

CURRENT STATUS OF URBAN ENVIRONMENT: A CASE STUDY ON PAIKGACHA MUNICIPALITY, KHULNA

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ABSTRACT

The aim of this study was to evaluate the existing situation of urban environment management of municipalities in Bangladesh, most particularly in Khulna city. Urban environment management is a potential dimension to keep pace with the adverse impacts of rapid urbanization and population growth. According to Bangladesh Paurashava Ordinance 1977, municipalities are assigned some duties regarding this issue. However, the municipality faces various problems during performing the duties, including scarcity of funds, poor monitoring process, low accountability, lack of implications of proper urban planning etc. which eventually result in poor service delivery. Paikgacha municipality area has been chosen as the study area for this study. This municipality was formed on 1 February 1998. The estimated population of the area is about 20,504 and the density of population is about 5640 per sq. km. It covers a total area of 6.94 sq. km.

Primary data were collected through questionnaire survey on 30 local people and expert opinion survey of the municipal authority of Paikgacha from March, 2019 to October, 2019. Some other secondary data sources have been used like various information gathered from Municipality office, BBS, LGED and other data. The primary data were given input in SPSS software and several analysis showing various dimensions of environment management were done. Using ArcGIS10.5 software, different maps were created indicating influence of various factors. From the perspective of drainage condition, transportation, waste disposal, waterbody condition etc. factors, the current environment status of the municipality was found to be moderate and seeks more monitoring and maintenance for its betterment. Such as the study reveals that about 33.33% of the total waterbodies were fresh, while, 30% covered by aquatic plants and 16.67% have odour problem in the municipality area. The whole study area has good connectivity of “pucca” drainage network constructed by the municipality in 2000. The drainage problem faced most by the people is water logging, odour problem and insect breeding and the prime cause of these problems is the vulnerable condition of the main discharge point. The drainage network discharged all the waste water into the Shibsra River without any treatment which accelerates river pollution. There are adequate number of community dustbins inside the area installed by the municipality but most of the people (about 60%) dump their household wastes here and there, only about 33.33% people used dustbin. The municipal authority finally dumps those raw wastes into the bank of the Shibsra River. There are not enough facilities for physical exercise in the municipal area, only one park for children is there which is maintained by the municipality. Due to lack of proper planning and sufficient technical support, Paikgacha Municipal Authority is incapable of managing the urban environment properly in response to the population dynamics.

Keywords: *Urban Environment Managements, Municipality, Environmental factors, ArcGIS.*

1. INTRODUCTION

In order to develop a sustainable, inclusive and zestful city, Urban Environmental Management reacts to the need of evaluating urban growth and environmental problems from the perspective of management and planning (Allen, 2003). Its main purpose is to address the challenge of sustainability as well as also gathers theories and aspects in established sectors of urban planning, sustainable urban and regional development, urban economics and urban governance and management studies into a distinguishable framework. The Environmental Management methodology is a proven method of finding and measuring the impact of built in environment on the whole environment (Ghosh, 2003). It allows planners to demand reliable and comparable information regarding environment. Themes include urbanization processes, spatial analytical techniques, urban indicators and monitoring, governance of urban regions, training in waste management, modeling and scenario analysis, environmental assessment etc. (Allen, 2003). In a wider sense, the urban environment consists of natural resources and living organisms and the processes of transforming the raw resources into various other useable products and services is urban environment management (Das, 2018).

Considering local government as an organ of a country, municipality is the cell of local government in urban area. A municipality may be designated as a city, village, or town (Encyclopaedia Britannica, 1998). Sao Paulo, a municipality located at the south-eastern region of Brazil, achieved significant development regarding green areas in the last decade. For this purpose, the municipality authority of Sao Paulo occupies the institutional and legal structures as well as takes initiatives to ensure community participation to make it more sustainable (Carbone, 2015). To attain sustainable development, the municipal authority also has to control its actions in such a manner so that any changes in management body do not create any discontinuity of activities. Again, without participatory and inclusive approach of the local government, no technology, capital or expertise can protect the environment (Shafqat, 2011). A successful study of urban environment management in New Zealand represents that it is possible to easily manage and improve the environmental condition with the help and assistance of the local people (Marsh, 2012).

Environmental management is another important responsibility of the municipalities of Bangladesh together with the mentioned above. A successful example of this is Chunarughat Paurashava of Habiganj District, they performed this responsibility by ensuring garbage collection, proper disposal of wastes, constructing sewerage, protecting public park and so on (Chowdhury, 2012). However, they also face some challenges during conducting these activities, including scarcity of funds, poor and irregular collection of fees, and dependence on governmental grants, poor monitoring system, low liability, and lack of urban planning. All these cause a poor delivery of services, degrading the environmental quality and quality of civic conveniences.

1.1 Novelty and Significance of the study:

The main contribution of this paper is to assess the urban environment status of Paikgacha municipality, which will in future promote more research works regarding urban environment condition of other municipal areas of Bangladesh. Very small amount of research work is conducted at municipality level of the country but municipality plays a very vital role in local government system. Paikgacha, being in the south-east region of Bangladesh is more vulnerable to natural calamities and lies in the saline zone. Due to this features the overall urban environment of this area is more disrupted than others.

This study aims to show the urban status of the environment of Paikgacha municipality. Different facilities and services of past and present (e.g. water body, drainage system, waste management system, recreation facilities, transportation system etc.) has been identified. Environmental details of this municipality and the impacts and effects of existing services on the environment have been analyzed using participatory approach. And finally the overall scenario has been graphically illustrated and described.

2. METHODOLOGY

The main concept of the study was based on objectives taken and originated from the literature review done before. A Literature Review developed on the basis of gathering knowledge about how the procedure could be performed and the collected data from field survey could be analyzed. Then Paikgacha has been chosen as the study area for the study. Different facilities and services of past and present which affects the environment and are the responsibility of the municipality (e.g. water body, drainage system, waste management system, recreation facilities, transportation system etc.) has been identified. Primary data were collected through physical and household survey and secondary data were collected from expert opinion survey, municipality office, local government engineering department (LGED). After collection, data were being prepare to analyze and interpretation. Environmental details of this municipality and the impacts and effects of existing services on the environment have been analyzed. Data analysis procedure has been conducted using statistical software and different charts and analytical figures have been made to show comparisons.

2.1 Study Area

Paikgacha municipality area has been chosen as the study area for this study. The estimated population of our study area is about 20,504 and the density of population is about 5640 per sq. km (Bangladesh Bureau of Statistics, 2001). The geographical location of the study area is between 22°28' and 22°43' north latitudes and in between 89°14' and 89°28' east longitudes. It covers a total area of 6.94 sq. km. It is bounded by Tala and Dumuria Upazilas on the north, Koyra Upazila on the south, Batiaghata and Dacope Upazilas on the east, Tala and Assasuni Upazilas on the west. Paikgachha Municipality was formed on 1 February 1998 (Banglapedia - the National Encyclopedia of Bangladesh, 2012). Figure 1 shows the map of the study area.

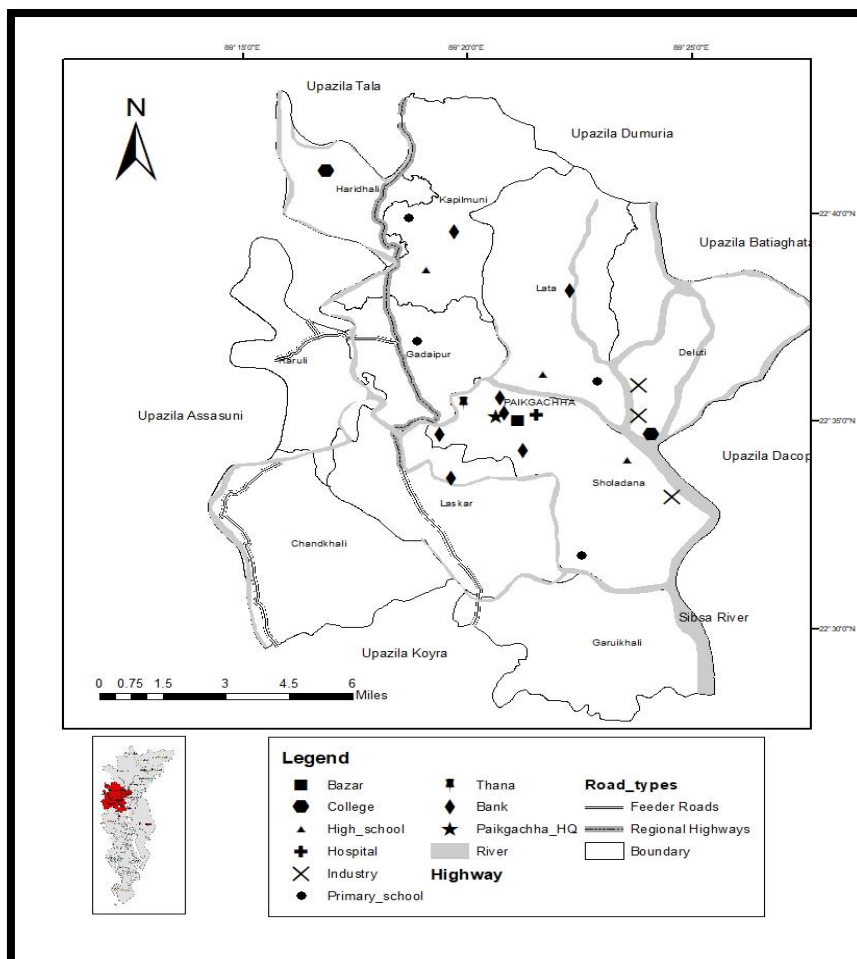


Figure 1: Paikgacha Municipality, Source: Author, 2019

2.2 Study Design

The necessary primary data of urban environment of Paikgacha Municipality area has been collected by conducting an effective field survey like, Reconnaissance Field Survey, Focus group discussion and household survey of 30 local people and expert opinion survey of the municipal authority. Some other secondary data sources have been used like various information gathered from Municipality office, BBS, LGED and other data.

The overall analysis of this study was mainly SPSS software. At first, all the data collected from questionnaire survey have been inputted to SPSS declaring its respective variables. Then statistical analysis has been done considering the factors that affect the environment in terms of water pollution and air pollution (e.g. water body, drainage system, waste management system, recreation facilities, transportation system etc.). And finally, on the basis of the analysis, pie charts and bar charts have been formed to show the results of the analysis. Co-relation between several interlinked factors have also been represented. Maps representing the influence of several factors have been created using ArcGIS 10.5 software.

3. ANALYSIS AND FINDINGS

3.1 Management of Waterbodies and Water Supply System

Supplying the people of the municipality wholesome water in sufficient quantity for private and public use is a vital responsibility of the municipality authority as well as to maintain the condition of the existing water body. The area has huge number of water body such as pond, canals etc. and also two river named Shibsa River and Kopotakkho River also flow through the area. According to the respondents, about 33.33% of the total waterbodies are fresh, 30% are covered by aquatic plants and 16.67% have odour problem. The municipal authority along with LGED worked to preserve the existing lake of the area named “Mishti Pukur”. Table 1 shows the relationship the condition of the waterbody and its use.

Table 1: Relation between condition of water body and purpose of use

Present condition of the water body	Purpose of use		
	Fishing (%)	Domestic water supply (%)	No use (%)
Fresh	16.67	6.67	10
Covered by aquatic plants	6.67	13.33	3.33
Odor nuisance	0	6.67	0
Total	23.33	36.67	13.33

Source: Field Survey, 2019

From Table 1 it is noticed that the maximum number of water body used for fishing purpose were well maintained. For daily household work the water with odor nuisance is used regularly which is bad for the health of the residents.

Before 2014 most of the residents of the municipality used tube well to meet the need of drinking water as well as for household purpose. In March 2014, the municipal authority together with Nabolok, a non-governmental organisation which worked for safe, portable water, installed some community tap for domestic water need. They also construct an over-head water tank with the help of the deputy commissioner along the bank of “Shorol Dighi”.

3.2 Drainage Condition

To maintain public health condition, it is the responsibility of the municipality to maintain an adequate drainage system by constructing, maintaining and clearing the drains within the municipality area for safe public health situation. Before discharge ensuring proper treatment of the drain water is also very important to maintain the environmental condition. The whole study area has good connectivity of “pucca” drainage network which is constructed by the municipal authority in 2000. But the residents of the area also suffering from some problem due to improper drainage system. Figure 2 represents the recurrence each type of drainage problem according to the respondents.

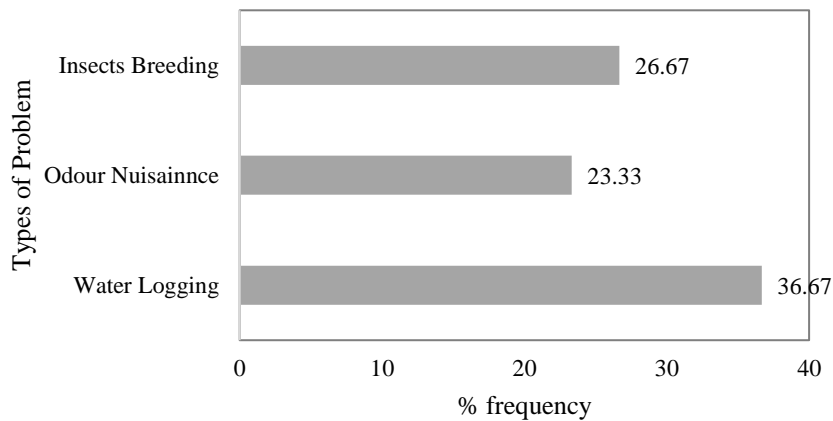


Figure 2: Effects of inadequate drainage
(Source: Author, 2019)

The problem which is faced most by the people is water logging and then insect breeding. Some people also found problem of odour due to inadequate drainage. Most of these problems arise as the existing condition of the discharging point of the drainage is vulnerable. The drainage network discharged all the waste water into the Shibsra River without any treatment which accelerates river pollution.

3.3 Solid Waste Management

Another key of public health and control of environmental pollution is proper management and safe disposal of solid waste generated from the area. Otherwise some common like low coverage, open dumping, irregular collection of wastes occurred which trigger environmental pollution. There are adequate number problems of community dustbin inside the area but most of the people (about 60%) said that they dumped their household wastes here and there, approximately 33.33% people said the wastes are thrown in dustbin. Very few people find some other way of disposing wastes. Table 2 shows the relationship the system of waste disposal and the distance of dustbin from the household.

Table 1:Relation between distance of dustbin and disposal system

Distance of dustbin (m)	System of waste disposal		
	Thrown here and there (%)	Thrown in the dustbin(%)	Disposed in other way (%)
<20	46.67	23.33	6.67
5	10	3.33	0
Total	56.67	26.67	6.67

Source: Field Survey, 2019

The Table 2 shows that most of the household have dustbin within 20 meters of their house i.e. there is adequate quantity of dustbin in the municipality but most of the people do not used it. Generally, they thrown waste along the roadside, on the pond side etc. Almost all the dustbins are provided by the municipality. The main reasons behind it is lack of concern of the residents and their previous habit as well as no maintenance of the dustbin by the municipality.

The municipal authority collects the wastes from the dustbins and finally dump those raw wastes into the bank of the Shibsra River.

3.4 Health Issue

Construction and maintenance of health and maternity centres, hospitals and dispensaries within the municipality area are the parts of promoting public health in the municipality. Weak management capacity always causes severe problems and worsens public health in the municipality.

There is only one hospital inside the area with capacity of 50 beds. The hospital is established on 1991 and later upgraded to 50 beds. The hospital is able to serve about 63% of the total municipality area.

Regular exercise is also very important to maintain a good physical and mental health. There are not enough facilities for performing physical exercise in the municipal area, only one park for children is there which is maintained by the municipality. According to the respondents 63.3% people have open space around their residence but only 26.7 % of them go to morning/evening walk daily. Figure 3 illustrate the causes of the people for not going to the existing park.

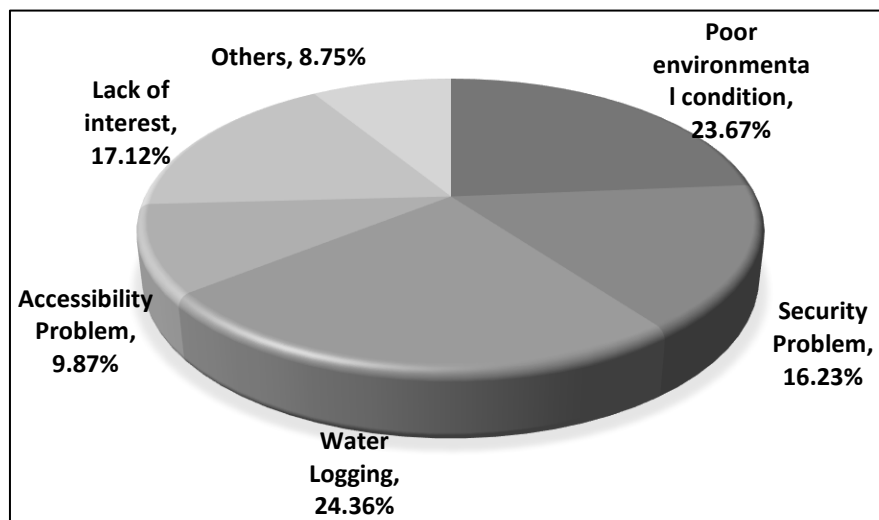


Figure 3: Causes of not going to parks,
Source: Author, 2019

3.5 Transport System

It is the duty of the municipality to control and regulate the traffic and public vehicles, constructing and maintaining public roads and other modes of communication for the favour of the local people. Almost all of the area have good connectivity of “pucca” road system.

Engineering section of the municipality authority mainly worked for the construction and maintenance of the roads of the municipality. LGED and Roads and Highway Department also worked along with the municipality authority for the maintenance and up gradations of the secondary roads.

Most of the residents of the area used non-motorized area vehicle for daily need to go to work which is beneficial for the environment as well as for the health of the local people.

Figure 4 shows the road network of Paikgacha municipality, which includes the main highway and other road types also.

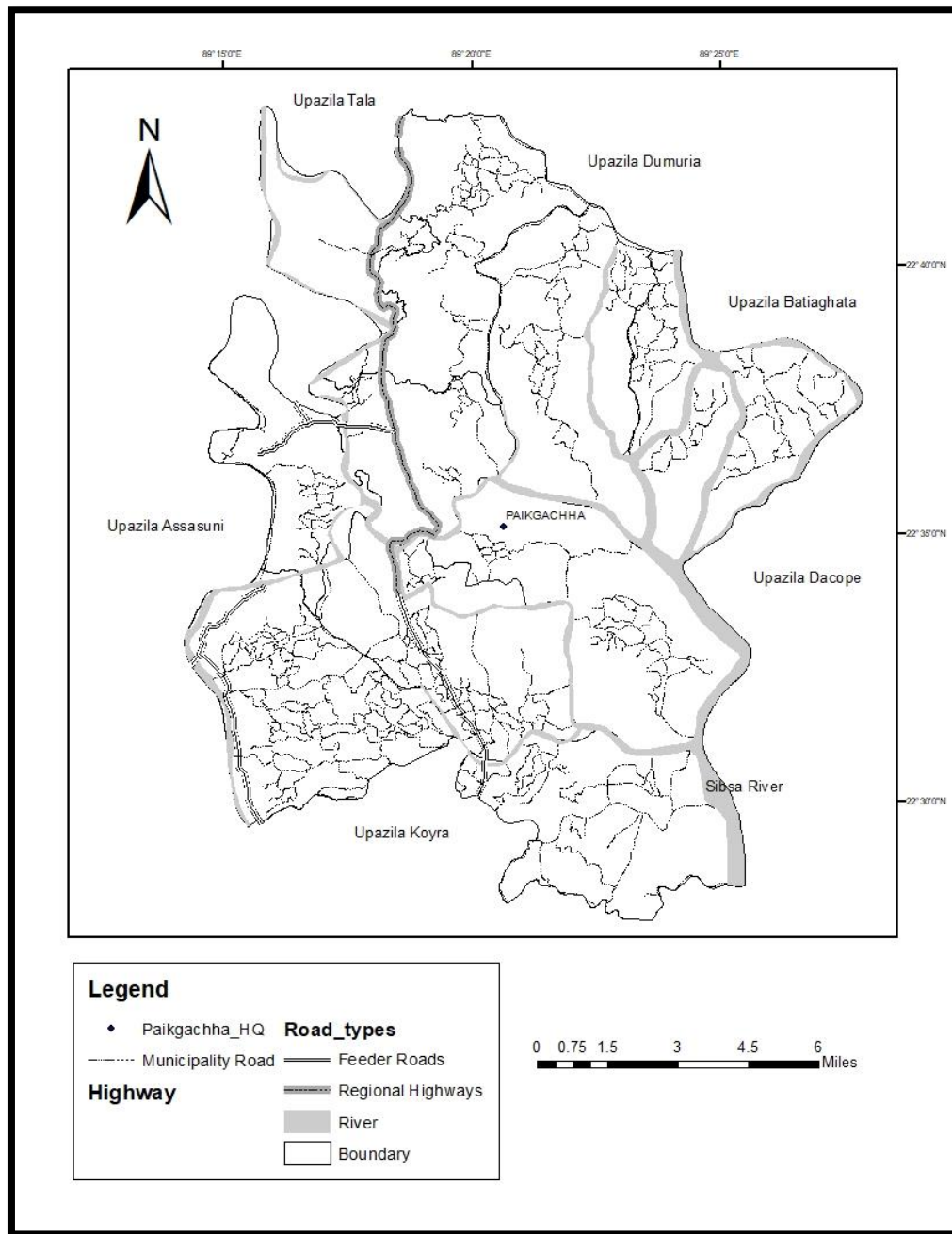


Figure 4: Road Map of Paikgacha Municipality
Source: Author, 2019

3.6 Industries of the area

The industries located inside the area are the main pollution sources. There are mainly three types of industry-rice mill, jute mill and a hatchery. During paddy processing in the rice mill, large amount of solid wastes, mainly rice husk, rice husk ash are produced and liquid wastes in the form wastewater. The major constituent of the waste generated from the jute mill are unspinnable jute fibre. The other constituents are batching oil, machine oil and grease, barks of jute plant and in-organic dirt. The hatchery is run by Bangladesh Fisheries Research Institute. Bagdha prawn and crab are mainly cultivated in the hatchery which are exported all over the country and even in abroad. The waste

generated from the hatchery are mainly the uneaten feed and fecal droppings, fish that do not survive the culture process, chemicals in the form of medications, disinfectants, and antifoulants etc(Dauda et al., 2018). Figure 5 shows the areas that are being populated by the existing industrial activities.

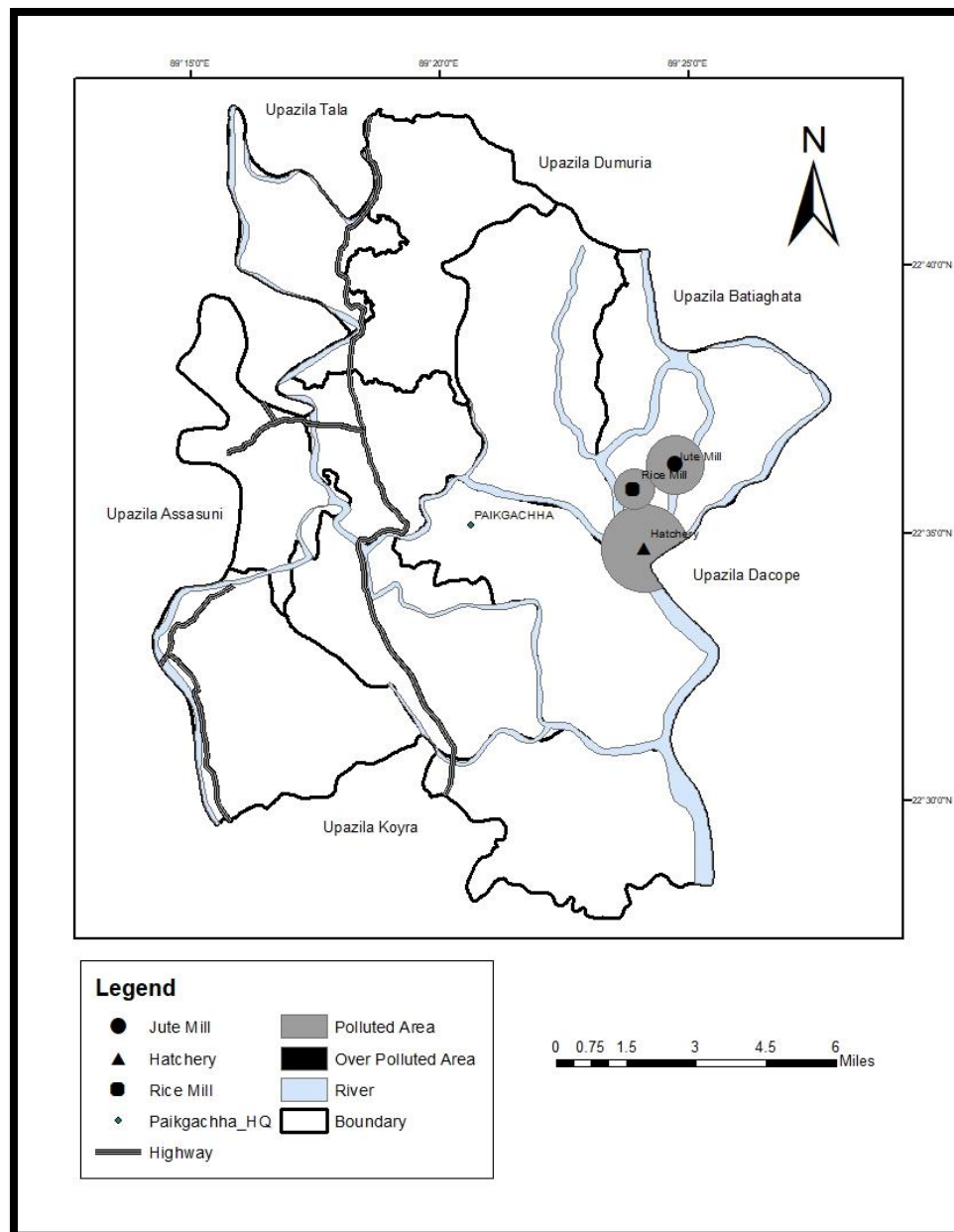


Figure 3: Influence of industry,
Source: Author, 2019

From Figure:5 it can be concluded that about 2.75% of the total area of the municipality are become polluted because of those three industries and 0.02% are over-polluted.

3.7 Homestead Garden

There are several environmental benefits of plantation within the house. Such benefits are creating habitats for native fauna, heat reduction, shading windows, reduce the speed and strength of winds, creating shelter for several microorganism and birds, improvement of air quality by removing carbon dioxide and returning oxygen to the atmosphere. Among the respondents about 63.33% have trees around their house. Most of them considered the economic benefit of trees and properly utilized their

backyard and front yard area. The others do not mainly because of lack of space and time as well as interest.

4. CONCLUSION

Urban environment management is a standardized method of examining urban growth and environmental problems from the management and planning perspectives to contribute to the development of sustainable. It is one of the major responsibilities of a municipal authority to manage the urban environment of the area and minimize the effects of pollution on them. In this project the environmental details of Paikgachha municipality have been identified. The final result shows that currently, the overall environmental status of Paikgachha municipality is moderate (27.75% of good condition and 19.38% of vulnerable condition) considering drainage condition, transportation, sanitation, waste disposal, waterbody condition etc. factors and seeks more monitoring and maintenance for its betterment.

- Three types of water bodies were found in the study area which play great role in the environmental management by providing water supply, act as natural drainage and a habitat of a large amount of species and micro-organisms. But the condition of those water body is not up to the mark, 33.33% of the total waterbodies are fresh, 30% are covered by aquatic plants and 16.67% have odor problem. The local people used this polluted water for daily uses even for cooking and other domestic use which is very threatening for their health.
- Almost the total area has pucca and semi pucca drainage system from 2000 but some drainage related problem still prevailed such as water logging, mosquito breeding in the area mainly due to lack of maintenance of the existing drainage network.
- Considering amount of negligence of the local people about their health and environmental issue are found. Most of the household have dustbin within 20 meters of their house but most of the people do not use it. Again 63.3% people have open space around their residence but only 26.7 % of them go to morning/evening walk daily. So, it is highly necessary to conduct awareness rising program in the area.
- From the study it is found that 2.75% of the total area of the municipality are become polluted and 0.02% are over-polluted because of the three industries- rice mill, jute mill and a hatchery.

Though the Paikgachha municipality authority keeps working for the management of the environment of that area, due to some technical and financial constraints they cannot give their best effort. Increasing the level of every municipalities management capacity of is a must to remove those constraints. The potentiality of the municipalities also needs to be addressed. Utilization of local resources, people oriented leadership and participation of people must be ensured alongside developing the management skill of municipality. This can ease the current pressure on the Paurashavas. And only then can they ensure a good quality of services and thereby a healthy and livable city.

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