

## Post-relocation Scenario of Bangladesh Tannery and Management Strategies towards Sustainable Development

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**Abstract:** The tannery industry is a remarkable industry in Bangladesh and it is considered as the second largest export sector of our country. As the oldest and dominant industry it plays a critical role in creating employment and contributing to the country's economy by export earnings. However, this industry also has a significant impact on the environment, due to high levels of air, water, and soil pollution, leading to environmental degradation and human health hazards particularly in the locality. Although there have been efforts to relocate the tanneries in order to minimize the environmental challenges, the current scenario calls for more action in this regards. The main objective of this study is to overview the present tannery layout by DPSIR framework (Driving Forces-Pressures-State-Impacts-Responses) and recommend management strategies towards sustainable development. A qualitative study was carried out among the government officials, the tannery related businessman, the tannery owners and the tannery workers from 30 randomly selected tanneries to reveal the specific characteristics and to fit the DPSIR framework. The result indicates that the current conditions are not significantly better than before the relocation. The reason is the unwillingness to follow the existing governmental rules and regulations and response systems. Some relevant planning is also absent to manage the critical situations. Finally, this study suggests a number of strategies in light of respondent's experience towards sustainable development of the greatest tannery industry.

**Keywords:** *Tannery Industry, Relocation, DPSIR Framework, Sustainable Management.*

### 1. Introduction

The leather sector is one of the oldest industries in Bangladesh and a major source of country's national export earnings. It is the second only to ready-made garments and Bangladesh leather exports contributes about 10 percent of the world's demand (Shibli and Islam, 2020). As leather is the traditional export item of Bangladesh, every year millions of sq. feet of finished leather are being produced by the tannery industry. Approximately 200-220 million sq. feet of raw hides and skins is exported by tannery sector in a fiscal year and from the total production, about 85% of which is exported in finished form and rest are used as various leather items in the country's local market (Hossain, 2021). Despite the high potential of this industry due to the increased availability of leather products and the demand of high-quality finished product for the international market, the rate of production and export quantity have not shown the

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desirable rate of growth due to various obstacles. Because of the internal and external obstacles, the exports fell from around 300 million USD in 2016 to less 90 million USD in current times of year 2020 (Shibli and Islam, 2020). The pandemic also impacted negatively during the fiscal year 2020-2021 and about 56% falling trend has been noted throughout the year (Financial Express, 2022). Moreover, one of the major challenges is to get the raw materials to produce tanning products in a satisfactory way to increase the export quantity and influence the international market with high standards (Ahmed, 2010). In addition, another major reason is the recent relocation of the tannery industry.

The previous tannery industry at Hazaribag was majorly responsible for polluting the environment around Dhaka, the capital city and the mega city, thereby hampering the normal life of the city dwellers. To prevent the numerous environmental problems and to protect the Buriganga River, the Bangladesh government established the BSCIC (Bangladesh Small and Cottage Industries Corporation) Tannery Estate away from the Dhaka mega city besides the Dhaleswari River. In 2017, the tannery industry was relocated to Savar in order to ensure all sorts of modern and environment friendly facilities in an industrial area dedicated to tannery. This study reveals and outlines the post-relocation scenario of the tannery industry. The first and the most critical thing is to understand all phases of the present tannery industry, the environmental aspects, waste management system and the effluent treatment system. In this backdrop, this study has identified numerous strategies towards sustainable development by understanding the existing condition of the overall situation, supporting facilities and environmental compliances.

## **2. Aim and Objectives**

The main aim of this study is to outline the existing conditions of the present tannery industry and proposed management strategies towards sustainable development. More specifically, the objectives of this study are: i) to overview the current tannery estate by DPSIR framework; and ii) to recommend the sustainable management strategies in light of respondent's experience.

## **3. Data and Methodology**

Present study is based on data collected from both primary and secondary sources. For the primary data collection, formal and informal interviews have been carried out among the government officials, tannery owners, tannery workers and the tannery related businessman. An Open-ended questionnaire survey has been conducted on 60 respondents from 30 randomly selected tanneries to gather qualitative data. From the field observation along with interviews and questionnaire survey, qualitative data has been gathered to overview the present tannery status with DPSIR Framework (Drive-Pressure-State-Impact-Response). 15 focus group discussions (FDGs) have been arranged to find out the sustainable management strategies in light of respondents' current experience. After fulfilling the targeted primary data collection from interviews, questionnaires, FDGs and observation survey, the data were processed using SPSS and Microsoft Office Excel. The secondary data has been collected from annual reports of tannery related government offices and local NGOs, journals, various published and unpublished articles regarding leather industry, several unpublished brochures collected from the company and newspapers.

### i) Overviewing Present Scenario by DPSIR Framework

The DPSIR framework (Driving Forces-Pressures-State-Impacts-Responses) is used to assess and manage several critical situations (Figure 1). Driving forces specify the socio-economic and socio-cultural forces created by human activities, which increase pressures on the environment. Pressures are the burdens that arise due to human activities on the environment. State, or state of the environment indicates the overall condition of the environment. Impact shows the harmful effects of environmental degradation. Responses refer to the actions taken by society to deal with the environmental situation (EEA, 2010). These components explain the DPSIR method and it is a casual framework to overview the interactions between society and the environment; human impact on the environment and vice versa because of the interdependence of the components (EEA, 2015a).

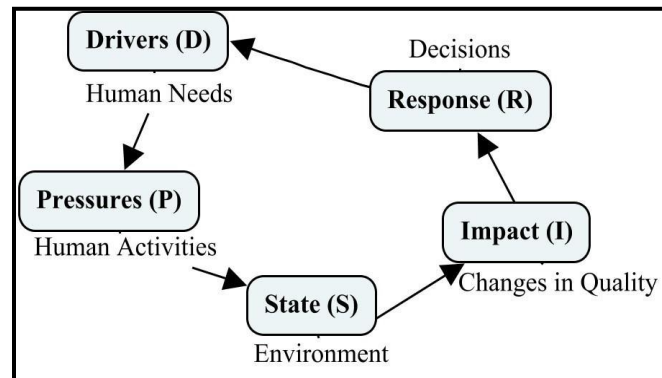


Figure 1: The DPSIR framework.

Source: Authors, 2022 (Concept adopted from EEA, 2010).

This framework is selected as an appropriate method to achieve the targeted result of the present study. This will give a comprehensive picture of the present tannery industry in order to take appropriate measures for sustainable management strategies. The driving forces will draw the causes and concern issue of the tannery industry; pressures will reveal the effects and pollution emanating from the driving forces; state will indicate the overall condition of the environment; impacts will clarify the harmful impact on surrounding environment and human being and finally responses will expose what actions should be needed for the sustainable production environment as well as policy making.

### 4. Study Area

The geographical location of the study area lies between 23°45'44" N latitude and 90°15'39" E longitude (Figure 2). It is situated about 24 kilometers away from Dhaka mega city beside the Dhaleshwari River at Tetuljhora union under Savar Upazila. After the relocation of Bangladesh Tannery Industry, the study area is well-known as "Savar Tannery Estate" or "Leather Industrial Park". According to the Bangladesh Small and Cottage Industries Corporation (BSCIC) officials and tannery entrepreneurs, the total area of this Tannery Estate is about 200 acres. At present, there are 140 tanneries (including small, medium and large tannery) performing their production in this new build up Savar Tannery Estate (Prothom Alo, 2022).

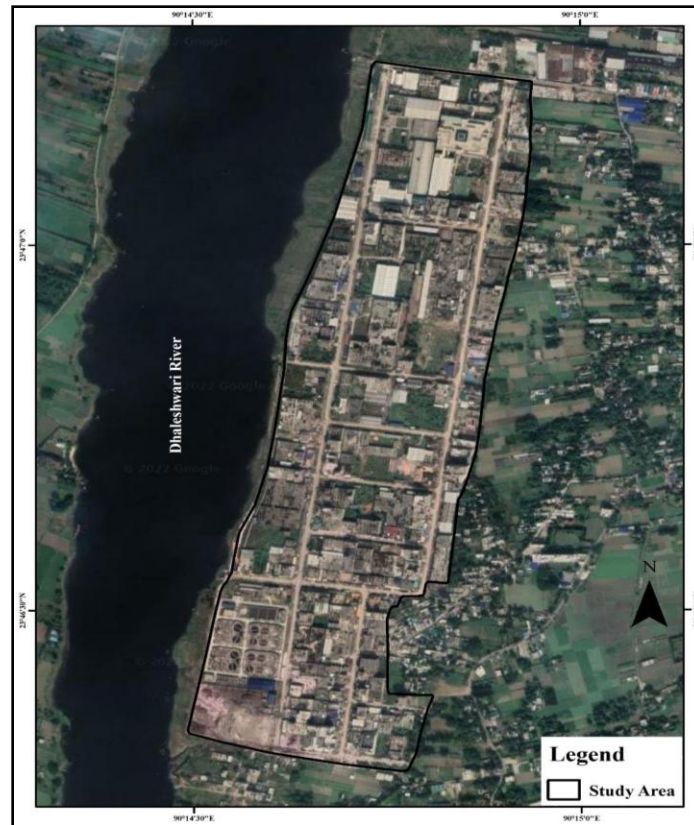


Figure 2: Savar Tannery Estate beside the Dhaleshwari River.

Source: Authors, 2022.

Documentation and evaluation of the present scenario in the study area as well as the overall tannery condition is the primary purpose of this section. After relocation, the Savar Tannery Estate has a new set of opportunities and challenges.

#### a) Respondents Profile

From the total respondents, about 65.5% respondents were in the range of 32-42 age groups, where 25.5% respondents were in the range of 45-55 age groups and the rest 9% respondents were in the range of below 32 and above 55 age groups. According to the respondents, about 85% are male and 15% are women related to the tannery industry. The educational background of the respondents is below satisfactory level. Among the respondents 45% of them only have primary level education, 53% having secondary education and only 2% are illiterate (Field Survey, 2022). Among the respondents, 30% were tannery owners; 40% were tannery workers; 10% were tannery related businessman; 10% were government officials and rest 10% were local people. Majority of the respondents were tannery workers to understand the tannery related people's profile.

## **5 Result and Discussion**

### **a) Overview of Current Tannery Condition**

After the relocation of the tannery industry from Hazaribagh to Savar, immense changes have been noted in the total layout of the tannery industry, environmental conditions and also in the socio-economic conditions around the area. People in and around the study area have been both benefiting and suffering due to the recent established tannery industry. The beneficiaries are mainly the people who are engaged at the tanneries or involved in any business directly or indirectly related to the tannery industry (Paul *et al.*, 2013). On the contrary, general people of the adjacent area who were neither engaged nor involved in any tannery-related businesses have been the worst sufferers of the pollution from the tannery industry (RAPID, 2019). Basically, there are no doubts that the environment and the surrounding communities have been extremely impacted by the adverse effects of the tanneries. The DPSIR framework has several factors which have contributed to overview the recent tannery status in the study area (Figure 3).

#### **i) Drivers**

Tannery industry is one of the remarkable sectors in our country that has the potential for the further development. One of the steps towards this development has been the establishment of a new tannery industrial layout. During field survey, it is found that the present condition here is shaped by three major drivers: local, regional and global factors. Improvement of the socio-economic conditions to the local communities as well as the overall community development is the main indicators of the local drivers. One responded who is the owner of a renowned tannery described that it was anticipated that the new tannery industry will reveal more opportunities for earnings to the local communities along with the inherited involved tannery workers. But this opportunity is a challenge now for the locals because of land, loan and Central Effluent Treatment Plant (CETP) issue. The regional drivers of the present tannery industry are indicating the country's economic development and the expansion of the oldest industrial sector. Finally, the global factors are indicating the increasing of export earnings and influencing the international market largely by producing vast tanning products. Before establishing the tannery industry in the study area, the re-location project was designed to hold the country's oldest industrial sector in a sustainable way and to achieve the maximum economic benefit from this sector. These three drivers (local, regional and global) contribute a dynamic role for the growth and development of the tannery industry. But from the field survey and questionnaires, it is found that these three drivers acting here as an adverse pressure for the present tannery development.

#### **ii) Pressures**

As the existing tannery sector is derived by three main factors to achieve its maximum targeted output, during field observation it was noted that these drivers resulting in continuous pressures on natural environment and human society. The total land use pattern of the study area has been completely changed to establish and develop the entire tannery sector. In order to improve the production system, modern machines along with harmful chemicals are used by each and every tannery in an immethodical way. Some of the respondents explained that they have little knowledge of the systematic use of the chemicals. So, the excessive use of the chemicals used in tannery is releasing toxic substances continuously in and around the study area. In addition, the incomplete CETP

is also responsible greatly to massive pollution by draining tannery liquid waste to the Dhaleshwari River. In addition to these human created pressures, the natural components are also being altered resulting in nature created pressures, thereby damaging the physical environment. The unrefined or slightly refined tannery flow changing the Dhaleshwari River quality. The changes of the land use pattern also deteriorating the natural environment not only in the study area but also in the nearby villages.

### **iii) State**

All the pressures changing the study area in natural, biological and human conditions. During field survey major human created pressures are noted such as the overflow of tannery drainage system which resulting in flooding and water-logging in the area with dirty and chemical mixed water; the incomplete central effluent treatment plant (CETP) passing unrefined or slightly refined tannery effluent into the Dhaleshwari River which resulting in causing serious destruction to the water quality of the river and ecosystem damage; the tannery solid wastes dumping in the open spaces which resulting in serious air pollution. All these factors are having serious impact to environmental quality and altering the environmental components. The pressures are affecting the biological community by declining greatly due to the habitat loss and decreasing species community more specifically, the local vegetation patterns and plantations are also dying because of the gradual land and water quality change. The normal living conditions for the communities is a challenged nowadays as the total environment of the study area is degrading rapidly and behaving in an anomalous way.

### **iv) Impacts**

The various drivers and pressures are noted to fluctuate the state of the present tannery layout and these changes are leading to the various destructive impacts. The area planned to develop with new tannery industrial area which is now a source of anxiety in various ways to the tannery workers and also the surrounding peoples. But the study area transformed into a new set up to increase tannery production system for the progression of the tannery industry and the welfare of the surrounding communities. Meanwhile, the field survey exhibits some remarkable impacts like the decrease of water quality and decline of the fish community of the Dhaleshwari River; poor air quality to take normal breath; the loss of soil quality thereby damaging the agricultural system in the adjacent villages. Thus, pollution of the air, water, and soil are the major worries both for the tannery workers and the local peoples. All these effects are greatly impacting to the human health conditions in a very negative way. People are suffering more from many diseases than before the establishment of the tannery industry. The fishing and agricultural practices of the villagers adjacent to the study area are now confronted with the harmful impacts. The people who depended on the river previously for fishing-based occupation are the most sufferer nowadays. The cultivation scenario is also changing swiftly as the land is losing its normal quality. The respondents described that the normal livelihood is mostly difficult now in the closest village Horindhora and another village Bokchor which is situated on the other side of the Dhaleshwari River.

### **v) Available Responses**

According to the respondents, there are many challenges but access to emergency responses are limited. For the local, regional and global drivers, only governmental policy is followed in an unsatisfactory way. During field surveys, it was noted that the

available rules and regulations are not maintained properly to minimize the existing human or nature created pressures. One respondent specified that there is no fire station or emergency fire services in the study area and solid wastes are also kept in the open spaces, which pollute the environment tremendously as there is no proper waste management system. About 50% of the respondents mentioned that the response system for the changing state of the natural, biological and human is only a mere monitoring system with very limited scope for taking the appropriate actions. The Dhaleshwari River has seriously degraded due to the discharge of chemical effluents directly into the river from the tanneries in an illegal manner. All these impacts are hampering the present condition greatly but the response policy is only in the form of mitigation and compensation policy in terms of monetary.

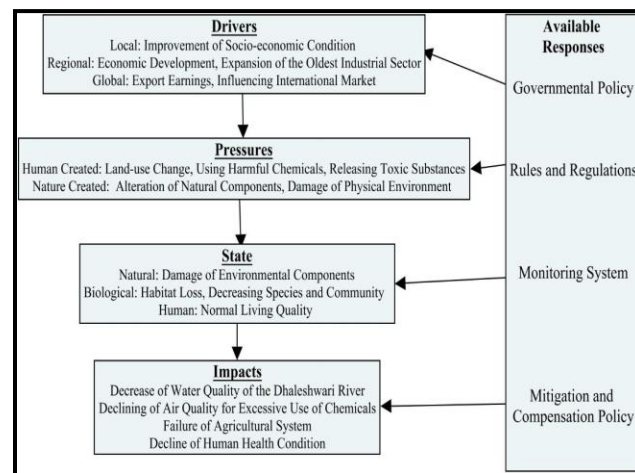


Figure 3: Overview of present tannery condition.

Source: Authors, 2022.

## 6. Sustainable Management Strategies

It is imperative to ensure the adequate measures should be taken for the new tannery area in order to minimize the adverse impacts that are being caused. With each passing day, the overall condition of the area is altering rapidly which is a threat to the most significant tannery industry. Local people and the people directly involved in tanning are greatly deprived of a normal life amidst the health hazards. Life and livelihood are now influenced adversely because of the unfriendly environment. The Dhaleshwari River is now known for its substandard condition although it is the most important means of peoples' livelihoods in the surrounding community. The current condition of the existing tannery industry is not acceptable and if the deterioration of the Dhaleshwari River continues in the coming days it may have a serious adverse impact to the local community as well as our country. During the field survey, the respondents pointed out some strategies in light of their experience (Figure 4) towards the sustainable development for the growth of the tannery industry. The following strategies that have been organized in collaboration with the respondent's opinion.

- i) Initiating production process in a complete and well-planned infrastructure to ensure the maximum production and the employment health security.
- ii) Using advanced machines with less harmful chemicals to prevent releasing extreme toxic substance that alters the environmental components.
- iii) Stopping the misuse of available natural resources and protecting the land and water quality.
- iv) Generating systematized settlement place from the tannery layout.
- v) Creating essential skill workforce for the overall tannery development and providing higher skill training to the existing manpower.
- vi) Providing appropriate knowledge and education facilities to the tannery workers to control the human created pressures.
- vii) Establishing proper health care centers and raising awareness to maintain good health.
- viii) Increasing community bonding to hold different occupational opportunities.
- ix) Building emergency fire service facilities to control unwanted fire hazard.
- x) Completing the CETP with its full functioning system to manage all tannery liquid waste.
- xi) Developing well-managed drainage system from every tannery to the CETP.
- xii) Expanding the capacity of CETP according to the up to date demand.
- xiii) Opening proper and well-organized solid waste management system.
- xiv) Making suitable dumping sites for the solid waste.
- xv) Evolving a relevant waste recycling system that might be a benefiting one.
- xvi) Starting systemized transportation facilities to carry the tannery products specifically the raw materials to stop different kind of pollution.
- xvii) Protecting the Dhaleshwari River from draining the unrefined or slightly refine tannery effluent.
- xviii) Eliminating the tannery discharge in any illegal way to the river or in any open spaces.
- xix) Enforcing strict laws for the proper tannery management system including the waste management, worker's security and environmental protection.
- xx) Introducing innovative technology to increase the production quantity and quality for covering the international market.
- xxi) Achieving global standards by obtaining expertise product design.
- xxii) Investing from the overseas along with the government to eliminate capital deficiency and expand leather industry.
- xxiii) Originating solar or alternative energy sources to minimize the electricity consumption.
- xxiv) Implicating regular monitoring system including tannery working environment, production system, environmental condition for the overall tannery well-being.



- xxv) Adapting an eco-friendly environment by following strategies from developed country or suggestions from environment experts.

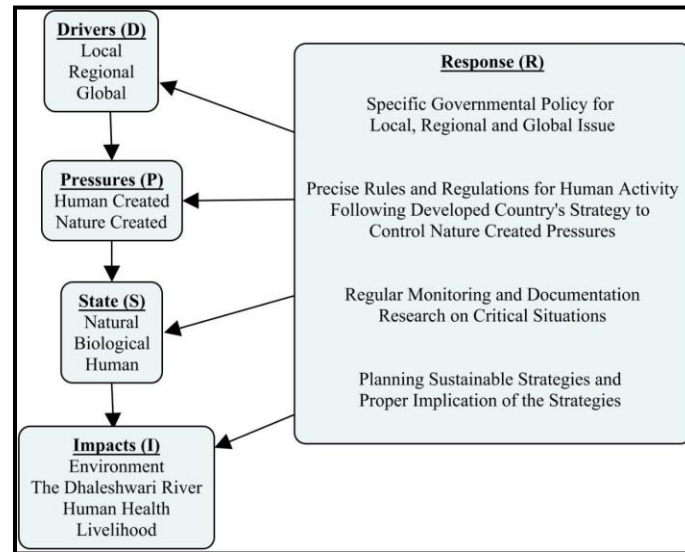


Figure 4: Management strategies for the development of present tannery.

Source: Authors, 2022.

## 7. Conclusion

The tanneries have been shifted from Hazaribagh to Savar with a hope for the development of the remarkable industry as well as our economy. From this study, it is found that the declining condition has begun since the relocation of the tannery industry happened. The overall natural and physical conditions as well as the export quantity of the leather products is changing in a negative trend. Only a few of the planning and management strategies are being followed and maintained by the tannery owners and the tannery workers. However, the relocation did not bring about all the positive changes that were expected to take place. As the proper sustainable management of the tannery industry is interrelated with the total environment and human society, the current situation in the study area needs to be addressed immediately for the growth of the leather industry and the sustainability of the local community. The existing tannery conditions should be improved by ensuring full functioning central effluent treatment plant (CETP); developing production process; monitoring and protecting the physical environment; achieving the standards of global markets; increasing export earnings from this sector; ensuring workers health and living quality; protecting the Dhaleshwari River. Thus, this study reveals the post-relocation scenario of the tannery industry applying the DPSIR framework and laid out a number of strategies towards sustainable development.

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### **Conflict of Interest**

The authors declare no conflict of interest.

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