

A Study on (Bangladesh) Hazaribagh Tannery Area and Relations with Economic, Environmental, Relocation Issues)

Rozina Khanam

Abstract— More than 200 modern and old tannery units are now operating in the industry of Bangladesh. These are located mostly in the Hazaribagh area of Dhaka city. These tanneries are a source of massive pollution. Wastage of these industries are polluting the surrounded area including river Buriganga. These pollution is threatening for local resident people, indirectly total city and a major river. This study was based on an investigation of “Hazaribagh Tannery Area and Relations with - Economic, Environmental & Relocation Issues”. For this study, primary data were collected from different group related & non-related with tannery business of the area. The survey was conducted on Hazaribagh to identify the total environmental condition, tannery worker, owner and economic growth and relocations of this industry as well sufferings of general resident. From the survey results on tannery worker and local people most of the respondents said that both solid and liquid waste came out from tannery, which was black color. Most wastage came out in noon time and its environmental effect was bad smell to the surrounding area reported by respondents. Survey result showed different health problems such as skin diseases, itch, rash, cough, fever, diarrhea, headache, asthma, dizziness etc. The highest portion of respondents had low environmental pollution awareness due to their education level. Relocation of tanneries to Savar area is government initiative for long. I have tried to find out reason behind for the delaying of the issue and further implementation way forward as well overall scenario - problem & prospect with lots of limitation.

Keywords— *Pollution, Waste Management, Awareness, Relocation, Health hazard, Environment, Economic Prospect.*

I. Introduction

The tannery industry in Bangladesh is concentrated in the Hazaribagh area. The tanneries of Hazaribagh started their journey from 1960. The industries expanded and after the independence of Bangladesh in 1971 (Azom et al., 2012). It has been reported that only about 20% of the large number of chemicals used in the tanning process is absorbed by leather, the rest is released as waste. Hazaribagh which is the largest tannery region in Bangladesh consists of more than 200 tanneries (Old/ Modern / Small / Large) generate 7.7 million liters of liquid waste and 88 million tons of solid waste each year ((Bhuiyan, et al., 2010). The dumping of untreated liquid tannery wastes from tannery industries at Hazaribagh and others (Rayerbazar, Lalbagh, and Kamrangirchar) in Dhaka is the major source of pollution of Buriganga. Pollution and contamination of the river, lake and pond water have impacts on the aquatic resources. Industrial pollutants with high concentrated heavy metals may cause waterborne diseases including diarrhea, cholera, jaundice, hepatitis, dysentery, skin diseases etc. Tannery workers are the worst sufferers and endure a hostile environmental condition. The residential areas close to the tanneries are vulnerable to different environment related problems (Huq, 1998). This Study was to find out economic, environmental and relocation issues in relation to pollution and health hazard of the specific area.

Rozina Khanam,
Bangladesh University of Professionals, Bangladesh

Specific objective of the study intended to:

Describe present scenario of the existing surrounding environment issues of Hazaribagh area. learn about health hazards in and around Hazaribagh. Find working environment and living conditions in and around Hazaribagh. Analyze the relocation issues associated with Tanneries of Hazaribagh.

The rest of this paper has organized with a brief literature review with survey on the focused issues, the research methodology and the results of data. Finally the paper concluded with some important finding and indicated some future research directions.

II. Review of Literature and Survey

Many authors have worked regarding tanneries of Hazaribagh and showed the impact of various pollutants on water, water test results, health hazards and some measures but no prior work was found which covers all the aspects (Economy, Environment & Relocation issues) in literature review.

This segment represents a brief review of research information in relation to assess the impact of tannery waste disposal on environment collected tannery industrial areas of Dhaka, Bangladesh. Since review literature forms a linkage between the past and present survey or related to problem which helps an investigation to draw a satisfactory conclusion. A survey work relevant to the present studies has been quoted under the following sequences:

a. Effect of tannery waste on water

Industrial wastes are usually generated from different industrial processes, as a result the amount and toxicity of waste released from industrial activities varies with the industrial processes. Among all the industrial wastage of tannery effluents are ranked as the highest pollutants (Azom et al., 2012). According to Human Rights Watch (2012), about 21,600 cubic meters of environmentally hazardous liquid waste is emitted every day from the tanneries located in Hazaribagh which include hazardous chemicals such as chromium, sulphur, ammonium, salt and other chemicals. Physician Chowdhury, A. (2011) mentions that some chemicals such as sodium sulfide, sodium meta sulfide, formic acid etc. are used in tannery industry. He has also mentioned that these chemicals are harmful to both the workers and the surrounding residential people. Anonymous, (2003) Most of the industries of Dhaka have been set up on the bank of the Buriganga River. The color of the of the water and river bank soil has been changed industrial waste and effluents being continuously released in the river, oil was floating on greenish water. Earth on the river bank is equally blackish in color.

b. Type of waste and environmental pollution

In the soaking and liming process of raw leather many chemicals are used to clean the salt, dirt, blood, hair etc. created solid and liquid waste and in the tanning process chromium oxide, ammonium sulphate, formic acid, sulphuric acid etc. are used also created solid and liquid

wastes (Huq, 1998). It has been estimated that about 1, 35, 00, 000 pieces of hides and skins from all over the country are brought to Hazaribagh every year for processing. In tanning, raw hides and skins normally go through a process called pickling, with sulfuric acid and common salt, after which they are treated with solutions of basic chromium salts are sources of pollution (Khatun and Huq, 1994).

c. Impact of tannery waste on Environment

Scientist stated that about 200 tons of solid waste is generated per day during peak season and 75 tons during off-peak season from the tanneries of Hazaribagh. The solid waste largely contains pieces of raw hides, and small portion of lime flashings. While some quantity of solid waste like shaving dusts are used for making leather board, a significant portion is left every day on the roadside and in the nearby dustbins causing foul odor to the surrounding area (Huq 1998). Hazaribagh which is the largest tannery region in Bangladesh consists of more than 200 tanneries generate 7.7 million liters of liquid waste and 88 million tons of solid waste each year. The direct discharge of these wastes has contaminated the ground and surface water with dangerously high concentrations of chromium, as well as cadmium, arsenic, and lead (Bhuiyan, et al., 2010)

d. Effect on Tannery waste on public health

A study of 1997 compared the self-reported health problems in 112 households in Hazaribagh with those from 100 households in a nearby Dhaka neighborhood (with similar socio-economic characteristics but located further from the tanneries). Respondents in Hazaribagh reported 31 percent more cases of skin diseases, 21 percent more cases of jaundice, 17 percent more cases of kidney related diseases, 15 percent more cases of diarrhea, and 10 percent more cases of fever than the residents in the other neighborhood (Haque et al., 1997). Huq (1998) reported that Tannery workers are the worst sufferers and endure a hostile environmental condition. Workers usually handle chemicals with open hand and do not wear any gloves. The workers suffer from various health problems and illness like skin diseases, diarrhea, jaundice, fever, kidney problems etc. The residential areas close to the tanneries are susceptible to different environment related problems. Human Rights Watch (2012) stated that Past and present tannery workers described and displayed a range of health conditions including prematurely aged, discolored, itchy, peeling, acid-burned, and rash-covered skin; fingers corroded to stumps; aches, dizziness, and nausea; and disfigured or amputated limbs. Although Human Rights Watch is not aware of any epidemiological studies on cancer among tannery workers in Bangladesh, some anecdotal evidence suggests that cancer rates are indeed elevated among workers dealing with chemicals.

III. Methodology of the Study

The study was conducted by a series of tasks like Visit to tanneries and surrounding areas, onsite assessments and interviews with relevant personnel including workers, managers, and other stakeholders. This report is based on information collected during 24 weeks of field research conducted in study area of Bangladesh. Followed below process to complete this report:



Figure: 1
Process to

conduct this study.

a. Study area

The study was conducted at the Hazaribagh. The Hazaribagh was selected for survey work to identify the health condition of tannery worker and local people and analysis of environment pollution. This area is near to us and in a risk of environmental and health problem as well economic and relocation related matters.



Figure -2: Map of Hazaribagh area with location

b. Sources of data for survey work

Information for this report was collected from both primary and secondary sources. Primary data collected by Sample survey was carried out for generating the required data. Secondary data was collected from Bangladesh bureau of statistics, the Institute of Water Modeling (IWM), the Society for Environment and Human Development (SEHD), the Department of Environment of Bangladesh (DOE), the Bangladesh Small and Cottage Industries Corporation (BSCIC), Bangladesh Tanners' Association (BTA). The secondary sources of this report also include Bangladesh Economic Review, Census of Manufacturing Industries, PhD thesis reports, Research report by Tannery Owners association, books and Internet.

c. Selection of sample

Visited tanneries, with the help of a senior and experienced supervisor, we interviewed people for this report, including people who currently work, or previously had worked in Hazaribagh tanneries. Of these, some people were local residence currently staying in tannery areas and tannery owners and workers. Around 100 respondents were randomly selected from the areas of which 30 were labors, 30 were local people, 10 directly involve in tanneries related business and owner, and others are various professional people residing in the area. The maximum number of respondents from Hazaribagh selected random and simplified way. We more than 30 people surfed throughout the area and identified focused people in terms of different variable.

d. Instrument for collection data

An interview schedule was prepared for collection of data from the respondents keeping the objectives of the study in mind. Both open and closed formed questions were included in the interview schedule. The questionnaire was prepared in Bengali for the respondents (Owner, Worker & General Residents). Necessary additions, deletions, modifications and adjustments were made in the interview schedule on the basis of experience gained from the pretest. Personal observation and telephone interview were also conducted for

this study area. All residents and workers interviewed provided verbal informed consent to participate and were assured that they could end the interview at any time or decline to answer any questions. Interviewees who are residents or workers have been given pseudonyms and in some cases, other identifying information has been withheld to protect confidentiality.

e. Data Processing and Analysis

SPSS and Microsoft Excel program of the computer were used to process and analyze the data. Many statistical tools were used by using univariate tools such as mean, median, mode, standard deviation to analyze data to quantify the variables. One way/two-way analysis was used in this research.

f. Methods

This is a descriptive type qualitative research which will describe how environment, economy and society are being affected by the different activities of Hazaribagh Tanneries. This study also cover relocation issues of tanneries from Hazaribagh to Hemayetpur, Savar.

IV. Analysis of the Study

After data collection, a rigorous analysis has done on the basis of previous literature and objectives. Issues has specified as below:

a. Threat Scene of Environment at Hazaribagh Area

The total population of Hazaribagh Thana is 1, 85,639 of which male are, 1, 00,776 and female are 84,863. The numbers of household are 43,740. The literacy rate of Hazaribagh area is 67.13% of which males are 69.5% and female are 69.5%. Many slums are situated nearby the tannery. According to Leather Technology Institute, there are 206 tanneries of Hazaribagh area. The total waste discharge area is about 25 hectares, where 20,000 people are presently living in a slum area, under extremely densely populated and unhygienic conditions. Some fisheries hatchery and livestock farm is situated in these areas. Some fisherman who catches fish in Buriganga River are live in those slums. There is some agricultural land was situated but now those land is not suitable for cultivation. There are two primary schools, one high school and the Leather Technology Institute of Dhaka University is situated (BBS, 2011). There are about 206 leather tanneries in the Hazaribagh district of Dhaka, the capital. Some use modest technology and machinery, but most operate as they did decades ago and release untreated toxic chemical waste near residential areas. There is considerable variety in how tanneries in Hazaribagh operate. Some tanneries will perform all stages of leather processing, converting raw hides to "wet blue" leather, then to "crust leather," and finally finished leather.

At least 160,000 people have become victims of pollution due to the presence of toxic chemicals, mainly chromium, in Hazaribagh, according to a report titled, "The Top Ten Toxic Threats: Cleanup, Progress, and Ongoing Challenges," published by Zurich-based Green Cross Switzerland and New York-based Blacksmith Institute. Hazaribagh came fifth on the list of top 10 polluted places around the world. The effluent that pours off tannery floors and into Hazaribagh's open gutters contains animal flesh, dissolved hair, and fats. It is thick with lime, hydrogen sulfide, chromium sulfate, sulfuric acid, formic acid, bleach, dyes, oils, and numerous heavy metals used in the

processing of hides. This effluent flows from the open gutters into a stream that runs through some of Hazaribagh's slums, and into Dhaka's main river, the Buriganga. The tanneries generate a lot of solid and liquid waste. Each day, the tanneries in Hazaribagh create an estimated 75 metric tons of solid waste (mostly salts, bones, as well as leather shavings and trimmings), an amount which may rise to 200 metric tons of solid waste per day in peak production periods (BBS;2007).

According to the Department of Environment, the tanneries discharge 22,000 cubic meters of untreated liquid toxic waste daily into the rivers, gutters and canals that run alongside in the roads of Hazaribagh. Toxins are also leaching into groundwater.



Figure – 3: Back side of a tannery factory with solid & Liquid waste

The tannery area soils had the highest concentration of cadmium, manganese, nickel, lead and zinc which might be due to discharging liquid wastes, flocculated sludge and other solids with excessive heavy metals coming from different tanning processes. The highest level of lead may constitute direct health hazards too, along with many other contaminants, the topsoil in Hazaribagh is heavily polluted with chromium, with some studies measuring the concentration in a range from 15,000 to 33,500 mg/kg dm. Although the vast majority of chromium in the soil in Hazaribagh is trivalent, a small amount of the total chromium in the topsoil is in form of hexavalent.

It is to be noted that a total of about more than 15 thousand cubic meter liquid tannery waste is discharged every day from the Hazaribagh area (Ahmed, 2005).

b. Scenario of River Buriganga

Hazaribagh tanneries, an export-oriented cluster of industries, produce some 20,000 cubic metres of toxic waste laden with chromium and at least 30 other toxins every day. The toxic waters flow into the Buriganga through the Rayerbazar sluice gate. At present waste, can't be discharged direct into the River Buriganga due to obstruction created by Dhaka flood control embankment. In January 2010, an effort was made to start cleaning the Buriganga's riverbed. The Buriganga Cleansing Project involves excavating 10 to 12 feet of sludge from the riverbed for a 3 km stretch and is set to last until June 2011. But irregular efforts to cleanse the river are not enough considering that, while the project aims to remove 1,000 tons of sludge from the Buriganga riverbed each month, the tanning industry continues to feed 25,000 tons of untreated wastes and 40,000 tons of toxic chemicals into the river every day. Public pressure and media scrutiny perhaps helped. After one report by Dhaka's Daily Star newspaper, The High Court announced that it wants the government to deploy police to the banks of the Buriganga to stop disposal of waste into the river.



Figure - 4: A boy showing Rayerbazar sluice gate on a canal which flows to Buriganga River with contaminated water.

c. Health Issues

Tannery workers face extreme health hazards. In the study compared the self-reported health problems of 100 households in Hazaribagh with those from 82 households in a nearby neighborhood (with similar socio-economic characteristics but located further from the tanneries). Respondents in Hazaribagh reported 31 percent more cases of skin diseases, 21 percent more cases of jaundice, 17 percent more cases of kidney-related disease, 15 percent more cases of diarrhea, and 10 percent more cases of fever than the residents in the other neighborhood. According to the report of the Bangladesh Society for Environment and Human Development, about half a million residents of Hazaribagh, are at risks of serious illness due to chemical pollution from tanneries near their homes.

Many residents of Hazaribagh's slums told us that tannery pollution is negatively affecting their health. Residents may come into contact with contaminants in their daily lives - by bathing in polluted water, contact with polluted soil, breathing in tannery gases, or wastewater flooding into houses during the monsoon season from late May to early October.



Figure - 5: Dermatological Diseases of a Tannery Worker

The most of the workers performed their duties in acid solution at pickling stage without wearing musk, gloves, boots and apron. The sulfuric acid is strongly corrosive, which may cause permanent damage to skin if any worker worked bare hand in acid solution. Suffered with Skin problems, allergic conditions, itching and other skin lesions are contact type disease. The majority of the respondents reported that children and tannery workers are suffered from skin diseases. Most of workers expressed that they have experienced skin problems because of their frequent contact with chemicals, and some of them were currently suffering

from skin problems. They willingly showed the skin lesions on their bodies, particularly on hands, fingers and legs. The symptoms of the skin conditions include a rash, boils and irritation. While talking to the local pharmacy, they reported that the drugs for skin problems were the highest selling drugs in the tannery locality.

There is no practice of use safety equipment's in the tanneries in Hazaribagh. Masum, a worker whose hand was amputated following an accident in a setting machine, Dhaka, May 3, 2012. Tannery machinery includes large revolving drums for soaking hides, fleshing machines, and shaving machines that feed pieces of leather against rotating blades, and plate machines that smooth and emboss leather in a heated hydraulic press. Operating such machinery can be dangerous work. Rahim has worked for some 25 years in the tannery. He told us that he has seen fellow workers lose hands, feet, and arms in tannery machines. "I had to go to the doctor several times," says Sanaul, a leather chemical engineer who had to quit his job at a leather tannery. "There was no ventilation in my plant, we were breathing polluted air and I didn't feel comfortable working there so I recently moved from Hazaribagh to escape the health hazards." Sanaul's fears are well-founded; just this past March 2013, three workers died of chemical inhalation. With his education, he was fortunate to be able to move and look for another job. For most of the people in Hazaribagh this is simply not possible - they have no choice but to work and live there.

d. Economic Prospects

Leather Industry developed in Bangladesh on a large-scale basis from the 1970s. About 95% of leather and leather products of Bangladesh are marketed abroad, mostly in the form of crushed leather, finished leather, leather garments, and footwear. Most leather and leather goods goes to Germany, Italy, France, Netherlands, Spain, Russia, Brazil, Japan, China, Singapore and Taiwan. Value addition in these exports averages 85% local and 15% foreign. About 100 modern tannery units are now in operation in the industry. These are located mostly in the Hazaribagh area of Dhaka city. The contribution of the leather industry to the Bangladesh economy was about US\$500 million accounting for 3% of country's exports in 2010-11 (BEPB, 2011). The country's share in the world leather market is 2-3%. The export of finished products such as shoes, slippers, leather jackets, hand gloves, bags, purses, wallets, and belts also earn a sizeable amount of foreign exchange. Bangladesh intends to increase its range of leather products to penetrate new market segments. The government of Bangladesh provides a support to the leather industry through various steps, including monitoring the export market, evaluating the performance of the sector by a permanent parliamentary committee, and liberal bank credit.

e. Relocation Issues

The unplanned tanneries at Hazaribagh in Dhaka do not have supporting infrastructure facilities. Hazaribagh itself is surrounded by thickly populated localities of the Dhaka city. The Government of Bangladesh has decided to move the whole tannery operation to a new location of 200 acres at 20km from Dhaka city. At the Leather Industrial Park at Savar under Dhaka Tannery Estate Project. According to the plan, 144 acres (72%) of the land are to be developed as industrial plots. The balance, 56 acres (28%), will be utilized for infrastructure for the estate that includes a Central Effluent Treatment Plant (CETP), disposal yard, administrative building, drainage, electricity sub-station and

others. Attempt to relocate the tannery industry in a planned place has started from 2003, still it is unsuccessful.

V. Findings of Study

This study was an attempt to Describe present scenario of the existing surrounding environment issues of Hazaribagh area. learn about health hazards in and around Hazaribagh. Find out working environment and living conditions in and around Hazaribagh. Analyze the relocation issues associated with Tanneries of Hazaribagh. Which has described and analyzed above. It is expected that the research findings would be applicable in general to the peoples as well as labor of tannery industry, respondents who lives nearby the tannery industry. The peoples should be educated to be perceived the probable impact on the tannery waste disposal towards the health and environment. For better management of environmental pollution and related problem as well keep the economic prospect rich there are some alternatives –

- Ensure Relocation of the tanneries outside the Dhaka city with in short span of time. Relocation plan should include the worker compensation and relocation of their resident issue.
- Making inventory of hazardous waste generation compulsory and updating periodically; Waste avoidance and waste minimization at source; Reuse, recovery and recycling of hazardous waste; Encourage cleaner production and eco-design practice; Encourage Common Effluent Treatment Plant (CETP).
- Develop and undertake public awareness building programme specifically at School, Masque, resident, workers and owners. To give knowledge about importance of environment pollution and the situation.
- Take urgent initiative to control present open liquid & solid waste management system for prevent further pollution.
- The implementation of cleaner production processes and pollution prevention measures can provide both economic and environmental benefits.

VI. Conclusion

This study focused on the economic prospect of Tannery industry that harms environment and livelihood which is situated in capital city of Bangladesh. A huge economic prospective industry polluting the environment by its solid and liquid waste, killing a major river and harming human lives. Proper Planning, implementation, management and stakeholders' involvement can reduce and mitigate these problems. It could be said that adequate preventive measures should be taken in tannery industrial activities with a view to ensuring safe, sound and healthy environment for greater benefit of Bangladesh.

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About Author (s):



Rozina Khanam is a Deputy Manager – Business Development in SMEC International Pty Ltd.- Australia based on Bangladesh. She is perusing her MPhil from Bangladesh University of Professionals (BUP). She received Masters in Disaster & Human Security Management from BUP in 2014; Masters in Business Administration (Marketing) from BUP in 2012; Masters in Zoology from NU in 2004. She has more than 8 years of experience in Development sector of Bangladesh and her research interest includes Environment, Community based livelihood management, Disaster Management, Risk management, Capacity building & resource management.