

RIVERBANK EROSION VICTIMS IN BANGLADESH . A SOCIO-
ECONOMIC AND ENVIRONMENTAL STUDIES OF TEO
AFFECTED VILLAGES IN BOGRA DISTRICT.

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ABSTRACT

This research on riverbank erosion victims has been done in two villages of Sariakandi Thana in Bogra district of Bangladesh. The study focuses on the existing socio-economic and environmental condition of the victims. It also explores the survival strategies of the victims in coping with the precarious condition by riverbank erosion. The environmental adaptation stimulates the victims to formulate survival strategies in different ways which are indigenous to their lifestyle. In spite of strong requirements for their survival the victims have not got an adequate assistance from the institutional and non-institutional responses. And due to lack of adequate institutional support the victims cannot organize their life to a changing environment.

An extensive research has been conducted in two villages of Bogra District named Antrapara and Nijitipara in this study. The study describes the physical environmental conditions of the study village with a special attention to natural disasters of the region. It focuses the socio-demographic profile of the victims and also at the same time economic studies of riverbank erosion victims of the study areas. At the micro level the study focuses as to how the environmental and socio-economic variables influenced the victims' adaptation and their survival strategies to the changing environment.

The victims who were identified in the riverbank erosion as the highest effective to their life and this identification stimulates them to adopt various strategies in their own ways for adjusting to the changing environment. The victims have identified what are the factors that are effective to their environment and to their lifestyle and tried to formulate the strategies to cope with the precarious conditions. The victims have adopted different strategies to reduce the loss due to riverbank erosion. A considerable proportion of the victims have depended on their fate and prayed to Allah to save themselves from these conditions.

Caused by riverbank erosion a considerable proportion of the victims are compelled to leave their original homestead plot and take shelter by the road side embankment, neighbors' land and relatives' land. For their resettlement the victims have received moral support, financial assistance and physical labour from others. For adjusting to the new place the victims share with their relatives and social counterparts. From the individual sources the

victims have mitigated their minimum necessities to their survival. The samaj counterparts show friendly and receptive attitude towards the victims. The victims have resettled themselves to the new places in poor housing and sanitation condition. Majority of the homesteadless victims have leaved their original place unwillingly because their social relationship were very close to others.

The health condition of the victims is very low. It is because that, the victims poor clothing unhygienic sanitation and the lack of their seriousness to their treatment. Vainly financial crisis is responsible to their low quality treatment. Sometime the victims of poor economic standing try to establish social relationships to their counterparts of rich economic standing for getting financial and other helps.

Since the natural environmental situations the economic crisis and poverty have been found to be related to natural disaster like riverbank erosion so in this decade of environment the policy makers and development researchers at the national level need to be aware of the magnitude of the environment conditions of the riverbank erosion victims. It is fact that caused riverbank erosion every year unemployment landlessness and poverty are increasing which is to country wide unstable condition.

FOOD TOXICANTS AND FOOD ADULTERATION SCENARIO IN BANGLADESH

Ph.D Thesis

By
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ABSTRACT

The study was carried out to examine the toxic and adulterated food and a survey was conducted to assess the health hazards in human life. Laboratory examination and survey were used to assess the food safety scenario in the country during the period of 3 (three) years (2006-2008). The food safety work in Bangladesh and abroad were reviewed. Findings of eight renowned laboratories were evaluated and discussed. A survey was carried out on food toxicants and adulterant's usage, user and consumer's perception and related health hazards covering several locations of Dhaka, Rajshahi City Corporation and Kathiadi Upazilla of Kishoreganj District. Survey was primarily aimed to generate information related to food safety issues. Farmers, Street vended food sellers, Consumers of street food, concerned Scientists and policy makers were interviewed using an oriented questionnaire. Wheat product (Atta, Modia) were analyzed in Food Toxicology Laboratory, IFST, BCSIR, Dhaka for determination of aflatoxin and these items were analyzed again in Industrial Physics Division Lab, BCSIR, Dhaka by Scanning Electron Microscope (SEM) with Energy Dispersive X-ray Microanalysis (Semi-quantitative) for heavy metal and toxic elements determination. Some other food items like-Chanachur, Chips, Noodles, White bread, Soya bean oil, Mustard oil, Pickle, Sauce and Fruit juice were also analyzed in BSTI laboratory for the quantification of adulterant and toxic elements. Adulteration of Fish with formalin, Vegetables and fruits with copper sulphate, Calcium Carbide were also examined in the Institute of Food Science and Technology (IFST), BCSIR, Dhaka.

Laboratory findings led to assume that around 50% of food articles either adulterated or contaminated. In the survey it was found that the farmers used pesticide for the production of all types of vegetables except kalmi shak. The highest level of pesticide used in Brinjal. The percentages of the street vended food consumers are higher in the city areas (Dhaka and Rajshahi) than that in the Kathiadi upazila, as 50% of the respondents of Kathiadi never eaten street vended food while those are 40% and 41.66% in Dhaka and Rajshahi respectively. Puir, Singara, Jilapi, Samucha, Jhal Mori and tea are mostly chosen food items by the consumers. 50% respondents of Kathiadi upazila and Rajshahi City never fell ill by food borne diseases while it was 40% for the respondents

of Dhaka. Among different types of food borne diseases, diarrhoea was the most frequent in all the locations. Diseases like Jaundice, Cancer and Kidney failure were also prevalent among the respondents but it can not be confirmed that these diseases occurred due to consumption of contaminated food. In both experiment of atta and moida it has been revealed that each tested samples of atta and moida contained aflatoxins B1 and in fresh atta aflatoxins B2 was present. All the quantities were above MRL and presence of aflatoxins B1 and B2 were further confirmed too by the LC/MS/MS analysis. Among the tested samples, 25% Chanachur, 50% Chips, 50% Noodles, 50% White Bread, 75% Mustard oil, 75% Soyabean oil, 50% Pickle (Mango, in Mustard Oil), 50% Sauce and 50% Fruit Juice (Sweeten Mango Juice) were fit for human consumption. Around 100 samples of fish were tested by the formalin detection kit from Dhaka City area, of which ten samples were found to be adulterated with formalin.

The formalin adulterated fish were, big size Roi, Puti, Kachki, Bailla and Tengra. of 50 samples of Rajshahi City Market, none had formalin. From the results of the present study it was clear that, as cooking or washing had no impact on reducing the quantity of formalin, if any one consume these fishes, s/he would have no chance to avoid formilan consumption. Significant amount of copper sulphate was not present in the tested samples. In the leafy vegetable (Lalshak) the amount was 0.51% which was not high. It was 0.31% in Vegetable (Patol) and this was also within limit for consumption. In Apple, the quantified amount of CuSO_4 was only 0.88%. The high content of Total Soluble Solid (TSS) and Titrable Acidity (TA) of adulterated mangoes might be tasteless, which was further confirmed by tasting with tongue. The international Agency for Research on Cancer (IARC) has determined that formaldehyde is probably carcinogenic to human. At present consumers of Bangladesh are facing dangerous problems in food purchase or consumption and the general people do not know what they are eating, adulterated or contaminate or safe food. It is absolutely necessary to stop the food adulteration or contaminaton and to protect the public health from the hazardous effect of such food, National Food Safety Advisory Council should immediately be formed and the Council emphasis on food safety as like as USA and European Union.

Food Habit, Nutritional Status and Disease Pattern of the Dwellers Slum Environment

Thesis submitted for the degree of
Doctor of Philosophy

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ABSTRACT

This cross sectional descriptive study was conducted among the slum dwellers in Rajshahi city with a view to explore the food habit natural status and disease pattern and also to determine the relationship of those mentioned variables of dwellers with their physical and socio-economic environment. A total of 430 slum dwellers from 106 house were interviewed there anthropometric measurements and physical environment of the households in the slums were Most of the households (95.5%) were Kancha (made of bamboo, wood, mud, polythene, etc) latrines and 14.2% had no latrine in their house. About a quarter of the slum dwellers (24.2%) were suffering from diseases during survey and among them majority (71.2%) were female Acute respiratory infections (ARI) peptic ulcerative diseases (PUD) and Skin diseases were on the top Of the list of diseases in adult respondents and among female alone pelvic inflammatory diseases (PID) was on the top (7.67%) Among <5 children it was ARI Mean weight of the respondents among >15 years were 58.5 Kg and 50.5 Kg for male and female (>15year) was 149.7 cm (SD#11.7cm) for >15 year mean body mass index BMI of male female and both sexes were 21.8, 22.7 respectively and 13.14% of the respondents were suffering from undernutrition (BMI, 18.5) Nutritional status i.e BMI of the respondents was found significantly associated with their eating habit of egg (p,.001) statistically highly significant and positive association were found between education level of the respondents and type of latrine used (p,00.1) inverse association between education of the respondents and suffering from diseases at the time of data collection (p<.001).

Physical environment (housing condition) of the slum house were found positively associated with education level of the respondents (p<.01) and monthly family income of the households (p<.001), which were statistically highly significant. Monthly family income of the households were found positively associated with first contact physician (qualified or quack) during the disease (p<.001) and inversely associated with suffering from any disease at that time(p<.01). Significant associations were also observed between latrine facilities and disease occurrence (p<.02), gender difference and eating pattern i.e., a countable number of males eat first of all and that of female eat last of all (p<.001), sex

and chronic disease i.e., female suffered more ($p < .001$), anaemia and frequency of taking meals ($p < .001$), anaemia and daily eating pattern ($p < .001$) and anaemia and suffering from any disease by the respondents ($p < .001$).

From the study it was also clear that general physical conditions of the women were worse than those of men. This study would certainly provide a wide range of information regarding physical environment, food habit, nutritional status and disease pattern of the slum dwellers to the policy makers so that they could take necessary steps to make the prevailing slum environment sustainable and healthy.

FISHERIES ECO-BIOLOGY
OF BEEL KOSHBA OF NAOGANON DISTRICT

A Thesis
Submitted to the Institute of Environmental Science (IES),
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for

the Degree of

DOCTOR OF PHILOSOPHY
IN
ENVIRONMENTAL SCIENCE

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ABSTRACT

The present study was conducted in Beel Koshba of Naogaon district on the fisheries ecology during the period July, 2005 to June, 2007. The physical condition of Beel Koshba consisted of air temperature, rainy days, rainfall, humidity, water temperature, water depth and water transparency were $26.07 \pm 4.56^{\circ}\text{C}$, 9.54 ± 8.55 days, 113.93 ± 114.01 mm, $79.33 \pm 7.94\%$, $25.36 \pm 5.12^{\circ}\text{C}$, 204.96 ± 110.36 cm and 30.91 ± 6.78 cm respectively. The chemical parameters of total hardness, alkalinity, pH, DO, CO_2 and ammonia were 146.60 ± 13.36 mg/l, 7.05 ± 0.75 , 6.03 ± 0.88 mg/l and 0.073 ± 0.31 mg/l respectively. The magnitude of monthly and seasonal variations of the physico-chemical factors indicate the eutrophic nature of the beel. A total of 54 species of different plants were found surround the beel area. Ten species of sub-merged, 10 species of floating, 19 species of rooted plant with floating leaves and 19 species amphibian vegetations were found in the beel. A total of 126 species of phytoplankton belonging to the 54 genera and 73 species of zooplankton belonging to the 42 genera were recorded from the beel.

A total of 103 species of fish belonging to the 52 genera of 21 families, 10 orders under Osteichthyes class were recorded. Food and feeding habits, seasonal availability breeding season, habitat and economic importance were also studied in the Beel Koshba. Identified annelids, arthropods, mollusks, amphibian, reptiles, aves and mammals were 8, 11, 15, 8, 21, 40 and 12 respectively. Among these 16 species of edible fisheries items were identified. It has been observed that abundance of fishes is decreasing day by day due to natural and man made causes and other environmental factors. Some of the species are extinct (*Nandus nandus*, *Chaca chaca*), some of the species are threatened to extinction (*Channa marulius*, *Bagarius bagarius*) in the northwest region of Bangladesh.

Disease symptoms of the 12 fish species were studied. The symptoms of the diseases were 13 in number. The symptoms of dermal lesion were observed in all of the infected fish species (12 species), followed by ulcer (11 species), epizootic Ulcerative Syndrome (10 species), tail and fin rot (6 species), scale loss (5 species), deformed (4), dropsy (3 species), gill rot (3 species), hemorrhage (3 species) black spot (3 species), tumour (2), white spot (2 species).

The incidence of diseases were 8.08%, 19.42%, 17.08%, 13.42%, 9.58%, 8.00%, 7.25%, 16.17%, 17.42%, 5.42%, 10.08%, 14.92%, in the species *Catla catla*, *Channa punctatus*, *Channa striatus*, *Cirrhinus mrigala*, *Heteropneustes fossilis*, *Labeo bata*, *Labeo rohita*,

Mastacembelus armatus, Mastacembelus pancalus, Mystus vittatus, Puntius sarana, Puntius iticto respectively. The overall incidence was 12.24%. The highest incidence was observed in Channa punctatus (19.42% followed by Mastacembelus pancalus (17.42%) and Channa striatus (17.08%). The lowest incidence observed in Mystus vittatus (5.42)

The occurrence of diseases was highest in February (24.75%) followed by March (23.92), January (23.42%), April (19.83%), December (19.75), November (18.17), October (4.75%), September (4.00%), May (2.92%), August (2.75%), and July (2.58%). The diseases were found in the month of July-May during the study period July-2005-June 2007, peak in the months of January-March.

In case of environmental hazards, natural hazards (flood, drought, tornado and earthquake) and man made hazards (degradation of water quality from agriculture sector, industrial waste and fishermen community) were observed. Environmental hazards from fishermen community were observed on the basis of age group, family size, income group, investment, educational qualification, sanitary system, land ownership, fuel use pattern, housing pattern etc. It was found that the fishermen were the highest (32%) in 21-30 age group and the lowest (4%) in 61-70 age group. In case of total population, 11-20 age group people was the highest (25.66%) and accordingly the lowest (1.54%) in 61-70 age group. Daily income of the fishermen was the highest (50%) in Tk. 61-90 income per day group and the lowest (2%) in above the Tk. 151 group. The highest (36%) investments were in Tk. 2001-4000 group and the lowest (8%) were in highest investment Tk. 8001-10,000 group. The fishermen were mostly illiterate (68%) and 25% near to illiterate i.e. below class five group. Only 1% was secondary school certificate and above. In case of subsidiary occupation, the highest (44%) fishermen sell their labour on daily basis, 24%, 12% and 8% were engaged in agriculture, fish trading and other works respectively. Family type was mostly nuclear. Eighty seven percent families have below 6 members. Only 1% family has above 9 members. In case of land ownership pattern 6% fishermen were absolute land less. Seventy percent fishers have no agricultural land, they have only ancestral homestead. Only 24% fishers have a little piece of agricultural land. Overall average per family has only 0.061 hectare land. They use Lakri, Waste straw, Dry leaves, Nanda and Bhusi as fuel for cooking. Most of the fishes (90%) caught by the fishermen was sold in paikari form and always they set a less amount than expected one. The fishermen have no adequate training (only 8%). They do not know (88%) the fisheries law. They showed interest (99%) to get training. Seventy percent Muslim and 30% Hindu community were engaged in the occupation of fishing.

AN INTEGRATED APPROACH FOR
MAINTAINING SOIL FERTILITY AND
PRODUCTIVITY IN RELATION TO VEGETABLE
CROP, BRINGAL (SOLANUM MELONGENAL.)

THESIS SUBMITTED TO THE
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OF

DOCTOR OF PHILOSOPHY
IN
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ABSTRACT

Field experiments were carried out to evaluate the integrated effect of FYM, chemical fertilizers and insecticide on yield and yield components of brinjal (var. BARI Begun-1, Uttara). Different of FYM and chemical fertilizers were applied following single and combined treatment. Before the application of manures and fertilizers soil samples from different plots were collected and tasted. According to soil test values FYM and fertilizers doses were estimated previously 6 treatments of FYM and fertilizers namely 50% NPKS 100% NPKSnB, 100% NPKS+FYM, 100%FYM, 100% FYM+ZnB and absolutely control were selected along with three recommended doses of insecticide (50%, 100% and 150%) All these were evaluated by three replications in a randomized complete block design (RCBD) It was two-term experiment where residual effect of plant nutrients and rationale of the doses were maintained in the consecutive years. IPM and IPNS approaches were maintained in both the trials for betterment of environmental aspects with ultimate goal of safety production of the edibal brinjal.

Vegetative and reproductive characters of plants were found to be highly influenced by applying plant nutrients in micro plot. Adequate and application of plant nutrients gave significantly higher values for vegetative characters like plant height number of leaf and area number of primary and secondary branches spreading of plants and reproductive characters like number of cluster bud flower and fruit and fruit length diameter volume and weight Recommended dose (100% NPKS+ FYM) showed better performance in all aspects.

Infestation of different harmful insects like brinjal shoot and fruit borer leaf miner aphids jassids leaf roller epilachna beetle etc were attacked at different stages of plant from the initial stage of plant growth IPM technologies were followed . Hence population of harmful insects were found to be reduced insects like ladybird beetle spiders black ant etc were also found to be increased which played a remarkable rolein controlling the harmful insects.

ECOLOGY AEROMYCOFLORA IN
RAJSHAHI METROPOLITAN CITY

Ph.D. Thesis

By

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ABSTRACT

The air influences every aspect of life and the activities or organisms affect the air. The Earth is enveloped by air. Air is directly involved in dispersal and survival of microorganisms. Airborne microorganisms like virus, bacteria, algae and fungal spores and others are known to exhibit correlation with the quality of air and its pollution. Most of the microorganisms originate from natural source like soil, water bodies, and animals including man. Sources of airborne microorganisms are everywhere they are in our food, in the water we use for our drink and bathing, on our utensils, and on our bed sheets.

Present study has been carried out from March 2005 to October 2007 to find out the actual status and Ecology of aeromycoflora in Rajshahi Metropolitan City. Isolation and identification of airborne fungi has been done from March 2005 – February 2006, in this investigation.

A systematic survey on the incidence of identified airborne fungi in different location of Rajshahi Metropolitan City in three media (PDA, Richard's and Sabouraud's) during March 2006-February 2007 has been investigated. Regarding the quantitative nature of the mycoflora, their mean, standard deviation and percentage contribution to total mycoflora. Weekly, monthly and seasonal periodicity has been studied during this investigation.

The prevalence of different types of ringworm (caused by four fungi) among the out door patients of Skin and VD department of RMCH have been studied during November 2006 to October 2007.

It is evident from this paper that 22 species of fungi (under 22 genera, 10 family, 7 order and 4 classes) have been recorded and identified. The fungi recorded during the study in order to ranked are Cladosporium sp. 14.48% Sporobolomyces sp. 13.17 %, Penicillium spp. 13.54 %, Candida sp. 7.90%, Aspergillus spp 4.99%, Alternaria sp. 4.78% , Curvularia sp. 2.61%, Fusarium sp. 2.01%, Glosporium sp. 2.38%, Botrytis sp 1.64%, Rhizopus sp. 2.32%, Cephalosporium sp. 1.24%. Pyricularia sp. 0.97%, Drechslera sp. 0.73%, Trichoderma sp. 2.61%, Mucor sp. 0.51%, Colletotrichum sp. 0.31%,

Microsporium sp 0.08%, and Epidermophyton sp. 0.08% collectively contributed among the total aerofungi.

The mean number with Standard deviation of the mycoflora colonies for PDA, Richard's and Sabouraud's media were calculated as 14.8 ± 9.7 , 15.33 ± 13.88 and 11.74 ± 11.25 respectively in course of the study period.

of the total aeromycoflora population of study area 28.37%, 23.61 % and 24.50% colonies were found to grow vigorously on PDA, Richard's and Sabouraud's media respectively, the rest 22.95 were recorded as sterile and unidentified.

Higher number of colonies were recorded in month April 2006 (7.96%) and January 2007 (7.87%) the lowest in the month of July (3.91).

Among the three seasons winter shows highest contributions of airborne fungi 30.6631% then summer, 29.61914% and lowest 16.76634% in rainy respectively. The mean number with Standard deviation the mycoflora colonies for seasons were winter 15.24 ± 13.85 , Rainy 9.22 ± 13.18 respectively.

The mean number with Standard deviation the mycoflora colonies for different areas were RUMC, RUM 12.55 ± 9.55 , IES, RU. 12.77 ± 12 , Binodpur Bazar 12.44 ± 10.22 , Upashahar r/A 14.22 ± 13.22 , Padma R/A, 10.33 ± 10 , Balia Pukur R/A, 10.44 ± 9.88 , Shahb Bazar 12.66 ± 12.77 , Shopura bazar 13.11 ± 12.77 , and DD. EMCH. 13.166 ± 12.44 , respectively. In different places of Rahshai Metropolitan City (RMC), the minimum temperature range was (6.76-18.6⁰C) maximum and 23.97-40.1⁰C. Average relative humidity was (30-90%) during the course of investigation.

Among the entire survey sites the distribution fungal colony was more or less the same, though Balia Pukur residential area showed the highest distribution 9.19% (The mean number with Standard deviation of the mycoflora colonies were 12.66 ± 12.77) and Padma residential area 10.44 ± 9.88) shows lowest contribution 6.91% of total count.

In the present study among the 22 genera only four air borne fungi were found to be pathogenic to human which causes dermatomycosis. The prevalence of various dermatomycosis during November 2006 to October 2007 together with number of dermatomycotic patients in each group (Collected from skin and venereal disease outdoor of Rajshahi Medical College Hospital). Symptoms of dermatomycosis were studied and the data were collected on the basis of age, sex, personal hygiene etc. of the patients and the data were evaluated in different point of view.

Incidence of different types of skin diseases among 1040 patients that tinea corporis (620) was the highest next tinea pedis (190). Incidence of tinea capitis (90) was the third and tinea versicolor (80) was the fourth. Among the studied diseases above tinea unguium (60) was the lowest.

Out of 1040 patients, the age group between 21-30 years suffer more (37.5%) than the rest of the age groups. The teenager (age group between 11-20) is the second dominated suffer group (32.6%) and the age group 61-70 years are less suffer (0.96%). It is also evident from this research that with the increase of age, the incidence of skin diseases is comparatively lower than that of young aged people.

ENVIRONMENTAL CONSEQUENCES OF DEVELOPMENT
INTERVENTIONS IN AREAS. A STUDY ON
SELECTED VILLAGES

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ABSTRACT

The study was conducted to explore the indigenous knowledge and concept of people of various statuses from two flood-free and two flood-affected villages on rural environmental consequences of development interventions under Comilla Sadar and Sonargaon Upazilas of Bangladesh. As well as the impact of development interventions in soil and water qualities were assessed.

Participatory Rural Appraisal (PRA) and survey methods were used to assess the current environmental conditions in the study areas. Agriculture soil tests covered soil texture, p^H , organic matter content, percent of total nitrogen, P and K. Nine soil samples from different land types of the study villages were tested for finding out residual effects of insecticides in soils under the groups of organophosphorus, organocarbamate and organochlorine after the boro season of 2003. Soil samples were collected from different types of agricultural land under the study. Water quality both for surface and ground water were considered for the study. Total Dissolved Salt, SS, NH_4^+ , P^H , P and K tests were carried out for surface water. Arsenic, TH and TDS tests were carried out for ground water assessment in the study villages.

Organic matter contents in agriculture soils were found very low compared to the actual need of 5.0 percent. Major crop nutrients i. e., N, P, and K were found very low and low except phosphorus in two villages under Comilla Sadar Upazila. No residual effects of insecticides under the group of organophosphorus, and organocarbamate were found in different soil under tests. DDT and DDE under the organochlorine group were found in two soil samples of Shahpur village under the study. It is learned that DDT was used in a few of the crop fields of the village two decades ago. So, DDT remains more than 21 years in crop fields. A part of the existed DDT in the field had broken into DDE. On average three crops were cultivated in villages of Comilla Sadar Upazila and two crops were cultivated in villages under Sonargaon Upazila under the study. Amount of fertilizers and insecticides used were more in villages of Comilla Sadar Upazila than other two villages under the study. The balance existence of major crop nutrients and agricultural soil quality were better in two villages in Sonargaon Upazila than other two villages of Sonargaon Upazila under study.

High amount of arsenic i. e., much more than the standard of 0.05 mg per liter was found in Ground Water (GW) of Khangshardi village of Sonargaon Upazila. Total Hardness (TH) values of canal water of two villages under Sonargaon Upazila were found higher than the standard for 120 mg per liter for fish. Physical appearances of surface water both for pond and canal water in terms of cleanliness and smell were found better in villages under Sonargaon Upazila. Tests results of suspended solids values in surface water were within the limit of standard fixed for potable water quality. p^H values of the same were around the lower limit of standard for potable water quality in all study villages. Major crop nutrients N, P, and K were found in all samples of surface water under the study. All water samples had more P than the standard (O) fixed for potable water / fish resources.

Micro credit leads IGAs in case of crop cultivation were found injuries for environment for the same reasons of using insecticides and fertilizers in crops. Majority of IGAs were small trade related which had no environmental effect on the study villages.

Diversity of trees was mainly affected in two villages under Comilla Sadar Upazila with the domination in planting timber rich plants. Besides, majority of big trees were lost from all study villages for various reasons. A number of traditional fish species, birds and wide animals extinct from all study villages during the last four decades. Besides, population of these species including frogs of various types reduced remarkably in the study villages. In case of cultured fish production of the same increased in folds mainly in two the villages under Comilla Sadar Upazila. Number of ponds was also increased remarkably in the study villages. Number and area of catchments were reduced in two villages of Comilla Sadar Upazila in the last four decades.

Respondents provided information of environmental issues of the villages like soil and water pollution and reduction of biodiversity, effect of these changes to the rural environment and steps needed for the development. It is evident that major environmental problems for reduction of soil fertility, soil and water pollution and destruction of biodiversity in rural areas take place due to application of insecticides in crops. Besides, killing and hunting of amphibian, reptile, bird and mammal and over fishing deteriorated further the rural environment.

Most of the upazila level officials did not know about the vital legislation of environment ECR 1997. A number of committees work at the upazila level for better output of various development works. No committee works exclusively for taking care of environmental issues of development activities in the upazila but upazila development of coordination committee (UPIC) and upazila project implementation committee (UPIC) take mainly water stagnancy related problems during construction works. Respondents opined that using mass media like radio television miking etc. in large scale for awareness building of common people about the importance of conserving and development environment would provide a better output for environmental development. Besides conduction of training and orientation courses for the upazila official about the measures to be adopted time to time should need to be introduced as regular phenomena. Establishment of safe habitats of fish, amphibian, reptile, bird and wild mammal with people's participation at the local level would improve rural environment. Besides, creating scope for giving posting a official from DoF at the upazila level would help to apply more coordinated efforts to address environmental issues properly in different development activities.

Notable findings of the study included existence of DDT in agricultural soils over two decades of times; existence of crop nutrients particularly P more than prescribed standard in pond and canal water create unfavorable conditions of aquatic lives. Excavation of a irrigation canal in a study village affected the biodiversity of the village seriously as runoff rain water from hilly areas of India could not cross that canal and reached up to the catchment's area of the village. The rich biodiversity of the village destroyed and the whole area turned into HYV paddy fields where huge amount of fertilizers and insecticides are used every year to produce HYV paddy and other crops. Replacing of aus paddy cultivation with HYV crops destroyed the vast habitats of migratory birds and moving ground of various traditional fishes at the shallow water of aus fields in the early monsoon season of two flood affected villages under the study. Decreasing trend of owl, eagle and vulture increased harmful mammals like rat and squirrel in study villages. Awareness of villagers and development workers about effects of development interventions on biodiversity of the study villages and their consequent opinion to develop the situation were notable. Besides, information on change of status of tree, fish, amphibian, reptile, bird and mammal both wild and domestic over last four decades gives a clear picture of their conditions in two different periods of the study villages.

ENVIRONMENTAL IMPACTS ON SANTAL PSYCHIATRIC
PATIENTS INHABITING IN THE DISTRICT OF RAJSHAHI

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in
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SUMMARY

This study aims at explaining the environmental impacts on Santal psychiatric patients inhabiting in the district of Rajshahi. Rajshahi is in the northern part of Bangladesh, where most of the Santals reside. It is infact, a cross sectional retrospective study, done on the Santal psychiatric patients attending the department of Psychiatry of Rajshahi Medical Collage, Rajshahi, Bangladesh by applying the SCID (Structured Clinical Interview for Diagnosis) and DSM-IV (Diagnostic and Statistical Manual of Mental Disorder), proposed by WHO and American Psychiatric Association, respectively.

The purpose of this research was to examine the different pattern of mental trauma of the Santals, who are one of the ethnic minorities. As such, it would specifically focus on pattern of psychiatric illness among the Santals, their belief towards the illness, Their healing rituals, the relation between culture and psychiatry and lastly the presence of different environmental stressors.

The researcher assesse consecutive series of a sample of 77 patients, of which 39 (50.64%) were male and 38(49.35%) were female. The majority of the respondesnt were in between the age of 16-35 years; 7.79 % were in the age group of 08-15 years; 11.68% were in the age group of 36-45 years; and 6.49% were above 65 years. Among them unmarried was 53.24% and married (44.15%). Mostly they were illiterate 61.03%), landless farmer (80.51%), and were in low income group (94.81). belief that possession by Bonga/kali and her annoyance led to the causation of mental disorder. The other important causes were uncleanliness during menstruation (41.55%) and loss of semen (35.06%).

The different study showing the attitude towards illness, were also quite same in other indigenous community.

The greater bulk of psychosocial and environmental problem included landlessness, inadequate social support, inadequate housing, extreme poverty, inadequate health care facilities, alcohol abuse, acculturation, identity problem, religious problem and relational problem.

On further elaboration, the respondents found few other life events also as major stressor and provoking factors for their sufferings. They were, viz. problem related to legal

system (each one case of infanticide and homicide during the process of illness), unsafe neighbourhood, burden of caring chronic physical illness, migration, and change in physical environment. Among the physical inciting agent, the noted were noise (due to power tillage and water lift pump) arsenics in water and unsafe drinking water.

The psychiatric disorder, diagnose among the respondents, included epilepsy among 13 patients, major mental disorder (Schizophrenia, schizoaffective, brief psychotic disorder, and delusional disorder) among 46 patients, and minor mental disorder (mixed anxiety depression with Dhat Syndrome and migraine, conversion disorder with dissociative trance disorder, obsessive compulsive disorder, major depressive disorder, somatisation disorder and panic disorder with agoraphobia) among 18 patients.

As most of the mental disorder, aetiologically follow the biopsychosocial model, here the abovementioned psychosocial factors, in fact contributed in causation of their illness.

So far their healing process, was considered, it was found that the procedures were quite same like those of other ethnic group. As a shamam, they say prayer, arrange some healing rituals, and use amulets, incantations and pulps of different herbs and oils, to alleviate the symptoms. In this regard, it reflects men's uniqueness in their belief, attitude and cultural practices.

Considering these findings and observations, it so appears that a significant 'social suffering' exists among the Santal, or in other words, among the indigenous and aboriginal people. To Kleinman et al. (1996), this is the kind of long term, institutionalized, ultimately invisible suffering that has been referred to as a 'soft knife' or long term oppression.

So, the subject of ethnicity and health today, holds an unmet challenge, when social, economic and cultural profiles vary between and within ethnic populations. Again, most ethnic minority communities live in such remote places that their access to health services is quite different. Addressing gaps in information needs foresight and commitment from government to implement linkage of physicians and hospital records, or to make a thriving strategy we need to form a tripartite partnership between health authorities, local authorities and local communities.

Sustainable Land Management Policy Implication and Sectoral Achievement

By

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A Thesis Submitted to the Institute of Environmental Science, University of
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Doctor of Philosophy

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ABSTRACT

Present investigation deals with the Sustainable Land Management policy implication and sectoral Achievement . It was conducted from the period of three years (July 2003to June 2006) in the Barind tract (Nachole Upazila) and Chalan Beel area (Singra Upazila) The Chalan Beel area lies between 24° 35' to 24° 70' North latitude and 89° 10' to 89° 35' East longitudes . The total area of Chalan Beel area is 368 sq Km Barind tract lies between 24° 20' to 25° 35' North latitudes and 88° 20' to 89° 30' East longitudes . Total area of Barind tract is about 7,770 sq . The investigation was designed with land management system of Bangladesh and degradation due to inadequate existing policies and improper implementation of laws in Bangladesh.

The present study has observed that there are many laws and government policies to manage the land of Bangladesh such as The Non Agricultural Tenancy Act'1949, The land Revenue act 1949, the state acquisition and tenancy act, 1951, the tax rules 1962, the vested property act1966, the agricultural pesticides ordinance 1971 the Bangladesh Irrigation and water rate ordinance 1983, most of these laws were prepared during british and pakistan The excessive landuse and improper landuse change are causing land degradation The Canals Act1864 , The Irrigation Act1876, The Destructive insects and pests act1914, the agricultural and sanitary improvement act1920 the tanks improvement act 1939, the agricultural pesticides ordinance the Bangladesh irrigation and water rate

Ordinance 1983 though recent policies are emphasizing to reduce those chemical fertilizers and pesticides in agricultural land . But these policies and law are not implements properly there are 24 agricultural laws and 7 policies passed by the government of Bangladesh to development the agricultural impact of this laws and policies on agricultural environment and other environment sectors examined and found that due to these law agricultural production increased significantly but there are some adverse effects such as wetland degradation and deforestation due to conversion of these lands into agricultural There are no enough provision in these existing law and policies to mitigate these problems it is also found that the existing laws and policies are inadequate to cope with the environment problems such as decreasing fertility

Wetland is a part and parcel of environment and fisheries production population increasing and human intervention resulted natural fish scarcity in recent the government of Bangladesh introduced 12 laws and 7 policies in different period to increase fish production for meeting up increasing demand and to develop and conserve the fresh water in Bangladesh.

ENVIRONMENTAL AND SOCIO-ECONOMIC
IMPACTS OF SOCIAL FORESTRY IN THE HIGH BARIND TRACT

A Thesis Submitted in Partial Fulfilment of the
Requirements for the Degree of
Doctor of Philosophy

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EXECUTIVE SUMMARY

Social Forestry is one of the policy measures that deals with the environmental restoration and poverty alleviation. Due to encouraging promotion of the government and NGOs Social Forestry has gained momentum in Bangladesh. This study deals with the related topics: core objectives of Social Forestry (ecological restoration, people's participation and poverty alleviation) and its management practice. The broad objective of this study was to evaluate the environmental impact as well as socio-economic outcomes of Social Forestry in the High Barind Tract. Interdisciplinary methods from scientific as well as from socio-economic framework were followed to conduct the study and data from both primary and secondary sources were used. Synecological investigation on the understorey vegetation of two exotic plantation sites (*Dalbergia sissoo* Roxb. and *Acacia auriculiformis* A. Cunn. ex Benth.) and one native-mixed plantation site (*Terminalia arjuna* (Roxb.) Wt. & Arn + *Mangifera indica* L.) planted under Social Forestry projects and analysis of some major physico-chemical properties of soil of these plantation sites were done. Questionnaire survey was carried out to assess the economic and social outcomes, to analyse management practices and to evaluate the perception of beneficiaries about the impact of Social Forestry on environment.

Content of some soil fertility parameters were found higher in the soils of plantation sites than the soils of their respective non-plantation reference sites, which was indicative of the positive impact of plantation on soil fertility. But this positive impact of plantation was species dependent. The result of t-Test showed significant differences at 5% level between some major soil attributes (Total nitrogen, K and Cu) of the plantation sites and the reference sites.

Majority soil attributes of native-mixed plantation showed the highest percentage of positive changes while that of the soil attributes of *Dalbergia sissoo* Roxb, plantation showed the minimum percentage of positive changes as compared to their respective reference sites. The native-mixed plantation was superior to exotic monocultures –*Acacia auriculiformis* A. Cunn. ex Benth. and *Dalbergia sissoo* Roxb. in enriching the topsoil. Furthermore, the degree of depletion of some soil attributes in the exotic monoculture plantation sites was higher than that of the native-mixed plantation site.

Different analytic and synthetic characters of understorey flora of the three plantation sites were determined by belt transect survey method for a period of two consecutive years. A total number of 57 species of climbers, herbs and shrubs belonging to 25 families were recorded in the three plantation sites during the study period. Among the recorded species, 1 was climber, 41 were herbs, 6 were shrubs and were tree seedling in

dalbergia sissoo roxb plantation site the total number of understorey plant species was 26 in acacia auriculiformis acunn ex benth plantayion site it was 30 and in native mixed plantation site the total number of species was 42.

As regards the dominance and regular distribution of the species it was observed that in dalbergia sissoo roxb plantation site brachiaria sp evolvulus nummularius L were regularly distributed during the three season Cynodan dactylon pers . and evolvulus nummularius L. gained dominance In summer season isachne miliacea roth and eleusine india (L) Gaertn were dominant species .

The floristic composition of the three site was distinct from each other and jaccard 's community coefficients were found relatively low among the pairs of the sites the three sites were in the primary successional state Presence of naturally regenerated tree seedlings and shrub species were higher in the native mixed plantation site then the exotic monoculture plantation site which indicated that nthe understorey flora of native –mixed plantation site was at more advanced successional atage than that of exotic monoculture plantation sites. Superior edaphic characteristics and micro-climatic factors of native-mixed plantation site, which were influenced by the overstorey species possible attributed to this result. The understory flora of native-mixed plantation site was more diverse and relatively rich in species composition. The result of analysis of variance revealed that the number of species of the three sites showed a significant difference at 5% level in case of sites and seasons. The Shannon's diversity index and evenness index values of understorey flora in the native-mixed plantation site were the highest among the three sites. Findings of synecological survey suggest that the overstorey plantation species influenced the floristic composition and diversity indices of understorey flora. The native-mixed plantation species was more successful in supporting its understorey flora as compared to the exotic monocultures.

The perceptions of the respondents about the impact of Social Forestry were positive in case of temperature, rainfall and prevention of soil erosion while their perceptions were negative in case of soil fertility, biodiversity of different plant groups and native birds.

Majority of the respondents did not get any monetary benefit from Social Forestry projects. A few of the respondents got meagre amount of benefit. Almost all of the respondents hoped that they would get a considerable amount of economic benefit from Social Forestry when the trees would finally be harvested; but the respondents feared that they would not get the rational price of their forest produce, as they were not involved in the extraction, valuation and marketing of the forest produce. However, there was a notable intangible benefit of Social Forestry. It was found that Social Forestry had brought about a positive change of beneficiaries' attitude and thinking towards the

improvement of environment. Excessive use of animal dung as cooking fuel suggests that the intervention of Social Forestry towards the lesser use of animal dung as cooking fuel and using it as manure to increase the biomass proportion of soil in the High Barind Tract was ineffective. Fuelwood supply from the Social Forestry projects was insignificant, which implied that Social Forestry projects in the study area failed to fulfil their much-hyped assignment-the 'Fuelwood supply'. The beneficiaries put priorities to their economic benefit and environmental restoration of the area over fuelwood supply as a cause of joining the Social Forestry projects.

As pointed out by the respondents and local people, the ineffective role of Bangladesh Forest Department and NGO officials hindered the proper beneficiary selection. A patron-client relationship was found between the elite selectors and the beneficiaries in the Forest Department-sponsored Social Forestry projects. In case of NGO sponsored Social Forestry projects, all of the beneficiaries were selected from the target groups of respective NGOs. Therefore, the neediest segment of the people of the communities was virtually left out from the Social Forestry projects in the study area. About half of the female respondents did not take active part in Social Forestry projects. Beneficiaries had little to say about species selection and species composition. The Forest Department and NGO's took all the major decisions regarding species composition and silvicultural practices. The respondents identified less economic benefit, theft of trees, no arrangement of timely thinning-pruning of plantations and harvesting of forest produce, and lack of co-operation from the Forest Department and NGO staffs as the major constraints of Social Forestry. Most of the species as suggested for future Social Forestry projects by the respondents were native tree species suitable for multipurpose usages including food, medicine, fuelwood, fodder and species of other economic values.

From this environmental and socio-economic research work on Social Forestry in the High Barind Tract, it is obvious that major soil nutrients were at higher levels under plantation sites as compare to their non-plantation sites. Among the plantation sites, the soil of native-mixed plantation site was superior to exotic monoculture ones. Moreover the understorey flora was found more successful in the native-mixed plantation site. From the socio-economic aspect, it has become evident that the preference of respondents to some selected native tree species was not for fuel alone, but they rather preferred these native species for quick and considerable economic returns along with other multiple benefits.

CHANGING PATTERN OF WETLANDS AND ITS
IMPACT ON ENVIRONMENT OF DHAKA CITY

Ph. D. Thesis

By

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ABSTRACT

Dhaka the capital city of Bangladesh is one of the populous Mega cities in the world. High density population as well as shortage of land causes intense densification in the existing built up. Rapid population growth creates extra pressure on the land of already over crowded Dhaka city and the city is expanding in an unplanned and uncontrolled manner. One of the major adverse impacts of unplanned growth is destruction of environmentally sensitive areas. Dhaka city has a large number of wetlands both big and small which includes rivers canals lakes lowlands etc. But the wetlands have been shrinking with the passage of time. In recent years the speed of conversion of wetland for housing and other infrastructures emerged as an alarming issue considering its adverse impact on environment. This study mainly focuses on the issue. Changes of wetlands in and around Dhaka city problems appeared in the city due to wetland change. Government's implication regarding wetland change.

This research documented the extent of wetland change since 1960. To accomplish the work topographic maps of 1960 and three images of different years were used. Findings reveal that a large portion of the wetland has been lost and the rate of destruction of wetland is alarming. During the total study period the city has lost 33% of water bodies and 52% of lowland. During the period 1960-88 the water bodies decreased about 30 hectares per year between 1988-2008 decreased about 6 hectares per year. Between 1988-2008 it is clearly observed from the analysis of change in land use dimension of selected wetland areas that wetlands are mainly converted to built-up areas. It also revealed from this analysis that the rate of transformation of wetland is highly related with urban settlement.

This research tried to apprehend the perception of local people regarding the loss of wetland through questionnaire survey. It is evident from the views of surveyed respondents mainly real estate companies and Government and organization are involved in wetland loss and water logging is the main impact of wetland loss.

The water logging becomes a burden for the inhabitants of Dhaka city and creating adverse social physical economic and environmental impacts. Interruption of daily work children problem going to school disruption of electricity risk of run of motor vehicle damage of house problems in getting drinking water sanitation problem creating

unhygienic situation and suffering from the disease are the encountered effects of water logging on city life respondents viewed that to overcome the water logging problem all illegal structure from the wetland need to remove immediately.

This research carried out a through assessment of prevailing plans acts rules and regulation for wetland management The present wetland management of the public agencies has been critically analyzed and there overlapping and conflicting areas were identified . Activities of different environmental groups were also reviewed in this study.

This investigation undertaken for this study reveals that the present management practices of government organization are very weak and not at all systematic The existing legal tools of different agencies are not exercised properly . Overlapping of function among the agencies creates conflicts in management The coordination status of government organization are poor but the PLDCS local influential people and others those are involved in wetland change are highly organize are well coordinated.

This study delivers the essence that combined effort is necessary from the part of involved stakeholders like local people. NGO local government body central government and civic organization to implement the conservation strategies of wetland political will and government commitment is also needed for this purpose.

In conclusion some recommendation are made regarding proper demarcation of wetlands strengthening the relevant GOs strict development regulation and proper enforcement of laws towards conservation of wetlands.

CONSEQUENCES OF ARSENIC CONTAMINATION IN
HUMAN BEINGS AND THEIR PREVENTION BY
APPLYING HOMOEOPATHIC PRINCIPLES

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ABSTRACT

Identification of arsenicosis patient was done by the field survey of Haria and Ramjong village of sonargaon upazilla and ahmadpur and Sagarkandi village of Sujanagar upazilla fifteen from haria two from ramgonj 60 from ahmadpur and 14 patients were chosen from sajarkandi village.

Then there had drawn a relation between age and arsenicosis the percentage of affected middle age groups (21 – 40) and (41 – 60) were respectively 76.48% and 11.76% among all affected people 15:2 and of all population only 16.04 % were affect in the research area of sonargaon upazilla in suganagar upazilla the percentage of affected middle age groups (21 – 40) and (21- 60) were respectively 58.07% and 25.81% among all affected people 26:5 and of all population 62% were affected .

Occupationally all the patients were of lower middle and lower class The main businesses of this patients were fish selling 37.5% and service 12.5% in the research area of sonargaon upazilla all the woman were house wife 31.25% Maximum children were helping there parents instd of going to the school The same picture found in Sujanagar upazilla also The main proficion of business 32.30% Maximum patient were shop keeper in little soap of Kashinatpur bazar some were blacksmith some were rickshaw and van pullar and some were farmer , farmers and service holders were in the same rank 11.2% females were mainly house wife in all village 43.5% and they were usually helping hands for there husband it was said that people of low earning were the main victim arsenic.

Microscopic analysis was done for the keratosis of the palm of the patients in microscopic view there was found many germ keratoses to some giant keratosis in epidermis keratosis were formed in the keratin layers and they were black in color due to the deficiency of oxygen in cells Other normaly keratin cells of the slides were of natural skin color Big keratosis had and oval shaped hole in the centres Affected keratins were flattened and rounded to the hole it seems that the hole was belonging to molecule of arsenic in the keratin layer The hole can be say the eye of the keratosis.

After applying medicines to arsenicosis patients the kurtosis stopped development instantly and in all the cases no causally found in this years No evidence of consequences of arsenic found in whole research period to till now kurtosis and uncertain cases recovered simultaneously.

Homeopathic medicines Arsenic album and antmonium crudatum secured respectively 81.25% and 55.6% recovery on arsenicosis and at the same time it prevents the consequences of arsenic contamination in human beings.

Accounting the Rural Environmental Resources: A Case Study of Two Selected Villages in Bangladesh

M.Phil Dissertation

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ABSTRACT

Developing countries like Bangladesh are faced with many environmental problems. Moreover, growing pressures on the environment and its resources due to increasing demand by an overpopulated nation, Bangladesh is really facing natural resources scarcity. Among the different measures taken for the protection and development of environmental resources, National Environmental Accounting system is needed to incorporate the non-marketable environmental goods and services, which have use value, into national accounting system, increasing environmental awareness in different countries and in Bangladesh as well have generated the need to accurately value and account for their environmental and natural resources as a means of developing appropriate economic, trade and sustainable development policies because existing systems of national accounts generally do not take into account of the impacts of economic and trade activities on resource potentials of a nation. However, the present research was aimed to identify the marketable and non-marketable environmental goods and services in rural Bangladesh and to value them and develop the accounting formulae to incorporate those goods and services into national accounts GDP. For these, one village of Godagari Upazila in Rajshahi district and one village of Singra Upazila in Natore district were selected as study area. Total sample size was (50+50) 100 from two villages. Each household used as the unit of the study. Random sampling technique used to select the study households. Data were collected using content analysis to gather the secondary data and questionnaire survey, case study, observation to generate primary data and questionnaire survey, case study, observation to generate primary data from study areas. Demographic information, socioeconomic status, annual incomes and expenditures, uses of different marketable and non-marketable environmental goods and services were collected through questionnaire survey. Observation was conducted to verify the collected data regarding uses of goods and services. Case study was conducted to estimate the uses of non-marketable environmental goods in household and calculate it in monetary form. Contingent valuation method was used to calculate the value of non-marketable goods of case study household.

In chapter two, different systems of environmental accounting is discussed to understand the theory and practice of environmental accounting and it is observed that most of the theory is adopted in developed countries that are difficult to adopt in developing countries like Bangladesh. In chapter three different valuation method of environmental

goods and service were analyzed to conceptualizing appropriate method for estimating the value of non marketable goods and service contingent valuation method was select for the present as is widely use for valuation of both the use value and non – use or passive in this research i estimated only the use value of non marketable goods used by the study household in there daily life such as ago residues dry leaves and branched of grasses cow dung used as cooking fuels wild vegetable roots medicinal plants and herbs that are used by the study population in chapter four i tried to conceptualize the marketable and non marketable environmental goods and services and to explore the study areas about this goods and services it is observed that Mahishmari village under Natore district is rich in agro ecology terrestrials and aquatic biodiversity then Raninagar because the two village situated in two different agro- ecological zones in Bangladesh However these non marketable environmental goods were not calculated by the household to annual income

Conceptually EDP is calculated using the following formula

$NDP = GDP - \text{depreciation allowances}$

$EDP = NDP - \text{environmental depletion allowances}$

$EDP_2 = EDP_1 - \text{environmental degradation allowances}$

$EDP = NDP - \text{imputed environmental costs}$

Where GDP is gross domestic products NDP is net domestic products EDP is Eco domestic products

It measures the actual economic performance of a nation in given year after adjusting non marketable environmental goods and service used degradation or depletion of environmental service etc. The main aim of the research was to develop an accounting guideline for accounting the non marketable goods and service in Bangladesh There are different limitation faced in the study areas to collect reliable data for valuation of ES the above formulae show the possible system of national environmental accounting system But in the M. Phil program as i felt it is not possible to develop and complete and achievable national environmental accounting framework considering environmental all resources weather it has value of possible value it is used in rural Bangladesh and to estimate the monetary value of those so no need to say that farther comprehensive research work needed to develop an achievable national environmental accounting framework.

A SUSTAINABLE MANAGEMENT OF SUNDARBAN FOREST

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ABSTRACT

The study of conducted to explore a perfect model for the sustainable management of sundarban forest . it also examines the existing management system of the sundarban forest and delineates the causes hindering the sustainable development of the forest.

Participatory Rural appraisal (PRA) and survey methods were used to asses the present condition of the forest . the nature of the study is imperial . Both primary and secondary data have been used to proved for the study. the technique by which the information has been collected from the sundarban forest involves the collection of data mainly from forest related persons The main source of the study is relevant field level data. it is worthy of mentioning here that the study is not based on laboratory work.

Respondents provided information of several issues of the forest with the past and present data in response to the question about the type if management of the forest sixteen deputy rangers have told about the characteristics of management several local mass has given their statement.

It is cleared from the study that sundarban is a valuable source of natural resource but the condition of the forest is becoming odd day by day necessary steps and measures should be taken to improve the situation the disappearance or extinction process can be stopped if it is possible to create an environment fostering forest . the problems of forest degradation and biodiversity reduction can be eradicated natural it is necessary to make general people conscious about the law relating to preservation of forests long term benefits from the proper maintenance the sundarban the sheer disadvantages for not maintaining that properly and to increase the number of employee.

The problem of piracy in sundarban is one of the main problems hindering development work therein in reply to a question about the development work of the forest of the total respondents designated at various important management position of the forest department 57.14% of the official mentioned that improving the development work should include measures to protect the sundarban from any sort of piracy or robbery another problem that chokes the development work of sundarban is the inability of the management to forecast properly the weather or other radical environmental change causing disaster to the sundarban.

After a long survey vane study there some logical suggestion has made also to protect sundarban all management would be taken of development and preservation . to develop of the condition first of all we have to protect them who are engaged in the protection of the sundarban then the condition will be improved proper community involvement should be made in order to eradicated piracy and other activities detrimental to the sundarban such as indiscriminate felling of thees reduction in biodiversity and above all the killing of tigers deer's and other animals.

For the sustainable management of the forest the study proposes to carry a considerable process which can be accepted by all.

SOCIO-ECONOMIC AND ENVIRONMENTAL
IMPACTS OF URBANIZATION IN BOGRA
MUNICIPAL AREA OF BANGLADESH

By

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A Dissertation

Submitted to the Institute of Environmental Science (IES) Rajshahi
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Master of philosophy

In

Economics

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ABSTRACT

Bangladesh is not only a development country but also an over populated one. Its population is increasing rapidly day by day . We can not control it successfully the country is training for development since 1971 after liberation but its development is hindered due to lack of proper management of its growing population .

Urbanization in this country is increasing at a very high rate but with this urban facilities are not increasing at the required rate.

In this dissertation the impact of urbanization on social characteristics like age structure educational facilities and literacy health care and maternity services family planning activities migration population density traffic jam woman empowerment social recreation facilities have been examined

Here it has also analyzed the impact of urbanization on economic characteristics like financial classification occupational structure consumption pattern housing pattern sources of drinking water electricity facility transport and communication financial institute land value land ownership and house ownership as well as the impact of urbanization on environmental characteristics like flora fauna cultivation sanitary facilities sewerage systems pollution slums drug addiction prostitution and order situation .

This dissertation is done by collecting primary data from grass root level through field survey fourteen sets of questionnaire including one hundred and forty seven closed and open ended question were prepared for collecting information from the selected one hundred and thirty three respondents.

The secondary data is collected from related published and reported materials including books articles reports official documents theses and dissertations

The collected data from primary and secondary sources are present in tabular form

Opinions have also been taken from the civil society to analyze the causes effects of the impact of urbanization.