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## **Water Logging and Losses in Ecosystem: A Case Analysis on DND Embankment, Bangladesh**

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### **Abstract**

*The paper attempts to explain the serious effects of water logging on ecology, especially the influences of DND embankment on the environment and lives concerned. This aspect hampers severely the living standard as well as the total environmental networks. Economic and business activities are being damaged along with the deteriorations of human health and educational services. It is investigated that 77 percent of the people living in Dhaka-Narayangonj-Demra (DND) area have been sufferings from different diseases, whereas educational losses are about 68 percent. In addition, 55 percent of businessmen are affected by water logging of DND embankment area in the rainy season of 2015. The main aim of the study is to investigate the losses of ecosystem by DND water logging problem. Moreover, it's another purpose is to find out the root causes of water logging in the habitats. Primary and secondary data has been used in the study work that is conducted in qualitative approach. 200 respondents have been interviewed for data collection. Besides, direct observation is another primary data source herein. Again, various sorts of documents related have been analyzed. Unplanned urbanization is the root cause of the then water logging; so state authority is suggested to take proper measures to check the anomalies along with the restoration of the natural drainage canals for rapid water discharge.*

**Key Words:** *Water logging, Drainage shortfall, Natural drainage canal, Neo-liberal urbanization, Ecosystem failure.*

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## **Introduction**

Water logging is a great problem world wide including Bangladesh in the 21<sup>st</sup> century. Actually it can be considered as a bad outcome of technological and economic development in the present age. It has become an increasing problem in recent years for a variety of reasons: natural changes in river flow, increased sediment in riverbeds due to reduced sediment depositions on floodplains protected by embankments, and a lack of operation and maintenance of sluice gates of the polders.<sup>1</sup> The problem affects the agricultural rural people as well as the urban residents heavily. In the past years, mainly farmers would experience the hazards; but presently the dwellings of the big urban areas are badly affected hereby. Water logging causes serious humanitarian crisis creating challenges in living condition, livelihood, health, food, security, employment, education and communication for a several months.

The main reasons of water logging in corn fields are due to block or filled up the drainage canals by greedy farmers to increase their crop lands. On the other hand, different development structures such as embankments, polders, bridge, culverts, and roads that causes the demise of water drainage. Moreover, unplanned and liberal urbanization process makes the water congestion a death trap to the city residents. Urban water stagnancy causes traffic jam and kills work hour. Sanitation, diseases, crisis of drinking water is normal scenario in logged area. The South-western coastal districts (about 16 districts) are greatly affected zone from where people are displacing to others. As most of the agricultural lands goes under water for nine months, the people have to be forced unemployed. The coastal polders, shrimp farming, climate change make this a one kind of handicapped region. Jessore, Khulna, Satkhira are the challenged most districts. Salinity has been a curse to the farmers of the districts. Even the agricultural lands of the whole Bangladesh are more or less experience the water congestion problem at present time. Because, new canals are not excavated more and the existing ones are being narrow down or grabbed by the influential villagers. On the other hand, neo-liberal and unplanned urbanization causes the water logging in Dhaka, Chittagong, Sylhet, Noakhali, Khulna and so on. Every year, it creates the plenty of pains to the city dwellers – municipal authority takes some projects as short term basis – but after some time they are disappeared suddenly. Currently Dhaka-Narayanganj-Demra (DND) embankment area is the worst suffered zone that happens every year causing dangerous losses and damages in the living conditions and the whole ecosystem. The people, as if, have been habituated with the disaster as a normal phenomenon. After 2004, 2006, in 2015 the DND embankment area has been water logged dangerously due to torrential rainfall from June to August. A good number of roads, kitchen markets, business centers, houses and schools went under ankle-to-knee deep water during the current spell of rain for the last few days. Locals blamed unplanned buildings in wetlands, illegal encroachment of low-lying areas, and a lack of regular cleaning of the drains for the situation.<sup>2</sup> Most of the drainage canal and channels are actually clogged due to indiscriminate disposal of solid waste. As a result, the rain water cannot discharge to the point of pumping station situated at Shimrail, Narayanganj district. The water logging in 2015 of DND project area has been taken as the case to be studied in this paper.

## **Objectives of the Study**

The study primarily examines the adverse effects of DND water logging on ecological services. Moreover, it has investigated the lives and livelihood. The paper analyzes the infrastructural damaged aspects of household, school, medical centers and business centers. There are several specific purposes of the study. These are:

- (i) To find out the root causes of water logging.
- (ii) To explain the losses of ecosystem.
- (iii) To suggest several policy issues to ease the crisis.

## **Methodology**

This is an explanatory type of research work which has been conducted mainly in qualitative approach. But quantitative approach has been taken herein for strengthening the arguments. Primary and secondary data sources are selected for collecting data properly.

- i. Data Collection:** Some 200 key informants have been interviewed through a semi-structured interview schedule. Businessmen, housewife, students, fish farmers, labors, common dwellers have been chosen as interviewees. The informants have been selected

randomly. 19 observations were set up in the schedule which includes the health, education, communication, livestock, plants, business and so on.

- ii. **Area of Data Collection:** Through the purposive sampling technique villages/mohollas have been taken for data collection. South Dogair under Demra, Matual under Matual, Bhuighor under Fotulla and Jhalkuri under Shiddirgonj Thana were the data collection areas in the research work. The four villages can represent the whole Dhaka-Narayangonj-Demra (DND) embankment area as they are the affected most.

Moreover, direct observation and document analysis were a good source of data collection.

## **Major Causes of Water Logging in Bangladesh**

The people of Bangladesh suffer water logging hazards not only in rural area but also in urban zone. Since medieval age Bangladesh has been experienced this problem in crop land in villages; but city dwellers are affecting hereby since just 40 years. Main cause of the problem lies in the lacks of sustainable development policy. When a ruling government has to think of next election for power race, they are psychologically forced to adopt the short-term policy and that causes environmental disaster. Main causes of water logging are stated below:

- (i) Development policies are adopted on the basis of research findings hardly in Bangladesh. Since Pakistan regime, most of the projects on water resource management have been implemented influenced by the prescription of donor agencies, not by the proper ground work.
- (ii) Naturally Bangladesh is a low-lying land. Every year during monsoon, the water from upstream states flows down to the Bay of Bengal by touching Bangladesh water bodies. But the river beds of most of the rivers have already been silted badly. As a result, almost 20-30 percent of the waters are logged in the low lying lands and they are stayed up to 1-6 months.
- (iii) Climate change is a striking role player for water logging. Every year sea level may be rising up to 2 cm. It is found from the satellite data that relative sea-level rise occurring for Bangladesh 8-18 mm/yr.<sup>3</sup> This situation causes water logging in the coastal areas adversely as the course of upstream water slows down that makes diverted onto the catchments areas and those cannot drained out properly due to the lack of proper canals or channels.
- (iv) Unplanned and neo-liberal urbanization frequently causes water congestion in whole Bangladesh more or less. The water logging of Dhaka, DND area and Chittagong are mainly caused due to indiscriminate urbanization. Level of urbanization in Bangladesh in 2011 was found as 28.4%.<sup>4</sup> But drainage network and their management mechanism actually are lowered compared to the density of population. Moreover, city dwellers are not civic duly in sense of proper waste management in urban areas.
- (v) The whole drainage network is being blocked frequently due to the indiscriminate solid waste disposal. Besides, the sewage drains are not cleaned properly and adequately.
- (vi) Natural drainage canals both in urban and rural areas are going to be demise of human intervention. Some 26 canals in Dhaka and 5 in DND project are presently in about out of order. Other drainage networks in DND area are almost clogged or narrow.
- (vii) Unplanned infrastructural development is causing perilous hazards in all Bangladesh. Concrete roads, bridge, culverts, box, water pocket, dams, polders, business structures are being developed, in fact, as a short term goal. Moreover, all the physical development

process seems to be a function of lack of proper feasibility study in sense of nature preservation.

## **Salient Features of DND Area**

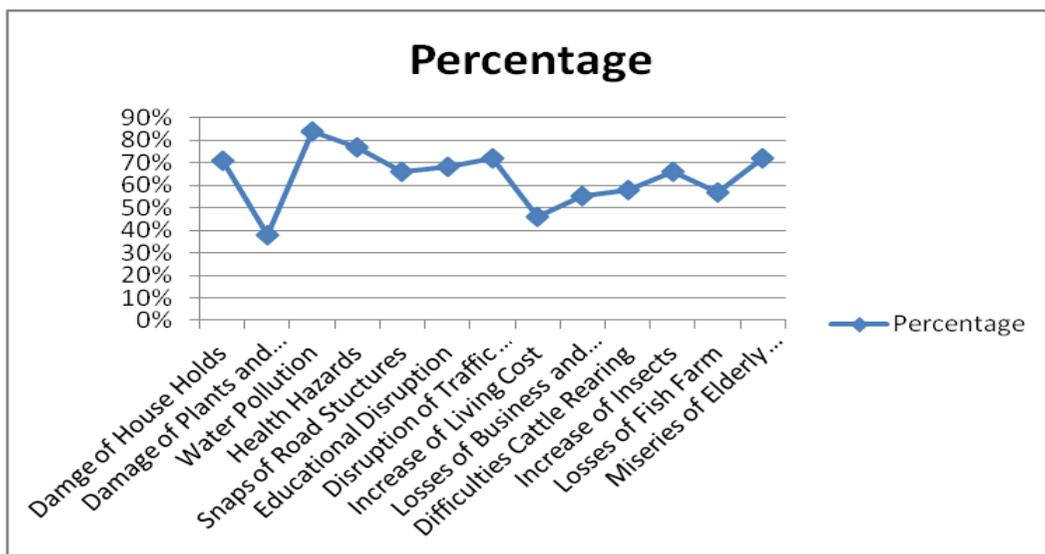
Dhaka–Narayanganj–Demra project is located between the cities of Dhaka and Narayanganj and bounded by the Buriganga and the Shitalakshya River. It was started in 1962 and completed in 1968 at a cost of Tk. 22.9 million. A dual purpose pumping station is located at Shimrail having a total capacity of 4.2 cusec. The project provides flood control for 4,860 hectares, irrigation for 6,070 hectares, pumped drainage for 4,860 hectares and gravity drainage for 2,470 hectares of land.<sup>5</sup> The DND embankment area was developed on 56.79 square kilometers of land in Fotullah and Siddhirganj of Narayanganj and Demra, Kadamtuli and Shyampur Thana of Dhaka district. It was regarded as a successful project then; but it has already been a great threat due to water logging. At the beginning stage it was only a land of agriculture which has currently been turned into an urban and industrial zone though all have been in an unplanned and indiscriminately.

Nearly 3 million of people are living here and increasing at about 15 percent/ year. By 2030 it would be an area of about 5.5 million people that must be considered a complete urban zone. But a question, how can it be managed properly? Demra, Shyampur, Kutubpur, Matuail, Siddhirganj, Godnail, Madaninagar, Bhuigar, Pagla, Fatulla etc. of DND area are approaching to an urban area at a very fast rate. Already wards (small administrative part of city corporation) 88, 89 of Dhaka City Corporation; wards 1, 2, 3 & 4 of Narayanganj and Siddhirganj Pourashava (now under city corporation) are declared urban areas within the project. Other Pourashavas under consideration for declaration are Kutubpur, Fatulla and Matuail.<sup>6</sup> The whole DND area is bounded by road-cum-embankments and floodwalls. The major project components were 31.25 km (now 31.00 km) road-cum-flood control embankment, 55.20 km irrigation canal, 45.40 km. drainage canal, 1.00 km intake canal, 216 nos. water control structures and one pump station at Shimrail with 4 pumps (14.52 cusec capacity). As the area is developed for drainage and irrigation, it is supplied with irrigation water in December to May and generally floods free.<sup>7</sup>

The total area is generally a low-lying land of which elevation is 2.0-2.5m PWD. Only 1 out of 5 natural canals is active and others are almost dead due to encroachment and filled up. The five canals were namely as DL-1, Pagla Khal, Fatullah Khal, Chanmari Branch Khal and Isdair (NR-1 Khal). Dhaka-Narayanganj Link Road has made all the drainage canals vulnerable most. Moreover, wall boundary plots and indiscriminate fish farming are greatly responsible for water congestion herein. Dhaka-Chittagong 4 lane road construction and newly constructed muddy roads within the project hampers the drainage system as there has been installed narrow pipe under the roads to be water circulation that is badly inadequate. Each year the area is affected by water logging, but in 2004, 2006 and 2015 it turned into a serious condition. About 80 percent of population is in greatly hazards in the water congestion of 2015. Although DND area is developed for housing under the monitoring activity of Capital Development Authority (RAJUK) and water management function is conducted by Bangladesh Water Development Board (BWDB), it is running at very little performance by them. Although the authorities have been negligent over the issue, water logging victims are living at Jatrabari, Dholaipar, Shekdi, Donia, Nayanagar, Kajla, Chhontek, Della, Dogair, and Matuail had clashed with the influential land grabbers on several occasions.

## Losses in Ecosystem of DND Area

In 2015 the DND project area has been affected dangerously by water logging. From June, torrential rains cause a great disaster in all aspects of human lives. The losses or damages have been shown here in a statistical (graphical) form. The data has been collected through a field interview survey. Some 200 respondents have been interviewed in 4 villages/mahallas named South Dogair, Matuail, Bhuighor, Jhalkuri. Statistical data is presented below in graphical shape:



**Figure1: Different Types of Losses in Ecosystem of DND Water Logged Area, 2015**

Field survey and direct observation show that most of the people’s lives were in hazardous conditions and data has been presented on the graph. About 71 percent of households have been damaged partially or fully; home yard and house passages are inundated. Nearly 84 percent of water sheds have been polluted by industrial and household wastes that smell badly and causes waterborne diseases of about 77 percent of the citizens. Moreover, 66 percent of roads and paths go under water resulting in the disruption of traffic movement of 72 percent. Officials, school goers have to face different difficulties on the roads. That’s why, living cost increases about 46 percent of each family; even 72 percent of elderly people and children fall into a movement and playing related miseries. Most of the time, they have to stay inside home as a confined manner. The informal workers (rickshaw puller, vendors, hawker, and grocery shoppers) face hardship heavily and their income decreases about 74 percent. And many of them were forced to sit idle closing their business. Majority of the people were suffering from different diseases such as diarrhea, fever, dysentery, skin disease, jaundice, hepatitis B, C, etc. Schools went to shut down and the roads to schools go under water causing almost 68 percent of child education hindrance. Besides, children were afraid of various insects (snakes), slipping down in muddy paths, wetting clothes etc. Livestock and fish farms are gotten perilous situation. Many of the fishes go out, get dead being poisoned; even net fencing, and keeping vigilance workers of the fish farms increase the cost nearly 57 percent. Again, household women got hazards in rearing their cattle animals as feeding problem and diseases make

them vulnerable. In South Dogair village at every night robber would have attacked the marooned people and robbed of them valuables and hurt them with sharp weapons. Nearly 36 percent of dwellers were in threats of robbing and other security problems. Finally, it can be mentioned that the business and industries incurs heavy losses. They incurred about 55 percent of loss that actually incurable. Labors can not move to mills and shops due to marooned roads and many mills go under flood water.

## **Policy Implications**

Several specific findings have been found out; so a good numbers of policy recommendations are placed to be considered by policy setters. These are:

- (i) A separate and single administrative regulatory body should be formed.
- (ii) A comprehensive DND development policy is suggested to formulate.
- (iii) Filled up canals ought to be restored and new several drainage canals have to be excavated.
- (iv) The existing dwellers are essential to be aware of proper structure development and thus waste disposal measure.
- (v) Industries should be brought under strict waste management process.
- (vi) Government's physical development activities and pumping station would have to be good performers.
- (vii) Illegal grabbers and fish farmers suggested to be taken under proper monitoring system and trial measure.
- (viii) During the water logging period the state authority should provide adequate relief materials and implement rehabilitation projects.

## **Conclusion**

It is finally found that water logging turned into a serious problem in Bangladesh. Along with the water congestion of South-Western region of Bangladesh, DND area is a badly suffered project at present time. It is observed that neo-liberal urbanization and unjust human activities are closely related with water logging. Moreover, mismanagement of the administrative authority concerned is heavily responsible for water stagnancy in the embankment urban area. Currently the area is to be regarded as an urban area and that's why, a separate regulatory body is suggested to form so that it can be developed and expanded properly. The natural drainage canals are to be restored to carry up the rain water to the point of pump station installed in Shimrail and Demra. Besides, at least 5 more new canals should be excavated immediately. There are lots of potential of DND area if it can be developed perfectly. In this area, planned industrialization can generate huge numbers of employment and make high rate of economic growth as communication and energy facility are available here. In addition, right urbanization process can accommodate millions of people that will ease the pressure of the population of Dhaka City. So policy makers are suggested to adopt a comprehensive DND development policy which will make this area a right urban habitat.

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