URBAN PRIMERY HEALTH CARE SERVICES DELIVERY PROJECT (UPHCSDP)

ADB Loan No. 2878 BAN (SF)
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Environment Monitoring Report

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URBAN PRIMARY HEALTH CARE DELIVERY PROJECT
(UPHCDP)

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ABBREVIATIONS

ADB	Asian Development Bank
CRHCC	Comprehensive Reproductive Health Care Centre
PHCC	Construction of Primary Health Care Centre
DOE	Department of Environment
EA	Environmental Assessment
ECA	Environment Conservation Act
ECA	Environmental Conservation Act (995)
ECC	Environment Clearance Certificate
ECoP	Environmental Code of Practices
ECR	Environmental Conservation Rules (1997)
EIA	Environmental Impact Assessment
EMR	Environment Monitoring Report
EMP	Environmental Management Plan
ESC	Environmental and Social Circle Division
ESO	Environmental and Safety Officer
ESS	Environmental and Safety Specialist
EU	Environmental Unit
GHG	Greenhouse Gas
IEE	Initial Environmental Examination
IPCC	Intergovernmental Panel on Climate Change
LGD	Local Government Division
NAPA	National Adaptation Program of Action
NEMAP	National Environment Management Action Plan
NEP	National Environment Policy
NGO	Non-Government Organization
PHC	Primary Health Care
PIM	Project Implementation Manual

Environment Monitoring Report

CHAPTER-1. INTRODUCTION:

1.1 Project Description: Bangladesh has a strong public sector primary health care network system in the rural areas; there is significant lacking of similar arrangement in the urban areas. Urban local bodies have been mandated to provide public health and primary health care service delivery to the residents within their administrative jurisdiction. Considering limitations and scopes, the Local Government Division of the Government of Bangladesh had taken initiative to provide primary health care services to the urban people through partnership among urban local bodies and Non-Government Organizations and with the financial support of Asian Development Bank and other co-financers. The Local Government Division had been implemented two projects namely Urban Primary Health Care Project (1998-2005) and Second Urban Primary Health Care Project (2005-2001). Evolving from previous two projects, the Local Government Division has been implementing Urban Primary Health Care Services Delivery Project (July 2012 to June 2017) with the financial support of Asian Development Bank, Swedish International Development Cooperation Agency and the United Nations Population Fund. In order to achieve the objective of the project need to construction of new health care centre buildings and other supporting structure like stack yards in the clinic/health care centre premises. Facilities will support enhanced use of Construction of Comprehensive Reproductive Health Care Centre(CRHCC), Construction of Primary Health Care Centre(PHCC), Periodic maintenance of CRHCC & PHCC and Green Clinic(Existing CRHCC & PHCC including piloting).

1.2. Objectives and outputs of the project: The ultimate aim of the project is to improve health status of the urban poor, especially women and children, in the project area. The immediate outcome of the project is to improve quality of Primary Health Care (PHC).

The following objectives will contribute to the achievement of the ultimate aim as well as the immediate outcomes of the project:

i. Improving accessibility (financial and physical) to PHC services in the urban areas covered by the project;

ii. Ensuring the delivery of quality PHC services to urban populations-the project will ensure the provision of MOHFW's essential service delivery package (ESD+) focused maternal and child health in urban areas, particularly for the poor. The project will increase focus on family planning, nutrition, adolescent health, and neonatal care;

iii. Increasing the utilization of PHC services by the urban poor, especially women, newborn and children;

iv. Strengthening institutional arrangements for the delivery of PHC services in urban areas;

v. Increasing capacity of the Urban Local Bodies (ULBs) to ensure the delivery of PHC services, according to their mandate; and

vi. Increasing sustainability of the delivery of urban PHC services by strengthening ownership and commitment of the ULBs to ensure the delivery of PHC services particularly for the poor.

1.3 Physical Infrastructure Development in UPHCSDP: The Urban Primary Health Care Service Delivery Project in consultation with relevant stakeholders, has been prepared this Environment Monitoring Report(EMR) to deal with potential environmental issues that may arise during implementation of the various civil works.

1.4 Purpose of the EMR: The purpose of this EMR is to ensure that the construction activities by the contractor doing as per contract specification and as per environmental requirement and the clinic/health care centers performing their activities as per environment friendly and management of clinical wastes properly.

2.0 Safeguard Requirements of the Government of Bangladesh: The main provisions for environmental protection and pollution control in Bangladesh are contained in the Environmental Conservation Act (ECA, 1995) and Environmental Conservation Rules (ECR 1997). Under the ECR, projects are classified as 'Green', 'Orange A', 'Orange B' and 'Red' to determine the level of environmental assessment required. The category of this Project is "'B' for ADB and category 'Orange B' for GoB" because the project does not have any significant adverse impact on environment. 'Category-B' projects are considered relatively minimum environmental impact hence initial environmental examination (IEE) along with environment management plan (EMP) is required to be carried out. An environment clearance certificate (ECC) from the Department of Environment (DoE) is adequate for this project. Orange Category projects fall into two categories. 'Orange A' projects are required to submit general information, a feasibility report, a process flow diagram and schematic diagrams of waste treatment facilities along with their application for obtaining DoE environmental clearance. Orange B projects are required to submit an Initial Environmental Examination (IEE) report, along with their application and the information and papers specified for Orange B projects. 'Red Category' projects are those which may cause 'significant adverse' environmental impacts and are, therefore, required to submit an Environmental Impact Assessment (EIA) report. It should be noted that they may obtain an initial site clearance on the basis of an IEE report, and subsequently submit an EIA report for obtaining ECC along with other necessary papers, such as feasibility study reports and no objections from local authorities. The DoE has recently developed simplified IEE and EMP checklists in

order to simplify the preparation of conventional and voluminous IEE and EMP reports that contain irrelevant and unnecessary information.

2.1 As per ECR '97 all existing and new industries and projects in 'Orange B' and 'Red' category require an Environmental Management Plan (EMP) to be prepared (after conducting an IEE or EIA) and submitted along with other necessary papers while applying for environmental clearance.

2.2. Construction of multi-storied buildings is considered as the 'Orange B' category in ECR'97. However, there is no fixed definition of a multi-storied building. In practice, building of more than 10 storied within Dhaka City (as per building construction rules of RAJUK) and building of more than 6 storied outside Dhaka city is considered as 'Orange B' category. It is expected that the new construction of buildings under the UPHCSDP outside of the Dhaka will not be more than 6 storied and as such, no environmental clearance will be required. If new construction of more than 6 storied building is considered, IEE and EMP would be required to get the environmental clearance from the Department of Environment (DOE) as per ECR'97. In addition, the EARF would need to be submitted to the DoE for their review and concurrence.

2.4 . In addition to the Environmental Conservation Act and Rules, there are a number of other policies, plans and strategies which deal with the water sector, agricultural development, natural resource management, coastal area, protected area, disaster management and climate change. These are the National Water Policy, 1999; the Forest Act 1927 (last modified 40th April 2000); National Forest Policy, 1994; the National Conservation Strategy 1992; National Environmental Management Action Plan (NEMAP) 1995; National Policy for Safe Water Supply and Sanitation 1998, National Policy for Arsenic Mitigation 2004, National Sanitation Strategy 2005, Coastal Zone Policy,2005;National Food Policy 2006; Coastal Development Strategy, 2006; National Agricultural Policy, 1999; National Fisheries Policy, 1996; National Livestock Development Policy, 2007; Standing Orders on Disaster, 1999 (revised in 2010); National Adaptation Programme of Action, 2005 (revised in 2009),Bangladesh Capacity Development Action Plan for Sustainable Environmental Governance 2007, Bangladesh Climate Change Strategy and Action Plan, 2009; National Plan for Disaster Management, 2010-2015; Solid Waste Management Rules 2010, Noise Pollution (Control) Rules 2006, etc. The Bangladesh National Building Code, 2006 and Bangladesh Labor Act, 2006 will also be important regarding the occupational health and safety of workers and laborers to be involved in the Project's infrastructure development. Besides these the Cabinet has approved 'Environment Court Bill 2010' and Bangladesh Wildlife (Preservation) Bill 2010.

2.5 The National Building Code 2006 and National Labor Act 2006 have defined certain measures to ensure proper safety and work environment as well as the compensation measures to the laborers. By national law, in order to be compensated, contractors must follow and comply with these safety provisions and compensation arrangements. The implementing agency must ensure that the appropriate occupational health and safety provisions have been included in the bidding documents and are being implemented by contractor. As per the Safe Drinking Water Supply and Sanitation Policy 1998, provision for arsenic, salinity and iron safe drinking water and adequate sanitation facilities will have to be ensured for all newly constructed buildings and existing buildings of UPHCSDP. The water quality needs to be monitored periodically to ensure that the supplied water is safe for drinking.

Description 0f Environmental Baseline

3. 0 Project Bounding

The primary requirement of Environmental Assessment study is to delineate the geographical boundary of the "Project area" and the impact area. The "Project area" is the physical location of the project while the "Impact area" encompasses the geographic extent of the significant environmental and socioeconomic impacts resulting from implementation of the proposed Health Care project. It is recognized that the benefits of the proposed project will considerably extend to the national scale. For the present EMR, the focus of the study will be limited to the area where physical impacts of the activity will be directly felt. A one km width strip around the project considered for environmental analysis. However general socioeconomic profile is prepared for the administrative units over where the present health care project is being constructed . Direct Impact Area covers the entire Gazipur City.

Physical Environment[1]

3.1 Climate

The project area is under the typical monsoon climate prevailing the country. It has three main seasons:

- Summer/Pre-monsoon - March to May
- Rainy season/monsoon - June to October
- Winter season - November to February

The rainy season is hot and humid having about 90 percent of the annual rainfall. The winter is predominately cool and dry. The summer is hot and dry interrupted by occasional heavy rainfall.

3.1.1 Temperature

The average low temperature occurring in November and December and January is 19.35^0 Celsius. While the average high temperature is 29.3^0 Celsius occurring in May. The extreme low temperature may be 11.9^0 Celsius in January and the extreme high temperature may be 34.4^0 Celsius occurring in April.

3.1.2 Rainfall (Kind, Amount, Duration, Frequency)

Total mean annual rainfall occurring in the area is about 2102 mm. Seasonal distribution is too much screwed as shown in following tables. From the table, it appears that about 75% of the total annual rainfall occur during this monsoon period. Heath Care Centre construction should be scheduled such that it is constructed during the Rabi and pre-monsoon season to avoid disaster by excessive rainfall and the consequent flooding.

Table 3.1
Seasonal Rainfall at Dhaka

Months	mm	Percent
Rabi (November-February)	108.50	5
Pre-monsoon (March-May)	418.70	20
Monsoon (June-October)	1545.00	75
Total	2102.20	100

Source: BMD, Dhaka

3.1.3 Flooding

Flooding starts during the pre-monsoon and submerges most of the agricultural lands by May/ June and continues this submergence till October/November. Construction works during the period in not possible except in high/filled lands which are above flood level.

[1] *House of Consultants Ltd. Data Base*

3.2 Soil Condition

Soil in the flooded area is predominantly silty clay under laid mainly by silty sand. Area above flood level or shallow flooded land consists of hard clay of the Modhupur tract. General topography of this flooded land is mainly plain while the high land especially the Modhupur tract comprises irregular pattern of broad ridges red basin. Seasonal flooding, becoming deeper towards the south. In most years, the flooding is by accumulated rainwater run-off and the raised ground water table. Only in years with high river floods does silty river water extend over meander floodplain. Bearing capacity of soil varies from one ton to Two tons depending on the floodplain and the Modhupur tract respectively.

3.3 Seismicity

Bangladesh and northeast Indian states have long been one of the seismically active regions of the world, and they have experienced numerous large earthquakes during the past 200 years at an average rate of one in every 30 years.

Sesmotectonic studies have been undertaken by various workers in the Burmies are comprising the Indo-Burman ranges and their western extension and in the northern India is complete list of references is provided in Haque, (1990), using data from various source, a seismicity map of Bangladesh and its adjoining areas has also been prepared by Mominuddin (1991).

Bangladesh have been classified as falling into seismic zones with zone-I the most severe and zone-III the least. The project area falls into Zone-II. As a result, the land buildings and land-based structures for this project should be designed to withstand ground accelerations of O.2G. (Figure 3.1).

3.4 Surface Water

Most of the project area is low lying, submerged during the monsoon season. During the dry season (Nov-April) the land is dry, leaving water in the major channel in the project area. The Turag river is the major drainage channel in the area and it is almost perennial except the upper reaches. Other channels mostly remain dry during the dry season (when the health care building will be constructed).

3.5 Groundwater

Ground water table in major portion of Bangladesh exists at a shallow to moderate (Generally below 3.0 m) depth with confined, semi-confined and unconfined aquifers, which are being recharged by major river systems and by infiltration of rain water. The ground water table fluctuates with seasons approaching near ground level (within 1.0 m) over most of the country during wet seasons (July-September).

Like other parts of the country, ground water is a stable source of water for various activities including irrigation (both shallow and deep tube wells), domestic purposes (hand pumps) and industrial applications (deep wells) in the project area. The ground water table in the area in the dry season is lowered to about 6.0 m before the end of monsoon. This condition is referred to as an aquifer fully response, where rivers or other forms of surface drainage control ground water table. The prevailing GWT during the dry season is therefore convenient for shallow under ground works.

3.6 Biological Environment[2]

3.6.1 Terrestrial Fauna:

Terrestrial Fauna recorded from the project area, through interview to the local peoples. The respondents reported a total of 40 species of terrestrial fauna. Of these Six species of Amphibian; 10 species of reptiles; nine species were mammals, and 18 species of birds. Some of those are very common and very few like Sona Bang (Rana Tigruna), Beji (Herpests) are rare. Further details given in Annex:1 in Table 3.1, 3.2, 3.3 and 3.4.

[2] [2]*House of Consultants Ltd. Data Base*

3.6.2 Terrestrial Flora

A total of 51 Terrestrial Flora Species were recorded during survey period in the project area. Flora identified through interview were classified under three categories viz. Terrestrial Natural flora; Terrestrial planted flora; and Medicinal flora. Few of these like Elacocurpus roustas etc. are rare. The recorded terrestrial flora from field area under each category has been presented in Annex: Table-3.5, 3.6 and 3.7.

3.6.3 Aquatic Fauna and Flora

A total of 11 aquatic fauna species and 16 Aquatic flora recorded in the project area.

Few of these like Udh (Lutre Lutra), Keorali (itydriua verticiltata) are rare. Details are presented including their scientific names in (Annex: Table 3.8 and Table-3.9).

3.7 Socio-economic Profile

3.7.1 Introduction

Socioeconomic profile of the project area based on the data available with the primary and secondary sources is presented here. The construction work of the HCC cover the Dakhin Khan of Gazipur Sadar under Gazipur district, The following sections illustrate features that characterize the people living in the area and their socioeconomic conditions.

3.7.2 Demographic Characteristics[3]

A review of the demography of the Project affected district will help to understand the characteristics of the APs. This Section presents an analysis of some selected characteristics of the inhabitants of the districts, including population by sex, population density, sex ratio, household size and literacy rate of the population.

The total population (males and females) of the Project-affected unions is 493,627 with an average population density of 1,570 per sq. km. Distribution of the population by sex, population density, sex ratio, average household size and literacy rate in the Project-affected unions are presented in Table 3.2.

[3] *House of Consultants Ltd. Data Base*

Table 3.2

Union-wise Population Distribution of the Project Area by Sex, Average Household Size and Literacy Rate

District	Upazila	Union	Population			Population density/sq km	Average Household size	Sex Ratio (M/fx100)	Literacy Rate
			Male	Female	Total				
Gazipur	Gazipur Sadar	Basan	22690	19435	42125	1472	5.1	116.7	40.5
		Gachha	20389	18652	39041	1364	5.2	109.3	39.5
		Kayaltia	25266	24528	49794	572	4.9	103.0	30.4
		Mirzapur	28985	27530	56515	650	4.8	105.3	31.0
	Sripur	Maona	16972	16481	33453	439	4.7	103.0	22.1
		Sripur	21689	19978	41667	987	4.9	108.6	35.0
		Telihati	17411	16786	34197	766	5.1	103.7	28.0
	Tongi	Ward no. 03	57420	48097	105517	9707	4.7	119.4	52.5

Source: Compiled from Population Census 1991, National Series, Union Statistics, Bangladesh Bureau of Statistics.

There are 107.6 males for every 100 females in the project affected unions. The sex ratio (107.6) of the project-affected unions is higher than that of national average of 103.8.

Table 3.2 shows that the literacy rate is 33.2 which is more or less similar to the national average of 32.4. It is observed that the literacy rate is higher among the males.

3.7.3 Occupational Structure of the Area

Occupation indicates sources of income from work as well as social status. Table 3.3 presents the main household occupation. A good number of women consisting 26.4% of population are engaged in household activities while 35.4% are students or children. Remaining 38.2% are active in professional work. Among the professional agricultural farming is the prime occupation (18.1%) of household. The remaining is engaged in business (4.4%), service (3.6%), agricultural labour (1.2%), rickshaw/van/ pushcart driver (0.4%), salaried worker (0.4%), tailors (0.4%) and other unusual occupation (2.1%). It is found from the table, 58.8 per cent of population has no occupation, which is comprised with housewives, unemployed, retired persons, students and children.

Table 3.3
Distribution of Household Members by their Primary Occupation

Occupation	Per cent
Farmer	16.8
Share Cropper	1.3
House wife/Household work	26.4
Agricultural labour	1.2
Rickshaw/Van/Pushcart driver	0.4
Service holder	3.6
Salaried worker	0.4
Businessman	3.2
Small Businessman	1.2
Unemployed/Retired/old	7.6
Tailor	0.4
Student /Children	35.4
Others	2.1
Total	100

Source: Primary Sources, HCL

3.7.4 Land Use Pattern

Land distribution pattern depicts that about 19% of the people have land less than 50 decimals, out of them 5 per cent have only a small homestead. The marginal farmers having land 50-149 decimal is constituted by 56% of the population and 12% is small farmer whereas 9% is medium farmer.

The average agricultural land owned by virtual landless farmers (less then 50 decimal) is 27 decimal. They on an average take 3 more decimals on mortgage or share. Thus the average operated land by them is 30 decimal.

The marginal farmers own on an average 87 decimal but operate 93 decimal. They also take 6 more decimal on mortgage or share. Small farmers own on an average 205 decimal of land but operate only 192 decimal, which indicates sharing/mortgaging out of 13 decimals on an average. The medium farmers own on an average 307 decimal while they operate 257 decimal. The near landless and marginal farmer take about 3-6 decimal on mortgage or share where as small or medium farmer give out on mortgage or share 13 to 50 decimal of land (Table 3.4).

Table 3.4
Agricultural Land Ownership Pattern of Household

Range of Land (in decimal)	Self owned (Avg. land in decimal)	Net Operated (Avg. land in decimal)	Per cent of Owner
1-5 (Landless)	3*	-	4
6-49 (virtual landless)	27	30	19
52-149 (Marginal Farmer)	87	93	56
150-249 (Small Farmer	205	192	12
250+ (Medium Farmer)	307	157	9

* Homestead only

3.7.5 Agricultural Situation

The agricultural land in the Project area consists of high, medium low and low land. Of the total about 75 percent is suitable for multiple cropping. Land fertility and irrigation facilities allow the farmers to cultivate a wide range of crops in the Project area.

The major crop of the project area is paddy. Other crops are wheat, jute, oilseed and sugarcane, pulse, potato, chili and vegetables. Ground water irrigation is extensively practiced for growing high yielding variety of rice. Most of the other crops are grown on non- irrigated lands.

As in other areas of Bangladesh, homesteads in the project area are comprised of two to five dwelling structures around one courtyard. This is a typical characteristic of Bangladesh farming houses. The courtyard is mostly used for pre-and post-harvesting operations, mainly done by women. Householders typically grow fruit trees and vegetables around the corners of the courtyard, at the back of the dwelling units, and in other areas of homestead. The courtyards are sometimes shared by more than one household.

3.7.6 Transportation

The project area has good communication facilities. The such as Gazipur-Dhaka, Gazipur -Ashulia, Gazipur –Mymensingh and Gazipur -Tangail are passing in and around the project area. The Turag River and Gargara khal cross the project area, which are accessible only during rainy season.

Gazipur -Mymensingh, Gazipur -Ashulia, Gazipur -Tangail are national highways and therefore, the traffic intensity is very high and heavy.

Lower part of the Turag River is navigable round the year. But within the project boundary this is seasonal. During the monsoon season country Boats play in the flood plains within the project area.

3.7.7 Electricity

All the surveyed mouzas have electricity facilities for household and commercial use. About 88.4% of the total sample household are using electricity (Table 3.5).

3.7.8 Water Facilities

Tube-well is the lone source of domestic water for all households. Self-ownership of this source of the household is 88.4%, 7.0% is served by public tube-well and others use tube-well of their neighbors (Table 3.5). It can be mentioned here, there is also provision of water supply through pipeline in the project area.

3.7.9 Latrine Facilities

Non-Sanitary ring slab latrine is used by 61% of the households which is followed by 21% sanitary latrine, 14.0% katcha latrine and 4.7% sanitary ring slab (Table 3.5).

Table 3.5

Households having electricity, water facilities and latrine facilities

Electricity		Water Sources and Ownership				latrine	
Status	%	Sources	%	Ownership	%	Type	%
Using	88.4	Tubewell	100	Own	88.4	Sanitary	20.9
Not Using	11.6			Govt.	7.0	Ring Slab/pit	4.7
				Others	4.6	Non-sanitary: Ring Slab	60.5
						Katcha	14.0

Source: Primary Source, HCL

3.7.10 Cooking Fuel

Most of the households (76.7%) use wood as the cooking fuel. Besides they use leaves, cow dung, husk (23.3%), etc. Average cooking fuel cost of per household is Tk. 307.

3.7.11 Employment Opportunity

In response about non-farm employment opportunities respondent stated that it is a bit higher than any other rural Bangladesh. About 77% of the respondent opined that non-farm employment opportunity is available in the area. Among various types of non-farm employment non-govt. organizations, transportation, construction works, labour selling in brickfield, and other industries like garments, spinning mill, cotton mill, textiles, beverage companies, etc. are remarkable here. So, local labour supply is less than requirement for both sectors of agriculture and non-agriculture.

3.7.11.1 Emigration and Immigration:

In response about emigration and immigration of the area, 65.1% respondent opined negatively in terms of emigration and 83.7% respondent opined positively in terms of immigration. It is seemed here, the trend of immigration is higher than emigration. Though non-farm opportunity is available here but some inhabitats of the project are migrated out of the area due to difficulties in getting job during rainy season (40.0%), expecting more salary/wage (33.3%) and business (26.7%). On the other hand, people immigrate in the area due to higher demand of agricultural labour (72.2%) and non-agricultural labor (27.8%). Non-agricultural labor is found mostly in brick-field.

3.7.12 Economic Condition of the Household

It is reported here annual average income is Tk. of 72,908 per sample households where as annual average expenditure is Tk. of 56,622 per sample households. About 56% of the total households have savings and percentage of loan recipient household is 35. Respondents stated as sources of loan are relatives (53.3%), NGOs (20.0%), friends (6.7%), moneylender (13.3%), Co-operative society and bank (20.0%).

3.7.13 Institutions, Social Organization and Public Health

According to the APs, they reside in and around the industrial area. There are factories for beverage (soft drink, mineral water), textile mills, spinning mills, garments factory, glass factory, etc. The people in the affected areas have little access (in terms of employment opportunity) to these industries, as the management of the industries does not prefer local people as worker. Those who have access to the industries are women usually.

However, there is agricultural labor crisis in peak cropping seasons in the area. The agricultural laborers, therefore, from outside the affected areas avail the opportunity to work there.

Educational institutions (school and madrasa) are available in the project area.

Non Government Organization (NGOs) like BRAC, Proshika, ASA, Al Haramine Foundation, Fair Foundation, Bikash, Annesha and JARIP are working for development of economic situation of poor households. Krishi Bank Grameen Bank, and co-operative society also work for the development of the locality. They provide credit for income generating activities like poultry and cattle rearing, puffed rice preparation, rice processing, crop production etc. Besides, loan is given for housing, petty business etc. Both men and women, especially women, are members of village organization of the NGOs. It needs mentioning here that women in the better-off household perform household chores including post-harvest activities in their homestead.

All of the upazila and district headquarters have government health service centers. Almost all the market centers have at least one drug store with a doctor to serve the local area on payment.

3.7.14 Gender Situation

Most of the female members of better off families are engaged in household activities. Sixteen per cent women of the total households engaged in income generating activities. They are also members of NGOs and co-operative societies. They take loan from these organizations to start IGA. Female members of above households are working for kantha sewing, poultry rearing and vegetable gardening. Average household income is Tk. of 400 from these IGAs.

3.7.15 Aesthetic Values, Recreational Resources and Development

In Ashulia, captivating scenic view attracts tourists, which brings a positive impact on economy of the area. Fantasy Kingdom is the another resources for recreation. However, these are being quite away from the health care construction area will not be affected.

3.7.16 Cultural Values

People from different religions live in their own community following their own tradition without facing any major problems. The points of cohesion of the Muslims people are; Eid, Friday prayers Circumcision, Milad Mohafil, Zanaza, marriage ceremonies and Burial occasion. On the other hand, in the Hindu community the points of cohesion are; worship, funeral and other Hindu festivals. In some points both religious group meet in the same place i.e sports ground, village fair and in any developmental work of the area. Women of the project area irrespective of religions are adhering to the restriction of Purdah.

As a result of survey and group discussion with different stakeholders leadership pattern of the project is as usual as other rural part of Bangladesh. It is reported here chairmen and members of union council, political leaders, village matbars, eldest and education personnel are the leading characters of the area. In the area, politics is the most cause of factionalism which is mitigated through negotiation by UP Chairmen, members and on village arbitration.

3.7.17 Historical/archeological Relics

There are no historical, archeological and cultural values exist in the project area.

4.0 ENVIRONMENTAL RESPONSIBILITIES AND INSTITUTIONAL SET UP

4.1 The contractor's conformity with contract procedures and specifications during construction will be carefully monitored. It is assumed that prime contractors may use sub-contractors without ensuring that they conform to general construction guidelines (good engineering practice and good working practices). Such practices degrade the quality of construction as well as the benefits of the Project. Contractors will be made to follow standard construction practices, monitored and supervised by Project Authority.

4.2 Key Anticipated Environmental Impacts and Proposed Mitigation Measures

The project related anticipated environmental impacts although very limited may include drainage congestion/water logging, dust pollution, noise pollution, disruption of natural ecosystem, occupational health hazards due to improper management of construction materials and solid and hazardous waste, risk from poor sanitation system, improper lighting and ventilation system in the clinics, etc. Due to the location, there may be some risks which may include arsenic, salinity and iron contamination in drinking water, natural disaster (earthquake) and extreme climate events (heat wave, cyclone, storm surge, etc.). Project related environmental impact could be minimized by adopting appropriate mitigation measures. However, the impacts on natural disasters and other extreme climate events could be reduced by adopting appropriate preparedness and precautionary measure which may include organizing training program for patients and health care personnel, on disaster/earthquake preparedness, climate adaptation and disaster risk reduction, health safety measures, environmental awareness, etc.

The potential environmental impacts and mitigation measures is given in the following table-no.4.1.

Table 4.1: Potential Environmental Impact and Mitigation Measures

Category	Potential Environmental Impact/Issue	Possible Mitigation Measures
Occupational Health, safety and hygiene	Occupational health and safety impact	• Implement suitable safety standards for all workers and site visitors; • Personal protection equipment for workers, such as safety boots, helmets, gloves, protective clothing, goggles and ear protection; • Provision of adequate healthcare (first aid) and safety facilities within construction sites; • Arrangement of safe drinking water and sanitation facilities for the labors; • Arrangement for water spray throughout the construction time; • The standard norms for toilet shall be followed.
Waste Management	Improper disposal of clinical wastes may cause verities of dieses.	• Arrangement of wastes disposal bin in every room of the clinic and disposed of clinical wastes in the bin afterwards collection of clinical wastes from the rooms and disposed properly as described in the waste management system of the clinic/health care centre. • Awareness training of the personnel of the clinic on the clinical wastes disposal system,
Drainage Management	Drainage congestion/water logging, Spread of vector born diseases around the clinic areas,	• Consider the drainage system of the whole health centre area in project design; • Maintain cross-drainage at all times during construction; • Prevent all solid and liquid wastes entering waterways by collecting solid waste and wastewater from brick, concrete etc.; • Drainage facilities will be integrated with water supply options and sanitary latrine facilities in planning and design;
Clearing of trees	Losses of tress and vegetation	• Consider alternation options to reduce the loss of trees and vegetation; • A green fence will be raised with native tree species around the clinic/health centre; • Plant same species of trees and vegetation as compensatory measures;
Stone/brick crushing	Dust and noise pollution	• Spray of water during dry season and in windy conditions; • Immediate compaction after construction of base course; • Cover the stockpiles of fine materials in construction yard; • Plan the work schedule of noise creating activities in consultation of local community; • Employ best available work practices on-site to minimize occupational noise levels;

Category	Potential Environmental Impact/Issue	Possible Mitigation Measures
Soil Erosion	Soil erosion during construction	• Careful arrangement to stop soil erosion by adopting proper protection measure before starting earthworks;
Road blockage	Blocking of Roads/ access/approach	• Construction materials and machinery should not be placed in a manner that blocks any roads, paths or local accesses; • Unloading of construction materials should be carried in a manner and time so as to avoid blockage of roads/paths/access; • Waste should not be placed on the roads;
Water Pollution	Water pollution from construction activities	• Prohibit direct disposal of solid and liquid wastage into nearby water body; • Spoil Management Plan should be implemented by the contractor;
Use of wood as construction/cooking materials	Deforestation	• Minimize use of wood for construction. • Use local materials as much as possible. • Innovations shall be integrated in design for making clinics/health centre should be environmentally friendly. • Contractor shall supply kerosene or LPG at construction camps and restrict cooking and heating in firewood
Proper ventilation	Day lighting and ventilation system	Provision for adequate ventilation in the health care centre,
Ensure safe drinking water	Arsenic, iron and salinity contamination in drinking water	• Analyze local surrounding arsenic test results and recommend for tube-wells or not; • Adopt rain water harvesting, pond sand filter, piped water supply in salinity intrusion areas; • After installation of tube-wells, presence of arsenic in the drinking will be tested and be used only it satisfy the Bangladesh standard
Water and sanitation	Selection of appropriate location for water source and sanitary latrine	• Discuss with medical/hospital committee and doctors/nurse and select a location which is convenient for clinic and not impacting on trees or any other common property resources; • A minimum distance of 15 m should be maintained between a tube-well and a latrine to prevent contamination of water resources. In case of shallow shrouded hand tube-wells, this distance should be 20 m as horizontal filters are used in this type of tube-wells.
Separate toilets for male and females	Female patient may face serious problem due to lack of separate toilet facility.	• Provide separate toilets at adequate distance between male and females. • Water supply should be available in the toilets. • One latrine should be designed for about 20 persons

Category	Potential Environmental Impact/Issue	Possible Mitigation Measures
	Extreme climate (e.g. cyclone, storm surge) and natural disasters (e.g. earthquake), etc. and fire	• Adoption of appropriate adaptation and disaster risk reduction strategy, emergency preparedness and recovery, training/orientation program for health service workers on climate change, disaster and earthquake, etc. • Construction of clinic/hospital cum disaster/cyclone shelter to cover the urgent needs of community and patient • Clinic building located in the cyclone and earthquake prone areas should be designed and constructed in way to be disaster and earthquake resilient or 'climate-proof' • Create awareness about natural calamities and extreme climate to doctors, nurse and other clinic staffs. • Fire safety management and mock drill; • Ensure emergency equipments and facilities like fire extinguisher/water hose, first aid boxes, whistles, torch lights etc.

4.4 Key Responsibility of the Contractor: The construction contractor of UPHCSDP is responsible for the safe environment of the project area during the construction, reconstruction, rehabilitation of building structure, drainages etc.

The responsibilities of the contractor will be as follows:

i. Provision of adequate healthcare facilities (first aid) within construction sites;
ii. Training of all construction workers in basic safety, sanitation and healthcare issues, , and on the specific hazards of their work;
iii. Personal protection equipment for workers, such as safety boots, helmets, gloves, protective clothing, goggles and ear protection;
iv. Clean drinking water to all construction workers;
v. Safe access across the constructions area;
vi. Arrangement for water spray at the construction area throughout the construction time,
vii. Ensure that no child labor will be deployed;
viii. A 5x5 meter concrete pit can be constructed for disposal of clinical wastes at the health centre premises,
ix. Keep work areas clean and tidy;
x. Ensure that there is adequate provision of correctly marked waste containers made available at convenient, locations for the disposal of wastes.
xi. Adequate protection to the general public, including safety barriers and marking of hazardous areas;
xii. Dispose of waste to nominated project disposal sites;
xiii. Equipment meeting environmental standard in respect of sound should be used in the project area.
xiv. Ensure that there is adequate provision of correctly marked waste containers made available at convenient locations for the disposal of wastes;
xv. Ensure that adequate toilet and ablution facilities are provided at the construction site.
xvi. Contractor should appoint an environment officer to monitor the issues recommended in the mitigation measures to make the project environment friendly.

5.0 Environment Management Plan

5.**1. General**: **Roles and Responsibilities of Functionaries:** All personnel in the Project Team, from the Project Director to site personnel are responsible for protecting the environment by ensuring that environmental protection measures are installed

and maintained, and established environmental management systems are followed for all project personnel, environmental responsibilities arise from relevant legislation and approvals.

5**.2. Monitoring Plan:** In order to ascertain whether environmental management system is functioning properly it is necessary to include a program to monitor. The EMP will include environmental monitoring procedure based on environmental review study of the UPHCSDP.

The EMP will focus on the implementation of mitigation measures during project construction period and inside the clinic management as shown in **Table 1.** The project implementation will be carried out under the overall supervision of the Planning and Development Section of UPHCSDP.

5**.4. Reporting Procedure:** Routine Monitoring on Environmental Performance of the project will be reported by project Division/Consultant of UPHCSDP and copy of the report will be made available to DOE/ADB.

Table – 5**.1** shows the details project activities, its potential environmental impacts, mitigation measures, responsibility and monitoring executor:

Table – 5.1: Environment Management and Monitoring Matrix

Activity	Environmental Impact	Mitigation Measure	Responsibility	Monitoring Agency
DURING CONSTRUCTION PHASE				
i. Employment of Child Labor in the Construction Activities :	The Environmental and Social Safeguard Policies of the DOE/ADB prohibits all kinds of child labor (lower than 14 years) personnel engagement in construction works of the projects.	Child Labor shall not be employed	Contractor	PD of UPHCSDP
ii. Use of Personal protective equipment (PPE) e.g., ear protection gear, mask, gloves, goggles, safety shoes, helmet, etc., is compulsory in order to ensure health and safety of the working labors at the project construction site.	May cause serious injury, to the workers at construction side.	Immediate Supply of Personal Protective Equipment (PPE) like, ear protection gear, mask, gloves, goggles, safety shoes, helmet, etc., to all the labors working at site and impose them to use to avoid any causality.	Contractor	PD of UPHCSDP
iii. Dumping of construction materials on the road.	Dumping of construction material on the road would create temporary road blockage and transport movement may be hampered,	Contractor should not dump construction material on the road,	Contractor	PD of UPHCSDP
iv. Firefighting equipment at the Camp, Offices and Job-Sites.	In absence of Firefighting equipment may cause serious hazards like life lose, blasting due to fire, .resident house demolish problem due to fire etc.	Immediate placement of firefighting equipment and training or demonstration of firefighting equipment use among the officials, engineers, labors at the site, at the clinic, at the site camp so that in case of any emergency they can utilize these equipment.	Contractor	PD of UPHCSDP
v. Transport and equipment movement.	Excessive dust polluting to the surrounding environment of the camp and sound pollution due to transport movement in the camp.	Equipment meeting environmental standard in respect of sound should be used in the construction area.	Contractor	PD of UPHCSDP

Activity	Environmental Impact	Mitigation Measure	Responsibility	Monitoring Agency
vi. Solid Waste at the job site, camp site.	Air and soil pollution in the site camp and at the job site.	Human generated solid wastes may be controlled through motivation, organize proper collection and transportation of all solid waste, Install proper solid waste disposal system at the camp, at the job site.	Contractor	PD of UPHCSDP
vii. Tree plantation at the site camp and at the offices/ clinics.	Positive impacts on the environment.	Tree plantation in the clinics, at the site camp, and at the offices should be implemented.	Contractor	PD of UPHCSDP
viii. Construction workers related Impact at the camp and at the construction sites.	Unhygienic and littered environment around the camp, exposure to hazards, transmission of diseases among workers, water-borne diseases to workers.	The local workers should be oriented to hygienic disposal of solid waste, workers should be awarded of hazardous materials and proper handling methods, setup warning signs, label and signals at appropriate locations of the camp, Pure drinking water facilities should be provided for which no epidemic ever broke out in the construction area.	Contractor	PD of UPHCSDP
ix. Management of excavated and or spoil materials.	It has adverse impacts on the environment if not managed properly.	The excavated materials should be managed and will be safely disposed of so as to avoid landslides and loss of forests and agricultural land.	Contractor	PD of UPHCSDP

x. Appointment an environmental officer at the construction sites.	In absence of environmental officer contractor's activities will not go as environment friendly.	Immediate placement of environmental officer.	Contractor	PD of UPHCSDP
OPERATION PHASE				
xi Clinic/ Health Care Centre Environment	Improper disposal of clinical wastes may cause of verities of dieses.	• Arrangement of wastes disposal bin in every room of the clinic and disposed of clinical wastes in the bin afterwards collection of clinical wastes from the rooms and disposed properly as described in the waste management system of the clinic/health care centre. • Awareness training of the personnel of the clinic on the clinical wastes disposal system, • A 5x5 meter concrete pit can be constructed for disposal of clinical wastes at the health centre premises,	Project Manager	PD of UPHCSDP
	Gender equity	Women and Men Patient ratio should be maintained; Gender equity should be followed during the admission/registration of patient,	Project Manager	PD of UPHCSDP
	In absence of First Aid Facilities may occur treatment problem	First Aid Facilities should be available in the Clinic/Health Care Centre	--as above--	--as above--
	In absence of firefighting equipment may occur fire hazards,	Firefighting equipment should be available in the clinics,	--as above--	--as above--
	May occur diarrhea problem if not drinking water is not pure,	Pure drinking water (Arsenic, iron, salinity free) should be provided	--as above--	--as above--
	Absence of electricity lighting fan etc. problem	i. Electricity, Fan, Light should be available in the Clinic/Health Care Centre, ii. Energy efficiency light, fan can be used,	--as above--	--as above--

	Ascertain Clean environment by disposal of wastes;	ensure that there is the adequate provision of correctly marked waste containers made available at convenient locations for the disposal of wastes;	--as above--	--as above--
	Smoking	Clinic/Health Care Centre should be marked up as "no smoking Zone"	--as above--	--as above--
	Inadequate sanitation facilities will create hygienic problem,	i. Sanitation facilities (wash room, urinal etc.) should be ensured in the Clinic/Health Care Centre and Provision of water closet and flushing system in toilet and bathroom and fixing of hand basins and cleanliness. ii. Separate washroom for women and men patient clearly marked up,	--as above--	--as above--
	i. Degradation of surrounding environment / health hazards due to clinical wastes, ii. air and soil pollution	Provision of adequate waste disposal been in the Clinic/Health Care Centre,	--as above--	--as above--
xii. Waste Management at the clinic	Improper disposal of clinical wastes may cause of verities of dieses.	• Arrangement of wastes disposal bin in every room of the clinic and disposed of clinical wastes in the bin afterwards collection of clinical wastes from the rooms and disposed properly. • Awareness training of the personnel of the clinic on the clinical wastes disposal system,	--as above--	--as above--

5.0 Environmental Monitoring Report: During the construction time the suggestion/instructions given in the environment report should strongly be monitored by the contractor. These instructions and remedial measures summarized and given in the table as bellow and will strongly be monitored by the UPHCSDP authority.
The Environmental Consultant on 26th of August, 2014 along with Engineer Mr. Sanwar Hossein, UPHCSDP visited the Gazipur City Corporation Office where UPHCSDP office also situated.

The Environment Specialist talked with Ms. Shirin Akhter, Monitoring and Quality Assurance Officer available at the office and discussed the project activities in details and discussed on construction activities.

After discussion the environment team visited the construction site of Dakhin Khan CRHCC Clinic area with ex Counselor Mr. Akbar Ali and Ms. Shirin Akhter, Monitoring and Quality Assurance Officer also.

During the visit the environment team has taken into consideration the following issues which are listed as follows:

i. At the clinic

1. Medical wastes from clinic/health care centre,
2. Gender equity,
3. First Aid Facilities,
4. Availability of fire fighting equipments,
5. Pure drinking water,
6. Electrification in the Clinic,
7. Disposal of wastes;
8. Sanitation facilities,
9. Ventilation within the clinic/health care centre,
10. Domestic sewage
11. Praying room,
12. Management of clinical wastes,
13. No smoking zone,

ii. At the construction site:

1. Appointment of environment manager by the contractor,
2. Use of safety kits by the construction labors,
3. First Aid facilities in the construction camp,
4. Fire fighting equipments in the camp,
5. Drinking water,
6. Protection activities,
7. Dumping of construction materials,
8. Water spray,
9. Drainage problem,
10. Child labor,
11. Air Pollution,
12. Soil Pollution,
13. Disposal of wastes,
14. toilet and ablution facilities,
15. Finishing works and activities,
16. Carrying construction material at site and dump,
17. Water and air quality
18. Water spray along the ROW to avoid dust pollution,

19. Top soil restoration along the ROW,
20. Maintain and compaction of building construction works,
21. Finishing works and activities,
22. Tree Plantation Program beside the building,
23. Base Camp,

7.2 Observation during the visit: The environment teams however observed that in the office of Gazipur Health Care Centre, some deficiency on the environmental issues were found.

At the construction site contractor constructing the building using traditional equipments and as per engineering construction procedure but they are not following all the environmental requirements.

7.4 Construction camp visit: During the visit of construction camp the environment team met with the Contractors Personnel Mr. Ziaur Rahman, Site Engineer at the camp and at the construction area.

During the visit, it was identified that first aid facilities, fire fighting equipments and other facilities like washroom, , drainage system etc are not yet placed adequately in the camp and at the job site which are not environment friendly.

Picture-1
Construction camp and construction materials

Picture-2
Construction worker without safety kits

4.4 Construction Materials: It was acknowledged during the site visit that construction materials like brick, rod etc. is properly stored in the base camp but sand was dumped temporarily at the road side which was suggested for clear as early as possible to the contractor personnel.

Picture-4
Construction materials dumped on the road side

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However details on the field observation issues are given in the following table no-1 and 2:

Table no-1: *Compliances and non-Compliances issues monitoring format at the Clinic/Health Care Centre:*

SL. NO	CONCERN ISSUE	RECOMMENDED MEASURES	IMPLEMENTATION/ COMPLIANCES: YES/NO	REMEDIAL MEASURES
1.	Medical wastes from clinic/health care centre	i. Proper and adequate provision of disposal of medical wastes from clinic/health care centre. ii. A 5x5 meter concrete pit can be constructed for disposal of clinical wastes at the health centre premises,	Partially	Compliance fully
2.	Gender equity	Gender equity should be followed during the service of the patients,	Yes	Compliance
3.	First Aid Facilities	First Aid Facilities should be available in the clinic/health care centre	Yes	Compliance
4.	Availability of fire fighting equipments	Firefighting equipment should be available in the clinic/health care centre	No	Immediate compliance
5.	Pure drinking water	Pure drinking water (Arsenic free) should be provided in the clinic/health care centre	Yes	Compliance
6.	Electrification in the Clinic	Electricity, Fan, Light should be available in the clinic/health care centre so that no problem arises during the operation of the clinic, (Energy efficiency light, fan etc. can be used,)	Yes	Compliance
7.	Improper disposal of clinical wastes may cause of verities of dieses.	• Arrangement of wastes disposal bin in every room of the clinic and disposed of clinical wastes in the bin afterwards collection of clinical wastes from the rooms and disposed properly as described in the waste management system of the clinic/health care centre. • Awareness training of the personnel of the clinic on the clinical wastes disposal system,	Partially	Compliance fully

8.	Sanitation facilities	• Sanitation facilities (wash room, urinal etc.) should be made available in the clinic/health care centre and provision of water closet and flushing system in the toilet and bathroom and fixing of hand basins and cleanliness should be available, • Separate washroom for women and men clearly marked up,	Yes	Compliance
9.	Ventilation within the clinic/health care centre,	Provision of adequate ventilation in the clinic/health care centre,	Yes	Compliance
10.	Domestic sewage	Domestic sewage from the clinic/health care centre shall be subject to suitable treatment prior to discharge in to environment. Under no circumstances untreated wastes shall be discharged into the environment.	Partially	Compliance fully
11.	Praying room	Praying room can be made available in the clinic/health care centre, can be separated for men and women,	Partially	Compliance fully
12.	Management of clinical wastes	Clinical wastes from the health care centre should strictly be disposed to the designated concrete covered pit by the clinic/health care centre authority so that surrounding environment not be polluted.	Partially	Compliance fully
13.	No smoking zone	No smoking zone should be declared in the clinic and can be postured in the clinic wall.	Partially	Compliance fully

Table no-2: *Monitoring format for the construction site: Compliances and non-Compliances issues*

Sl. No	Concern Issues	Recommended measures	Implementation/ Compliances: Yes/No	Remedial Measures
1.	**Appointment of environment manager by the contractor,**	The contractor yet to be appointed environment manager at the site.	**No**	**Immediate compliance**
2.	**Use of safety kits by the construction labors,**	Not using safety kits on the day I visited the site	**No**	**Immediate compliance**
3.	**Base Camp**	Base camp should be construct as per specifications	**Partially**	**Compliance fully**
4.	**First Aid facilities in the construction camp,**	Ensure that First Aid Facilities should be made available at the camp and at the construction sites,	**No**	**Immediate compliance**
5.	**Fire Fighting Equipment's**	Fire Fighting Equipment's should adequately be placed at the base camp to prevent any accidental fire	**No**	**Immediate compliance**
6.	**Drinking water**	Clean drinking water to all workers	**Yes**	**Compliance**
7.	**Protection activities**	Adequate protection to the general public, including safety barriers and marking of construction areas;	**Yes**	**Compliance**
8.	**Dumping of construction materials on the road**	Traffic problem	**No**	**Immediate compliance**
9.	**Drainage problem**	Adequate drainage throughout the camp to ensure that disease vectors such as stagnant water bodies and puddles do not form,	**Yes**	**Compliance**
10.	**Child labor**	Ensure that no child labor will be deployed,	**Yes**	**Compliance**
11.	**Air Pollution**	Water spray should be done along the construction area so that surrounding environment not be polluted by dust, smog, etc	**Partially**	**Compliance fully**
12.	**Soil Pollution**	Spill of oil and grease from the vehicles at the	**Partially**	**Compliance fully**

		construction sites and during re-feeling time should be taken care so that no soil polluted by this type of activities.		
13.	**Disposal of wastes**	Ensure that there is adequate provision of correctly marked waste containers made available at convenient locations for the disposal of wastes at the construction area,	**Partially**	**Compliance fully**
14.	**toilet and ablution facilities**	Ensure that adequate toilet and ablution facilities are provided at the construction site and base camp,	**Partially**	**Compliance fully**
15.	**Finishing works and activities,**	The finishing work yet to be done as construction activities not finished.	**Partially**	**Compliance fully**

Submitted By:

(Dr. Mohsin Almaji)

Environment Specialist,

UPHCSDP.

Annex-1:

List of Flora and Fauna

Table 3.1: Terrestrial Fauna Amphibian

Sl. No.	Local Name	Scientific Name	Status
01	Pana Bang	*Rana tytleri*	Common
02	Kuno Bang	*Bubo melanostictus*	"
03	Sona Bang	*Rana tigruna*	Rare
04	Ballon Frog	*Uperonon globulosus*	"
05	Skipper Frog	*Rana cyanophyctis*	"
06	Jhi Jhi Bang	*Rana timnocharis*	"

Source: field survey data base.

Table 3.2: Terrestrial Fauna Reptiles

Sl. No.	Local Name	Scientific Name	Status
01	Anjila	*Mabuya carinata*	Common
02	Dhura Shap	*Amphiesma stolata*	"
03	Matia Shap	*Atretium schistosum*	"
04	Tiktiki	*Hemidactylus brooke*	"
05	Kari Katta	*Kachugotectum*	"
06	Daraish Shap	*Ptyas mucosus*	F. Common
07	Gokhra	*Naja lutra*	"
08	Kassap	*Chitra idica*	"
09	Gui Shap	*Varanus nubulosus*	Rare

Source: field survey data base.

Table 3.3: Terrestrial Fauna Mammals

Sl. No.	Local Name	Scientific Name	Status
01	Badur	*Pteropus giganteus*	Common
02	Idur	*Mus musculus*	"
03	Shial	*Vulpes bengalensis*	"
04	Chika	*Pipistrellus.sp*	"
05	Bagdash	*Viverra zibetha*	F. Common
06	Khekshial	*Canes aureas*	"
07	Beji	*Herpestes*	Rare

Source: field survey database.

Table 3.4: Terrestrial Fauna Birds

Sl. No.	Local Name	Scientific Name	Status
01	Choroi	*Passer domesticus*	Common
02	Doyel	*Opsychus sularis*	“
03	Kak	*Carvus splendens*	“
04	Bagari	*Emberiza spodocephala*	“
05	Ghugho	*Streptapelia Orientalis*	“
06	Shalik	*Stuma contra*	“
07	Kokil	*Eudynamus scolopacea*	“
08	Bok	*Ardea alba*	“
09	Tuntuni	*Orthotomus sutorius*	
10	Badur	*Pteropus giganteus*	“
11	Chil	*Milvus migrans*	F. Common
12	Machranga	*Helcyon smyrrensis*	“
13	Tota	*Psittacula alexandari*	“
14	Haludpakhi	*Oriolus xanthornus*	“
15	Katthokra	*Picus canus*	“
16	Pecha	*Tyto alba*	Rare
17	Shakun	*Gyps bengalensis*	“
18	Tia	*Psittacula Krameri*	“

Source: field survey database.

Table 3.5: *Terrestrial Natural Flora*

Sl. No.	Local Name	Scientific Name	Status
01	Boiraj	*Anesoptera scaphula (Roxb)*	Common
02	Jam	*Syzygium spp*	“
03	Bansh	*Bambusa spp.*	“
04	Am	*Melia agedaroch*	“
05	Korroi	*Albizia procera benth*	“
06	Jika	*Lannea koromandelica*	“
07	Sitki	*Phyllanthus reticulatus*	“
08	Borroi	*Zizyphus mauritiana*	“
09	Satni	*Alstonia acholaris Br.*	“
10	Peyara	*Psidium guajava*	“
11	Kalagas	*Musa spp.*	“
12	Shimul	*Bombax cetha*	F. Commom
13	Tetul	*Tamarindus indicus L.*	“
14	Dumur	*Ficus hispida L.f*	“
15	Shora	*Streblus asper (Lower)*	“
16	Bebya	*Cratoxylon rerifolium Kurf*	“
17	Jarut	*Lagerstroemis specioss (L)*	“
18	Matur	*Pisum Satiyum L*	“
19	Tal	*Botsddud flabellifra L.*	Rare
20	Hizal	*Borringtomia racemosa*	“
21	Nim	*Acadirachta indica*	“
22	Kamranga	*Averrhoea carambola*	“
23	Rati	*Abrus precatorius*	“
24	Chalta	*Dillenia indica*	“

Source: field survey database.

Table 3.6: Terrestrial Planted Flora

Sl. No.	Local Name	Scientific Name	Status
01	Tezpata	*Cinnamomum tamala (Nees)*	Common
02	Amgas	*Melia agedarach*	"
03	Kathal	*Artocarpus heterophutlus*	"
04	Supari	*Areca catechu*	"
05	Lichu	*Litchi chinenesis Sonn.*	"
06	Khezur	*Phoenix sylvestria (L)*	"
07	Satni	*Alstonia acholaris Br.*	"
08	Kalagas	*Mysa spp.*	"
09	Lebu	*Citrus aurantifolia*	"
10	Bel	*Aegle maronelos*	"
11	Peara	*Psidium guajava*	"
12	Narikel	*Cocos nucifera*	"
13	Jambura	*Citrus grandis*	F. Common
14	Tetul	*Tamarindus indicus*	"
15	Lukluki	*Flacourtia jangomas*	"
16	Jalpai	*Elacocarpus roustus*	Rare
17	Tal	*Borrasus flabellifera L.*	"
18	Kamla	*Citrus reticulata Blanco*	"
19	Anarosh	*Ananas sativus*	"

Source: field survey database.

Table 3.7: Terrestrial Herbal/ Medicinal Flora

Sl. No.	Local Name	Scientific Name	Status
01	Akanda	**Calotropis gigantea**	Common
02	Bashok	*Adhtoda vasica nees*	"
03	Tulshipata	*Ocimum americanun L.*	"
04	Dumur	*Ficus hispida L.f.*	"
05	Nim	*Acadirachta indica*	"
06	Arjun	*Germinalia arjuna Bed*	"
07	Bish Bizaura	*Citrus medic*	F. Common
08	Ulat Kumbal	*Abroma augusta*	"

Source: field survey database.

Table 3.8: Aquatic Fauna

Sl. No.	Local Name	Scientific Name	Status
01	Kakra	**Seylla serratta**	Common
02	Shamuk	*Anastemus oscitans*	"
03	Zhinuk		"
04	Guishap	*Varanus bengalensis*	"
05	Rui	*Labeo rohita*	F. Common
06	Air Fish	*Mystus aor*	"
07	Boal	*Wallago attu*	"
08	Bang	*Bufo melanostictus*	"
09	Dhora shap	*Xencehrophis piscator*	"
10	Kachim	*Trionyx gangeticus*	"
11	Udh	*Lutra lutra*	Rare

Source: HCL field survey database.

Table-3.9 Aquatic Flora

Sl. No.	Local Name	Scientific Name	Status
01	Dholkalmi	*Ipomoea fistulosa*	Common
02	Muthagas	*Cyperus spp*	“
03	Kachuripana	*Elchhornis*	“
04	Hoggal	*Typha elephantinaRoxb*	“
05	Sheola	*Biysca octandra*	“
06	Shapla	*Nymphaea nouchali Burm,f ,*	“
07	Ghagra	*Xanthium indicum*	F.Common
08	Khudi Kachuripana	*Lemna Spp*	“
09	Padmaphul	*Schumanntanthus dichosomus*	“
10	Kalmi	*Ipomoea albo.L*	“
11	Shalook	*Nymphaea nouchali burm*	“
12	Jal Padma	*Nelumbo nucifera gaertn*	“
13	Bishkatali	*Polygonum sp*	Rare
14	Hizal	*Baringtonia acutangula*	“
15	Kharjara	*Litsea monopetala*	“
16	Keorali	*Hydrilla verticillata*	“

Source: HCL field survey data base.