil and water quality and increased health risk in Bangladesh as in other countries (Dinham 1991, Bull 1982).

Deployment of a global model of afforestation is one of the major causes of forestry crisis (both deforestation and afforestation problems) in Bangladesh. Forest regeneration with exotic species is also directed by the motivation of monetary benefits where the concern of the sustainability of the natural system and its life-supporting provisions to the communities, especially women (Shiva 1989, Rocheleau and Ross 1995), are ignored. Rather such projects created a political space for the intrusion of many other powerful outsiders and state agencies to curtail and in some instances seize the rights of needy groups. Moreover, afforestation projects left no scope for local women to participate as active partners. Deforestation in the area is the product of government policy failures, the impact of infrastructural and other installation set up in the woods, unresolved land tenancy complications and establishment of an eco-park project. Finally, it can be said that both the deforestation and afforestation issues resulted in the deprivation of women from their access to and user rights of the natural forest resources (Agarwal 2001, Rocheleau 1996a).

The application of weak and outdated policies and the institutional failures of the concerned government agencies have resulted in the spread of mass level food quality degradation putting the public at risk of different types of long and short term diseases. The fundamental difference of the food quality problem from the forest crisis and the impacts of shrimp farming is that it has affected the whole community irrespective of gender, social or economic status. Most people have very limited options to cope with the situation. Surprisingly, the concerns over food quality have never been considered seriously by government bodies. The tendency for quick profit maximization, for this case as well, was found to be the primary force behind the food adulteration issue. Moreover, the contemporary process of globalization under the worldwide capitalistic economic system, western consumerism and capitalistic model of economic gain, has

influenced groups in the society to act against the interests of environmental sustenance or social stability (Atkinson 1991, Adams 2001). Moreover the pervasive practice of corruption at different levels of society, including government institutions, the widespread lawlessness, and the lack of transparency and accountability of the concerned groups, all supplement the crises. Structural poverty of Bangladesh is probably another underlying force behind the environmentally harmful activities.

It is interesting to note that significant groups (comprising grassroots organizations, civil society, tribal men and women, NGO activists, environmental organizations, print and electronic media) have raised their voices against the environmental and social deleterious activities. The direct and indirect protests and movements have forced the government to amend the old food safety law in recent times. The suspension of the eco-park development for the time being is also a result of these protests. These protests have created conflict with the stronger counterparts and have sometimes turned to violence. For example, the killing of Karunamyee Sardar in Paikgacha (Khulna) in 1990 (http://www.thebangladeshtoday.com/archive/November/09-11-2005.htm), who was peacefully protesting against saline water shrimp farming, reminds us that economic gain cannot be sustained without the long term sustenance of socio-ecological structure. These social and environmental movements can be traced as a potentially positive force for change towards an ecologically and socially balanced society. In this context, state agencies need to reassess their policy prescriptions and ensure effective policy implementation. Moreover, there is a need for wider change in existing national and global political and economic processes in order to reduce the structural gaps between rich and poor countries.

References

Adams, W. M. (2001). *Green Development: Environment and Sustainability in the Third World.* London: Routledge.

Agrawal, A., Gibson, C. C. (1999). Enchantment and Disenchantment: the Role of Community in Natural Resource Conservation. *World Development*, 27 (4), 629– 649.

Agrawal, A. and Ostram, E. (2001). Collective Action, Property Rights, and Decentralization in Resource Use in India and Nepal. *Politics and Society*, 29 (4), 485– 514.

Agarwal, B. (1989). Rural Women, Poverty and Natural Resources: Sustenance, Sustainability and Struggle for Change. *Economic and Political Weekly*, 28, October.

Agarwal, B. (1990). Social Security and the Family in Rural India: Coping With Seasonality and Calamity. *The Journal of Peasant Studies*, 17 (3), 341- 413.

Agarwal, B. (1992). The Gender and Environment Debate: Lessons from India. *Feminist Studies*, 18, 119-57.

Agarwal, B. (1997a). Re-sounding the alert—gender, resources and community action. *World Development*, 25, 1373–1380.

Agarwal, B. (1997b). Environmental Action, Gender Equity and Women's Participation. *Development and Change*, 28 (1), 1-44

Agarwal, B. (1998). Environmental management, equity and ecofeminism: debating India's experience. *Journal of Peasant Studies*, 25 (4), 55-95.

Agarwal, B. (2000). Conceptualizing environmental collective action: why gender matters. *Cambridge Journal of Economics*, 24 (3), 283-310.

Agarwal, B. (2001). Participatory exclusion, community forestry and gender: an analysis for South Asia and a conceptual framework. *World Development* 29 (10), 1623-1648.

Ahmed, M, R. and Laarman, J. G. (2000). Gender equity in social forestry programs in Bangladesh. *Human Ecology*, 28 (3), 433-450.

Ahmed, N. (1996). Commercial shrimp cultivation in Khulna, Bangladesh: its negative impact on women, their families and the environment. ICRW Report.

Alam, M.S. and Rashid, M. S. (1996). Remote sensing for coastal landform and land cover mapping in Bangladesh. In P. J. Atkins and M. S. Alam, (Eds), *Information technology, environment and development in Bangladesh.* Department of Geography, Durham, UK, 67-83.

Alam, M.S., Islam, K.K., and Huq, A. M. Z. (1999). Simulation of rural household fuel consumption in Bangladesh. *Energy*, 24, 743-752.

Ali, M. (2002). Scientific forestry and forest landuse in Bangladesh: a discourse analysis of people's attitude. *International Forestry Review,* 4 (3), 214-222.

Ali, S. M. K. and Anee, R. A. (2001). Food borne diseases. Paper presented in the national seminar on food safety organized by IPH (Institute of Public Health) and WHO, Dhaka.

Allen, J. C. and Barnes, D. F. (1985). The causes of deforestation in developing countries. *Annals of the Association of American Geographers,* 75 (2), 163-184.

Anonymous, (1990a). Pesticides in the third World. *The Lancet*, 336, (8 December), 1437.

Anonymous, (1990b). Pesticide- here today but where tomorrow? *The Lancet*, 336, 999.

Anonymous, (1991). The trouble with pesticides. *The Lancet*, 338, (Nov 9), 1200-1201.

Antle, J. M. (1996). Efficient food safety regulation in the food manufacture sector. *American Journal of Agricultural Economics*, 78 (5), 1247-1247.

Appadurai, A. (2001). *Globalization*. London: Duke Universtiy Press.

Atkins, P. and Bowler, I. (2001). *Food in Society, Economy, Culture, Geography.* London: Arnold.

Atkins, P., Hassan, M. and Dunn, C. (unpublished 2006). Poisons, pragmatic governance and deliberative democracy: The arsenic crisis in Bangladesh.

Atkinson, A. (1991). *Principles of Political Ecology*. London: Belhaven.

Avery, D. (1999). The fallacy of the organic utopia. In J. Morris and R. Bate (Eds), *Fearing food: risk, health and environment*. Oxford: Butterworth- Heinemann.

Ballassa, B. (1978). Export and Economic Growth. *Journal of Development Economics*, 5, 181–189.

Bandyopadhyay, J. and Shiva, V. (1987). Chipko: rethinking India's forest culture. *The Ecologist,* 17 (1), 26-34

Bandyopadhyay, J. and Shiva, V. (1986b). *Chipko: India's civilization response to the forest crisis*. New Delhi: Intach.

Bangladesh Forest Department, (1999). Feasibility study for Tangail division: forestry sector project (1997/98–2003/04). Dhaka, Ministry of Environment and Forests.

Barbeau, A. and Roy, M. (1985). Genetic susceptibility, environmental factors and Parkinson's disease. Paper presented at 8th International Symposium on Parkinson's Disease, New York, June 9-12, 1985.

Barbier, E. B. (1993). Economic aspects of tropical deforestation in Southeast Asia. *Global Ecology and Biogeography Letters,* 3, 215-235.

Barbier, E. (1989). Cash crops, food crops and sustainability: The Case of Indonesia, *World Development*, 17 (6), 879-895.

Bassett, T. (1988a). Breaking up the bottlenecks in food-crop and cotton cultivation in northern Cote d'Ivoire. *Africa,* 58, 147-73.

Bassett, T. (1988b). The political ecology of peasant-herder conflicts in the northern Ivory Coast. *Annals of the Association of American Geographers*, 78 (3), 453-72.

Bassett, T. J. and Zimmerer, K. S. (2004). Cultural ecology. In G. Gaile and C. Willmott (Eds), *Geography in America at the dawn of the twenty-first century.* Oxford: Oxford University Press.

BBS (Bangladesh Bureau of Statistics), (2002). Statistical yearbook of Bangladesh. Dhaka: Government of Bangladesh.

BCAS (Bangladesh Centre for Advanced Studies), (1997). Forest resource management project: biological survey (final report). Dhaka.

Beaumont, P. and Philo, C. (2004). Environmentalism and geography: the great debate? In J. A. Matthews and D. T. Herbert (Eds), *Unifying Geography: Common Heritage, Shared Future.* London: Routledge.

Beck, U. (1991). *Risk society: towards a new modernity.* Translated by M. Ritter. London: Sage.

Beck, U. (1995). *Ecological politics in an age of risk.* Translated by Amos Oz, Cambridge: Polity.

Beck, U. (1998). Politics of risk society. In J. Franklin (Ed) *The politics of risk society.* Cambridge: Polity Press.

Benjaminsen, T. A. (1997). Natural resource management, paradigm shifts, and the decentralization reform in Mali. *Human Ecology*, 25 (1), 121–143.

Berkes, F. (Ed). (1989). *Common property resources: ecology and community-based sustainable development.* London: Belhaven.

Behera, B. and Engel, S. (1995). Institutional analysis of evolution of joint forest management in India: A new institutional economics approach Forthcoming in *Forest Policy and Economics.*

Bhattacharya, D., Rahman, M. and Khatun, F. A. (1999). *Environmental consequences of structural adjustment: towards sustainable shrimp culture in Bangladesh.* Paper 2. Dhaka: Centre for Policy Dialogue.

Bhuian, A. A. (1994). Policy and strategy for the development of sal forest areas with peoples participation: its constraints and remedial measures. In the Proceedings of National Workshop on Agroforestry for the Degraded Sal Forests, organized by Bangladesh Agricultural Research Council, Dhaka, Bangladesh.

Binswanger, H. P. (1991). Brazilian policies that encourage deforestation in the Amazon. *World Development*, 19 (7), 821-829

Bose, S. K. (1994). Case study of the Agroforestry component of thana afforestation and nursery development projects in the sal forest area. In the Proceedings of National Workshop on Agroforestry for the Degraded Sal Forests, organised by Bangladesh Agricultural Research Council, Dhaka, Bangladesh.

Bowbrick, P. (1992). *The economics of quality, grades and brands.* London: Routledge.

Blaikie, P. (1985). *The political economy of soil erosion in developing countries.* London: Longman.

Blaikie, P. and Brookfield, H. (1987). *Land degradation and societies.* London: Methuen.

Braidotti, R., Charkiewicz, E., Hausler, S., and Wieringa, S. (1994). *Women, the environment and sustainable development: towards a theoretical synthesis.* London: Zed Books.

Braun, B. and Castree, N. (1998). *Remaking reality: nature at millennium.* London: Routledge.

Briggs, J. and Sharp, J. (2004). Indigenous knowledges and development: a postcolonial caution. Third World Quarterly, 25 (4), 661-676.

Bryant, R. L. (1992). Political ecology: an emerging research agenda in Third-World studies. *Political Geography*, 11 (1), 12-36.

Bryant, R. L. (1993). Forest problems in colonial Burma: historical variations on contemporary themes. *Global Ecology and Biogeography Letters,* 3, 122-137.

Bryant, R. L., Rigg, J. and Stott, P. (1993). Forest transformation and political ecology of Southeast Asia. *Global Ecology and Biogeography Letter,* 3, 101-115.

Bryant, R. L. (1996). Romancing colonial forestry: the discourse of "Forestry in Progress" in British Burma. *The Geographical Journal*, 162 (2), 69-178.

Bryant, R. L. and Bailey, S. (1997). *Third world political ecology.* London: Routledge.

Bryant, R. L. and Wilson, G. A. (1998). Rethinking environmental management. *Progress in Human Geography,* 22 (3), 321-343.

Bryant, R. L. (1992). Political ecology: an emerging research agenda in Third-World studies. *Political Geography,* 11 (1), 12-36.

Buckingham, S. (2004). Ecofeminism in the twenty-first century. *Geographical Journal,* 170 (2), 146-154.

Bull, D. (1982). *A growing problem: pesticides and the third-world poor.* Oxford: Oxfam.

Burling, R. (1997). *The strong women of Madhupur.* Dhaka: The University Press Ltd.

Burton, I., Kates, R. W. and White, G. F. (1978). *The environment as hazard.* New York: Oxford University Press.

Cain, M., Khanam, S. R. and Nahar, S. (1979). Class, patriarchy, and women's work in Bangladesh. *Population and Development Review,* 5 (3), 405-438.

Carney, J. and Watts, M. (1990). Manufacturing dissent: work, gender and the politics of meaning in a peasant society. *Africa,* 60 (2), 207-241.

Carney, J. (1993). Converting the wetlands, engendering the environment: the intersection of gender with agrarian change in the Gambia. *Economic Geography,* 69 (4), 329-348.

Castree, N. (2002). Environmental issues: from policy to political economy. *Progress in Human Geography,* 26 (3), 357-365.

Castree, N. (2004). *Nature.* London: Routledge.

Caswell, A. J. and Hooker, N. H. (1996). HACCP as an international trade standard. *American Journal of Agricultural Economics,* 78, 775-779.

Chambers, R. (1994). The origins and practice of participatory rural appraisal. *World Development,* 22 (7), 953-969

Chapman, G. P. and Thompson, M. (Eds) (1995). *Water and the quest for sustainable development in the Ganges valley.* London: Mansell.

Choudury, A. H. (1995) Thana afforastation and nursery development project (BGD/84/054, internal report). Dhaka: Ministry of Environment and Forest.

Clare, H. (2005). Cultures of GM: discourses of risk and labelling of GMO in the UK and EU. *Area,* 37 (3), 286-294.

Colchester, M. (1993). Pirates, squatters and poachers: the political ecology of dispossession of the native peoples of Sarawak. *Global Ecology and Biogeography Letters,* 3, 158 79.

Colchester, M. (1994). Sustaining the forests: the community-based approach in South and South-East Asia. *Development and Change,* 25(1), 69-100.

Conklin, H. (1954). An ethno-ecological approach to shifting agriculture, New York Academy of Sciences, *Transactions,* 17 (2) 133-42.

Corbridge, S. (1991). Third World development, *Progress in Human Geography.* 15 (3), 311-321.

Corsini, G. U. and Bocchetta, A. (1986). Parkinson's disease and pesticides. *The Lancet* (Nov 15), 1163.

Crook, W. G. (1982). Food additives and hyperactivity, *The Lancet*, (May 15), 1128.

Crow, B. and Sultana, P. (2002). Gender, class, and access to water: three cases in a poor and crowded delta. *Society and Natural Resources*, 15, 709-724.

Dasgupta, S., Meisner, C. and Huq, M. (2005). Health effects and pesticide perception as determinant of pesticide use: evidence from Bangladesh, http://ideas.repec.org/p/wbk/wbrwps/3776.html,

Deb, A. K. (1997). *Fake blue revolution: environmental and socio-economic impacts of shrimp culture in the coastal areas of Bangladesh.* Community Development Centre (CDC) Canada.

Delap, E. K. and Lugg, R. (2000). *Not small fry: children's work in Bangladesh's shrimp industry.* Save the Children, UK and Uttran, Bangladesh.

Dankelman, I. and Davidson, J. (1988). *Women and environment in the Third World: alliance for the future.* London: Earthscan.

Dinham, B. (1991). FAO and pesticides: promotion or proscription. *The Ecologist*, 21 (2), 61-65.

Dore, E. (1996). Capitalism and Ecological Crisis: legacy of the 1980s, in H. Collinson (eds) *Green guerrillas: environmental conflicts and initiatives in Latin American and the Caribbean*, London: Latin American Bureau.

Dove, M. (1983). Theories of swidden agriculture and the political economy of ignorance. *Agroforestry systems*, 1, 85-99.

Dryzek, J. S. (1997). *The politics of the Earth: environmental discourses.* New York: Oxford University Press.

Dyer, O. (2003). Women with breast cancer are more likely to have high blood levels of pesticides. *BMJ*, 326-952.

Eden, S. (1998). Environmental issues: knowledge, uncertainty and the environment. *Progress in Human Geography*, 22 (3), 425-432.

Escobar, A. (1992a). Reflections on development, grassroots approaches and alternative politics in the Third World. *Features*, 24 (5), 411-336.

Escobar, A. (1992b). Imaging a post-development era? critical thought, development and social movements. *Social Text*, 31/32, 20-56.

Escobar, A. (1996). Constructing nature: elements for a poststructural political ecology. In R. Peet and M. Watts (Eds), *Liberation ecologies: Environment, Development, Social Movements*. London: Routledge.

Fairhead, J. and Leach, M. (1995). False forest history, complicit social analysis: rethinking some west African environmental narratives. *World Development* 23 (6), 1023- 35.

FAO (Food and Agricultural Organization), (1993). *The state of food and agriculture: Bangladesh*. Rome: FAO Agriculture Series.

FAO, (1998). http:/www.fao.org/docrep/w8088e/w8088E00htm/29th January.

FAO and WHO (2003). Assessing food safety and quality, guidelines for strengthening national food control systems, food and nutrition. Paper No 76, Rome.

Farooque, M. (1997). *Law and custom on forests in Bangladesh: issues and remedies*, Dhaka: BELA (Bangladesh Environmental Lawyers Association).

Feingold, B. F. (1976). Hyperkinesis and learning disabilities linked to the ingestion of artificial food colours and flavours. *Journal of Learning Disabilities*, 9, 551-559.

Forsyth, T. (1996). Science, myth and knowledge: testing Himalayan environmental degradation in Thailand. *Geoforum*, 27 (3), 375-392

Fortmann, L. (1996). Gendered knowledge: rights and space in two Zimbabwe villages: reflections on methods and findings. In D. Rocheleau, B. Thomas-Slayter and E. Wangari (Eds), *Feminist political ecology: global issues and local experiences*. London: Routledge.

Franke, R, W. and Chasin, B., H. (1979). Peanuts, peasants, profits, and pastoralists: the social and economic background to ecological deterioration in Niger. *Peasant Studies*, 8 (3), 1-30.

Franke, R, W. and Chasin, B. H. (1980). *Seeds of famine: ecological destruction and the development dilemma in the Western Sahel*. Montclair: NJ, Allanheld, Osmun.

Freidberg, S. (2001). To garden, to market: gendered meanings of work on an African urban periphery. *Gender, place and culture*, 8 (1), 5–24,

Gadgil, M. and Guha, R. (1992). *This fissured land: an ecological history of India.* Delhi: Oxford University Press.

Gadgil, M. and Guha, R. (1995). *Ecology and equity, the use and abuse of nature in contemporary India.* London: Rutledge.

Gafur, A., Kamal, M., Dhaly and Khatun, S. (1999). Socio-economic and environmental impact of shrimp culture in South-Western Bangladesh: an integrated approach. Dhaka: Nijera Kori and IDPAA in Proshika.

Gain, P., Morol, S. and Rozario, C. (1994). Commercial fuelwood plantation in Modhupur forest: an impact assessment survey of the participants. Dhaka: SHED.

Gain, P. (2002). *The last forest of Bangladesh.* Dhaka: Shed.

Gauld, R. (2000). Maintaing centralized control in community-based forestry: policy construction in the Philippines. *Development and Change*, 31 (1), 229-254.

Ghai, D. and Vivian, J. M. (1992). *Grassroots Environmental Action: People's Participation in Sustainable Development.* London: Routledge.

Ghani, C. Q., Alim, A. and Stevens, P. R. (1990a). Rehabilitation and landuse planning of Sal forests. Dhaka: FAO/UNDP Project BGD/85/085, part 1.

Ghani, C. Q., Alim, A. and Stevens, P. R. (1990b). Rehabilitation and Landuse Planning of Sal Forests, (Part 2) FAO/UNDP Project BGD/85/085, Dhaka.

Ghani, C. Q., Alim, A. and Stevens, P. R. (1990c). Rehabilitation and Landuse Planning of Sal Forests, (Part 2) FAO/UNDP Project BGD/85/085, Dhaka.

Goodland, R. J. A., Dally, H. E. and Serafy, S.E. (1993). The urgent need for rapid transition to global environmental sustainability. *Environmental conservation*, 20, 297-309.

Govereh, J. and Jayne, T. S. (2003). Cash cropping and food crop productivity: synergies or trade-offs? *Agricultural Economics*, 28 (1), 39–50.

Grossman, L. (1984). Peasants, *subsistence ecology and development in the highlands of Papua New Guinea.* Nj: Princeton University Press.

Grossman, L. S. (1993). The political ecology of banana exports and local food production in St. Vincent, Eastern Caribbean. *Annals of the Association of American Geographers*, 83 (2), 347-367.

Guha, R. (1989). *The unquiet wood, Ecological change and peasant resistance in the Himalaya.* New Delhi: Oxford University Press.

Guha, R. (1983a). Forestry in British and post-British India: a historical analysis. *Economic and Political weekly*, 28 (44), Oct 29, 1882- 1896.

Guha, R. (1983b). Forestry in British and post-British India: a historical analysis. *Economic and Political Weekly*, 28 (45-46), Nov 5-12, 1940-1947.

Gupta, P. K. (2004). Pesticide exposure – Indian scene. *Toxicology*, 198 (1-3), 83-90.

Gupte, M. (2004). Participation in a gendered environment: the case of community forestry in India. *Human Ecology*, 32 (30), 365 – 382.

Guthman, J. (1997). Repressing crisis: the theory of Himalayan environmental degradation and the project of development in post-Rana Nepal. *Development and Change*, 28, 45-69.

Halim, S., Mallick, D., Reza, O., Hasan, S. R. and Kabir, S. A. (2001). Women and children study, Feasibility study report for the shrimp component of the fourth fisheries project.

Halim, S. (2004). Marginalization or empowerment? Women involvement in shrimp cultivation and shrimp processing plant in Bangladesh. In K. T. Hossain, M.H. Imam, S. H. Habib (Eds), Women, Gender and Discrimination. University of Rajshahi.

Hardin, G. (1968). The Tragedy of the Commons. *Science,* 62, 1243-1248.

Hanak, E. Boutrif, E. Fabre, P. and Pineiro, M. (2000). Food Safety Management in Developing Countries. In the proceedings of the International Workshop, CIRAD-FAO, Montpellier, France, 11-13 December 2000.

Hathaway, S.C. (1995). Harmonization of international requirements under HACCP-based food control systems. *Food Control,* 6 (5), 267–276.

Hecht, S. B. (1985). Environment, development and politics: capital accumulation and the livestock sector in Eastern Amazonia. *World Development*, 13 (6), 663-684.

Hecht, S. and Cockburn, A. (1989). *The fate of the forest; developers, destroyers, and defenders of the Amazon*. London: Verso.

Henson, S. and Traill, B. (1993). The demand for food safety: market imperfections and the role of Government. *Food Policy*, 18 (2), 152-162.

Henson, S and Caswell, J. (1999). Food safety regulation: an overview of contemporary issues. *Food Policy*, 24 (6), 589-603.

Hewitt, K. (Ed). (1983). *Interpretation of calamity*. London: Allen and Unwin.

Hooker, H. N. (1999). Food safety regulation and trade in food products. *Food Policy*, 24 (6), 653-668.

Huda, N. and Roy, M. K. (2001). State of the forests, in Bangladesh. In Q. I. Chowdhury (Eds), *State of environment report 2000*. Dhaka : Forum of Environmental Journalists of Bangladesh, 75-190.

Hurst, P. (1990). *Rainforest politics: ecological destruction in South-East Asia*. London: Zed Books.

Hussain, M. M. (1992). *Study on national forest policy in Bangladesh*. Dhaka: Forest Department (Memo).

Hyde, W. F. and Kohlin, G. (2000). Social forestry reconsidered. *Silva Fennica*, 34 (3), 285-314.

Jackson, C. (1993a). Environmentalism and gender interests in the Third World. *Development and Change*, 24 (4), 649-677.

Jackson, C. (1993b). Women/nature or gender/history? a critique of ecofeminist development. *Journal of Peasant Study*, 20 (3), 389-419.

Jackson, C. (1993c). Doing what comes naturally? woman and environment in development. *World Development*, 21 (12), 1947-1963.

Jaroz, L. (1996). Defining deforestation in Madagascar. In R. Peet and M. Watts (Eds), *Liberation ecologies: environment, development and social movements*. London: Routledge.

Jewitt, S. (1995). Europe's 'others'? Forestry policy and practices in colonial and postcolonial India. *Environment and Planning D: Society and Space*, 13 (1), 67-90

Jewitt, S. (2000). Unequal knowledge in Jharkhand, India: de-romanticizing women's agroecological expertise. *Development and Change*, 31 (5), 961-985.

Jodha, N. S. (1986). Common property resources and rural poor in dry regions of India. *Economic and Political Weekly*, 31(27), 1169-1181.

Joekes, S., M. Leach, and C. Green (Eds) (1995). Gender relations and environmental change. *IDS Bulletin*, 26 (1), 1-9.

Johnson, P. S. (1993). *The Earth summit: the United Nations Conference on Environment and Development (UNCED)*. London: Kluwer Academic Publishers.

Jones, P., Shears, P. and Hiller, H. (2001). Retailing organic foods. *British Food Journal*, 103 (5), 358-365.

Iftekhar, M. S. and Hoque, A. K. F. (2005). Causes of forest encroachment: an analysis of Bangladesh. *GeoJouranal*, 62, 95-106.

Ishiyyama, N. (2003). Environmental justice and American Indian tribal sovereignty: case -study of a land-use conflict in skull valley Utah. *Antipode*, 35 (1), 119-39.

Islam, S.T. (2006). PhD thesis, *Resource assessment of deciduous forest in Bangladesh.*

Islam, S. T. and Donoghue, D. N. M. (2005). Woodland resource assessment in Bangladesh: a case study of deciduous sal forests. In the proceedings of the annual conference of the remote sensing and photogrammetry society (RSPSoc 2005). University of Portsmouth, 6-9 September 2005.

Islam, S. (1994). Agroforestry experiences in Betagi and Promora in Chittagong district. In the proceedings of national workshop on agroforestry for the degraded sal forests, organized by Bangladesh Agricultural Research Council (BARC), Dhaka, Bangladesh.

IPH (1994). Report on street vended and weaning Foods in Bangladesh, Survey report conducted by IPH, Dhaka.

Islam, K., Harun, K. M. Y. and Hossain, S. (2003). Socio-economic, demographic and food safety profile of street food vending in Dhaka city, research report of INFS, Dhaka.

Islam, A. (1999). Effects of shrimp farming on the physio-chemical and biological qualities of water. Mymensingh: Bangladesh Agriculture University.

Ito, S. (2002). From rice to prawns: economic transformation and agrarian structure in rural Bangladesh. *The journal of peasant studies*, 29 (2), 47-70.

Kabeer, N. and Simeen, M. (2004). Globalization, gender and poverty: Bangladeshi women workers in export and local markets. *Journal of International Development*, 16, 93–109.

Kabeer, N. (1994). *Reversed realities: gender hierarchies in development thought.* London: Verso.

Kendie, S. B. (1995). The environmental dimensions of structural adjustment programmes: missing links to sustaining development. *Singapore Journal of Tropical Geography*, 16, 42-57.

Khotari, R. (1984). The non-party political process. *Economic and Political Weekly*, 79, 5.

King, Y. (1989). The ecology of feminism and the feminism of ecology. In J. Plant, (Eds), *Healing the wounds, the promise of ecofeminism.* Philadelphia: New Society Publishers.

Kinsey, J. (1993). GATT and the economics of food safety. *Food Policy*, 18 (2), 163-176.

Khan, M. M. (2000). Political and administrative corruption: concepts, comparative experiences and Bangladesh case. Paper prepared for Transparency International Bangladesh, http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN019105.pdf

Khan, N. A. and Begum, A. S. (1997). Participation in social forestry re-examined: a case-study from Bangladesh. *Development in Practice*, 7 (3), 260-266.

Khan, M. (1996). A typology of corrupt transactions in developing countries. *IDS Bulletin*, 27 (2), 12-21.

Khan, N. A. (1998). Land tenurial dynamics and participatory forestry management in Bangladesh. *Public Administration and Development,* 18 (4), 335-347.

Khan, N. A. (2001). Regional study on forest policy and institutional reform (RETA 5900), Bangladesh country case study (final report). Manila: Asian Development bank.

Khan, S. H. and Rahman, S. M. (2002), Food Safety and consumer rights: Bangladesh Perspective. Unpublished report, IPH, Bangladesh.

Khan, M. M. (2003). State of governance in Bangladesh, *The Round Table*, 370, 391-405.

Kolavalli, S. (1995). Joint forest management: superior property rights? *Economic and Political Weekly*, 29 July, 1933 –1938.

Kothari, A., Singh, N. and Suri, S. (1995). Conservation in India: a new direction. *Economic and Political Weekly*, 28 October, 1943 -1947.

Kummer, D. M. (1992). *Deforestation in the postwar Philippines*. Chicago: University of Chicago.

Kumar, A. and Kaul, R.N. (1996). Joint forest management in India: points and ponder. *Commonwealth Forestry Review*, 75 (3), 212-216.

Kumar, C. and Vashisht, U. S. (2005). Redefining community–state partnership in natural resource management: a case from India. *Development in Practice*, 15 (1), 1-12.

Lama, J. R., Seas, C. R., Barun, R. L., Gotuzzo, E. and Sack, R. B. (2004). Environmental temperature and acute diarrhoea in adults in Lima (Peru). *Journal of Health, Population and Nutrition*, 22 (4), 399-403.

Lawless, H. (1995). Dimension of sensory quality: a critique, *Food quality and preference*, 6 (3), 191-199.

Leach, M. and Mearns, R. (1991). Poverty and environment in developing countries: An overview study. Report to ESRC, Global Environmental Change Programme and Overseas Development Administration. Swindon: ESRC.

Leach, M., Joekes, S. and Green, C. (1995). Editorial: gender relations and environmental change. *IDS Bulletin,* 26 (1), 1-8.

Liverman, M. D. (1999). Geography and the Global Environment. *Annals of the Association of American Geographers*, 89 (1), 107-120.

Loader, R. and Hobbs, J. E. (1999). Strategic response to food safety legislation. *Food Policy,* 24 (6), 685-706.

Lohmann, L. (1993). Land, power and forest colonization in Thailand. *Global Ecology and Biogeography Letters,* 3, 180-192.

Mackenzie, F. (1986). Local initiatives and national policy: gender and agricultural change in Murang'a district, Kenya. *Canadian Journal of African Studies*, 20 (3), 377-401.

Mackenzie, S. (1999). Restructuring the relations of work and life: women as environmental actors, feminism as geographic analysis. *Gender, Place and Culture,* 6 (4), 417-430.

Maathai, W. (1986). Learning from the South: the green belt movement. In P. Ekins (Eds), *The living economy: a new economics in the making.* London, Routledge and Kegan Paul plc.

Malla, Y. B. (1997). Sustainable use of communal forests in Nepal. *Journal of World Forest Resource Management*, 8, 51-74.

Matthews, J. A. and Herbert, D. T. (2004). *Unifying geography: common heritage, shared future.* London: Routledge.

Maxwell, S. and Fernando, A. (1989). Cash crops in developing countries: the issues, the facts, the policies. *World Development,* 17 (11), 1677-1708.

Moran, E. M. (1993). Deforestation and land use in the Brazilian Amazon. *Human Ecology*, 21 (1), 1-21.

Menon, A. (1995). Constructing the 'local' decentralizing forest management. *Economic and Political Weekly*, 30, 2110- 11.

Merchant, C. (1996). *Earth care: women and the environment.* London: Routledge.

Mies, M. and Shiva, V. (1993). *Ecofeminism.* London : Zed books.

MoEF (Ministry of Environment and Forest), (1991). Bangladesh country report for United Nations Conference on Environment and Development (UNCED), Dhaka: Government of Bangladesh.

MoEF (Ministry of Environment and Forest), (1999). Feasibility study for Tangail division, forestry sector project (1997/8-2003/4). Dhaka: Department of Forest.

Momsen, J. H. (2004). *Gender and development.* London: Routledge.

Momsen, J. H. and V. Kinnaird (Eds). (1993). *Different places, different voices.* London: Routledge.

Moorhouse, W. (1994). Unpublished business: Bhopal ten years after. *Ecologist*, 24, 164-168.

Moore, D. S. (1993). Contesting terrain in Zimbabwe's eastern highlands: political ecology, ethnography, and peasant resource struggles. *Economic Geography*, 69, 380-401.

Moran, E. M. (1993). Deforestation and land use in the Brazilian Amazon. *Human Ecology*, 21 (1), 1-21.

Moser, N. C. (1989). Gender planning in the third world: meeting practical and strategic needs. *World Development*, 17 (11), 1799-1825.

Mawdsley, E. (1998). After chipko: from environment to region in Uttaranchal. *Journal of Peasant Studies*, 25 (4), 36-54.

Misra, U. K., Nag, D., Misra, N. K. and Krishnamurti, C. R. (1982). Macular degeneration associated with chronic pesticide exposure. *The Lanchet*, (30 January), 288.

Mitlin, D. and Thompson, J. (1995). Participatory approaches in urban areas: strengthening civil society or reinforcing the status quo? *Environment and Urbanization*, 7 (1), 231-250.

Molnár, P. J. (1995). A model for overall description of food quality. *Food Quality and Preference*, 6 (3), 185-190.

Mukherjee, N. (1995). Forest management and survival needs: community experience in West Bengal. *Economic and Political Weekly*, 30 (49), 3130-3132.

Mukul, 1993, Villages of Chipko movement. *Economic and Political Weekly*, 10 March.

Mythen, G. (2004). *Ulrich Beck: a critical introduction to the risk society.* London: Pluto Press.

Neupane, H. R. (2003). Contested impact of community forestry on equity: some evidences from Nepal. *Journal of Forest and Livelihood,* 2 (2), 55-62.

Nietschmann, B. (1973). Between land and water: *the subsistence ecology of the Miskito Indians*. New York: Seminar Press.

Nizamuddin, K. and Rasheed, K. R. S. (1992). Sal forest products utilization By rural community. Dhaka: Environmental Survey and Research Unit, Department of Dhaka, Department of Geography.

O'Keefe, P., Westgate, K. and Wisner, B. (1977). Taking the naturalness out of the natural disasters. *Nature*, 260, 566-567.

Okoko, E. (1999). Women and environmental change in the Niger Delta, Nigeria: evidence from Ibeno. *Gender, Place and Culture*, 6 (4), 373–378.

O'Riordan, T. (1981). *Environmentalism*. London: Routledge.

Ortner, S. (1974). Is female to male as nature is to culture? In M. Rosaldo and L. Lamphere (Eds), *Women, culture and Society*. Canada: Stanford University Press.

Otsuki, T., Wilson, J. S. and Sewadeh, M. (2001). Saving two in a billion: quantifying the trade effect of European food safety standards on African exports. *Food Policy*, 26 (5), 495-514.

Parajuli, P. (1991). Power and knowledge in development discourse: new social movements and the state in India. *International Social Science Journal*, 127, 173-190.

Parajuli, P. (1998). Beyond capitalized nature: ecological ethnicity as an arena of conflict in the regime of globalization. *Ecumene,* 5 (2), 186-217.

Pascale, S., Mirna, W., Isabelle, B., Patrick, B. and Abi, S. B. (2006). Respiratory diseases and pesticide exposure: a case-control study in Lebanon. *Journal of Epidemiology & Community Health*, 60 (3), 256-261.

Peet, R. and Watts, M. (1996a). *Liberation ecologies: environment, development, social movement*. New York: Routledge.

Peet, R. and Watts, M. (1996b). Liberation ecologies: development, sustainability, and environment in the age of market triumphalism. In R. Peet and M. Watts (Eds), *Liberation ecologies: environment. development, social movement.* New York: Routledge.

Peet, R. and Watts, M. (1993). Introduction: development theory and environment in an age of market triumphalism. *Economic Geography*, 69 (2), 227-253.

Peluso, N. L. (1992). *Rich forests, poor people: resource control and resistance in Java.* Berkeley, CA: University of California Press.

Peluso, N. L. (1993a). Traditions of forest control in Java: implications for social forestry and sustainability. *Global Ecology and Biogeography Letters,* 3, 138 - 158.

Peluso, N. L. (1993b). The political ecology of extraction and extractive reserve in East Kalimantan, Indonesia. *Development and Change*, 23 (4), 49-74.

Peluso, N. L. (1995). Whose woods are these? counter-mapping forest territories in Kalimantan, Indonesia. *Antipode*, 27 (4), 383-406.

Parajuli, P. (1998). Beyond capitalized nature: ecological ethnicity as an arena of conflict in the regime of globalization. *Ecumene*, 5 (2), 186-217.

Peri, C. (2006). The universe of food quality. *Food Quality and Preference,* 17 (2/3), 3-8.

Plumwood, V. (1992). Beyond the dualistic assumptions of women, men and nature. *Ecologist*, 22 (1), 8-13.

Potgieter, N., Obi, C. L., Bessong, P.O., Lgumbor, E. O., Samie, A. and Nengobela, R. (2005). Bacterial contamination of Vhuswa – a local weaning food and stored drinking-water in impoverished households in the Venda region of South Africa. *Journal of Health, Population and Nutrition*, 23 (2), 150-155.

Prasad, P. and Rao, V. (1997). Adaptations of peasants in a stress environment. *Economic and Political Weekly*, 32 (5), 228-234.

Proshika, (2003). A study on the adulteration of soybean oil in Bangladesh. Unpublished report. Dhaka: Proshika.

Primavera, J. H. (1995). Mangroves and brackish water pond culture in the Philippine. *Hydrobiologia*, 295 (1-3), 303-309.

Primavera, J. H. (1997). Socio-economic impacts of shrimp culture. *Aquaculture Research*, 28, 815-827.

Rahman, A. (2001). *People's report on Bangladesh environment 2001*. Dhaka: The University Press Ltd.

Rahman, S. M. M., Mannan, M. A., and Anwar, K, S (2003). Quantitative and Qualitative Assessment of Ingredients of Biscuits, Breads, Ice-creams and Sweetmeats in Dhaka city. Dhaka: Unpublished report of IPH.

Rahman, S. M. and Ismail, A. T. K. M. (2004). Strengthening official food safety control services. Paper presented in FAO/WHO Second Global Forum for Food Safety Regulators, held in Bankok, Thailand, 12 – 14 October 2004.

Rahnema, M. (1988). Power and regenerative processes in micro-spaces. *International Social Sciences Journal*, 117, 361-375.

Rangan, H. (1995). Contested boundaries: state policies, forest classifications and deforestation in the Garhwal Himalayas. *Antipode*, 27 (4), 343-362.

Rangan, H. (1996). From Chipko to Uttraranchal: development, environment and social protest in the Garhwal Himalaya, India. In R. Peet and M. Watts (Eds) *Liberation ecologies: environment, development, social movements*. London: Routledge.

Repetto, R., and Gills, M. (1988). *Public policies and the misuse of forest resources*. Cambridge: Cambridge University Press.

Reardon, T. and Farina, E. (2001). The rise of private food quality and safety standards: illustrations from Brazil. Paper presented in the International Food and Agribusiness Association's 2001 Food and Agribusiness Symposium, 27th June 2001, Sydney, Australia.

Reed, D. (Ed). (1992). *Structural adjustment and the environment*. London: Earthscan.

Repetto, R. and Gills, M. (1988). *Public policies and the misuse of forest resources*. Cambridge: Cambridge University Press.

Rigg, J. (1991). Thailand's Nam Choan Dam Project: a case study in the 'Greening' of South- East Asia. *Global Ecology and Biogeography Letters*, 1(2), 42-54.

Rigg, J. (1993). Forests and farmers, land and livelihoods, changing resource realities in Thailand. *Global Ecology and Biogeography Letters*, 3, 277-290.

Rietbergen, S. (Ed). (1996). *The Earthscan reader in tropical forestry*. London: Earthscan.

Rithaler J. (1992). *Harvesting report forestry master plan, Bangladesh* (TA No. 1355-BAN). Manila: Asian Development Bank.

Robbins, P. (2004). *Political ecology: a critical introduction*. Oxford: Blackwell.

Rocheleau, E. D. (1995). Gender and biodiversity: a feminist political ecology perspective. *IDS Bulletin*, 26 (1), 9-16.

Rocheleau, D. and Ross, L. (1995). Tree as tools, tree as text: struggles over resources in Zambrana-chacuey, Dominical Republic. *Antipode*, 27 (4), 407-428.

Rocheleau, D. E., Steinberg, P. E. and Benjamin, P. A. (1995). Environment, development, crisis, and crusade: Ukambani, Kenya, 1890-1990. *World Development*, 23 (6), 1037-1051.

Rocheleau, D., Thomas-Slayter, B. and Wangari, E. (Eds) (1996a). *Feminist political ecology: global issues and local experience*. London, Routledge.

Rocheleau, D., Ross, L. and Morrobel, J. (1996b). From forest gardens to tree farms: women, men and timber in Zambrana-Chacuey, Dominican Republic. In D. Rocheleau, B. Thomas-Slayter and E. Wangari (Eds), *Feminist political ecology: global issues and local experiences*. London: Routledge.

Rocheleau, D. and Edmunds, D. (1997). Women, men and trees: gender, power and property in forest and agrarian landscapes. *World Development,* 25 (8), 1351-1371.

Rose, T. L. (1978). The functional relationship between artificial food colours and hyperactivity. *Journal of Applied Behaviour Analysis*, 115, 439-446.

Roy, D. and Halim, A. (2001). *A critique to the Forest (Amendment) Act of 2000 and the (draft) Social Forest Rules of 2000*. Dhaka: SHED.

Sach, C. (Ed). (1997). Women working in the environment. London: Taylor and Francis.

Saigal, S. (2000). Beyond experimentation: emerging issues in the institutionalization of joint forest management in India. *Environmental Management,* 26 (3), 269–281.

Salam, M. A., Noguchi, T. and Koike, M. (1999). The cause of forest cover loss in the hill forests in Bangladesh. *Geojournal*, 47, 539-549.

Salam, M. A., Noguchi, T. and Koike, M. (2005). Factors influencing the sustained participation of farmers in participatory forestry: a case study in central Sal forests in Bangladesh. *Journal of Environmental Management,* 74, 43-51.

Sarin, M. (1993). From conflict to collaboration: local institutions in joint forest management. New Delhi: *JFM Working Paper* 14 (SPWD/Ford Foundation).

Sarin, M. (1995) Regenerating India's forests: reconciling gender equity with joint forest management. *IDS Bulletin*, 26 (1), 83-92.

Sarin, M. (1998). Community forest management: whose participation? In I.Guijt and M, K. Shah (Eds), *The myth of community: gender issues in participatory development*. London: Intermediate Technology Publications

Schmink, M. and Wood, C. H. (1992). *Contested frontiers in Amazonia*. New York: Columbia University Press.

Schroeder, R. A., and Suryanata, K. (1996). Gender, class power in agroforestry systems: case studies from Indonesia and West Africa. In R. Peet and M. Watts (Eds), *Liberation ecologies: environment, development, social movements*. London: Routledge.

Schroeder, R. A. (1997). Re-claiming land in the Gambia: gendered property rights and environmental intervention. *Annals of the Association of American Geographers*, 87 (3), 487-508.

Schröder, M. J. A and McEachern M. G. (2004). Consumer value conflicts surrounding ethical food purchase decisions: a focus on animal welfare. *International Journal of Consumer Studies*, 28 (2), 168-177.

Schmink, M. (1982). Land Conflicts in Amazonia. *American Ethnologists*, 9 (2), 341-357.

Schmink, M. and Wood, C. H. (1987). The 'political ecology' of Amazonia. In P. D. Little, M. H. Horowitz and A. E. Nyerges (Eds) *Lands at Risk in the third World: Local Level Perspectives*. Boulder: Westview Press.

Scott, J.C. (1985). *Weapons of the weak: everyday forms f peasant resistance*. New Haven: Yale University Press.

Sebata, T. and Steele, A. D. (2002). Atypical rotavirus identified from young children with diarrhoea in South Africa. *Journal of Health, Population and Nutrition*, 19 (3), 199-203

Sen, G. and Grown, C. (2000). *Development, crises and alternative visions: Third World women's perspectives*. New York: Mohanty Review Press.

Shah, M. K. and Shah, P. (1995). Gender, environment and livelihood security: an altenative viewpoint from India. *IDS Bulletin*, 26 (1), 75-83.

Shekhar, U. N. (2000). Decentralized natural resource management: form state to co-management in India. *Journal of Environmental Planning and Management*, 43 (1), 123-138.

Sheth, D. L. (1984). Grassroots initiatives in India. *Economic and Political Weekly*, 19, 6, 259-261.

Shiva, V. (1991). *The violence of the green revolution: Third World agriculture, ecology and politics*. London: Zed Books.

Shiva, V. (1989). *Staying alive: women ecology and development*. London: Zed Books.

Siddque, N. A. (1986). Impact of forest management practices in Bangladesh on wildlife and the environment. *Tiger paper* 12 (1).

Sivaramakrishnan, K. (2000). State science and development histories: encoding local forestry knowledge in Bengal. In M. Doornbis, A. Saith, and B. White (Eds), *Forests: nature, people, power*. Oxford: Blackwell.

Sinell, H. (1995). Control of food-borne infections and intoxications. *International Journal of Food Microbiology*, 25 (3), 209-217.

Sopher, D. E. (1963). Population dislocation in Chittagong Hills. *Geographical Review*, 53 (3), 337-362.

Socket, P. (1993). Social and economic aspects of food-borne diseases. *Food Quality,* 18 (2), 110-119.

Stonich, S. C. (1991). The promotion of non-traditional agricultural exports in Honduras: issue of equity, environment and natural resource management. *Development and Change*, 22, 725-755.

Stonich, S. C. and Baily, C. (2000). Resisting blue revolution: contending coalitions surrounding industrial shrimp farming. *Human Organisation*, 59 (1), 23-36.

Stott, P. and Sullivan, S. (Eds). (2000). *Political ecology: science, myth and power.* London: Arnold.

Sturgeon, N. (1997). *Ecofeminist natures: race, gender, feminist theory and political action*. New York: Routledge.

Sundar, S. (2000). Unpacking the 'joint' in joint forest management. In M., Saith and B. White (Eds), *Forests: nature, people, power*. Oxford: Blackwell.

Susman, P., O'Keefe, P. and Wisner, B. (1983). Global disasters, a radical interpretation. In K. Hewitt (Eds), *Interpretations of calamity*. Boston: George Allen and Unwin.

Swinbank, A. (1993). The economics of food safety. *Food Policy*, 18 (2), 83-94.

Swain, A. (1997). Democratic consolidation? environmental movements in India. *Asian Survey*, 37 (9) (Sep), 818-832.

Tait, J. (2001). More faust than frankenstein: the European debate about the precautionary principle and risk regulation for genetically modified crops. *Journal of Risk Research*, 4 (2), 175-189.

Toufique, K. (2000). Impact of structural adjustment policies on the environment in Bangladesh, unpublished report prepared for SAPRI (Structural Adjustment Participatory Review Initiative).

Toxic chemicals in foodstuffs,
http://www.sos- arsenic.net/english/environment/index.html#sec9.1

Turner, M. (1993). Overstocking the range: a critical analysis of the environmental science of Sahelian pastoralism. *Economic Geography*, 69 (4), 402-21.

Trevino, J. R. (1999). Food pollution. *Otolaryngology-Head and Neck Surgery*, 120 (3), 889-896.

Unnayan Samannay, (2001). People's Report on Bangladesh Environment 2001. Dhaka:UPL.

Unnevehr, J. L. and Jensen, H. H. (1999). The economic implications of using HACCP as a food safety regulatory standard. *Food Policy*, 24 (6), 625-635.

Unnevehr, L. J. (2003). Food Safety in food security and food trade, *Focus*, 10, 1-17.

Vayda, A. P. (1983). Progressive contextualization: methods for research in human ecology. *Human Ecology*, 11 (3), 265-81

Vayda, A. P. and Walters, B. B. (1999). Against political ecology. *Human Ecology*, 27 (1), 167-179.

Walker, K. J. (1989) The state in environmental management: the ecological dimension. *Political Studies*, 37, 25-38.

Walker, R., Moran, E. and Anselin, L. (2000). Deforestation and cattle ranching in the Brazilian Amazon: external capital and household processes. *World Development*, 28 (4), 683-699.

Walter, P. A. (2005). Political ecology: where is the ecology? *Progress in Human Geography*, 29 (1), 73-82.

Wandel, M. and Bugge, A. (1997). Environmental concern in consumer evaluation of food quality. *Food Quality and Preference*, 8 (1), 19-26.

Wangari, E., Thomas-Slayter, B. and Rocheleau, D. (1996). Gendered visions for survival: semiarid regions in Kenya. In D. Rocheleau, B. Thomas-Slayter and E. Wangari (Eds), *Feminist political ecology: global issues and local experiences*. London: Routledge.

Warren, K. J. and Cheney, J. (1991). Ecological feminism and ecosystem ecology. *Hypatia,* 6 (1), 179-197.

Watts, M. (1983a). *Silent violence: food, famine and peasantry in northern Nigeria.* Berkley: University of California Press.

Watts, M. (1983b). On the poverty of theory: natural hazards research in context. In K. Hewitt (Ed), *Interpretations of calamity*. Boston: George Allen and Unwin.

Watts, M. (1993). Development I: power, knowledge, discursive practice. *Progress in Human Geography*, 17(20), 257-272.

Watts, M. and Bohle, H. G. (1993). The space of vulnerability: the causal structure of hunger and famine, *Progress in Human Geography*, 17, 1, 43-67.

Weber, M. T., Staatz, J. M., Holtzman, J. S., Crawford, E. W. and Bernsten, R. H. (1988). Informing food security decisions in Africa: empirical analysis and policy dialogue, *American Journal of Agricultural Economics*, 70 (5), 1044-1052.

Whitmore, T. C. (1993). Changing scientific perceptions of the eastern tropical rain forests: a personal view. *Global Ecology and Biogeography Letters,* 3, 115-122.

Wisner, B., Blaikie, P. Cannon, T., and Davies, I. (2004). *At risk: natural hazards, people's vulnerability, and disasters*. London: Routledge.

Wisner, B., Weiner, D., and O'Keefe, P. (1982). Hunger: a polemical review. *Antipode*, 14, 1-16.

Wolf, E. (1972). Ownership and political ecology. *Anthropological Quarterly*, 45, 201-5.

Wood, G. D. (1997). *Bangladesh: whose ideas, whose interests*? London: Intermediate Technology publication.

Yapa, L. (1996). Improved seeds and constructed scarcity. In R. Peet and M. Watts (Eds), *Liberation ecologies: environment, development, social movements*. London: Routledge.

York, R. K. (1995). Quality assessment in a regulatory environment. *Food Quality and Preference*, 6 (3), 137-141.

Zafarullah , H. Z. (1987). Public administration in the first decade of Bangladesh: some observations on developments and trends. *Asian Survey*, 27 (4), 459-476.

Zimmerer, K. S. (1993). Soil erosion and social (dis)courses in Cochabamba, Bolivia: perceiving the nature of environmental degradation. *Economic Geography*, 69, 312-327.

Zimmerer, K. S. (2000). Rescaling irrigation in Latin America: the cultural images and political ecology of water resources. *Ecumene,* 7 (2), 150-75.

Zimmerer, K. S. and Bassett, T. J. (Eds). (2003). Political ecology: a*n integrated approach to geography and environment-development studies*. London: Guilford Press.

http://www.members.shaw.ca/motirahman Rahman, M. (2002). Globalization, Environmental Crises and social change in Bangladesh, accessed on 16/07/05,

http://www.saprin.org/bangladesh/research/ban_environment.pdf Taufique, K. A. (2000). Impact of Structural adjustment policies on the environment in Bangladesh, accessed on 03/03/05.

http://www.port.ac.uk/departments/economics/cemare/project_poressfa.htm accessed Ahmed, S. A., Mallick, D. L., Ali, L. and Rahman, A. (2002). Literature Review on Bangladesh Shrimp. Individual Partner Report for the Project: Policy Research for Sustainable Shrimp Farming in Asia (PORESSFA), accessed on 05/12/04.

http://www.aec.msu.edu/agecon/fs2/ag_transformation/atw_govereh.pdf Govere, J., Jayne, T. S., and Nyoro, J. (1999). Smallholder commercialization, interlinked Markets and food crop productivity : Cross-country evidence in Eastern and southern Africa, Department of Agricultural Economics and the Department of Economics, Michigan State University (MSU), accessed on 03/03/05.

http://www.aciar.gov.au/web.nsf/att/jfrn-6bn95T/$file/pr90chapter09.pdf Allauddin, M. and Hamid, M. A. (1995). Shrimp Culture in Bangladesh with Emphasis on Social and Economic Aspects, accessed on 05/12/04.

http://www.enaca.org/shrimp World Bank, NACA, WWF and FAO. (2002). *International Principles for Responsible Shrimp Farming,* synthesis report. published by the Consortium of World Bank, NACA, WWF and FAO, accessed on 10/09/05.

http://www.iges.or.jp/en/fc/pdf/report5/PTR0208pdf> Mustafa, M. (2002). A review of forest trends in Bangladesh. Policy Trend Report, accessed on 8/06/05.

http://www.bforest.gov.bd/ accessed on 10/02/06.

http://www.libertyindia.org/policy_reports/forest_conflict_2002.pdf, Hazra, A. K. (2002). History of Conflict over Forests in India: A Market Based Resolution Working Paper Series. Julian L. Simon Centre for Policy Research, accessed on 10/05/05.

http://banglapedia.search.com.bd/HT/D_0243.htm, accessed on 18/3/06.

http://www.iso.org/, accessed on 10/2/06.

http://www.cifor.cgiar.org/publications/pdf_files/polex/Psarin0301.pdf, Sarin, M. (2001). Disempowering in the name of participatory forestry?-village forests joint management in Uttarakhand. Forests, Trees, and People Newsletter 44, Rome. accessed on 20/05/06.

Appendix

1. Minutes of the interview with Mr Farooque Chowdhury, secretary General, Consumer's Association of Bangladesh

Silent Food Terrorism in Bangladesh: An interview had been conducted (03-12-03) with the secretary general of Consumer's Association of Bangladesh (CAB). The Secretary General indicated that the nation will be intellectually disabled due to the continuous consumption of impure food. He mentioned that most of the food items we take every day are somehow impure, adulterated or contaminated. From that point of view he marked the issue as *Silent Food Terrorism in Bangladesh*. He discussed many pertinent issues regarding food safety, adulteration and fraud. His opinion is summarised below.

1. Bangladesh suffers from the lack of having standard institutions and laboratories where interested parties can test food samples. Only 15 laboratories are working in Bangladesh that specialise in the examination of food items. The 50-year old IPH (Institute of Public Health) is the largest and most modern laboratory in the country. Furthermore, the chemical agents and reagents used by the laboratory technicians are also below standard and this contributes to inaccurate test results. These inaccurate results act as baseline information in the public media and the public is kept in dark about the real facts. In addition, the personnel engaged in testing food items in the market and those who analyze the specimens in the laboratory are not beyond corruption and bribery. In many instances, it has been noticed that these public institutions are act in favour of the fraudulent commercial enterprises for licensing, adverting and marketing their products. In any cases, the quality and the skills of the technicians are not up to the mark. In this context, the CAB highlights the need to improve existing laboratories with modern equipment and standards along with the development of manpower. The establishment of new laboratories will also bring trust in the test results.

2. In another comment, the general secretary of CAB stressed the need for coordination among the agencies working in the sector of food safety.

3. The research reports are mainly focused on the Dhaka city, but the food adulteration and safety issues are spread all over the country. So new research should be undertaken to cover the provinces and large cities.

4. The secretary general suggested that the political parties should be committed in their agenda to act in favour of safe food.

2. Minutes of the Interview with Mr. Makhanlal Babu, Chief Health Inspector, Dhaka City Corporation, Dhaka.

An interview took place with Mr. Makhanlal Babu, Chief Health Officer, Dhaka City Corporation (DCC) on the 07 January 2004. He commented on the prime responsibilities of his section on food safety issues (like market monitoring for adulterated food items, random sample food collection on doubt of quality, inspecting meat processing surroundings as regards to clean up issues, legislative framework that they use against the fraud in this sector, their limitations and so on).

The Health Department of the DCC mainly monitors the selling/trading of all open or uncovered street vending foodstuffs and gets only those samples (form the shops or restaurants) which are certified by the Bangladesh Standard Testing Institute (BSTI). It is imperative to note that BSTI certifies only 107 (according to their list) food items in the Bangladesh, but there are several hundred types of food items in the market without having BSTI certification. In this regard, health inspectors do not take samples of those items which remain out of the BSTI list, (even the legislative framework does not permit them to do so).

Mr Babu said that food safety issues in Bangladesh are monitored and controlled by the *Bangladesh Pure Food Ordinance 1959 and 1967*. According to this rule, DCC health inspectors file cases against the retailers from whom they collected samples (not against the producer). He hinted that sometimes products are coming into the market without proper labelling (for instance, without the producer's address). So the producers or the wholesale business people are always kept out of the legal process. After taking samples, health inspectors generally send the samples to the DCC laboratories for testing (sometimes these are sent to the laboratories of Institute of Public Health, Nutrition Department of Dhaka University, and Atomic Energy Commission). He said that the laboratories are very old and are not equipped for microbial tests.

Mr. Makhanlal Babu stressed the lack of manpower in his Department to carry out the duties in the field of health and safety. The Health Department of DCC divides 90 wards of the city into 10 zones and they employ only two health inspectors under one health officer. So, for about 10 million people in the Dhaka city area there are only 10 health officers and 20 health inspectors. Their duties include not only the monitoring of food quality issues but also the child birth/death registration, mosquito control and undertake immunization programme of the government. So, it is very difficult for them to pay sufficient attention in food safety issues.

He said that the DCC operates a Magistrates' Court (with four Magistrates now working) to resolve the legal issues relating to this problem. It can be noted that almost 2000 cases were filed in 2003 on the food adulteration/fraud aspects in this court (table-1).

Table-1: Number and Types of Cases Filed in the Magistrates' Court in DCC on Food Safety Issues.

Number of Cases	Charged for
902	Introduction of Impurity/Improper ingredients in the food stuffs.
1009	Complaints against those restaurants/shops who sold mouldy and stale food items to the people.
22	Those business people who used toxic elements in food stuffs and chemical reagents for early ripening fruits imported or local. (For example it can be noted that last year many wholesale businessmen used carbide to ripe Indian mangos).

Source: Health Department, Dhaka City Corporation, 2004.

He mentioned that the accused people generally do not wish to proceed with the legal process; rather they admit their fault/fraud in advance and pay the very small fines (for example the highest fine is 200 taka, which is equivalent to £2, for any level of case it is). So it is financially worthwhile not to go through the process but to pay this tiny amount as a fine. Mr. Babu wanted to show this as an example of the ineffectiveness of the existing legislative mechanism to fight against food fraud in Bangladesh.

He finally gave some concrete suggestions as:

- Health education is essential from both consumers' and producers' point of view, so that they can be aware of the health impact of the adulterated food consumption.

- A consumer rights protection act should be framed and is essential for the community, which might be an instrument to protect them against this soundless violence. This act is completely absent in Bangladesh at present. Mr. Babu hailed the processions and actions staged by an NGO named CAB (Consumer Association of Bangladesh) to put pressure on the government to formulate a law.

- He hinted that the government should (may be through BSTI) originate an up-to-date guideline (i.e. rate of the product can be fixed, mentioning ingredient specification, production/expiry date, address of the producer on the label) for the certification of any food items that is going to be marketed.

- Corruption should be uprooted from the government bodies (sometimes unfair businessmen manage government personnel for their own interest on bribery) so that fraud and adulteration in food items can be checked and monitored properly.

- Overall economic well-being of the people should be ensured, otherwise the tendency of purchasing cheap vis-à-vis impure/adulterated food may take place even though all efforts for ensuring safe food marketing/production are set by the government.

- There should be constructive articles in the news media (i.e printing, broadcasting) with effective suggestions how new approaches can be taken in favour of the welfare of public health.

- There should be a social/cultural movement/campaign against this fraud in food stuffs to aware people (consumers and producers) and the government in general on it.

3. Minutes of Interview with Mr. Zahidul Islam, Convenor, Safe Food Programme, Bangladesh Environmental Movement (BAPA), Dhaka.

Another interview took place with Mr Zahidul Islam, Convenor, Safe Food Programme, Bangladesh Environmental Movement (BAPA), Dhaka on 28 December 2003. BAPA is a platform of civil society of the country (irrespective of their political identity), working for the protection of environment of the country. At this moment this body is the biggest environmental pressure group in Bangladesh. In recent times, BAPA considered the food safety issues as one of the important topics in their agenda of actions for the welfare of public health. As a consequence, they are now staging a programme called 'Safe Food Programme', where Mr Islam is responsible for action. He informed me that BAPA has recently arranged seminars on the use of toxic chemicals and pesticides in foods and vegetables and associated health hazards, inviting key personnel from different corners of the society. The outcomes of this series of seminars were reflected in the news media in Bangladesh, which in turn are very informative for the people to take into account their health impact. Mr Islam also said that BAPA prepared many posters and leaflets on the issue and sent them to many organizations/institutions for public awareness development purposes. They demonstrate in street rallies, and also stage protests with their fellows coloured with banners and festoons in the public places in Dhaka city area. He informed me that they always try to participate in important meetings and seminars on the same area held in other places to voice their statement and arguments in favour of a safe food programme in Bangladesh.

He hinted that the government still does not perceive that poisoning people through adulterated food as a problem in the country. Political parties make commitments to the people about ensuring foods for all. But the question of the quality of that food still remains undervalued. That is why it is usual to find out-dated (sometimes decomposed) rice and wheat grains in the government departments to be distributed among the poor people through VGD (Village Group Development), food for work, food for education programme etc.

Mr Islam pointed out that in many instances that government bodies are not willing to cooperate in disclosing information/reports. He stressed that the government should be clear in these issues so that constructive suggestions can be made by the government experts.

He further mentioned that establishment of new testing laboratories is essential in the country. The most modern laboratory (BSTI) was established in Bangladesh 50 years ago, which is still using old machinery and is operated by the personnel with low grade qualifications.

An important thing he mentioned that there should be some clear-cut decision on the quality and standard of some food items. For example, in case of banana production, the bunches are sprayed with pesticides and growth hormone to increase the size and luster of the fruit and to hasten the ripening process. But still the local experts do not know whether these bananas are risk free or not as we do not have that level of laboratory facilities to test that. Here, he mentioned that if these artificially raised fruits/vegetables are not dangerous for health then we should accept them, if not it should be rejected and actions must be taken to stop its production. This sort of dilemma escalates some uncertainty in a sense that BAPA should stage any procession against this practice or not. Because a big agricultural industry might collapse if proper actions cannot be taken on the basis of authentic data support.