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“Investment in compliance for LWG certification: an analysis of costs, benefits, and way forwards for tannery industries in Bangladesh”





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EXECUTIVE SUMMARY

Leather Working Group (LWG) is one of the most prominent global leather supply chain certifications. It is a prime prerequisite for exporting leather, particularly in US and EU markets. Yet, at the moment, Bangladesh has no LWG-certified tannery except for four located outside of its tannery estate. Among others, uncertainty regarding the benefits of LWG certification and lack of knowledge regarding good practices of globally LWG-certified tanneries are key reasons for Bangladesh tanneries not opting for LWG certification.

Against this backdrop, the study has been conducted with objectives of a) conducting a cost-benefit analysis for Bangladeshi tanneries investing in ESQ compliance to be LWG certified; b) assessing the global good practices of LWG certified tanneries (particularly India) and analysing their replicability in Bangladeshi tannery industry; and c) to provide with key recommendations for the tannery industry's stakeholders to have LWG certified tanneries in Bangladesh.

In conducting the cost-benefit analysis, the benefit-cost ratio method has been applied. Additionally, Delphi method has been applied for assessing the replicability of global good practices (mainly in India) and generating going forward steps for the stakeholders of the Bangladeshi tannery industry. Primary data sources of the study include IDIs, KIs, field visits, etc. Field visits of the study was organized in Chennai, India and in BSCIC Tannery estate Bangladesh. On the other hand, secondary data sources of the

study include books, journal articles, web pages, etc.

The study finds that the likely nominal cost of ten years investment of becoming LWG certified for an individual tannery in Bangladesh can range between USD 30,908 to 87,226 (@1USD = 94 BDT) depending on the current level of compliance. The study also finds that the estimated benefits of investing in ESQ compliance for LWG certification could range between at least 1.05 to 3.15 times the cost likely to incur. Also, it is estimated in the study that for a tannery that already has a good level of compliance, it might take at best two and half years to retrieve the cost that was incurred for the LWG certification, while in case of a tannery with least existing compliance standard it can take up to eight and half years.

In becoming LWG certified, the study recommends that government agencies in the short run should, as there is in India, consider establishing a pre-treatment unit and an Ozonation treatment unit in the BSCIC CETP with temporary flexibility in the existing allowable TDS limit. Additionally, the government must extend its monetary support to the tannery industry and, at the same time to those industries that can use the waste of the tannery industry as their raw materials. The monetary support for the tannery industry temporarily needs to be result-oriented, like in India, where the tanneries can claim a significant portion of costing (by showing proper evidence) as a subsidy only after becoming LWG certified. As a policy measure, similar

to India, Bangladesh government can consider making it lawfully mandatory for the cement industry to source one or two per cent of their raw materials from the sludge of the tannery industry. Also, they should consider charging for the amount of water discharged by tanneries. On the one hand, the pricing on discharged water would help to ensure most efficient water use by tanneries, on the other hand, will enable the government to provide monetary support to the industry in the area of ESQ compliance. Besides, an adequate authority should be provided by the government to the tannery owners in operating the BSCIC CETP company. In the long run, the government agencies should consider establishing a RO unit in the CETP and allow the establishment of individual ETP. On the other hand, the tannery association should consider

limiting the amount of water that a tannery can discharge, ensure accountability of individual tanneries, and negotiate with the government in availing monetary support as immediate measures. In addition, they need to increase collaboration with other stakeholders and gradually create coordination between tannery and other tannery-related industries in the long run. However, none of these recommendations will be effective if Bangladeshi tannery owners individually do not have the right mindset to become LWG certified. In addition, gradually, they need to invest in ESQ compliances, establish a basic pre-treatment and chrome recovery facility in tannery premises, start using renewable energy, and should have dedicated compliance officers.



Meeting with the researchers of Central Leather Research Institute (CLRI) in Chennai, India

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1. BACKGROUND

The outlook of the global leather industry portrays a bright prospect. With the gradual disappearance of the intensity of the COVID pandemic, the global leather industry is expected to expand continuously. To be specific, the global demand for leather goods is forecasted to reach USD 624.08 billion by 2028, with a yearly growth rate of 5.9 per cent during the period (Grand View Research, 2021).

Leather is the second highest exported item for Bangladesh. In Fiscal Year 2022, Bangladesh's export of leather, leather goods, and footwear reached USD 1,245 million (EPB, 2022). Not only is leather one of the oldest industries in Bangladesh, but it also has several advantages in producing leather and leather goods [such as cheap labour costs, lower water and energy prices, availability of raw hides within the country etc.] (Reza, 2022). Yet, the country, as it is now, may not be able to reap the entire benefits of the expected boom of the global leather industry according to its potential. Among others, the inadequacy of Environmental, Social and Quality (ESQ) compliances and, therefore, not having Leather Working Group (LWG) certified tanneries is a major reason.

LWG is the leading certification group for the leather manufacturing industry. It is acknowledged worldwide as an indicator for the evaluation of the ESQ compliance status of a tannery. An LWG-certified tannery is considered an entity that manufactures leather while minimally harming the environment, using minimal resources, and obliging to global labour rights standards. There are seventeen

specific indicators in LWG, based on which a tannery is assessed critically. However, the requirement against these indicators have been and will be evolving from time to time as per the changes in the global requirements. Because of its strict requirements and transparent audit process, LWG certification has become one of the primary requirements for tanneries to be able to export processed leather, particularly to the market of Europe and the USA.

Despite LWG having mammoth importance for the tannery business, as of 2022, only four tanneries/tannery units out of two hundred in Bangladesh are LWG certified. Under the existing circumstance, the Bangladeshi tannery industry is lagging in terms of market competitiveness and receiving under-price for export. On the one hand, the lack of ESQ compliances required for the LWG certification is resulting in polluting the environment and undermining labour rights creating domestic criticism over the industry, on the other hand, the Bangladeshi tannery industry is inching away from the global market competitiveness as ESQ compliance is increasingly becoming a crucial determinant of export orders, coupled with peer countries' tannery industries making stride progress (such as India, China, Vietnam etc.).

Realising the significance of LWG certification, the government of Bangladesh took several steps, including shifting the tanneries to BSCIC Tannery Industrial Estate in Hemayetpur and establishing Common Effluent Treatment Plant (CETP). Unfortunately, due to gaps in planning, these steps of the government could not yield the expected results in terms of LWG

certification. Yet, the Bangladeshi tanneries are well placed to acquire LWG certification. It will require them to be motivated to invest in ESQ compliance, be guided by good global practices and have significant support from the government.

Usually, the higher level of benefits is one of the biggest motivations for any business going for any investment. However, at the moment, none of the existing literature answers the questions regarding the cost and benefits of the LWG certification. More specifically, it is still unknown whether investing in ESQ compliance to LWG certified is beneficial for Bangladeshi tanneries; standing at the current situation, the estimated monetary cost required for investing in ESQ compliance to be LWG certified, the amount of benefit it could yield from investing in this regard; years required to retrieve the cost of the investment etc. In addition, there is hardly any research work which consolidates good global practices on LWG certification and assesses their replicability in the context of the Bangladeshi tannery industry. In order to fulfil this existing research gap, the study seeks to undertake a cost-benefit analysis for Bangladeshi tanneries investing in ESQ compliance to be LWG certified and assess the global good practices in this regard.

2. OBJECTIVES

The objectives of the study are four-folds. These include:

1. To conduct a cost-benefit analysis of investments on ESQ compliances for LWG certification and provide a projection of relevant data;
2. To consolidate the global good

practices on LWG certifications, particularly in India;

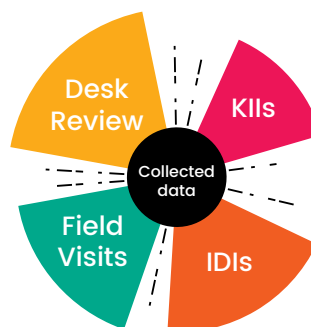
3. To assess the replicability of the consolidated good practices in the context of Bangladesh;
4. To provide recommendations on required steps for Bangladeshi tanneries to become LWG certified

3. METHOD

3.1 Collection of data

The study is conducted based on both primary and secondary data. A number of tools were used for the purpose of data collection. Major of them include desk review, key informant interviews (KIIs), in-depth interviews (IDIs), and field visits.

Figure 1: Major tools used for the collection of data for the study



Source: Authors' illustration

The desk review was conducted to gather secondary information on existing literature, newspapers and websites. The collected secondary information includes both qualitative and quantitative information. The main purpose of conducting the desk review was to collect information on the cost and benefits of investing in ESQ compliance and also to collect good practices of globally LWG-certified tanneries.

Field visits have been one of the most utilised tools for collecting information for the study. Given that tanneries in India use similar procedures as Bangladesh in collecting raw materials from different parts of the country and have a similar tanning culture, the first field visit was conducted in compliant tanneries in Chennai, India. This visit aimed to observe the best practices on CETP, solid waste management, waste recycling, tanning technologies, and research and development needed for LWG certification. On the other hand, to compare and assess the feasibility of establishing the same best practices in case of Bangladeshi tanneries, the second and final field visit was conducted in Hemayetpur Tannery Estate in Bangladesh.

Both IDIs and KIIs were conducted with different stakeholders related to the tannery industry and LWG certification. The participants include representatives of LWG-certified tanneries in India, representatives of LWG-certified tannery in Bangladesh, representatives of non-LWG certified tanneries in Bangladesh, CETP management officials in India, CETP management officials in Bangladesh, LWG auditor in India, Researcher in Bangladesh, LWG auditor in Bangladesh, Workers representatives in Bangladesh.

3.2 Method of cost-benefit analysis on investment in ESQ compliance

The quantitative cost-benefit analysis in this study is conducted based on the benefit-cost ratio method. The benefit-cost ratio (BCR) is usually measured to identify the relationship between the relative costs and benefits of a proposed

investment. The result of the BCR can be expressed in a quantitative value. For example, if an investment yields a BCR of more than 1, the investment can be considered to provide more benefits than the cost. The following formulas have been used in conducting BCR analysis:

$$Present\ Value\ [Benefits] = \frac{\sum_{t=0}^N |CF_t[Benefits]|}{(1+i_t)^t} \dots\dots(I)$$

$$Present\ Value\ [Costs] = \frac{\sum_{t=0}^N |CF_t[Costs]|}{(1+i_t)^t} \dots\dots(II)$$

From (I) and (II):

$$Benefit\ Cost\ Ratio\ (BCR) = \frac{|Present\ Value\ [Benefits]|}{|Present\ Value\ [Costs]|}$$

Where the considered parameters are:

- Cash flows and discounted cash flows (benefits)
- Cash flows and discounted cash flows (costs), and
- Interest or discount rate

Along with calculating the numerical value for the benefit-cost ratio, qualitative benefits and costs that are non-numerical and intangible have been evaluated under the study. The qualitative cost-benefit analysis has been conducted based on the information collected under the study. The cost and benefits have been compared from two aspects. The first aspect is within the LWG-certified tanneries (pre-and post-certification period). The second aspect is comparing LWG-certified and non-LWG tanneries.

3.3 Method of replicability analysis of the good practice on ESQ compliances

In order to identify which of the captured good practices on ESQ compliances in this study is copiable in Bangladesh, a replicability analysis has been conducted.

In conducting the replicability analysis, the Delphi method was utilised. The summary of good practices was informed to several groups of stakeholders, including Bangladeshi tannery business representatives and the LWG auditor. Practices that were commonly agreed as copiable in Bangladesh by the group of stakeholders were reported as feasible under the analysis and vice versa.

4. AN OVERVIEW OF LWG CERTIFICATION

4.1 Standards of LWG certification

Background

LWG, a non-profit organisation, is mainly an environmental audit protocol covering key components of leather production, including traceability, social responsibility, health safety, and chemical management. It came into existence in the year 2005 with the combined effort of a group of brands (such as Adidas, Clarks, Ikea, Nike, Marks & Spencer, New Balance, and Timberland etc.) and leading leather manufacturers across the globe (Leather Working Group, 2022). The purpose of establishing this group was to enhance the sustainability of the global Leather industry by mitigating the environmental impact of the leather supply chain through audit certification.

Audit Protocols of LWG

While under LWG, tanneries are audited based on established parameters, the LWG certification can also be obtained by traders and subcontractors (Flores, Junges, & Souza, 2020). The certified auditors of LWG conduct the audits on behalf of LWG. At the moment, there are

13 certified LWG auditors internationally, including two from India, one from Bangladesh, Spain, Australia, the UK, France, Indonesia, Germany, Thailand, Taiwan and Turkey. These auditors are permitted to conduct audits against five protocols. These include a) LWG Environmental Audit Protocol (mainly for leather manufacturers); b) LWG Trader Audit Protocol (mainly for traders of part-processed or finished material); c) LWG Chemical Management Module (also for leather manufacturers but only regarding their chemical management practices); d) LWG Subcontractor Audit Protocol (mainly for companies completing subcontracting work on behalf of a third party); and e) LWG Commissioning Manufacturer Protocol (mainly for companies subcontracting out all manufacturing work).

Indicators of LWG leather manufacturers audit

The LWG leather manufacturers audit is the most applicable module for Bangladesh, which conduct audits for seven categories of leather manufacturers, including a) raw hides/skin to tanned; b) rawhide/skin to crust; c) rawhide/skin to finished leather; d) tanned hide/skin to finished leather; e) crust hide/skin to finished leather; f) tanned hide/skin to crust leather, and g) rawhide/skin to pickled/pre-tanned material. Under the protocol, the latest issue (7.2.0) was released in 2022, which has a total of 17 indicators and a total score of 1710. As it is an environmental audit protocol, most of its indicators are related to the environment. However, there are also indicators in the area of social responsibility, traceability, chemical

management and occupational health and safety (Table 1). The LWG certification can be obtained in four categories. The most basic category of LWG certification is audited (minimum average score needed is 50), then there is the bronze category (minimum average score needed is

65) and silver category (minimum average score needed is 75). The highest obtainable category in LWG certification is gold (the minimum average score needed is 85). The evaluation is usually conducted based on the tannery's last 24 months of operations.

Table 1: Indicators and their minimum criteria for LWG certification

SL	Description	Max score	Potential score	Actual Score	Minimum requirement (%)			
					Gold	Silver	Bronze	Audited
1	General facility details	-			-	-	-	-
2	Subcontracted operations	100			85.0	75.0	65.0	50.0
3	Social audit	50			0	0	0	0
4	Operating permits	100			85.0	75.0	65.0	50.0
5	Production data	100			85.0	75.0	65.0	25.0
6	Traceability (incoming)	50			0.0	0.0	0.0	0.0
7	Traceability (outgoing)	60			0.0	0.0	0.0	0.0
8	Environmental Management Systems (EMS)	100			85.0	75.0	65.0	50.0
9	Restricted Substances, Compliance, Chromium VI Management	150			85.0	75.0	65.0	50.0
10	Energy consumption	100			85.0	75.0	65.0	25.0
11	Water usage	100			85.0	75.0	65.0	25.0
12	Air & noise emissions	100			85.0	75.0	65.0	50.0
13	Waste Management	150			85.0	75.0	65.0	50.0
14	Effluent treatment	150			85.0	75.0	65.0	50.0
15	Health, Safety (H&S), Emergency Preparedness	150			85.0	75.0	65.0	50.0
16	Chemical Management	150			85.0	75.0	65.0	50.0
17	Operations Management	100			85.0	75.0	65.0	50.0
Total		1710			85.0	75.0	65.0	50.0

Source: Leather Working Group

General facility details, Subcontracted operations

The very first indicator of LWG certification is General facility details. However, it does not contain any score and hence does not have any impact on the certification result. Under this criterion, introductory information about a tannery is asked for. Such as name, address, registration number, location of the operation (both offsite and on-site), area size, number of workers, responsible persons for environmental issues etc. The second indicator of LWG is only applicable to those tanneries that do subcontract. Under this criterion, it is checked whether the subcontracted tanneries have been audited by any of the approved LWG auditing protocols, including the Leather Manufacturer Audit Protocol, Subcontractor Audit Protocol, and Mini Audit Protocol.

Social Audit

The indicator social audit is the only indicator that considers social compliance issues. This indicator endeavours to identify whether the tannery can demonstrate social responsibility through independent assessment. A tannery can pass this section if it has LWG-approved certifications for those dealing with social compliance issues. Some of the LWG-approved certifications include BSCI, SMETA, FSLM, SA8000 Standard, WRAP etc. Although the indicator has a score of 50, at present, it is not a mandatory requirement to be LWG certified.

Operating permits

The indicator operating permits indicator has a score of 100, and it assesses the

tannery's state of compliance with the applicable licences and legislation (for example, trade licence, environmental clearance certificate, building license etc.). Similarly, the indicator Production Data has a score of 100. However, it is only applicable for those tanneries that are sourcing part-processed and raw materials from another trader. In such a case, the trader has to be LWG approved and assessed for LWG audited facilities. If a few of the traders supplying the tanneries is not LWG approved, the tanneries need to differentiate these traders by proper labelling and evidence. However, the scoring for this indicator is only based on LWG-approved traders.

Traceability (incoming) and Traceability (outgoing)

Similar to Social Audit, both Indicators, Traceability (incoming) and Traceability (outgoing), are not mandatory for LWG certification at the moment. These two indicators evaluate the ability of the tannery to trace its incoming material and outgoing materials (from and to a specific place, country, or region).

Environmental Management System (EMS) and Restricted Substances, Compliance, Chromium VI Management

On the other hand, Environmental Management System (EMS) is a mandatory requirement for LWG certification and has a score of 150. The indicator requires a tannery to have a documented, effective and active system for managing environmental aspects of the operation. The indicator Restricted Substances, Compliance, Chromium VI Management is also a mandatory

criterion for LWG certification. It evaluates how a tannery manages and its extent of awareness regarding restricted substances; including how it mitigates the risk of formation of CrVI. The stipulated score against this criterion is also 150.

Energy Consumption, Water Usage, and Air and Noise Emissions

Another key indicator of LWG certification is Energy Consumption which has a score of 100. This indicator measures the energy usage per unit produced (lesser use means a higher score). Additional score is provided under this criterion if any tannery uses renewable energy produced on-site. Similarly, the Indicator Water Usage (score 100) measures the freshwater use, per unit produced (lesser use means higher score). It also provides additional marks to the tanneries that use recycled water. As the words suggest, the indicator Air and Noise Emissions (score 100) assesses a tannery's level of air and noise emissions to the environment and also whether this issue is being monitored and managed.

Waste Management and Effluent Treatment

Waste Management, one of the most crucial indicators, examines the tannery's ability to manage and control the waste generated by the site and whether there are inventories, categorisation of wastes and, most importantly, proper storage and disposal. On the other hand, Effluent Treatment, another crucial indicator, holds a score of 150. It examines the management of the tannery of all forms of liquid waste, either at its own site or at a third-party provider. The higher the

quality of the treatment of the effluent discharged, the higher marks are given.

Health, Safety, Emergency Preparedness, Chemical Management and Operation Management

The indicator Health, Safety, Emergency Preparedness (score 150) evaluates the tannery's capability to manage a range of emergency and health safety risks. It also assesses the management of Hydrogen sulphide created on site. The Chemical Management indicator gauges the awareness, understanding and management of chemicals used within the tannery. The final indicator of LWG certification, Operation Management (score 100), determines the tannery's capacity to control the manufacturing process, review best practices, and measure equipment use.

4.2 Upcoming modification on LWG certification

The requirement and criteria have always been evolving as per the global requirement. However, even after a number of improvements in the indicators and LWG being trusted globally, the latest LWG certification procedure still has some gaps. To fill in these gaps, LWG will be coming up with several modifications in upcoming audit procedures.

One of the biggest gaps that the existing LWG certification has, is it does not provide adequate focus on social compliance, including human rights issues (Flores, Junges, & Souza, 2020). With the existing process, a tannery can be gold LWG certified even if it ignores social compliance completely.

Apprehending the significance of this issue, LWG has already decided to make it a mandatory criterion in an upcoming version. However, it might not be enough to make the criteria mandatory; more direct indicators of social compliance (for example, wage payment, collective bargaining arrangement, child labour, rights of marginality etc.) could be included in the LWG assessment.

Also, under the existing auditing process, two indicators related to deforestation, Traceability (incoming) and Traceability (outgoing), are not mandatory. This undermines the deforestation issue caused by the global leather industry. Again, taking this under cognisance, LWG has announced in upcoming versions of LWG audit protocols, both these two indicators will be made compulsory for LWG certification.

Another change that LWG has been considering is providing LWG membership (not certification) to tanneries conducting self-assessments based on LWG audit protocols. However, LWG certification does not publicly disclose audit results (Flores, Junges, & Souza, 2020). Hence, the justification for making self-assessed tanneries members of LWG might not be on the strongest ground.

4.3 Local and global status of LWG certification

Given that the LWG certification is renowned in the global leather industry and is one of the most important

prerequisites for export, the number of entities with LWG certifications and membership has continuously increased. At the moment, LWG has 1,800 members globally who are different stakeholders of the leather value chain, including leather manufacturers, brands, suppliers, traders, and associations. As of July 2022, the number of LWG-certified leather manufacturers reached 1,040.¹ The number of countries with LWG members and certified facilities is more than 52.² However, the number of LWG-certified entities varies from country to country. As of 2020, India had the highest number of LWG-certified leather manufacturers – 139 in total. China, on the other hand, had the second highest LWG-certified leather manufacturers (Table 2).

Table 2: Number of LWG Certified Leather Manufacturers for different countries (as of 2020)

Country	Number LWG Certified Leather Manufacturers
India	139
China	103
Italy	68
Brazil	60
Taiwan	24
Spain	17
South Korea	16
Turkey	16
Vietnam	14
Bangladesh	03

Source: Leather Working Group

¹ See: <https://www.leatherworkinggroup.com/news/latest-news/leather-working-group-reaches-1-000-lwg-certified-leather-manufacturers>

² See: <https://www.leatherworkinggroup.com/join-us/facts-and-figures>

Among all other peer countries that have a leather manufacturing industry, Bangladesh had the lowest number of LWG-certified tanneries– 03 as of 2020 (Table 2). However, the most recent data on LWG in 2022 shows that Bangladesh has four LWG-certified leather manufacturers (Table 3). It is to be noted that none of these entities is from the BSCIC tannery estate.

Table 3: List of LWG-certified leather/leather goods manufacturers in Bangladesh

Name of the entity	Type of leather	Audit	Rating
ABC Leather	Footwear Leather, Leather goods	D - Tanned hide/skin to finished leather	Audited
Apex Footwear Limited	Footwear Leather	D - Tanned hide/skin to finished leather	Gold
Austan Limited	Hand-bags and Footwear	D - Tanned hide/skin to finished leather	Audited
Riff Leather Limited	Footwear Leather, Lining Leather	C - Raw hide/skin to finished leather	Bronze

Source: LWG

5. A SHORT OVERVIEW OF THE CURRENT STATE OF BANGLADESHI TANNERIES

Background

The tannery is one of the oldest industries in Bangladesh. The first tannery, established in Bangladesh, was in the 1940s in Narayanganj (Biswas & Rahman, 2013). However, subsequently, it was shifted to Hazaribagh -- the place which later remained as the major cluster for tannery industry until the cluster was again shifted to BSCIC tannery estate in Hemayetpur. Over the long course of time since the establishment in Bangladesh, along with shifting to different places, the industry has undergone several modifications, such as diversification of the type of leather produced, using more automated technology, etc. However, one issue remains more or less unchanged throughout this historical journey. That is, as was in the past, the Bangladeshi tannery industry is still facing challenges in improving its ESQ compliance status.

Environmental Compliance

Environmental pollution remains a major concern for the industry. Although shifting the tanneries from Hazaribagh to Hemayetpur was expected to prevent the industry from polluting the environment, this remains an area of unfulfilled. In the past, in Hazaribagh, the industry used to directly discharge liquid waste to the Buriganga river without any treatment. This used to result in dreadful pollution of the river. After the industry shifted to BSCIC Tannery Industry Estate, a CETP, along with facilities for chrome recovery, and sludge treatment, was established by the government agency

BSCIC for the use of all the tanneries located in the estate. However, it was not adequately taken into consideration that water use in the tanning process in Bangladesh is comparatively high. Bangladeshi tanneries use more than 50,000 litres of groundwater to wash one tonne of rawhide, while the international standard is only 25,000 litres.³ Usually, one ton of hides generates 20–80 cubic meters of wastewater (Reza, 2022). Therefore, the established CETP had to be well-capacitated and performed. Unfortunately, the capacity of the established CETP is only 25,000 cubic meters⁴ per day, which is way below the amount of wastewater generated—particularly during the peak season of Eid-ul-Adha. As a result, the CETP is not performing as per expectation, and the treated water cannot meet many of the discharge requirements stipulated by the Department of Environment (DoE) (Table 4).

On top of that, solid waste management, including for treatment of sludge in the newly built estate, is way below par. The sludge is not dissected. Sludge or any other components of solid waste are hardly being used as a by-product of other industries. As a result, the pilling up solid waste is being stored on open land, creating several environmental hazards. During the pre-planning phase, the plan of the BSCIC Tannery estate was to use the generated solid to produce electricity. However, with the tanneries starting to operate on the estate, producing electricity from solid waste became an economically nonviable mechanism.

Table 4: Performance of BSCIC CETP against different environmental criteria (in November, 2021)

Parameter	Inlet (mg/L)	Outlet (mg/L)	DoE Criteria
pH	7.3 ^a	7.5 ^b	6–9
COD	2562	325	200
BOD	363	97	= < 100
Sulfide	2.65	< 0.1	1
CT	24.90	12.50	-
TDS	5456	5060	2100
TSS	1168	85	150
TKN	52.92	53.76	-
Total Cr	13.2	1.28	2
Oil and Grease	948.8	2.4	10

Note: ^a at 23.0°C; ^b at 22.0°C

Source: Muhammad (2022)

Social Compliance

On the other hand, along with environmental compliance, social compliance holds significant importance; the tannery estate solely employs nearly 20,000 workers. Yet, social compliance status in the existing tannery industry remains an area where further improvement is needed. Several tanneries do not provide adequate attention to locally and internationally recognised labour rights. For example, workers of the tannery industry lack awareness regarding their entitled leaves; also, many employers reject offering any sick leave. (Mia, Sarker, & Islam, 2022). A section of female workers is also not aware of maternity leave and are hardly offered by their employers as per the Bangladesh

³ See <https://www.tbsnews.net/economy/industry/after-buriganga-tannery-waste-now-pollutes-dhaleswari-186850>

⁴ Some of the interviewees argued that the capacity of the CETP is even less than 25,000 liters

Labour Act (BLA) (Mia, Sarker, & Islam, 2022). In addition, there is no constant monitoring of labour rights violations by employers at the moment (Moazzem, Khandker, & Ahmed, 2022). Other key undermined areas of labour rights include insufficient wage payment, absence of day care facilities, uncleaned toilets, long working hours, inadequate pure drinking water availability, and the presence of child labour (below 18 years) (Mia, Sarker, & Islam, 2022).

Occupational health and safety is another major area where corrective actions need to be taken for the tannery estate. Currently, the tannery hub lacks providing medical facilities; most tanneries do not have occupational health and safety policies. In 2019, at least one worker in the estate died in a sulphuric acid burnt accident; in the same year, two workers died after falling into a chemical tank.⁵ Given the extensive use of different chemicals and machineries for tanning, any occupation accident in a tannery is a higher risk than in many other industries. Basak, Raihan, & Bhuiya (2019) estimated that minimum treatment expenditures for an injured worker in the Bangladeshi tannery sector ranges between 0.05 - 0.2 million BDT. The expenditure is 9 to 36 times higher than the cost of enabling Personal Protective Equipment (PPE) for one worker, which would prevent the accident. Basak et al. (2019) also identified electrical, chemical and mechanical as three areas and lack of awareness of workers, mechanical malfunction, and carelessness of owners as three reasons for most of the accidents that take place in a Bangladeshi tannery.

6. GOOD PRACTICES ON ESQ COMPLIANCES OF INDIA AND LESSONS LEARNED FOR BANGLADESH

India has more than 2,000 tanneries. Most of the tannery's clusters are located in West Bengal (mostly in Kolkata) and Tamil Nadu (Mostly in Chennai and Vellore). Tanneries in both Bangladesh and India use almost identical production technology. Yet, the successful achievement of Indian tanneries in terms of obtaining LWG certification indicates their significant compliance practices in the area of ESQ. This study has identified a number of good practices of the Indian tannery industry that Bangladesh could directly or partially, immediately or in the long term, could replicate to improve its ESQ compliance status.

6.1 Operational Practices

6.1.1 Pre-treatment facility at individual tannery and CETP

One of the key fundamental differences between Bangladeshi and Indian tanneries is the use of pre-treatment for effluent discharge. Unlike Bangladeshi tanneries, all the Indian tanneries connected to CETP (such as Ranipet, and Pallavaram) have their respective pre-treatment mechanism at the tannery premises. Hence, the effluent discharged by tanneries already gets treated before reaching CETP. Also, CETP in India has a separate pre-treatment unit that assists in limiting effluent load, yielding expected results (in terms of LWG environmental parameters) and enhancing the sustainability of the

⁵ <https://www.thedailystar.net/frontpage/news/savar-tannery-estate-high-hazard-yet-little-safety-1693417>

performance of Indian CETP. The effluent firstly undergoes the “Oil and Grease Trap” which removes the moving objects (such as fat and proteins) from the effluent. The effluent then goes through a “Bar Screen Chamber” that eliminates the main elements in the effluent using its PVC/

which solar dry the sludge and then the dried sludge is taken to the Secure Landfill (SLF) of the CETP. Both “Sludge Drying Beds” and “Filter press” dry the sludge; however, the filter press dries the sludge more quickly and with fewer moisture contents for disposing to the SLF.

Picture 1: Pre-treatment facilities in India



Source: Field visit to India

SS type rigid, non-corrosive and fixed bar screens that have space of 5 mm. Thirdly, the screened effluent is gathered in the “Raw effluent collection tank”. The effluent then is entered into “Pre-settlers”, where overhead sedimentation tanks sediment coarse solids of the effluent. While this effluent is afterwards forwarded to the main CETP, the sludge generated from the effluent in this phase of pre-treatment is sent to “Sludge Drying Beds/Filter press”,

Establishing such a pre-treatment facility both at all Bangladeshi tanneries and in CETP could significantly improve the performance of Hemayetpur CETP (in BSCIC Tannery Estate) and help meet the DoE environmental parameters, which is one of the minimum criteria to be LWG certified (audit category). Besides, establishing individual pre-treatment would neither require a mammoth monetary investment nor any

modification of existing CETP. However, the establishment of an effective pre-treatment facility would need additional land, which could be difficult for the Bangladeshi tannery industry, particularly given the meagre land they have been allocated to operate by BSCIC. Rather, for the time being, Bangladeshi tanneries could at least consider the establishment of “Bar screening chamber” and “Filter press” as part of the pre-treatment facility. This would require lesser space and can still significantly improve the performance of Hemayetpur CETP by pre-treating the effluent at the individual tanneries.

6.1.2 Chrome recovery units at individual tanneries

Member tanneries of Indian CETP (such as Ranipet CETP) have individual chrome recovery units in their tannery premises. The chrome recovery unit of these tanneries separates the chrome liquor, precipitate it by collecting it in a tank and using magnesium oxide solution, and then regenerates the chrome from the chrome slurry by mixing sulfuric acid. This regenerated chrome is recovered, mixed with fresh basic chromium sulphate, and used again in the tanning process. Bangladesh, at the moment, has a common chrome recovery unit. However, while it can separate the chrome, it cannot recover it. Having an Indian-like individual chrome recovery unit would require additional space, which is scarce for Bangladeshi tanneries at the moment. Under such circumstances, Bangladeshi tanneries perhaps consider going for Clustered Chrome Recovery Unit (CCRU) instead of an individual CRU. That is having individual chrome recovery units for groups of tanneries. This, too, would

reduce the amount of chrome used in the tanning process and also increase the efficiency of Hemayetpur CETP.

6.1.3 Use of renewable energy

The use of renewable energy is found to be pervasive to different extents in the Indian tannery industry. Be it in the form of collecting and using rainwater or using sun power through solar panels for electricity consumption; renewable energy has been in use by most LWG-certified (gold) Indian tanneries to different levels. Solar panel is also being used for generating electricity for the CETP (For example, Ranipet CETP of India uses a 4 MW solar photovoltaic power plant). Given that solar panel requires a lot of space, some solar panel has been established in a distant place from the targeted location. Bangladeshi tanneries are in a very much suitable position for using rainwater. Like Indian LWG-certified tanneries, they could establish separate rainwater collection storage in the tannery premise. This would not require a huge investment and, at the same time, would facilitate fulfilling LWG’s renewable energy-related criteria. On the other hand, the use of solar panels usually requires additional space, which is scarce in Bangladesh. Therefore, gradually Bangladeshi tanneries can go for distant solar establishments to reduce the use of energy and decrease the production cost thereby.

6.1.4 Use of Ozonation treatment

Along with several ZLD CETP, the Indian tannery industry also has partially treated CETP in India. One such CETP (Pallavaram) treated effluent by using

Ozonation technology. Under this technology, Ozone is created using an ozone generator from the air. When this produced Ozone is mixed into the water, oxidising initiates, which removes various pollutant elements, including colours, chemicals, bacteria, metals etc. Use of this technology appears to be fully replicable in Bangladeshi CETP in Hemayetpur, particularly because it requires very minimal land space and can be done within different floors of a building. The whole size of Pallavaram CETP, including the Ozonation treatment unit, is around 3 acres, while Bangladesh already has 18 acres of CETP in Hemayetpur.

Picture 2: Discharge of effluent using Ozonation treatment



Source: Field visit to India

However, one big concern about using this technology is that it cannot significantly reduce the TDS from the effluent water. Usually, the TDS of the treated water under Ozonation treatment remains around 5,000. However, in case of Pallavaram CETP, instead of directly discharging the water with this amount of higher TDS, they send it to the industrial CETP, operated by the state government, and then it is discharged to the sea at Chennai. Given that the sea is far away, Bangladeshi tanneries have a scope of diluting this higher TDS water with river water and discharge it to the nearby Turag River. The higher flow of the Turag River could offset the higher TDS water and should significantly reduce the toxicity of the effluent. However, the current legal effluent parameter set by the Department of Environment (DoE) does not permit to discharge of water with more than around 2,000 TDS. Therefore, enabling this technology in Bangladesh would require the government to revise the regulation.

6.1.5 Reuse of discharged water through River Osmosis (RO) technology

CETP in Hemayetpur does not have a RO unit. In India, several Zero Liquid Discharge (ZLD) CETPs of Ranipet Tamil Nadu has RO unit for effectively removing salts and other pollutants from the discharged effluent. This allows the ZLD CETP of India (such as Ranipet CETP) to recover almost 85% of water discharged by its tanneries and send them back to tanneries for reusing.

Picture 3: Effluent status of different RO purification steps



Source: Field visit to India

Although the use of RO in CETP has been much more effective, the cost and land it requires can again be a barrier to starting this facility in Hemayetpur CETP. Also, the use of RO technology will increase the use of energy, such as electricity consumption could hurt the requirement of LWG certification to use lesser energy. Besides, ZLD is still not a mandatory requirement for tanneries to be LWG certified. Considering these matters, the use of RO technology may not be an immediate requirement for Bangladeshi tanneries to be LWG certified.

6.1.6 Use of quality equipment and chemicals

In many cases, equipment and chemicals used for tanning by LWG-certified tanneries in India are more effective in terms of quality and water usage. For example, the retaining drum, desalter machine, double grip hydra fleshing machine, etc., used by LWG certified tanneries in India, are more automated, require less space, use less water, and

are more productive than the ones used by Bangladeshi tanneries. Also, chemicals used in both individual tanneries and CETP in India are QC passed, which has been playing a role in ensuring the discharge of lesser toxic effluent from the tannery industry.

At the Individual level, Bangladeshi tanneries can consider a one-time investment in upgrading their machinery and quality of chemicals, which, in turn, would yield them a number of long-term benefits such as cost efficiency, energy efficiency, higher production capacity etc. Also, the CETP at Hemayetpur can consider establishing a quality monitoring unit for the chemical used in the process, which could enhance the treatment capacity of the CETP within the existing technology.

6.1.7 Recycling and management of solid waste

Solid waste management is one of the most crucial areas for a tannery

to be environmentally compliant. In India, a major portion of the solid waste generated from tanning and CETP is used as a by-product in other industries. For example, the shaving and buffing

Indian state government (Tamil Nadu) has made it mandatory for the local cement industry to source at least 1-2% of their raw materials from the sludge of the CETP of the tannery industry.

Picture 4: A leather board factory in India - uses shaving and buffing dust of tanneries as raw material



Source: Field visit to India

dust of tanneries in India are used as a by-product in the leather board (composition leather) industry. In addition, the flesh waste of the CETP is used by the glue industry to produce glue in India. Indian CETP has also successfully used flesh waste to produce different kinds of bio-Oil (such as Biodiesel). However, it is so far implemented at the pilot level, not in full operation. On the other hand, sludge (consists of chromium oxide, sodium chromium oxide, quartz, gypsum and chromium sulphate hydroxide) generated from CETP is used by the Indian cement industry. The Indian tannery industry pays the cement industry for taking the sludge from the CETP (based on the weight of the sludge). Before providing the sludge to the cement industry, they squeeze it by high pressing so that it weighs as less as possible, and the cost of paying to the cement industry remains low. In addition,

These practices are missing in case of Bangladesh. A coordinated approach should be taken, including a representative of the tannery industry, cement industry, leather board industry, glue industry, and government, to enable circularity of tannery solid waste, among other industries. One point to be noted is that solid waste generated by ETP is not being fully recycled in India. The non-recyclable portion of the solid waste is dumped in a secured landfill. The area of the Ranipet ZLD CETP landfill in India is around 125.0 × 100.0 × 4.0 TD, with a capacity of 71,500 tons. Establishing a similar-sized secured landfill would have been more suitable for Bangladesh if the scarcity of land was not an issue. At the moment, the solid waste is being piled up in an open field in the tannery estate of Hemayetpur. The plan of the estate to produce electricity from solid waste turns out to be economically nonviable.

Picture 5: Secured landfill system in Ranipet Tannery Effluent Treatment CETP



Source: Field visit to India

Under the circumstances, Bangladesh can still dump solid waste in a secured landfill only after ensuring recycling of most elements, reducing the amount of solid waste significantly. In the long term, investigation and research should be conducted on how to recycle the remaining part of the solid waste (that is not recyclable at the moment) so that

6.1.8 Real-time monitoring by public environment monitoring agency

In India, all the environmental parameters are measured in CETP in real-time by use of flow meters. The output of the flow meters is always accessible online to the public environment monitoring agency (such as the pollution control board).

Picture 6: Online monitoring system in SIDCO I CETP



Source: Field visit to India

there would be no requirement to dump solid waste in a large and secured landfill in future for the industry.

As such, the agency can monitor the CETP's performance and ensure that the legal parameters are not being violated. This

has reduced the requirement for more physical inspections of the government agency. In addition, it allows the CETP to comprehend their performance status and their area of improvement.

6.2 Managerial Practices

6.2.1 Celling on the amount of water discharged by tanneries

All the tanneries under CETP in India are provided with a maximum amount of water limit that one tannery can discharge daily (in SIDCO CETP India, around 25,000 litres per day). As a result, the total amount of discharge effluent of all tanneries never exceeds the capacity of the CETP. If one tannery does not utilise its maximum discharge capacity for one or few days. In that case, it can then sell its unused discharge effluent amount to another tannery which may require to discharge of additional wastewater. Having this kind of coordination should be feasible in Bangladesh tanneries as well, except for during the Eid ul Adha period, when the amount of production becomes abnormally high. The establishment of large cold storage for raw hides in other places –if not possible in the Estate area – could ease this kind of coordination. This initiative could significantly improve the performance of Hemayetpur CETP without modifying it or even making a huge new investment.

6.2.2 Establishment of coordination between association, academia and researchers

Leather has been one of the oldest industries in India. Right after independence, Indian government emphasised this industry given its huge export potential. In this connection,

dedicated research institutes and universities for the leather industry were established. Indian tannery industry has been able to rip the benefits out of it. These universities and research institutes have been providing crucial consultancy support to the industry based on numerous research they have been conducting on developing Indian best-suited tannery processing and effluent treatment equipment and technology in the tannery industry.

Another crucial contribution these organisations are making is in creating skilled human resources for the industry. Training is regularly held for CETP managing human resources by these local organisations. A similar networking for the Bangladeshi tannery industry, academia, and think tanks could be considered for the industry's overall betterment.

6.2.3 Gradual shifting to more efficient tanning technology

Indian tannery industry has been pursuing to adopt more advanced technology that would help to minimal use of resources, including water and chemical. Minimal use of water and chemical at the source means the minimal output of effluent. This, in turn, would reduce pressure and dependency on infrastructure like CETP. One such technology developed by CLRI, is termed as Waterless Chrome Tanning Technology. The technology is still at its initial level and so far, licensed by more than 100 clients. This technology claims to remove the use of water, salt, sulfuric acid and basification salts during the chrome tanning process.

Picture 7: Some of the newly invested technologies of Indian CSIR-CLRI



Source: Field visit to India

However, the Bangladeshi tanning industry may not be in the perfect situation to adopt this technology right now. Mainly for four reasons: a) this technology can only be applied to chrome-based tanning processor tanneries, not to vegetable-based tanning tanneries; b) the adoption of license for this technology is comparatively expensive at the moment (according to a group of tannery owners); c) this technology so far appeared to predominantly reduce the use of water in only one step of tanning process rest remains the same (according to one interviewed expert); and d) the benefit of adopting this technology will only be significant when all the tanneries in the estate utilise this technology which is uncertain.

On the other hand, another significant pilot technology of the Indian tannery industry that could bring significant future outcomes is using a small-sized ball in the tanning process. When a ball is used when mixing chemicals (including chrome) with raw skin, it helps better dissolve the chemical into the skin. This,

in turn, reduces the amount of effluent chemical also enhances the quality of the finished product. In the long run, based on suitability, the Bangladesh tannery industry can consider adopting this technology gradually to improve the production process.

6.2.4 Significant monetary support from the government

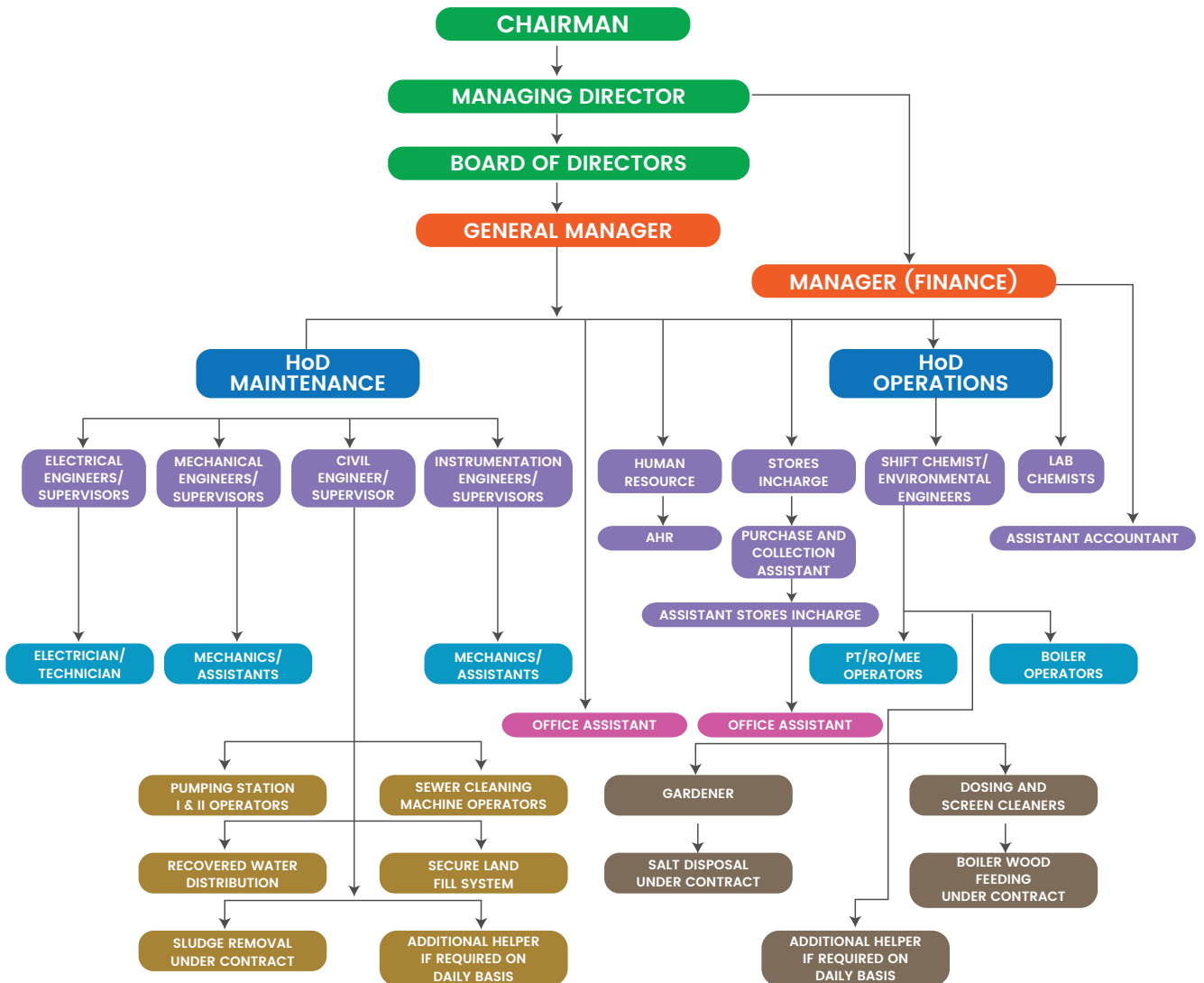
The Indian government has been providing significant monetary support for the development of the tannery industry. The Indian government has borne around 70% of the total investment in the CETP, 15% by the state government and the rest 15% bear by the tanneries. At the same time, Indian government also provide monetary support to individual tanneries in the form of loan and grant. One such support scheme provides monetary support in the form of a grant to the individual tanneries if it becomes certified under any government-listed certification (LWG is also included there). However, the support is only provided after the investment and submission of proper documentation that provides evidence of its certification.

Temporarily, the Bangladesh government can restructure its existing monetary support strategy (mostly in credit) and develop an outcome-oriented support scheme where the tanneries will only get access to support if they get LWG certification. This might play a key role in motivating the Bangladeshi tanneries to invest in LWG certification as it would enhance the security of the money they will invest.

6.2.5 Organised management of CETP

Indian CETP is managed by its board, where all the board members, including the chairman, are the owners of a tannery. The state government's role in Chennai is limited to monetary, and legal support and regular monitoring and inspection. On the other hand, all the technical and non-technical workforce for the CETP is recruited against a structured organogram. The staff of CETP are provided with regular training.

Picture 8: Organogram of the Ranipet Tannery Effluent Treatment Company Limited



Source: Field visit to India

At the moment, Hemayetpur CETP has a skilled human resource deficit in managing it most effectively. Hence, the CETP management could consider arranging practical and result-based training for the staff of CETP organised by experts from different countries, including India.

interest in adjusting the tanneries' prices. However, implementing this initiative might also increase the cost of production for the tanneries. Therefore, this needs to be kept in mind in setting up the price.

6.2.6 Pricing for the amount of water discharged

In India, individual tanneries have their own water discharge meter, by which they are charged based on the amount of water they discharge. This practice helps the tanneries to be more cautious regarding the amount of water they use and keep the use of water at the most minimal level. The Bangladesh government has already indicated its

6.2.7 OSH, Chemical, Environmental policy and management

The occupational health and safety of the workers are well maintained in LWG gold-certified Indian tanneries through proper operation and chemical management and health, safety and emergency preparedness plan. All the chemicals stored by the tanneries are labelled in a way that they can be traced easily. Chemicals of good quality are used for the tanning process. Toxic chemicals are stored and labelled separately.

Picture 9: Different policies in relation to environment, chemical and waste in Indian tanneries



Source: Field visit to India

Adequate space for the movement of workers was also noticed in most of these Indian tanneries. Workers are provided with training regarding the proper maintenance of the chemicals and emergency procedures. All the policies and procedures regarding health and safety are mostly visible throughout the tanneries for informing the workers. Basic safety equipment such as fire distinguisher, PPT etc., are found to be available in these tanneries.

of the formal channel in recruiting and releasing of workers. In case of recruitment, the workers are given a formal appointment letter including a stipulation of the wage the workers will receive. Also, information for each worker is maintained in documents and inspected by auditors when required. This process does not require a significant amount of investment; hence, Bangladeshi tanneries that are not used to this practice could consider

Picture 10: An Indian tannery's documentation of all the required information for LWG certification



Source: Field visit to India

In developing a similar management policy for OSH, chemicals, and the environment in Bangladeshi tanneries, the mindset of the owners should be enough. However, investment should be made in purchasing safety equipment to make the workplace safe for the workers and thus become LWG certified.

6.2.8 Formal recruitment and release process

In social compliance, another good practice identified in the case of the Indian tannery industry is the use

establishing this formal mechanism as part of social compliance initiatives.

6.2.9 DFS wage payment to workers

LWG-certified tanneries in India pay their workers' wages through Digital Financial Services (mainly through banks). Digital payment allows financial transparency in case of wages, overtime and bonuses of the workers. Given that Bangladeshi workers are not entirely aware of formal banking channels, their payment of wages can be disbursed through MFS, which is comparatively more popular

with Bangladeshi workers. A coordinated approach (including MFS providers, tannery associations and government agencies) could be considered in order to overcome existing barriers (such as digital illiteracy, no access to phone/smartphone, trust deficit on MFS etc.) of the workers in receiving wages through their MFS account.

6.2.10 Active workers' representatives

Indian LWG certified tanneries in Chennai do not have any formal trade unions. However, they elect their workers' representatives who look after all the workers' issues. Besides, according to conducted interviews, there are trade unions in the other tannery clustered situated in different states of India. Although Bangladeshi tanneries have trade union activities, they have their representative only in around 30 per cent of tanneries. Either the trade union coverage needs to be increased, or at least trade union's representative can be elected by each tannery who could look after the labour welfare issue in the tanneries.

6.3 Practices of other industries

While India is one of the key leather exporter countries in the world, there are also countries like China, Vietnam, Brazil, and Italy that hold a significant share of the global leather market to different extents. Given that the indicators of LWG certification are the same across the world, the good practices of Indian tanneries are mostly similar to LWG-certified tanneries from other countries. However, in an effort to enhance the

leather industry's sustainability, respective countries have adopted some additional/different steps which could be termed as good practices in the area of ESQ compliances.

6.3.1 Brazil

Brazil apprehending the importance of the sustainability of the leather industry, has formed the Brazilian Leather Certification of Sustainability (CSCB). Under this certification, independent audits are conducted in the area of economic results, reduction of environmental damage, and relations with employees and communities (Global giant, 2021). In addition, Brazil has enacted distinct laws targeting the leather industry known as Leather Law Blitz ('Blitz Lei do Couro'). The regulation demands that the word 'leather' can only be utilised when referring to products made of animal skin. The aim of this law is to protect the leather article in the Brazilian market from those counterfeit/artificial ones.

6.3.2 Vietnam

In Vietnam, all tanneries must submit environmental impact assessment (EIA) reports, install wastewater treatment systems (WWTSS), and pay wastewater fees (Thanh, 2011). In addition, some tanneries in Vietnam have established solar panels in an effort to use renewable energy and reduce carbon emissions.⁶

6.3.3 Italy

The tanneries in Italy are using advanced technologies to curb environmental pollution during the tanning process.

⁶ See <https://vir.com.vn/solar-esco-develops-solar-energy-project-in-tong-hong-tannery-vietnam-69107.html>

Their advanced technology assists: in recovering and reusing the water used during the liming phase and also amassing the hair as the by-product of the water (Pham, Nguyen, & Luong, 2022). This, in turn, saves 6% electricity, 12% methane, and almost 25% wastewater in the first phase of tanning (Pham, Nguyen, & Luong, 2022). On the other hand, instead of sulfide, Italian tanneries use oxygenated water in the tanning process. This innovative process totally eliminates sulfides and other pollutants. The Italian tanneries also use a novel hydrolysis technique that does not require any chemicals in the hair treatment process to deal with the solid hair generated as the by-product. Apprehending the toxicity of chrome to the environment, Italian tanneries have replaced the use of chrome with natural polymers (Pham, Nguyen, & Luong, 2022).

7. INVESTMENTS IN ESQ COMPLIANCES FOR LWG CERTIFICATION

7.1 Quantitative cost-benefit analysis

Costs and benefits of a tannery can vary significantly based on its size, production capacity, types of products, existing status of compliance etc. However, for this particular study, cost-benefit analysis for the investment in ESQ compliance to be LWG certified has been estimated for Bangladeshi tanneries under certain assumptions. The analysis should give a reflection of the extent of the cost and probable years needed for getting back that cost as benefits.

It is to be noted that the cost-benefit analysis has been conducted considering ESQ compliance requirements to LWG certified under the audit category. Also, in conducting the quantitative analysis, only tangible costs and benefits are considered. Additionally, a fixed range of exchange rate is assumed for USD over the periods of time (1 USD= 94 BDT).

7.1.1 Cost analysis

The cost is estimated considering Bangladeshi tanneries operating in the BSCIC tannery estate. The analysis of the cost considers only the individual tannerys' investment items. It is assumed that the CETP and solid waste management are functioning properly at the estate and the tannery would have to invest only within its premises. The data for the costs has been collected from the conducted key informant interviews with a different group of stakeholders who holds special expertise in this area. The cost has been estimated for two kinds of tanneries. One is assuming the tannery has a minimal ESQ compliance level (Table 5). Another is assuming the tannery has a comparatively better compliance level (Table 6).

The cost for each of the categories has been divided into two broad categories. One is the variable cost, and another is the fixed cost. The recurring cost items have been considered as the components of variable costs. On the other hand, all the one-time cost items have been considered as fixed costs. The assumed depreciation rate of the capital is ten per cent. This means the period of both the cost and benefits of the investment will be ten years.

Table 5: Item-wise break down of the costs estimated for the investment (for the tannery with already better ESQ compliance level)

Cost (in USD)	Parameters	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total Nominal Cost
Variable cost	Audit fee (adjusted for inflation)	-	2,000	-	2,140	-	2,290	-	2,450	-	2,622	11,501
	Maintenance cost (adjusted for inflation)	500	535	572	613	655	701	750	803	859	919	6,907
	Capital depreciation (10% each year)	500	500	500	500	500	500	500	500	500	500	5,000
Fixed cost	Consultant fee	2,500	-	-	-	-	-	-	-	-	-	2,500
	Infrastructure and machineries	5,000	-	-	-	-	-	-	-	-	-	5,000
Total nominal cost		8,500	3,035	1,072	3,253	1,155	3,491	1,250	3,753	1,359	4,041	30,908
Discounted cost		8,500	2,759	886	2,444	789	2,168	706	1,926	634	1,714	
Present value of total cost		22,525										

Source: Authors' calculations based on conducted KIIs

The variable cost items that have been considered in conducting the cost estimation include audit fee (which will have to be paid every two years), maintenance cost, which is the cost of operating the newly established machine

and facilities for LWG certification (including the cost of workers) and the cost of depreciation each year. The audit fee and maintenance cost has been adjusted for future periods assuming seven per cent inflation each year.

Table 6: Item-wise break down of the costs estimated for the investment (for the tannery with minimal ESQ compliance level)

Cost (In USD)	Parameters	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total Nominal Cost
Variable cost	Audit fee	-	2,000	-	2,140	-	2,290	-	2,450	-	2,622	11,501
	Maintenance cost	1,500	1,605	1,717	1,838	1,966	2,104	2,251	2,409	2,577	2,758	20,725
	Capital depreciated (10% each year)	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	25,000
Fixed cost	Consultant fee	5,000	-	-	-	-	-	-	-	-	-	5,000
	Infrastructure and machineries	25,000	-	-	-	-	-	-	-	-	-	25,000
Total nominal cost		34,000	6,105	4,217	6,478	4,466	6,894	4,751	7,359	5,077	7,880	87,226
Discounted cost		34,000	5,550	3,485	4,867	3,050	4,281	2,682	3,776	2,368	3,342	
Present value of total cost		67,401										

Source: Authors' calculations based on conducted KIIs

On the other hand, the one-time costs items, including consultant fees, infrastructure, and machinery purchasing costs, have been considered fixed costs. It is to be noted that the cost of establishing individual ETP is not included here. The major area of investment under the infrastructure and machinery cost items is enabling pre-treatment facilities, sedimentation tank establishment, chrome management, in-house testing facilities etc.

The analysis predicts the total nominal cost for the ten years investment cost ranges between USD 22,525 – 67,401, depending on the existing level of compliance (Table 5 and 6). The total estimated present value⁷ of the nominal cost stands between USD 15,625 – 61,001. The estimated nominal cost, however, differs from another nominal cost estimation by Muhammad (2022). According to its estimation, the cost of investing in becoming LWG certification

⁷ Using $PV = FV / (1+i)^n$, where i is assumed as 10 per cent

ranges from BDT 13.2 million to 22.20 million (USD 0.14 million to 0.24 million) (Table 7).

The cost of establishing an ETP varies significantly depending on technology, capacity and types, whereas the

Table 7: Cost of investing in LWG certification

		In BDT million	Related issues
01	Compliance officer	0.5	Considering BDT 20,000 for two years
02	Social audit	0.7	Social audit preparedness and audit fee
03	Operating permits	0.1	Certificate fees and other costs
04	Production data	0.1	Document preparation
05	Traceability (incoming)	0.5	Purchasing of Pathing Machine
06	Traceability (outgoing)		
07	Environmental Management Systems (EMS)	0.2	Training and internal audit
08	Restricted Substances, Compliance, Chromium Vi Management	2.4	Cost of different tests
09	Energy consumption	0.1	Purchase and setting of solar panels
10	Water usage	1	Purchasing of inline digital meter
11	Air & noise emissions	2	Purchase of emission measure and controlling devices
12	Waste Management	0.5	General expenditure of tannery
13	Effluent treatment	0.4	ETP and tests expenditure
14	Health, Safety (H&S), Emergency Preparedness	1.2	Purchasing of PPEs, Risk assessment, Equipment, Practice drill, drum guarding etc.
15	Chemical Management	1	Training, use of quality chemical, building of necessary storage
16	Operations Management	1-10	Housekeeping, marking of walking and storage places, calibration, electricity stirs, use of hair shaved method etc.
17	Consultant fee	0.5	To evaluate the status after preparation
18	LWG Audit fee	0.6	It will remain fixed
19	Others	0.4	Miscellaneous costs
Total		13.2 to 22.20	

maintenance cost of an ETP varies based on types of waste type, the concentration of the pollutant, the extent of removal (Sarker and Sarkar, 2018). Although the cost analysis does not include the cost of establishing an individual ETP for a tannery, according to Key Informant

Interviews, in Bangladesh, establishing an individual ETP should take around USD 6 lac⁸. The capacity of the ETP would be around 30 KL. However, Sarker and Sarkar (2018) estimated the cost of establishing an ETP (paint manufacturing facility) is around USD 316,310, whereas the annual maintenance cost is around USD 73,627 (Table 8).

Table 8: Fixed and maintenance cost of establishing an ETP in Bangladesh

Type of Cost	Components	BDT	USD (@ 84 BDT) ¹
Fixed cost	Total cost of material supply	1,600,000	19,048
	Consultancy, plant commissioning, electrical and mechanical work supervision fees	250,000	2,976
	Cost of civil work	1,200,000	14,286
Total Fixed cost		3,050,000	36,310
Variable cost per year	Annual chemical cost for chemical treatment	3,444,000	41,000
	Annual chemical cost for biological treatment	62,700	746
	Annual electricity cost	1,290,000	15,357
	Annual maintenance cost (Repair work of units, repair and replacement of machines and instruments)	140,000	1,667
	Annual cost of manpower	1,248,000	14,857
Total variable cost per year		6,184,700	73,627

Note: ¹ Considering the exchange rate of 2018

Source: (Sarker and Sarkar, 2018)

⁸ For chemical treatment ETP

7.1.2 Benefit analysis

Similar to the cost analysis, the benefits of ESQ compliance and LWG certification can also vary depending on the several categories of tanneries. This particular benefit assessment is conducted assuming its existing yearly export is around 400,000 square feet, and it produces raw to finished leather.

According to conducted interviews, the main quantitative benefit of having ESQ compliance and LWG certification is, on average increase in the price by 40 per cent. Of this 40 per cent, after subtracting the cost of production, including the additional cost for LWG certification, the

LWG certified tannery, after becoming LWG certified, can have as high as 70 per cent additional new orders compared to their existing level. This means that the additional profit can be generated from this 70 per cent of new orders after being LWG certified. It is to be noted that having environmental compliance would entitle a tannery two per cent corporate tax cut in Bangladesh. However, this benefit was not taken into account in the estimation as there is uncertainty regarding the extent of tax payment by Bangladeshi tanneries, as reflected in the opinion of the interviewed respondents. Also, it is assumed that there will be no further increase in the price of the product over the years.

Table 9: Estimated benefits for Bangladeshi tannery currently exporting around 400,000 square feet of leather

Benefits (In USD)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total Nominal Benefits
Increase in 25% profit per unit in 70% new orders	-	11,200	11,200	11,200	11,200	11,200	11,200	11,200	11,200	11,200	100,800
Discounted benefits	-	11,200	10,182	9,256	8,415	7,650	6,954	6,322	5,747	5,225	
Present value of total benefits	70,951										

Source: Authors' calculations based on conducted KIIs

increase in the profit could be around 25 per cent. Also, according to them, the profit per unit of finished leather can be around twenty cents at the moment for non-LWG-certified tanneries. Additionally, it was claimed in the interviews that a non-

Considering the above-mentioned criteria, the assumed total nominal benefits of LWG certification stand at USD 100,800 in ten years. On the other hand, the present value of this nominal benefit is estimated to USD 70,951.

7.1.3 Benefit-cost ratio

The benefit-cost ratio for the tannery with an already higher compliance level is:

$$\begin{aligned} \text{Benefit-Cost Ratio (BCR)} &= \frac{\text{Present value of benefits}}{\text{Present value of costs}} \\ &= \frac{70,951}{22,525} \\ &= 3.15 \end{aligned}$$

The BCR 3.15 indicates that the LWG investment is profitable. Also, the monetary benefits of LWG certification are 3.15 times higher than the cost of LWG certification. It can also be apprehended from the results is that for a tannery that already has a good level of compliance, it might take at best two and half years to retrieve the cost that was incurred for the certification.

On the other hand, the benefit-cost ratio for the tannery with a lower level of compliance is:

$$\begin{aligned} \text{Benefit-Cost Ratio (BCR)} &= \frac{\text{Present value of benefits}}{\text{Present value of costs}} \\ &= \frac{70,951}{67,401} \\ &= 1.05 \end{aligned}$$

The BCR 1.05 indicates that the LWG investment is profitable. Also, the monetary benefits of LWG certification 1.05 times higher than the cost of LWG

certification. It can also be apprehended from the results that for a tannery with a meagre level of compliance, it might at best take eight and half years to retrieve the cost that was incurred for the certification.

7.2 Qualitative cost-benefit analysis

The cost and benefits of investing in ESQ compliances are not limited to monetary values only. It has a number of underlying benefits and costs; some of them are qualitative in nature, while some of them are intangible.

The only intangible cost of investing in ESQ compliance for being LWG certified is the dedication and direct involvement of the owner of a tannery. In other words, the owner needs to have self-motivation and be directly involved in all the compliance-related activities to see the tannery getting and remaining LWG certified. Moreover, it is not a one-time process. Criteria in the area of ESQ compliance to be LWG certified have been and will be evolving and expected to be stricter in future. Therefore, the owners of tanneries need to take self-interest in conforming to challenges related to ESQ compliance from their business's sustainability point of view.

Table 10: A comparison of the benefits of LWG and non-LWG certified tanneries

Before LWG/Non LWG certification	After LWG Certification
• Lower price of product	• Better price of product
• Higher energy use	• Lower energy use
• Higher risk of industrial accidents	• Lower risk of industrial accidents
• Lower productivity and workers' morale	• Higher productivity and workers' morale
• Inferior brand image	• Better brand image

Before LWG/Non LWG Certification	After LWG Certification
• Inferior shareholder relations	• Better shareholder relations
• Inferior operational management	• Better operational management
• Penalty and punishment from the government	• Incentives, awards and recognition from the government
• Concentrated product markets and partners	• Diverse product markets and partners
• Lower job attraction	• Higher job attraction
• Limited access to credit support	• Greater access to credit support

Source: Conducted KIs

Compared to a non-LWG-certified tannery or pre-LWG certification period, an LWG-certified tannery can have access to several benefits (Table 9). One of the major intangible benefits of being ESQ compliant and LWG certified thereby could be considered as the self-satisfaction of the owners and management. Any LWG-certified tannery can consider itself as a contributor to global green initiatives. It can assist in enhancing their business's brand image both locally and internationally. This also results in better shareholders relations and the prospects of expanding business to a diverse market increase. Besides, green and safe workplace should boost workers' productivity and decrease the risk of industrial accidents. Additionally, it could attract talent and a more skilled workforce to join the company. As shown in the quantitative analysis, the cost of operation can be reduced significantly by conforming ESQ compliance. Having access to detailed information about the business, because of ESQ compliance, will allow the tannery to have a more strategic overview of its business process. This can open the path for new business strategies

as well. By obliging domestic social and environmental compliance criteria, a tannery can be entitled to certain rewards, incentives, and recognition from the government.

8. RECOMMENDATIONS

One of the objectives of the conducted study was to provide recommendations on required steps for Bangladeshi tanneries to become LWG certified. It is to be noted that all the tanneries of the BSCIC tannery estate are not equally capable of becoming LWG certified. Therefore, multilateral roles need to be played by all the industry's stakeholders, including the tanneries, tannery association, government agencies, and development partners, in easing the LWG certification process for both the capable and partially-capable tanneries in Bangladesh. Subsequent sections discuss some of the key expected roles of these stakeholders in this regard. The listing of recommendations has a priority ranking; that is, the first recommendation for each stakeholder is in the most immediate and short-term need, while the last one is a long-term requirement.

8.1 For individual tanneries

In attaining LWG certification by conforming to ESQ compliance, individual tanneries have one of the most important roles to play. Based on the study findings, the following recommendations could be made for individual tanneries.

Mindset: It is needless to say, without the desire of the individual tanneries, none of steps - taken in regard to LWG certification- will be effective. Hence, individual tanneries, particularly the owners, need to have the mindset of being LWG certified. According to Indian LWG certified tanneries, it is not that difficult to be LWG certified if an owner himself can remain determined and involved more directly in the compliance process, which is the most important requirement from Bangladeshi owners at the moment.

Establishing basic pre-treatment facility on tannery premise: Establishing a basic pre-treatment facility at their tannery premise can be one of the key areas of investment for Bangladeshi tanneries at the moment. In case the establishment of a full pre-treatment process is not possible right now due to scarcity of space, they can at least consider establishing a customised pre-treatment facility as per expert's guidance. Establishing pre-treatment facility can significantly reduce the pressure on BSCIC CETP and improve of treatment performance thereby. However, the real benefits of establishing such pre-treatment facilities can only be achieved if this step is taken collectively by large portions of tanneries of the estate.

Gradual investment: In the current situation, instead of going for immediate higher investments, individual tanneries should gradually but surely keep investing in the high-impact areas as

per their capabilities. As mentioned in earlier sections, a number of areas of social and environmental compliances, do not require higher investment immediately. For example, making workers and management aware and proper labelling of chemicals, including the restricted ones used in the tanning process, does not require a higher investment. Also, providing workers with formal appointment letters and payment of wages through DFS can be easily managed by the tanneries without investing a higher amount. These small changes can bring significant success in the area of ESQ compliance status of tannery. However, such kind of areas, where result can be obtained without investing a huge amount, can vary tannery to tannery depending on their current status of ESQ compliance. Hence, individual consultants, who hold expertise in the area of LWG certification, can be hired by tanneries to assess their current ESQ compliance level and identify areas of immediate improvement.

Chrome recovery unit: As chrome recovery unit in BSCIC tannery estate is not functioning to the expected level, Bangladeshi tanneries can consider establishing individual Chrome Recovery Unit in their premises as is in India; however given that space would be an issue in this regard, assessment could be conducted by tanneries with the help of an expert in identifying the feasibility of establishing clustered chrome recovery units (a unit connected with a group of tanneries) in tannery premises.

Use of renewable energy: Individual tanneries in Bangladesh should opt for using renewable energy more actively; as in India, there should be rainwater harvesting facilities in the tannery premise in Bangladeshi tanneries; given the space

is limited in the tanneries, the storage tank can be established in the underground; yet the feasibility of this facility might vary across tanneries.

Having dedicated compliance officers:

There should be a dedicated compliance officer, trained on ESQ compliances in each tannery who can coordinate with the compliance requirements for LWG all the time.

8.2 For tannery association

Given that tanneries in Bangladesh are now operating in an estate, the tannery association needs to play a pioneering role in ensuring ESQ compliances in individual tanneries. Their role should include:

Fixing the amount of water discharge:

The association should consider setting up a fixed effluent discharge limit among the tanneries in order to ease the pressure of CETP as long as the capacity of the CETP remains the same; also, it must ensure that all the tanneries have: a pre-treatment facility for easing the pressure from the CETP; electromagnetic flow meters to gauge the amount of effluent a tannery uses and discharges.

Ensuring accountability of individual tanneries:

The association should come up with strict measures (such as annulling association's membership) in case individual tannery's negligence to ESQ compliance standards (such as not complying the court's latest orders, violating the limit of effluent discharged, not having pre-treatment facility etc.)

Negotiate with the government in regard to result-oriented monetary support:

As it is in India, the tannery association needs to negotiate with the government in regard to obtaining

more result-oriented monetary support for the tannery industry in obtaining LWG certification. The association needs to sit with government agencies and share the evidence-based prospects of the industry and its distinct areas of contribution. For example, although RMG is the leading foreign currency earner in Bangladesh, due to its excessive dependency on import of raw materials, a significant portion of this earnings also goes out. In contrast, leather, including the tannery industry, is not highly dependent on the import of raw materials, which is a distinct advantage of this industry.

Increase collaboration with other stakeholders:

The tannery association should increase collaboration with other stakeholders, including research organisations, development partners, buyers, other experienced industries etc. in regard to having knowledge and information support, technological support, human resource skill development support, etc. for ESQ compliance. Foreign experts (including from India) could be hired for the capacity development of the workers working for the management of the CETP. In addition, BTA can consider seeking knowledge support, particularly in the area of social compliance and workplace safety, from associations like BGMEA and BKMEA that are highly experienced in the same and have shown success to different extents.

Establishing coordination between tannery and other tannery-related industries:

The association, with the help of government and development partners, should sit together with glue, leather board, and cement industry's representative in an effort to have coordination regarding using solids waste of the tannery industry as raw materials in the respective industries. The solid waste should be considered as a distinct supply chain and all the possible

scopes of distributing tannery industry's solid waste to other industries need to be identified. In this regard, a feasibility study can be undertaken with the joint cooperation of development partners, government agencies and associations, which would provide evidence-based guidance.

8.3 For government agencies

Establishment of Pre-treatment unit in CETP: As mentioned government could consider establishing a pre-treatment unit in CETP. If space becomes an area of concern, at least, the government can establish "Bar screening chamber" and "Filter press" as part of the pre-treatment unit. However, experts should be hired in this regard who could guide establishing the best possible pre-treatment unit depending on the space available in the estate.

Establishment of Ozonation treatment unit with temporary flexibility in TDS limit: While the BSCIC should immediately consider completion of all remaining work of CETP in the estate, in addition, at least for now, BSCIC could consider establishing an ozonation treatment unit. Addition of this unit could significantly decrease the toxicity from the effluent water. Also, this technology does not require a huge land. However, as the technology cannot significantly reduce the TDS from the effluent (remains around 5,000), DoE can temporality (for 2-4 years) consider remaining flexible regarding allowing TDS limit to around 5,000 from the existing 2,000 level. This would enable the tanneries to at least comply with the LWG audit category requirement. In the meantime, the required other ways and technology for reducing TDS limit (such as expanding

land area for the estate, establishing RO technology etc.) must be installed to curb the TDS limit within the current limit.

Extending output oriented monetary and policy support: Government must extend its monetary support to the tannery industry and, at the same time to those industries that can use the waste of the tannery industry as their raw materials (such as glue, leather board, cement etc.). The monetary support for tannery industry temporarily needs to be result oriented like in India where the tanneries can claim a significant portion of costing (by showing proper evidence) as subsidy only after becoming LWG certified. As a policy measure, similar to India, the Bangladesh government can consider temporality to make it mandatory for the local cement industry to source at least 1-2% of their raw materials from the sludge of the CETP of the tannery industry. The government should also consider providing adequate monetary⁹ and technological support to those small industries (such as leather board, glue etc.) that could use the components tannery's solid waste as their raw materials. In the long run, extensive research and assessment should be undertaken in adopting the best technologies in dealing with solid waste (for example, the technology of producing different kinds of bio-Oils using flesh waste is in a pilot phase at the moment, this can be taken under consideration for adopting in the future).

Charging for the amount of water discharged: The government can consider charging the tanneries for the amount of water they discharge, which should, in turn, ensures the most efficient use of water in the tanneries and ease the

⁹ Temporarily, the Bangladesh government can restructure its existing monetary support strategy (mostly in credit) and develop an outcome-oriented support scheme where the tanneries will only get access to support if they get LWG certification.

pressure from CETP. This would contribute to generating additional amount of taxes for the government. From this additional amount of tax received from the tannery industry, the government can provide monetary support to the tanneries in becoming ESQ compliance. Therefore, on the one hand, the pricing on discharged water would help to ensure the most efficient water use, on the other hand, will enable the government to provide monetary support to the industry in the area of ESQ compliance.

Providing adequate authority to BSCIC CETP company: The BSCIC should provide adequate authority to the tannery owners in operating BSCIC CETP company. The management of CETP company needs to be recruited against a structured organogram as is in India, and training should be conducted by international and national experts to enhance their skills and capacity of its human resources.

Allowing for establishment of individual ETP: In India, many tanneries, even after being connected to CETP, have their own ETP. Bangladesh government, in the long run, can also consider providing permission for those tanneries that want to build individual ETP, particularly those which would agree to continue paying for CETP even after building self-ETP.

9. CONCLUSION

Tanners in Bangladesh are already highly aware of the ESQ compliance requirements to be LWG certified. A number of good practices in the area of ESQ compliance are also already there in some of tanneries. Yet, the number of tanneries with LWG certification remains beneath, mainly due to the apathy of the tanneries. The key source of their apathy towards LWG certification is the non-performing CETP at the BSCIC tannery

estate, which they believe would not permit them to have LWG certification even if they comply in all other areas unless they have their own ETP. Also, there is a lack of confidence among the tanneries regarding what extent the ESQ compliance could cost and how long it could take to yield the expected benefits.

The findings of the study indicate that investing in LWG compliance at the current state level is profitable for the tanneries in Bangladesh. The benefits of investing in ESQ compliance for LWG certification could range between at least 1.05 to 3.15 times the cost likely to incur. Also, it is estimated in the study that the cost for a tannery that already has a good level of compliance, it might take at best two and half years to retrieve the cost that was incurred for the LWG certification, while in case of tannery with least existing compliance standard it can take up to eight and half years. It is to be noted that this estimation has been conducted under certain assumptions, particularly assuming the tannery exports yearly around 400,000 square feet of finished leather. Hence, the benefit could be even higher, and the return period could be even lower for the tanneries with a higher export.

The field visit experience and conducted key informant interviews imply that Bangladeshi tanneries have a great prospect of becoming LWG certified by taking lessons from Indian tanneries. Although a number of good practices in Indian and other tannery industries identified in this study are not entirely replicable in case of the Bangladeshi tannery industry, by adopting the feasible good practices, significant success can be achieved. However, in this regard, relevant government agencies, tannery associations, and other key stakeholders must act cooperatively.

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