IMPACT ASSESSMENT OF LEATHER INDUSTRY ON ENVIRONMENTIN ADDIS ABABA IN CASE OF WALIA LEATHER AND LEATHER PRODUCTS PLC.

A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF JIMMA UNIVERSITY FOR PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION

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IMPACT ASSESSMENT OF LEATHER INDUSTRY ON ENVIRONMENT IN ADDIS ABABA CITY IN CASE OF WALIA LEATHER AND LEATHER PRODUCTS PLC

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A RESEARCH SUBMITTED TO COLLEGE OF BUSINESS AND ECONOMICS DEPARTMENT OF MANAGEMENT IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS MANAGEMENT

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Declaration

I, Tadesse Abebe declare that the research project entitled *Impact assessment Leather Industry on Environment in Addis Ababa In Case Of Waliya* Leather and Leather Products Plc.is my original work that is done under the guidance and advice of my advisor Mr. Tesfaye Melaku. This research project is done as partial fulfillment for Masters of Arts Degree in Business Administration (MBA). This research has not been done before and all sources of materials used for the study have been appropriately acknowledged.

Tadesse Abebe

Data_____

Sign----------

Certification

This is to certify that Tadesse Abebe has done the study on the topic *Impact Assessment Leather Industry on Environment in Addis Ababa In Case Of Waliya Leather and Leather Products Plc.* This study is authentic and has not been done before by any other researcher on the same topic.

Approved By

Main Advisor Name ----------Date---------Signature--------

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Table of Contents

Content Page

Abbreviations and Acronyms

BAT----------Best Available Technologies

BOD----------Biological Oxygen Demand

CETP ----------Common Effluent Treatment Plant

COD----------Chemical Oxygen Demand

CREGS----------Climate Resilient Green Economy Strategy

CSA----------Central Statistics Agency

ECPC----------Environmental Cleaner Production Center

E IA----------Environmental Impact Assessment

E IP----------Eco-Industrial Park

ELIA----------Ethiopian Leather Industry Association

EMS----------Environment Management System

E PA----------ETP： Environmental Protection Agency

FEPA ----------Federal Environmental protection Authority

FGD ----------Focus Group Discussion

GTP----------Growth and Transformation Plan

LIDI ----------Leather Industry Development Institute.

MoEF----------Ministry of Environment and Forest

MoFED----------Ministry of Finance and Economic Development

MoFEI----------Ministry of Forest and Environment of the Government of India

MoI----------Ministry of Industry

MoLSA----------Ministry of Labor and Social Affairs

UNESCO ----------United Nations Educational, Scientific and Cultural Organization

UNIDO----------United Nations Industrial Development Organization

WLLPP---------- Waliya leather and leather product plc.

Abstract

The focus of the research is to assess environmental challenges of the leather industry in the case of the Waliya leather and leather products factory. Exploratory research design was employed. Both qualitative and quantitative research approach were applied. Stratified Sampling was used. Primary and secondary data were collected by questionnaires and semi structured interview. To analyze the data, statistical package for social science (SPSS) which is statistical software package become applicable accordingly. The finding of the study revealed that environmental policy, regulations and standards are not properly implemented by Waliya leather and leather products factory due to lack of cost effective mechanism of treating its waste, financial constraint and skill in running common effluent treatment plant. The management of the factory perceives using environmental treatment plant has additional cost of production and makes less competitive in the industry. Due to lack of awareness Waliya leather and leather products factory management were protect the environment in its minimal way and it is based on afraid of penalty not willingly to protect the environment. Workers were not comfortable with the safety measures in Waliya leather and leather products factory. In addition, it is found that there are significant number of employees who do not take training about environment protection and safety. The coordination between different stakeholders in the implementation of environmental standards to the leather industry is weak due to different priorities and focus of different stakeholders. The MOI gives more focus to the export targets, less mainstreaming of environmental issues especially before the formulation of Climate Resilient Green Economy Strategy; whereas Ministry of Environment and Forest and Addis Ababa city government Akaki kality sub city have great concern on the environment issues but lack of bringing innovative solution. Lastly the study recommends Waliya leather and leather product factory managers have to use participatory approaches in dealing with the environmental protection problem caused by the factory around villagers and Addis Ababa city administration should combined concrete policy implementation mechanisms which designed to solve environmental impact caused by Waliya leather and leather product factory.

The target population and sampling method community, government body and employees

Key words: Environmental law Valuation leather industry, environmental Impact and pollution, policy **implementation mechanism**

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

Tanning industry is means of job creation and export earnings for developing countries. However, if there is no proper way of treating the waste from the industry, it becomes harmful to the environment because Leather industry is one of the pollutant industries (Favazzi, 2013).

Ethiopia has great potential of livestock with cattle population of 59 million, with sheep and goat populations of 30 and 29 million, respectively, makes the country first in Africa; with an annual off-take rate of nearly 10% for cattle, 33% for sheep and 38% for goats, (CSA, 2016).

As per MOI (2017) evidence the Ethiopian government makes the leather industry as one of the priority areas in the manufacturing industry. The Ethiopian government wants to bring accelerated economic growth which needs vibrant growth of different sectors including the manufacturing sector. Leather and leather products are among the main manufacturing export products. Within the manufacturing sectors, the leather industry comes as the leading exporter the country was able to generate above 123.4 million USD in the year 2014.

In Ethiopia also there is a concern on the waste of the tanneries. The industrial establishments huge potential of for sustained economic development of the country has been constrained for they were not designed and operated in sustainable manner; most of tanneries do not have treatment facilities and environmental management systems as a result they simply discharge their wastes into the environment. It is obvious that the effect will further extend to rural areas as well. It is in the interest of tanneries to produce as much tanned leather as possible, to the lowest possible cost, avoiding paying added costs for the reduction of the effects of pollution, which will increase proportionally to the commercial success of the tannery which is unacceptable for the surrounding communities. Postponing the solution of this problem will bring serious problems to the management of the environment up to the extreme consequence of the impossibility to live in the area (Layman, 2012).

The push for development shall be moved from the field of quantity to the field of quality and variety: first of all to produce with less water, to produce with environment friendly technologies, in the end to use efficient wastewater treatment systems. Coming to this point, normally, we have to face the indifference of the tannery industry entrepreneurs, who put on the table their contribution to society into creating jobs, as an important achievement recognized useful to society. However, this contribution does not change the physical law under which the industrial revolution has to be considered: environment must be protected for the welfare and well-being of women and men living in the surrounding communities. It is clear that environment protection might create in the immediate future a reduction of production and even a reduction in the potential investment in the near future, related to the production of tanned leather, but the complexity of the social system and the push towards a better quality also is a potential for the creation of a number of "important and socially useful" jobs: a clean production is usually repaid by a widely better quality (Adriaens, 2015).

In order to achieve this aim, some mechanisms shall be considered, mechanism different from those of the automatic mechanism of the market, which usually reward only the minor cost or the no cost. The subjects able to put these mechanisms into action are public agencies, the role of which is to understand and serve to common interest in the short and long period: we shall consider the government as the main actor for the implementation of fare policies of incentives. (Bartlett J. 2017).

This research paper assessed current situation of Ethiopian leather industry development and challenges on the Environment specific to Waliya Leather and Leather Products Plc.

Waliya Leather and Leather Products Plc. was established 1986. The initial startup capital was birr 1 million but as the annual report of shows that currently Waliya Leather and Leather Products Plc reaches 27 million ETB (WLLPP, inside magazine 2017)

Regarding employees and staffs, though the plc. Started with only total employees of 300 labors and professional employee now the company expands and permanently hired 500 employees (WLLPP, inside magazine, 2017)

Regarding the daily performance Waliya Leather and Leather Products Plc. on average he soaking up to 10,000 pcs of sheep or goat and 1000 pcs of hides. The major products of Waliya

Leather and Leather Products Plc. are footwear and finished leather (WLLPP, inside magazine 2017).

1.2 Statement of the Problem

According to Neville, C (2010) tanning industry involves chemical reactions and mechanical changes. In addition He strongly remark that tanning industry generates solid waste in developing countries which discharge to rivers or other water areas or open areas. Furthermore he added as it could have adverse effect on the environment and human if it is not properly managed.

On the different scenario, this industry is one of the major means of exports earning in Ethiopia (Alemayehu, 2014). However, he also asserts that there are challenges in tapping its economic benefit with minimizing its pollution effect to the environment. Generally, it becomes a delicate balance to maintain practically both keeping the environment sustainable and the growth of the industry.

In short, implementing environmental policy of the country in harmony with the required growth of leather industry becomes a difficult task for the industrialist. It was planned by the government to reach the annual export target of around 1billion dollar export by the end of 2018 from the leather industry (GTPII).

Aklilu (2016) emphasis there is a conflict between this economic interest and environmental sustainability. Because, it is strong fact that most of the tanneries in least developed countries discharge their waste in to the surrounding are without proper treatment. He also remarks that even though a number of tanneries in Ethiopia particularly in Addis Ababa have primary and secondary treatment to manage their wastes they don't follow the right procedure to treat the waste.

As per LIDI (2017) annual magazines report applying proper dosages of chemical; good maintenance and continuous monitoring and evaluation are uncommon practice to all leather processing firms. The magazine also remarks existence of around 12500 m^3 waste water and 150 tones solid wastes generated per day from all tanneries though they don't want to incur the cost of treatment of their waste from the tanning process.

From preliminary survey in Waliya Leather and Leather Products Plc, even though there are mechanisms on the paper as a policy to treat solid waste material, they don't perform it as per the regulation of the country. In an informal interview and discussion with communities and employees of the factory they revealed that the company is damping its solid waste in the river basin near which is south direction of the company. In addition they revealed that the factory manager don't want to include the treatment cost on their production cost because they believe that as they are affected by competitive price in the industry.

Informal discussion with the manager of the Waliya Leather and Leather Products Plc. Even though the managers explain as there is well established treatment mechanism in the company, most experts disagree with him. Rather they reveal the existence of weak treatment performance the factory. Besides, the employees explain the existence of health problem over the employees of the company. Furthermore, the residents around Waliya leather and leather product plcare complaining about smell, health problem which violets their right to leave in clear environment. They also express Untreated wastes of the factory damages animal health, living and non-living things in the environment.

As per the annual magazine of Waliya Leather and Leather Products Plc., though the company conducts well established waste treatment system now it faces a challenge to conduct primary, secondary and tertiary treatment with minimum cost. And the company requires an incentivize from the government to use effluent treatment plants (Waliya annual magazine, 2016).

Furthermore as per Waliya annual magazine, (2016) the There is a conflict between economic interest and environmental sustainability, there is poor of waste water treatment system, no environmental awareness and Education, the practice were not coincide with what the law regulates and there is high risk of population contamination by industrial waste.

Hence, taking the above controversies and inconvenience as base ground, the researcher wants to assess the leather industry in Addis Ababa in case of Waliya Leather and Leather Products Plc. by stating the following research questions.

1.3 Research Questions

To meet the objectives of the study the following research questions were used in this research

1. What is the current status of Waliya Leather and Leather Products Plc. in implementing environmental guide lines to the leather industry?

2. What are major challenges in the implementation of environmental policy and regulation to Waliya Leather and Leather Products Plc.?

3. What are the impacts to downstream villagers and the environment in general?

1.4 Objectives of the Study

1.4.1. General Objective

The main objective of the research to assess environmental challenges of the leather industry in the case of the Waliya Leather and Leather Products factory by addressing the following specific objectives.

1.4.2. Specific objectives

In view of the above fact, this research paper aims at the following specific objectives.

1. To assess how leather industry environmental guidelines are implemented by Waliya Leather And Leather Products Plc.
2. To assess the major impacts resulted in the downstream villages' lively hood by Waliya Leather And Leather Products Plc.
3. To propose possible recommendation of minimizing environmental pollution of the leather industry without affecting the industry growth.

1.5. Significance of the Study

This study may contribute to the academic community and policy makers specifically. It might add value to the exiting literature of leather Industry development and Environmental challenges in Ethiopia. To serve as a stepping stone for other researchers who would like study in this area in a wider scale. To make possible recommendation for Waliya Leather and Leather Products

Plc. and other stake holders to use efficient system effluent treatment of the waste released of the tanning process.

1.6 Scope of the study

It would have been better to assess the case of more tanneries. However, due to resource and time constraints, only Waliya Leather and Leather Products Plc taken as case study. This tannery is selected because it is one of the tanneries which have big production capacity in Addis Ababa and there are complaints from villagers from its waste treatment. Hence it would be a good case study for the problem raised in this research paper, i.e. leather industry and environmental challenge.

1.7 Limitation of the Study

In order to get a stronger picture of the issues in the different lather factories the researcher would have liked to involve a larger number of respondents. But due to inconsistent time frame limitations provided by the study program this was a big challenge and affected the quality of the paper. The shortage of up-to-date reference materials and research works, specifically to the Ethiopian leather industry context, were also the limitation of the study. Another barrier the researcher came across in the process of data collection was refusal by management of the factory and considering it as some sort of confidentiality and unconvincing reasons to fill the questionnaire and to conduct an interview such as lack of time to fill, fear of sensitivity of the questionnaire contents if its results present to public, etc. but at the end it become possible by discussion with concerned body.

1.8 Organization of the study

This study consists of five chapters. The first chapter provides brief introduction of the study which includes, background, statement of the problem, objectives and significance of the study, research questions, scope and limitations of the study, and research design. In the second chapter, conceptual frame work of the study, policy and legal frame work for the environment management and empirical literature review were included. The third chapter contains data description and chapter four has data interpretation and analysis. Finally chapter five presents summary of findings, conclusions and recommendations.

CHAPTER TWO

2. REVIEW OF RELATED LITRATURE

2.1 The Concept of Leather Manufacturing Process

Tanning is a process where putrefaction is avoided while maintaining or enhancing the mechanical properties of being flexible and soft even when dry. Hides and skins gain durability and can be used in a wider range of products because of this process. These skins usually come from large and medium size mammals such as the ox, cow, calf, buffalo, sheep, goat, pig and horses; although marine animals and some reptiles are also processed (Sharphouse, 2013).

According to (Adriaens, 2015) tanning process can be summarized as follows

1**. Pre-tanning (also known as beam house operations):** this consists of unit operations from skinning the animal and preparing the skin for transport by curing, to treating the skin prior to tanning (washing, liming treatment, unhearing, fleshing, de liming, bating and pickling).

2. **Tanning (also known as tannery operations):** Tanning through chemical or vegetable treatment of the skin.

3. **Post-tanning (finishing operations):** That consists of operations to obtain the finishing mechanical and esthetic characteristics usually containing steps such as splitting to gain uniformed thickness, washing residue form tanning process, pH neutralizing, dyeing, flattening, oiling, drying and rolling.

These steps require many natural resources such as water, metals, and derived chemicals in order to achieve the desired quality. If better manufacturing practices and control systems are not in place the tanning process can become an important environmental issue. Because of its potential and the many companies that have poor manufacturing practices, the tanning industry has generally been identified as a source of pollution and described as a problematic industrial sector in terms of environmental performance.

2.2. Sustainability and the Tanning Industry

As per Bartlett (2017) explanation, contemporary societies are called to respond to two orders of problems: the MATERIAL, represented by the technology and by the production and the SOCIAL, involving the quality of life and the human relationship. Both orders evolve in conformity with the internal laws regulating the relation between industry and society.

Regarding law and environment Andersen (2016) suggested the following approaches as follows

A) The functionalist approach: Here the laws of environment are treated as an aspect of development and are managed by the traditional laws of economy, production and consumption;

B) The economy of environment: Dedicating great attention to the environment pollution and to the management of natural recourses;

C) The economy of ecology: Completely moving the prospective and saying that the salvation of humankind's economy is subordinated to the reconstruction of the economy of nature. In reality, it will not be practical to side to only to one of the above approaches, rather it is required to balance between economic growth and environmental issues, if the economy is not allowed to grow it would be difficult to protect and sustain the environment.

2.3. Pollution and Human Health

According to Arnorld (2015) the leather industry throughout the world has been identified closely with the generation of air, liquid and solid waste pollution. The tanneries generate huge amounts of liquid and solid wastes and emit obnoxious smell caused by the degradation of protein material of skin and generation of gases such as NH3 and H2S and CO2. Access to clean and sustainable food resources are essential for the preservation of one of the largest livestock populations in the world. Untreated waste generated from the tanning process can negatively influence the animal food supply (UNIDO, 2011).

2.4. Tannery Wastewater Characteristics and Management Schemes

Scholar including Mactacalf and Edydy (2013) characterize waste water in terms of its physical, chemical and biological composition with the parameters all interrelated. Characteristics of

wastewater generated from the tanning process in each production stage can respectively be seen for beam house process as, BOD(Biological Oxygen Demand), COD(Chemical Oxygen Demand) salt, pesticides, flesh, hair, suspended solids, sulfate, ammonia, base, chloride for tanning process (chrome tanning) as. BOD, COD, salt, acid, chromium, suspended solids and for finishing process as BOD, COD, salt, chromium and oils

Bartlett (2017) point out a significant number of operations within a tannery are wet operations consuming large amounts of water, chemicals and energy and leading to large amounts of polluted water. Through "process integrated" measures a significant reduction of water consumption and pollution load can be achieved, however tanneries keep producing waste water requiring special treatment. In cases where the potential for "process integrated" measures has worn out, further pollution reduction has to be found in the improvement of end-of-pipe measures

2.5 .Cleaner Technologies

Confronted with increasing legal and social pressures, no tanner can afford the luxury of not being familiar with the main issues and principles of environmental protection pertaining to tannery operations. Obviously, pollution prevention, the persistent promotion of cleaner leather processing, which ultimately leads to lower treatment costs, remains the supreme priority (UNIDO, 2011).

By applying industrially proven low-waste advanced methods such as the use of salt-free preserved raw hides and skins, hair-save liming, low-ammonia or ammonia-free deleing and bating, advanced chrome management systems, etc., it is possible to decrease significantly the pollution load, namely: COD and BOD by more than 30%, sulphides by 80-90%, ammonia nitrogen by 80%, total (Kjeldahl) nitrogen by 50%, chlorides by 70%, sulphates by 65%, and chromium by up to 90%. Yet, despite all preventive measures, there is still a considerable amount of pollution load to be dealt with by end-of-pipe methods (UNIDO,2011). The pressure to adopt cleaner technologies normally emanates from environmental imperatives such as the need to meet specific discharge norms, reduce treatment costs or comply with occupational safety and health standards. The typical primary targets are: lower water consumption, improved

uptake of chemicals, better quality/re-usability of solid waste, and reduced content of specific pollutants such as heavy metals and electrolytes.

The spread of cleaner technologies and processes has been neither spontaneous nor extensive. For all the claims about favorable cost-benefit ratios and/or environmental benefits to be derived from many of these technologies, tanners are not quick in adopting them, be it due to inertia, higher costs or the limitations mentioned earlier (UNIDO, 2011).

Due to variations in raw material, process, chemicals, water consumption, etc., it is small wonder that figures about pollution load in the literature vary a lot and should be interpreted very cautiously. Wastewater treatment is a multi-stage process to purify wastewater before it enters a body of natural water, or it is applied to the land, or it is reused. The goal is to reduce or remove organic matter, solids, nutrients, Cr and other pollutants since each receiving body of water can only receive certain amounts of pollutants without suffering degradation.

Therefore, ETP must adhere to discharge standards limits usually promulgated by the relevant environmental authority as allowable levels of pollutants, for practical reasons expressed as BOD5, COD, suspended solids (SS), Cr, total dissolved solids (TDS) and others. The three main categories of tannery wastewater, each one having very distinctive characteristics according to (UNIDO, 2011) are:

a) **Effluents emanating from the beam-house**- liming, deliming/bating, water from fleshing and splitting machines; they contain sulphides, their pH is high, but they are chrome-free.

b) **Effluents emanating from the tan yard (tanning and re-tanning, summing)** - high Cr content, acidic.

c) **Soaking and other general effluents, mainly from post-tanning operations** (fat- liquoring, dyeing) - low Cr content.

It is very important to segregate these streams and to pre-treat them separately according to their characteristics to avoid possible safety risks (formation of deadly hydrogen sulphide) and to reduce the cost of treatment and sludge disposal (to avoid contamination of sludge with Cr).

The mixing of liming and tanning streams gives rise not only to the obnoxious smell typical of poorly managed tanneries; the resulting lethally poisonous gas, hydrogen sulphide (H2S), is still by far the most frequent killer in tannery accidents, which occur mainly in inadequately ventilated spaces, especially in pits and channels. The volume and pollution load of sanitary wastewater in comparison with industrial wastewater is insignificant. Very arbitrarily and not quite consistently we speak of the following main phases of treatment (UNIDO, 2011).

2.5.1 Physical-Chemical Treatment

The objective here is the removal of settle able organic and inorganic solids by sedimentation, and the removal of materials that will float (scum) by skimming. Approximately 25-50% of the incoming biochemical oxygen demand (BOD5), 50-70% of total suspended solids (SS), and 65% of the oil and grease are removed during primary treatment. The effluent and sludge from primary sedimentation are referred to as primary effluent and sludge. The wastewater is received in wastewater collection sump having arrangement of screen chamber and grit removal chamber. Screen chamber and grit chamber is provided for the removal of coarse grit, floating matter and any suspended large particles which can damage internal part of pumps and other rotating equipment (Metcalf and Eddy,2013).

From wastewater collection sump, wastewater is pumped using effluent feed pump to equalization tank. Before equalization tank, effluent is passed through oil and grease trap for the removal of floating and insoluble oil and grease particles. Oil and grease trap is a baffled wall channel where wastewater is subjected to up and down flow for the removal of floating particles at the top surface. Separated oil and grease layer is collected from the top layer by manual skimming operation through collecting troughs and drain pipe. From oil and grease trap effluent is collected in equalization tank. Equalization tank is provided to ensure the complete mixing of varying quality and quantity. Complete mixing is achieved by floating type submerged mixers.

2.5.2 Biological Treatment

In most cases, secondary treatment follows primary treatment, its goal being the removal of biodegradable dissolved and colloidal organic matter using aerobic biological treatment processes. Aerobic biological treatment is carried out in the presence of oxygen by aerobic micro-organisms (principally bacteria) that metabolize the organic matter in the wastewater,

thereby producing more micro-organisms and inorganic end products (principally CO2, NH3, and H2O). Several aerobic biological processes are used for secondary treatment and the differences among them have to do primarily with the manner in which oxygen is supplied to the micro-organisms and with the rate at which organisms metabolize the organic matter (Arnorld, 2015).

Biological treatment is achieved by providing activated sludge process. In this treatment soluble BOD is stabilized by oxidation of organic matter by microorganisms. Nutrient and food is supplied to microorganisms for enhancing their growth. Oxygen required is provided by air blower through non-clog type membrane diffusers to achieve higher rate of oxygen transfer efficiency. Mixed liquor overflow from aeration tank is taken into secondary clarification process, for the separation of microorganisms under gravity. Bottom sludge from secondary clarifier is re circulated back in the aeration tank. Excess biomass is transferred into bio sludge tank. Clear overflow from secondary clarifier is transferred to the tertiary treatment (Andersen J., 2016).

2.5.3 Advanced (Tertiary) Treatment

Tertiary or advanced wastewater treatment is employed to reduce residual COD load and/or when specific wastewater constituents are not removed by previous treatment stages.

Tertiary treatment consists of chemical oxidation, pressure sand filter and activated carbon filter. Effluent from biological treatment is passed through chemical oxidation tanks, where Hydrogen Peroxide dosing is done. Mixing in chemical oxidation tank is provided with air agitation using separate air blowers. Effluent from chemical oxidation tank is collected in intermittent storage tank. From where effluent is further subjected to pressure sand filter and activated carbon filter. Suspended solids get removed in pressure sand filter and activated carbon filter provides treatment for removal of color and COD so that final treated wastewater meets the discharge norms. Backwashing of both the filters is done daily for cleaning of filter beds. The backwashed water is diverted back into wastewater collection sump for further treatment (Arnorld, 2015).

2.6 Policy and Legal Framework for Environmental Management

2.6.1 The Constitution of Ethiopia

The constitution of the Federal Democratic Republic of Ethiopia provides the overriding principles for all legislative frame-works in the country. The concept of sustainable development and the environmental rights of the people are protected in the constitution by articles that stipulate the rights of peoples in the country. The concept of sustainable development and environmental rights are enshrined in article 43, 44 and 92 of the Constitution (FDRE constitution, 1995).

Article 43 of the constitution also speculates "The Right to Development" which identifies peoples' right to improved living standards and to sustainable development; and participate in national development and, in particular, to be consulted with respect to policies and projects affecting their community. Similarly, according to Article 44; Environmental Rights, all persons have the right to a clean and healthy environment; and who have been displaced or whose livelihoods have been adversely affected as a result of State programs has the right to commensurate monetary or alternative means of compensation, including relocation with adequate State assistance.

Moreover, in Article 92: Environmental objectives are identified as, "Government shall endeavor to ensure that all Ethiopians live in a clean and healthy environment, the design and implementation of programs shall not damage or destroy the environment, people have the right to full consultation and to the expression of views in the planning and implementation of environmental policies and projects that affect them directly and Government and citizens shall have the duty to protect the environment"(FDRE constitiution,1995).

2.6.2 Environmental Policy of Ethiopia

The Environmental Policy of Ethiopia was approved in 1997 and is the first key document that captured environmental sustainable development principles. The goal of the Environmental Policy of Ethiopia is to improve and enhance the health and quality of life of all Ethiopians and to promote sustainable social and economic development through the sound management and use of resources and the environment as a whole so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs (EPA, 2007).

For the effective implementation of the Environmental Policy of Ethiopia, the policy encourages creation of an organizational and institutional framework from federal to community levels. The Environmental Policy of Ethiopia provides a number of guiding principles that require adherence to principles of sustainable development; in particular, the need to ensure Environmental Impact Assessment. It considers impacts on human and natural environments, provides for early consideration of environmental impacts in projects and programs design, recognizes public consultation, includes mitigation and contingency plans, provides for auditing and monitoring; and is a legally binding requirement (EPA, 2007).

2.6.3 Ethiopia's Climate Resilient Green Economy Strategy

To cope with the prevailing environmental problems such as land degradation and other climatic hazards (rainfall fluctuation, increasing temperature, flooding), and speed up its socioeconomic development, the Government of Ethiopia has initiated climate-resilient green economy as a development strategy in 2011. This development direction promotes environmental protection, reducing fossil fuel consumption which releases greenhouse gases into the atmosphere. With demand for energy growing with the increasing population, industrialization and urbanization, the Government realized that harnessing clean and renewable energy sources such as wind, solar, hydro and geothermal energy sources was critical. It has indicated that these natural resources would deliver electricity at virtually zero GHG emissions. The generated electricity is a fundamental enabler of modern economic development, from powering cities and fuelling industrial activity to pumping water for irrigation purposes in agriculture. The Government also decided to increase its income through exporting electric power generated from clean sources to neighboring countries (CREGS, 2012).

Ethiopia has the ambition to develop along a green economic trajectory. It has consequently outlined a strategy to build this green economy. So far, it has identified and prioritized more than 60 initiatives that could help the country to achieve its economic development goals while at the same time limiting net GHG emissions in 2030 to below today 150 Mt CO2e - around 250 Mt CO2e less than estimated for the current development path . Building a green economy will lead to further socio-economic benefits and allow Ethiopia to tap climate finance (CREGS, 2012).

2.6.4 Establishment of Environmental Protection Organs

Proclamation 295/2002 establishes the organizational requirements and identifies the need to establish a system that enables coordinated but different responsibilities of environmental protection agencies at federal and regional levels. The Proclamation indicates the duties of different administrative levels responsible for applying federal law. Depending on the decisions made, resources available and specific organizational situation in each Region, Regional States have devolved duties and responsibilities to wereda and kebele.

Participatory process of making the country's economy green and climate change resilient was initially planned to be undertaken under the ownership of the then EPA. However, such effort did not receive the necessary attention either at the federal or regional level thereby necessitating the establishment of the new Ministry. AS a part of the effort to realize the government's Climate Resilient Green Economy strategy, the former EPA has been upgraded into MoEF in 2013.

2.6.5 Environmental Impact Assessment

The Federal Government has issued a Proclamation on Environmental Impact Assessment, (Proc, 299/2002) and the primary aim of this Proclamation is to make EIA mandatory for specified categories of activities undertaken either by the public or private sectors, and possibly, the extension of EIA to policies, plans and programs in addition to projects. The provisions of the proclamation include; projects will be subject to EIA and execution is subject to an environmental clearance from the former EPA or Regional Government Environmental Agency, as applies; EPA or the Regional Agency depending on the magnitude of expected impacts, may waive the requirement of an EIA; All other licensing agencies shall, prior to issuing of a license, ensure that either EPA or the regional Environmental Agency has authorized implementation of project; a licensing agency shall either suspend or cancel a license that has already been issued, in the case that EPA or the Regional environmental agency suspends or cancels the environmental authorization; and approval of an Environmental Impact Study Report (EISR) or the granting of authorization by the EPA (Proc, 299/2002).

2.6.6 Environmental Pollution Control

Proclamation No. 300/2002 on Environmental Pollution Control primarily aims to ensure the right of citizens to a healthy environment and to impose obligations to protect the environment of the country. The proclamation is based on the principle that each citizen has the right to have a healthy environment, as well as the obligation to protect the environment of the country.

The law addresses the management of hazardous waste, municipal waste, the establishment of environmental quality standards for air, water and soil; and monitoring of pollution. The proclamation also addresses noise and vibration as one source of environmental pollution and it seeks for standards and limits for it providing for the maximum allowable noise level taking into account in the settlement patterns. In general, the Proclamation provides a basis from which the relevant environmental standards applicable to Ethiopia can be developed, while sanctioning violation of these standards as criminally punishable offences.

Furthermore, it empowers the EPA and/or the Regional Environmental Authority to assign environmental inspectors with the duties and responsibilities of controlling environmental pollution. In order to ensure implementation of environmental standards and related requirements, inspectors belonging to the EPA or the relevant regional environmental agency are empowered by the Proclamation to enter, without prior notice or court order, any land or premises at any time, at their discretion.

2.6.7 Solid Waste Management

Proclamation no. 513/2007 aims to promote community participation in order to prevent adverse effects and enhance benefits resulting from solid waste. It provides for preparation of solid waste management action plans by urban local governments.

Therefore, Solid Waste Management Proclamation No. 513/2007 states (Article 5.1) that Urban Administrations shall ensure the participation of the lowest administrative levels and their respective local communities in designing and implementing their respective solid waste management plans. In Article 5.1 each Region or urban administration shall set its own schedule and, based on that, prepare its solid waste management plan and report of implementation. Further information on preparation and implementation of solid waste management plans may be obtained from the Regional Environmental Protection Authorities and federal EPA. Measures

related to waste handling and disposal. According to this proclamation, any person shall collect waste in an especially designated place and in a manner, which does not affect the health of the society and no person shall dispose solid, liquid or any other waste in a manner which contaminate the environment or affects the health of the society.

2.6.8 Prevention of Industrial Pollution Regulation

As a follow up to Proclamation 300/2002, a regulation to prevent industrial pollution was developed by the Federal Environmental Protection Authority and endorsed by the Council of Ministers to ensure compatibility of industrial development with environmental conservation.

This Regulation confers important obligations to industrial operators. A factory subject to the regulations is obliged to prevent or minimize the generation and release of pollutants to a level not exceeding the environmental standards. The regulation also obliges industrial operators to handle its equipment, inputs and products in a manner that prevents damage to the environment and to human health. Moreover, the regulations urge industrial operators to prepare and implement an emergency response system of their own. On the other hand, industrial operators are required to prepare and implement internal environmental monitoring systems and keep written records of the pollutants generated and the disposal mechanisms used to get rid of the pollutants. In relation to it, factories are required by the regulation to submit annual compliance reports with the provision of the regulations (Regulation 159/2008).

2.6.9 Labour Proclamation

The Labour Proclamation which was revised in 2003 provides the basic principles which govern labour conditions taking into account the political, economic and social policies of the Government, and in conformity with the international conventions and treaties to which Ethiopia is a party. The proclamation under its Part Seven, Chapter One, and Article 92 of this proclamation deals with Occupational Safety, Health and Working Environment, Prevention Measures and Obligations of the Employers. Accordingly the Proclamation obliges the employer to take the necessary measure for adequate safeguarding of the workers in terms of their health and safety (Proclamation 377/2003). Moreover, the Occupation Health and Safety Directive (MOLSA, 2003) provides the limits for occupational exposure to working conditions that have adverse impacts on health and safety.

Despite the above proclamation there is still considerable issue regarding to the relationship between employers and workers for issues such as wage, safety and other benefits. The former complains that this law opens window for inefficiency and tilted to the workers because they can make their case to the court. On other hand still employees have dissatisfaction on benefit package and other rights.

2.6.10 Public Health Proclamation

The Public Health Proclamation (200/2000) comprehensively addresses aspects of public health including among others, water quality control, waste handling and disposal, availability of toilet facilities, and the health permit and registration of different operations. The Proclamation prohibits the disposal of untreated solid or liquid hazardous wastes into water bodies or the environment that can affect human health.

2.6.11 Environmental Guidelines and Standards

During 2008 - 2010 EPA had prepared draft environmental standards for several industrial sector activities and ambient environmental qualities. During the same period, the EPA also prepared several draft guidelines that includes the draft Guideline on Sustainable Industrial Zone/Estate Development. Few years back, the Environment Council, which is a higher body with a mandate to endorse guidelines, have selectively accepted the industrial environmental standards for twelve specified industrial sub-sectors. The accepted industrial emission standards include Tanning and leather finishing, Manufacturing and finishing of textiles, pharmaceutical manufacturing etc.(MoI,2012)

In general starting from the constitution to different law Ethiopia in corporate useful environmental laws this is a positive step in applying the environmental policy and laws, however additional policy instruments and mechanisms are required to in force the above law.

Sect oral approaches should be used to study the binding constraints in implementing Environmental policy, laws and standards. There are serious weaknesses in the use of the strategy of environmental policy integration in industrial sector especially the tanning area as a tool for the promotion of sustainable development (Baker, 2016).

For example issue of implementation of environmental standard for tanning industry is quite different for food industries, i.e. Sector specific strategies should be designed to make environmental policy practical. In addition laws which motivate enterprises in the form of tax or cost sharing shall and other innovative tools should be formulated to address the cost of using ETP and installations for keeping the environment clear.

As cited by zeleke (2011) tried to pinpoint that, tanneries should select key strategy to maintain achievement and enhance its performance that extends beyond compliance in promoting EMS in general in tanning process, transfer technological and eco-friendly management practice. According to him, the tanneries development path way should comply with five pillars of sustainable development; - ecologically protective, socially acceptable, economically productive, and environmentally just and efficient.

2.7 Empirical Literature Review

According to the 2016 report by Ministry of Health on the study of liquid waste management, out of 118 industrial establishments assessed in the city of Ethiopia, 70have solid waste discharges, 81 generate air pollutant discharges while 82 generate liquid wastes that are discharged to the surrounding. Only 16 out of the investigated factories are found to have some form of wastewater treatment plants and the rest discharge their wastes without any form of treatment.

Abebe A. (2019) carried on a research entitled Corporate Environmental Responsibility in Ethiopia: a Case Study of the Akaki River Basin, Ecosystem Health and Sustainability. This research is aimed at investigating Corporate Environmental Responsibility Practices in large-Scale Manufacturing Enterprises in the Akaki River basin on protecting the urban environment with particular emphasis on twenty selected industries. To attain its objective, the study employed a mixed methods research design. For the practical investigation data were collected by employing tools such as questionnaire, key informant semi-structured interview, group discussions and observational data. The findings of the research show that corporate environmental responsibility is very limited.

Anshu A., (2015) conducted a research with a topic of Environmental Problems Caused By Leather Processing Units in Kanpur leather industry. The study was undertaken to study the

environmental problems caused by leather processing units Jaj-mau, Kanpur. A descriptive research design was planned using survey and questionnaire method. Random sampling technique was adopted to select a sample of 15 leather processing unit through lottery method.

The result highlighted that the detrimental work practices in leather processing units create not only environmental hazards but also occupational problems to worker. Use of different chemicals during leather processing produces wastes in solid, liquid and gaseous form. Exposure to different chemicals is the main cause of soil pollution, atmospheric pollution, water pollution and air pollution.

Researchers (Fitsum D., &Fikirte D., 2014) carried a thesis entitled Socio-economic Impacts of Bahir Dar Tannery. To achieve the objective, primary data were collected from different group. A total of 100 household heads who reside near the tannery; 100 workers and one technical manager of the tannery; and three officers of Environmental Protection Agency were consulted. The finding the research were as a labor based export oriented industry the tannery is beneficial for the surrounding community by creating employment opportunity and generating foreign currency. Despite such benefits, the tannery is causing adverse impacts on the workers and the community.

Javed, Chattha and Mobeen (2016) conduct a research on the topic an assessment of environmental concerns in the leather industry and proposed remedies: a case study of Pakistan. The paper aims to address the environmental pollution problems in the leather-manufacturing sector of Pakistan. It was based on findings of Environmental Audit of 4 tanneries carried out by Federation of Pakistan Chambers of Commerce and Industry in Pakistan under Environmental Technology Program for Industry (ETPI) Project. The finding shows the harmful effect of numerous chemicals generated by the leather industry, chemical recovery and reuse is an economically feasible alternative for the leather sector.

Researchers Abraha, Gebrekidan and Afework, Mulugeta (2008) Carried On A Research Entitled Environmental Impacts Of Sheba Tannery (Ethiopia) Effluents On The Surrounding Water Bodies. The finding of the research where there is high impact on the surrounding environment

Mathias Nigatu, Bimir (2015) carried on a research with the title of Corporate Social Responsibility Learning in the Ethiopian Leather and Footwear Industry. The study was carried

out as a qualitative case study, informed by the selected leather and footwear firms, industry association and leather industry development institute. Interviews and content analysis of policy/regulatory documents were the main methods employed. Findings show that firms' learning social responsibility is at emergence stage with the state and foreign market pressure as key motivators. While regulating environmental and labour conditions, the state offers incentives for higher economic responsibility of firms. Then, there exists collaborative learning in the firm-state institutions affinity.

I conducted a research as a fulfillment master degree which is unpublished. The title was post treatment of tannery wastewater in horizontal subsurface flow constructed wetland connected to sequence batch reactor: performance, nutrient profile and effluent reuse for irrigation. The objective of the study was to assess the performance of an anaerobic-aerobic sequence batch reactor (SBR) connected to a constructed wetland (CW) system for the treatment of tannery wastewater and suitability assessment of treated effluent reuse for irrigation. And the finding was tannery industries have a great impact on the surrounding environment

2.8 Research gap

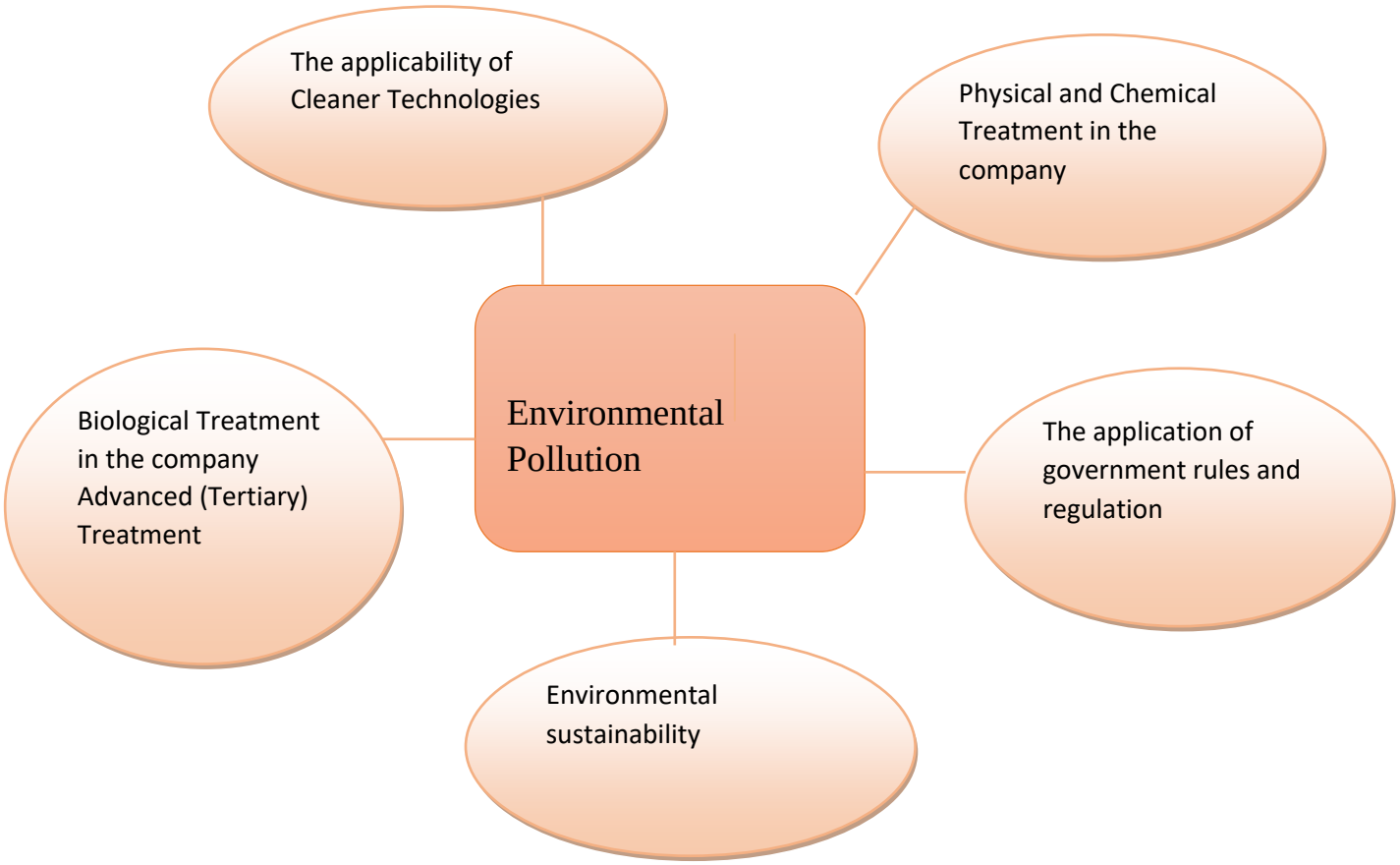
From the above theoretical and empirical review, the government of Ethiopia formulated environmental policy and a number of laws for its implementation. Starting from the constitution, there are several proclamations, regulations, standards and guide lines for implementation of the policy. However, there is less integration between these laws and the industrial policy. Furthermore there the government of Ethiopia does not have continuous follow up on the implementation of the laws and regulations in each and every tannery in the countries. From the empirical review there is no any research that asses the environmental challenges of Waliya tanneries factory over its surrounding. There for the researcher wants to fill this gap.

2.9 Conceptual Frame Work

Based on the stated problem and explained literature review, the researcher develops the following conceptual framework. In the conceptual framework the applicability of cleaner technologies, physical and chemical treatment in the company, biological treatment in the

company, advanced (tertiary) treatment and the application of government rules and regulation are factors while the intensity of environmental pollution is crucial factors. Lastly, environmental population and health problems are the factors to be concerned in the study.

Fig 2.1 Conceptual Framework



Source: Developed For the Study, 2020

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

3.1 Research Design

Regarding research design researcher used explanatory research design. In exploratory research design, the researcher's ideas and thoughts are critical as it is primarily dependent on their personal inclination about a particular topic. Explanation about unexplored aspects of a subject is provided along with details about what, how and why related to the research questions. It is conducted for a problem which was not well researched before, demands priorities, generates operational definitions and provides a better-researched model. It is actually a type of research design which focuses on explaining the aspects of your study in a detailed manner. The researcher starts with a general idea and uses research as a tool which could lead to the subjects that would be dealt with in the incoming future. It is meant to provide details where a small amount of information exists for a certain product in mind of that researcher (Kothari, 2004).

In this study the researcher tried to explore the conception of environmental sustainability, the applicability of cleaner technologies, physical and chemical treatment, biological treatment, advanced (tertiary) treatment and the application of government rules and regulation in Waliya Leather and Leather Product Plc.

3.2 Research Approach

Research approach is a plan and procedure that consists of the steps of broad assumptions to detailed method of data collection, analysis and interpretation. It is therefore, based on the nature of the research problem being addressed (Kothari, 2004).

In this research, the researcher applied both qualitative and quantitative research approach. Qualitative research is an approach used largely in the social sciences to explore social interactions, systems and processes while quantitative approach emphasize objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques. Quantitative research focuses on gathering numerical data and

generalizing it across groups of people or to explain a particular phenomenon (Cressweell, 2014).

The reason why the researcher prefers to uses both qualitative and quantitative approach is to fill the gap of one approach by another approach. In addition to this, since the data were collected in the form of numbers, questionnaires, structured interviews and FGD, to handle such variety of data both approach find is to be preferable.

3.3. Type and source of data

For accomplishing the research work and research objectives both primary and secondary data were collected.

3.3.1. Primary source of data

The primary data was collected from those employees of Waliya Leather and Leather Product Plc. (employees, supervisors and managers) through questionnaire and interview. Primary Data were collected by questionnaire and interview questions field visit. In addition, to have clear idea about the subject matter under this research, in depth interviews were made with managers and experts of Waliya Leather and Leather Products Plc. the researcher were also included the saying of LIDI. Key respondent from the community were interviewed randomly to know the position of the community.

3.3.2. Secondary Source of Data

In addition to the primary data secondary data was used from the factory report. With regard to secondary data source, relevant information collected by consulting different pertinent documents such as, the Ethiopian leather industry and Environmental policy, countries experience and other related literatures were thoroughly reviewed. These include reports, journals, books; websites etc.

3.4. Data Collection Instruments

To accomplish the research objective both primary and secondary data were collected. In order to obtain reliable and sufficient information structured questionnaires, interview and FGD were

used as a data collection instrument. All the necessary data for this study were collected from the respondents through self-administered questionnaire, interview and document analysis.

3.4.1. Questionnaire

The researcher would employ questionnaire to obtain primary data from employees. Therefore, the questionnaires were developed in close and open ended form. Under the closed ended questionnaire, the respondents can only answer from a given alternative which limit them from further explanation of their feeling regarding to the title of the study, even if it is easier and quicker for the research to analyses it. This is why the researcher was developed these questionnaire in open ended from which give the respondents freedom to express their opinion or attitude towards leather industry in general and Waliya Leather And Leather Products Factory in particular.

3.4.2. Interview

The researcher was used a face to face interview with the respective Waliya Leather And Leather Products Factory managers and LIDI experts who have exposed to leather industry and environmental issues.

Furthermore the instruments were used to collect the necessary information regarding assessment of environment policy guide lines to leather industry related to Waliya Leather and Leather Products Plc. were secondary data analysis, focus group discussion, interviews and questionnaires.

Documents analysis and observation instruments (which were proposed but impossible to find) were also used to assess the wastewater management and evaluate its current status of the tannery.

3.5Sample Size Determination and Sampling Techniques

3.5.1 Sample Size Determination

The total employees and managers of Waliya leather and leather products plc are 500 which are the population of the study.

In order to determine the sample size the researcher uses the Cochran (1977) formula.

Cochran (1977) developed a formula to calculate a representative sample for proportions as

$$no = \frac{z^2pq}{e^2}$$

Where

no = the sample size

z =the selected critical value of desired confidence level

p = the estimated proportion of an attribute that is present in the population

q=1-p

e is the desired level of precision

Since there is no any empirical study conducted in Waliya leather and leather products plc, the researcher proposed a large population (Total of 50%variability) whose degree of variability is not known. The researcher assumes the maximum variability, which is equal to 50% (p =0.5) and taking 95% confidence level with ±5% precision, the calculation can be p = 0.5 and hence q=1-0.5 = 0.5; e= 0.05; z=1.96

$$no = \frac{(1.96)2(0.5)(0.5)}{(0.05)2} = 384$$

Cochran (1977) pointed out that if the population is finite, then the sample size can be reduced slightly. This is due to the fact that a very large population provides proportionally more information than that of a smaller population. He proposed a correction formula to calculate the final sample size in this case which is given below.

$$n = no$$

1+ (no-1)

N

Where no is the sample size derived from the first equation and N is the population size.

$$n = \frac{384}{1+\frac{(384-1)}{500}} = 217$$

There for the sample size of this study is 217 participants

3.5.2 Sampling Techniques

The researcher was clustered the population or employees of the Factory .First factory workers at different levels were stratified based on their occupation. To do this, lists of the entire factory workers already become under the researchers hand via there alphabetic order which primarily obtained from the factory administration then stratified it in to three groups.

The first strata would contain managers, production, quality heads and supervisors while Machine operators constituted the second group. The last group included casual workers and villagers.

In case of focus group discussion, it made with villagers or community leaders randomly. Though, convenience sampling determined number of respondents from the community, LIDI &MOI experts, and random sampling were determines the individual's participants, with pre-arranged time schedule that were made with the respondents. Lastly, form randomly selected experts; the interviews were conducted by the researcher with each of the informants in their office.

3.6 Data analysis Techniques

After the data collects, data presentation and analysis is the necessary step. The information collected from both primary and secondary data sources through review of different documents

and interviews with key informants, personal observations as well as questionnaire survey were be organized and narrated.

To analysis the date, Statically Package for Social science (SPSS) which is statistical software package become applicable accordingly. To be specific, answers of respondents‟ on the questionnaire survey were summed up by frequency counts and then converted into percentages to provide the understandings of issue under discussion numerically.

Regarding, the descriptive data obtained from the structured questioners (Yes and No items) and open ended questions were analyzed by identifying the themes which informed the categories as they emerge from the data. Facts that were extracted from different documents were analyzed thematically and served to confirm study outcomes accordingly.

3.7 Validity and Reliability Test

Reliability is consistency across time (test-retest reliability), across items (internal consistency), and across researchers (interrater reliability). Validity is the extent to which the scores actually represent the variable they are intended to whereas Validity is a judgment based on various types of evidence.

In this study the validity as well as the reliability test was checked. Regarding the validity the content, the objective and logical data flow as per the objective were checked out. The researcher was consulting the adviser and experts from Ethiopian leather institute. But in case of reliability due to the nature of binary and nominal nature only validity were checked out.

3.8 Ethical Consideration

During data collection, respondents informed as to why the data would be collected. They informed about the objectives and methods of the study. The privacy of respondent kept safe. Moreover, respondents expected to provide their response voluntarily.

CHAPTER FOUR

4. RESULT AND DISCUSSION

4.1 Introduction

In this chapter the collected data were organized, coded and analyzed accordingly. The analyses part consists of three parts. The first part is demographic characteristics of respondents, the second part is analyzing, and describing and explaining the conception of environmental sustainability, implementation of environmental standards and regulations and the last part discuss the challenges of the industry. In the demographic part job position of respondents, educational back ground, sex and work experience of respondents were addressed. Out of 217 total distributed questioners 17 were not returned back. The response rate comes up with 92% which is acceptable to continue the analysis.

4.2 Demographic Issues

4.2.1 Job Position

In leather factory the work types were dominantly categorized in to three. Thus are production and quality heads shifting leaders, managers and supervisors, machine operators and casual workers and tannery processers and shift leader?

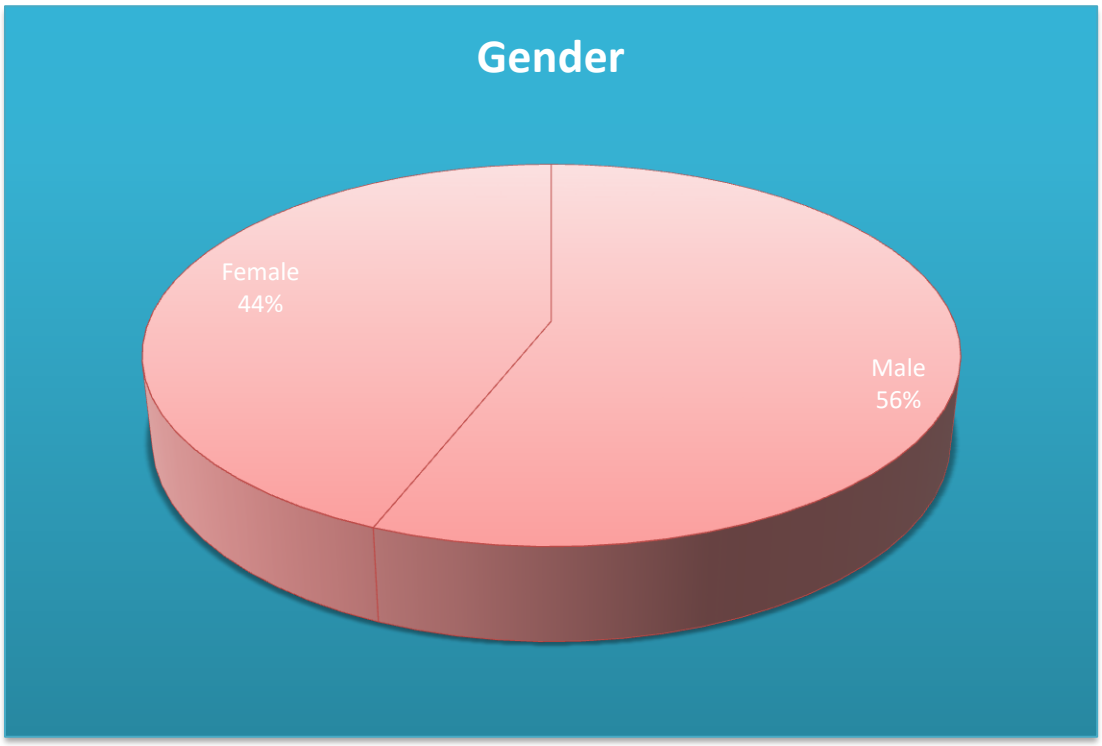
Fig 4.1 Job Position of Respondents

Source: Survey Result, 2020

The respondents of the survey questionnaires were categorized into three groups, i.e. production and quality heads shift leaders and supervisors, Machine operators and casual workers. The sample size for the survey was 217, which is believed to be representative of the total population. Out of 217 total distributed questioners 17 were not returned back due to respondents refusal to return.. The response rate comes up with 92% which is acceptable to continue the analysis.

4.2.2 Gender

Fig 4.1 Gender Distribution

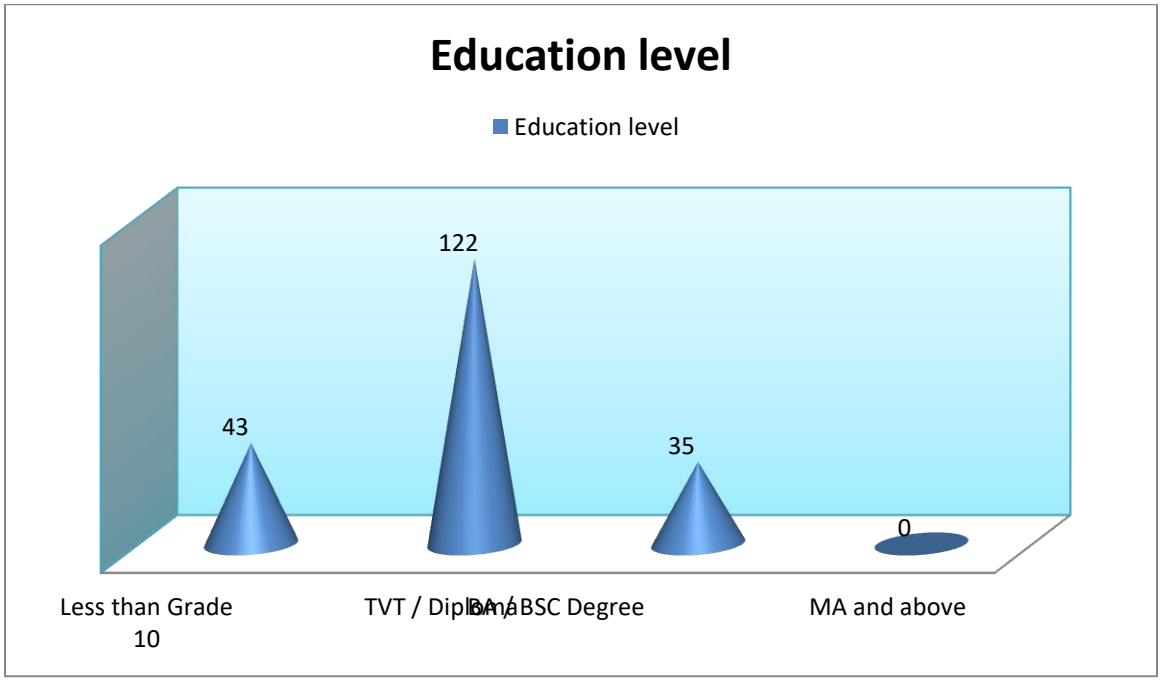


Source: Survey Result, 2020

As shown on the above figure, among the respondents 88 were female and the 112 were male .This indicates tha44% of the respondents of the survey questionnaires are female and 56% of them are male

4.2.3 Educational Background

Fig 4.3 Education Level

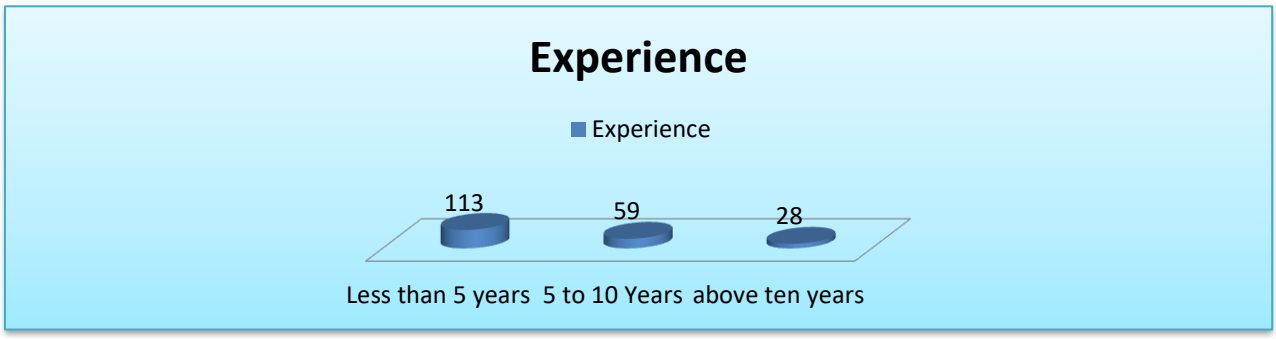


Source: Survey Result, 2020

Regarding the educational level of respondents, 43 respondents are up to grade 10, 122 are TVET graduates/Diploma, while35 respondents are BA/BSC Degree. There is no respondent was found to have post graduate degree as presented in the above figure.

4.2.4 Work Experience

Fig 4.4 Work Experience of Respondents



Source: Survey Result, 2020

Regarding to the experience of the respondent, 56.5% of theme have less than 5 years, 29.5 % have 5 to 10 Years, and 14 % have above ten year experience. The data from the education experience and education level of the respondent implies most Waliya leather and leather products workers doing by their virtue of experience rather than academic level.

4.3 Descriptive Analysis

4.3.1 Conception of Environmental Sustainability

Environmental sustainability is an interaction with the environment to avoid depletion or degradation of natural resources and allow for long-term environmental quality. Use of different chemicals during leather processing produces wastes in solid, liquid and gaseous form. Exposure to different chemicals is the main cause of soil pollution; atmospheric pollution, water pollution and air pollution. The following table summarizes the role and practice of Waliya Leather and Leather Factory in relation to its environment.

Table 4.1 Summery of Responses

1	**What do you think is the main reason of installing ETP in the tannery?**	**Frequency**	**Percent**
	To protect the environment	170	85%
	To secure tannery penalty	30	15%
	I don't understand	0	0%
2	Do you exactly know the source of water the tannery uses for production process?	Frequency	Percent
	Rain water	75	37.5
	Ground water	110	55%
	Municipal water	13	6.5%
	I am not sure	2	1%
3	Have you ever thought of water scarcity sometime in the future used for industrial (tannery) production	Frequency	Percent
	Yes	139	69.5%

	No	61	30.5%
4	Do you feel comfortable with the odor from the tannery?	Frequency	Percent
	Not comfortable	121	60.5%
	Strongly not comfortable	59	29.5%
	Not affecting them	20	10%

Source: Survey Result, 2020

For contribution of the sustainability of the tanning industry first proper conception of environmental sustainability is required. In order to know the respondents‟ attitude regarding to environmental protections, questions related to this issue were raised by the researcher. When respondents asked about the purpose of using ETP, as shown on the above table, majority of respondents, i.e. 85% of them replied using ETP is primarily for the sake of protecting the environment while 15% of the respondents said to avoid penalty and no of them replied they have no any idea.

Another point raised to know their conception on the environment is the issue of bad odor from the tannery. The table depicts the feeling of workers about the odor from the tanneries, 60.5% of respondents replied they are not comfortable; while 29.5% are strongly not comfortable, and 10% confirmed that is not affecting them.

Usually, tanneries use water extravagantly if it comes from cheap ground water. In relation to this when respondents asked about the source of water used by Waliya leather and leather products as shown in the above table majority of them, i.e. 55% responded the tannery uses ground water, 37.5% replied it uses rain water, and 6.5% responded municipal water and 1% were not sure thinking about the scarcity of water. In addition to this respondents were asked about scarcity of water and they portrays there will be scarce in the future, in which majority of the respondents, i.e. 69.5% disagree on the grounds that water will be scarce in the future while the remaining agree it will be scarce and few of them they do not have any idea.

According to researches (I) Leather industry is one of the most polluting industries. The leather processing is responsible for unfavorable impact on environment. The global production of leather is about 24bn m2 that presents a substantial challenge to leather industry. The tannery affluent produces high amount of dissolved and suspended organic and inorganic solids that are

giving rise to high oxygen requirement. The unbearable smell generating from waste material and presence sulphide, ammonia and other volatile compounds are associated with leather processing activities. Solid waste produced in leather industry include animal skin trims, animal hairs, flesh wastes, buffing dust and keratin wastes. All of these wastes contain protein as its main component. If this protein is not utilized properly, it will responsible for dangerous pollution problems to environment.

The Waliya Leather and Leather Products Factory respondents have good conception on the importance of obeying the environmental standards and guide lines, majority of the respondents believe using ETP is primarily for the sake of protecting the environment and 58% strongly agrees implementation of Industrial pollution standards by Waliya Leather and Leather Products Factory. These two facts shows most of the respondents have environmental concern.

Respondents have the understanding of the effect of the bad smell discharged to the environment, 90% of respondents are not at ease with the odor. The key respondent from the tannery also understands the effect to the villagers but the problem is the cost and the technology of removing the bad odor from the waste. This could be interpreted as most of the employee understood the problem resulted from the tannery.

Waliya Leather and Leather Products Factory tannery uses most of the time ground water and in relation to this, 83% of the respondents disagreed that water will be scarce in the future .This shows misconception as water as plenty of resource not recognizing even ground water could be depleted in the future, i.e. there is lack of environmental sustainability concept about water from the factory workers.

The MOI which was established to bring industrialization, by attracting investment, creating conducive environment and supporting the manufacturing industry to boost export, substituting import and job creation seems to be in delicate situation between the export from the tannery and their pollution. The key respondent form MOI acknowledges that there has been less environmental mainstreaming on plans and implementation especially before two years, i.e. the launching of the CRGES. There is awareness by MoI future development of the manufacturing industry should address the issue of environmental issue and difficult to compete in the international market without addressing this issue. There is great emphasis for export issues,

environment issues have been seen as supplementary to yearly annual plan. According to him, this is due to the eagerness from the government side to bring fast economic growth and there have been also resource and capacity limitations.

The key respondent form LIDI also gave similar response, in that LIDI as an institution which was established to support the leather industry in investment attraction, marketing, and technology transfer also faces two challenges. On one hand, the institute is expected to support the leather industry to reach 500 million USD export target by the end of 2017/2018; on the other hand, it has to work on the environment issues.

The ELIA which has the role of organizing leather and leather products enterprises also has similar understanding with MoI and LIDI, The position form the association is to take a balanced approach in dealing with the environmental issues related to the tannery. The key respondent form ELIA explained the position of the association is that environmental protection action should be practical according to the reality of Ethiopian tanneries, other wises it will be counterproductive for the survival of the weak tanning industry and the economic growth of the country.

From the above discussions, it becomes clear that the government badly needs foreign exchange and wants to bring speedy economic growth and it is not a matter of understanding, rather an issue of balancing between economy issue and the environment issues and their haven lack of innovative approach for the problem. On other hand, the villagers of Waliya leather and leather product factory have shown more concern to the environmental issues during the course of FDG. They said that "we are not opposing the development endeavors and the investment themselves but factories should not let down to pollute our environment.

4.3.2 Implementation of Environmental standards and regulations

Table 4.2 AboutWalia Leather and Leather Products Plc

1	**Is Walia Leather and Leather Products Plc applies Environmental guide lines to the leather Industry?**	**Frequency**	**Percent**
	Strongly agrees	78	39%
	Agree	81	40.5%

	Disagree	13	6.5%
	strongly disagrees	1	.5%
	I don't have any Idea	27	13.5%

Source: Survey Result, 2020

Regarding the application of environmental guidelines to Tanneries by Waliya leather and leather products, from the above table we can see that 79.5% of the respondents strongly agree, while 19.5 % of them disagree. From this we can infer that Waliya leather and leather products were applied environmental guide line to conduct its daily activity.

To know the application of ETP by Waliya Leather and Products Factory question related to it was raised during the survey. As shown on the above table 73.5 % of the respondents replied it discharges waste directly to the river, while 5.5 % of them responded directly to the soil and majority of them, i.e. 21% replied it discharges to the river through environmental treatment plant.

When respondents asked about their knowledge of chemicals used in tannery production process dissolved in water, 99% of replied "yes" and the reaming 1% informants replied "No". Similarly when respondents are asked whether or not could tell the most toxic chemical used in the tannery, 69% of them replied that they could not tale about this chemical while the reaming 31% believes they can tell this chemical.

Concerning about the presence of sludge disposal site in Waliya Leather and Leather Products Factory, 56% agree it has sludge disposal site, 44% replied disagrees, however 68% of the respondents disagrees the site is free of another environmental treat.

Table 4.3 about Treatment Plant

2	**What kind of treatment plant your tannery Installed**	**Frequency**	**Percent**
	Primary	67	33.5%
	Secondary	127	63.5%
	Tertiary	6	3%
	Have no any treatment plant	0	0%
3	If you have Treatment plant, is it working properly?	Frequency	Percent

	Yes	113	56.5%
	No	80	40%
	I do not know	7	3.5
4	How is the wastewater discharged in the tannery you are working?	Frequency	Percent
	Directly to the soil	11	5.5%
	Directly to the river nearby	147	73.5%
	to the river through the treatment plant	42	21%
	Is there any sludge disposal site you know post tannery processing?		
	Yes	112	56%
	No	88	44%

Source: Survey Result, 2020

As the above table shows that Waliya Leather and Leather Products Tannery Factory was not using even its primary ETP treatment plant properly. The BODs and CODs were more than the minimum limit. The total Chromium (as Cr VI) maximum limit should not be more than 2mg/l, however at that time participants pint out that it was beyond the limit around. 33.40. This shows the severity of the problem at that time. The key respondent form the tannery responded in line with this fact before the rehabilitation project of upgrading for Waliya Leather Products Factory there was no chrome recycling at that time. During the field visit it was observed that additional safeguard measures are being taken. However, the tannery is not working at its full capacity due to working capital problem. Hence, there is no guarantee that if Waliya Leather and Leather Products Factory works in its full capacity to use primary treatment plant effectively. The key respondent from the tannery also shares this concern, i.e. if the tannery increases its production, it should increase the human resource and finance allocation for treating the waste.

Application of BAT is one way of reducing the waste discharge from the tanneries; however, Waliya Leather and Leather Products Factory are not practicing it well according to the respondents. Majority of them disagree hides are pre-cleaned in the tannery and on the pre-treatment of water. On the other hand, when asked about whether water is left running between production stages, 93.5 % replied "yes". All these data implies BAT is not applied appropriately in Waliya Leather and Leather Products Factory. Had it been practiced BAT, it would have been decreased the solid and Liquid discharged from it.

Table 4.4 Awareness Program

5	Is there any scheduled awareness creation program on waste water management issues in the tannery?	Frequency	Percent
	Yes	101	50.5%
	No	99	49.5%
6	Do you know kinds of chemicals used in tannery production processes dissolved in water?		
	Yes	198	99%
	No	2	1%
7	Can you tell the most toxic chemical composing the wastewater in the tannery?		
	Yes	187	93.5%
	No	13	6.5%

Source: Survey Result, 2020

Regarding to the application of environmental guidelines to Tanneries and its applications by Waliya Leather and Leather Products Factory 30 % disagree. On other hand, when the respondents were asked about the discharged from the tannery, 73% of them replied it discharges to the river through ETP. These Data indicates the uncertainty of Waliya Leather and Leather Products Factory in applying environmental regulations and standards set to tanneries adequately. There were no certain clear and well establish mechanism to treat wastes in the factory.

According to Environmental Pollution Control Proclamation No. 300/2002 and the regulation of Industrial Pollution, Industries, including tanneries, should have appropriate mechanism for not discharging hazardous chemicals to the environment. In relation to this tanneries are expected to have ETP. During the field visit it is observed that Waliya Leather and Leather Products Factory have primary ETP, but the secondary treatment plane were not well functioning and strong enough. However, during the interview with key respondent from Industry Zones and Environment Directorate director, there is a problem in running ETP properly by this tannery and other tanneries also do not use even the primary ETP for not incurring the cost of treatment of

the waste. This is also supported by the survey made by LIDI, that there are14 tanneries having treatment infrastructure up to primary level, while most of them are not properly running their ETP (LIDI, 2017).

Table 4.5 Chemicals

8	Where are the tannery chemical stored?	Frequency	Percent
	in separate store away from the tannery	21	10.5%
	In the processing area in the tannery.	47	23.5%
	There is no defined organized chemical store I know	132	66%
9	Is the tannery chemical weighing materials checked and standardized for accuracy?		
	Frequently	6	3%
	Sometimes	174	87%
	Not at all	20	10%
10	Do you think appropriate on job training given to the tannery chemical workers concerning safety and recipe optimization		
	Agrees	113	56.5%
	Disagrees	87	43.5%
11	How is about the adequacy of chemical recipe monitoring system installment in the tannery?		
	Efficient	24	12%
	satisfactory	127	63.5%
	Inadequate	49	24.5%

Source: Survey Result, 2020

The Prevention of Industrial Pollution Regulation orders every industry including tanneries that they should have environment action plan to work on environment protection in accordance with this regulation. Regarding to this issue 95% of the factory respondents agree the presence of environmental control plan in this tannery and the remaining disagree. This indicates at least on the paper, Waliya Leather and Leather Products Factory has action plan dealing with environmental issues. However, the key respondent, from Industry Zones and Environment

Directorate director responded that the issues are in the mind set of genuinely using the action plan strictly. The key respondent from the tannery acknowledges that he observers more strictness in applying the standards.

Table 4.6 Pre Test

12	**Is the water used for tannery processing pre-treated?**		
	Yes	187	93.5%
	No	13	6.5%
13	Is water left running between production stages?		
	Yes	187	93.5%
	No	13	6.5%
14	Is fresh water used in every new bath?		
	Yes	143	73.5%
	No	57	26.5%
15	Have you ever seen water reuse and recycling in any tannery production processes?		
	Yes	22	11%
	No	178	89%

Source: Survey Result, 2020

All key respondents, including the FDG accept that there is improvement on complying with the environmental standard sets by MoEF. But the respondents who participated in the FDG are afraid the severe pollution effect that occurred before one year. The MoEF sets Environmental guidelines and standards to be followed by tanning industry. However, the above table indicates there were some gaps in meeting the standards of most parameters by Waliya Leather and Leather Products Factory.

4.3.3 Challenges of the Waliya Leather and Leather Products Factory

Table 4.7 Challenges of the Industry

1	**Frequency**	**Percent**

	What is/ are the main challenge/s in using waste treatment plant by your tannery?		
	Finance	156	78
	knowledge to use the treatment plant	100	50

Source: Survey Result, 2020

As the above table shows the major challenge for Waliya Leather and Leather Products factory were financial challenges 78% of respondents were mentioned finance as a challenge. Furthermore the respondents from MoI and LIDI stress the less competiveness of Ethiopian tanneries including Waliya Leather and Leather Product Factory they are not motivated to incur this additional cost. They have problems in getting high quality and quantity of raw hides and skins, working capital constrains, absence of production and chemicals and components where as other countries such as India have this kind of advantage.

The key respondent from ELIA also argued that Ethiopian tanning industry is less competitive; the industry has challenges like other manufacturing industries that is Industrial Input, finance, technology, logistic and customs, and power break. He added also the marketing problem to get the right buyers in the international market. Because of these factors it will be impractical to force individual tanneries to use more than primary and secondary ETP, to use tertiary ETP the cost will not be bearable, the tanneries will collapse financially.

There are also institutional capacity limitation and coordination problem between different stakeholders for supporting Waliya Leather and Leather Product Factory and other tanneries. The proclamation for the establishment of environmental protection organ advocates the establishment of organizational starting from federal to wereda level. However during this research it was observed that, there are limited human and logistical resources, in addition, there is also capacity problems. For example it is observed that Akaki sub city commerce office which is expected to follow up tannery industries in the sub city has only two staff and the office has no car for its operation. There are similar responses from the key respondents from MoI and LIDI. The MOI have Industry zone and Environment Directorate, LIDI have environment directorate separately. However, they have limitation of capacity, according to the key respondent from these institutions. The MoEF is giving capacity building training and coordination of regional

and federal institutional arrangements for the implementation of environmental standards and guide lines according to the key respondents from the ministry. In addition to this, it transfers its EIA mandates for selected federal government ministries including MoI to follow projects. Due to capacity and resource limitation the coordination between MoEF, MoI, and Akaki kality sub city administrator is not strong according to the key respondent from MoEF.

To sum up major challenges of lather and leather products were is the lack of quality and supply of raw hides and skins from the livestock sector, with important implications for the whole value chain. The low, and currently also deteriorating, quality of raw hides and skins supply is a result of parasitic skin diseases as well as the prevalent animal husbandry (flaying, branding, curing) and post-mortem management practices (backyard slaughtering and sub-standard collection, storage and transportation) in the context of a limited availability of infrastructure and services (abattoirs, veterinary services, etc.). The underlying issue is the low commercial value of hides and skins, which limits the interest of farmers to improve current practices. The seasonality of supply due to the three festival seasons in January, September and May adds to the challenge of tanneries to source hides and skins for further processing. As a result, (i) tanneries are operating at low capacity utilization rates; (ii) global buyers to some extent stopped or reduced imports of finished leather from Ethiopia, in particular since global demand for different colors increased in recent years (black tanned leather might cover defects); (iii) leather manufacturers have difficulties to locally source quality leather for export markets

4.4 Chemical Usage and Safety

When asked about their knowledge of chemicals used in tannery production process dissolved in water, 99% of the respondents agreed that they know the chemicals or they answered the choice yes. Similarly about same of theme disagreed that they could tell about the most toxic chemical used in the tannery. These data indicate that there are significant employees who have no specific knowledge about the chemical that they are using it but they are working on it simply by experience.

The tannery has tried to store chemicals in a good manner and it has separate chemical store, this is confirmed during the field visit .On the other hand, when employees were asked about whether they take training about safety and environmental protection training, most of them conform they

have taken training in one form or another. However, still a considerable number of workers did not take such kind of training.

Regarding the process of tanning taking much of water and chemical, 61% of the respondents replied the beam housing step uses a lot of water .This implies, to decrease the discharge waste of Waliya leather and leather product factory primarily technology transfer should be done on its beam house section.

Standardization and checking for the accuracy of weighing materials is very important inside the tannery because the amount of chemical affects the quality of leather and also helps in decreasing unnecessary chemical discharges during the tanning process. However, most of the respondents replied this practice is not at all performed in Waliya Leather and Leather Products Factory. This indicates the uncertainty in the production process and consequence of unnecessary discharge of chemicals. It also increases the cost of production and also affects the quality of finished leather. Similarly, when respondents were asked about the sufficiency of chemical recipe monitoring, 47% of them disagree and 12% strongly disagree it is adequate. This shows the unreliability of the chemical supervision system installment in the tannery according to the respondents.

Regarding the risk of chemical contamination to workers, Most of the respondents replied that there is less risk, 27% answers sometimes there is risk, while 14 %said there is always risk. This shows still considerable amount of workers believe they are subjected to risk during chemical handling. Similarly, asked about the effort of Waliya Leather and Leather Products Factory to assure workers health and condition, 11% of the respondents replied that the management is making strong effort, majority responded that it is making some effort, while 31% replied that it is not making any effort. These shows still there are significant amount of workers who are not convinced activities of the management in dealing with safety and health condition of the workers is enough. The design and layout of a tannery contributes to the proper discharge of its waste. Related to this factor when the respondents were asked about whether the tannery structure well installed to let efficient wastewater out flow under the floor, 52% of them agreed, while 48% of them disagreed that it has this appropriate arrangement. This implies that, there are significant workers who are not feeling comfortable by the layout of the tannery.

To sum up since there are still hazardous chemicals such as alkalis, acids, or solvents, this must be used in a tannery. Therefore, workers protection must still be considered. The impact of chemicals on human safety and the environment can only be fully assessed by considering all production process.

4.5 Interview and Focus Group Discussion

From the conversation made with LID and ELIA association, Ethiopian tanneries could not use beyond primary and secondary treatment plant at this stage of development .By using reverse osmosis technology or member separator which has high operation cost and technological capability, that means it is the standard set for chlorides less than 1000mg/l is very difficult to be met by individual tanneries. Regarding water recycling, the key respondent from the tannery it was learned that this is impossible because of the fact that recycling water needs a lot of investment. In response, the best thing for the tannery is to use the cheap ground water. The key respondent form ELIA also supports this idea, i.e. it is very expensive investment to recycle water, and he said that "it is almost building another factory". This shows almost the impossibility of water recycling mechanism due to cost factor with individual tanneries.

From the interview, LIDI respondent said that "we are still a poor country and if we use primary and secondary ETP, for the time being it is enough. When our economy is in advance in the future, we could use tertiary ETP to remove the salt and recycling the water". Inorganic pollution is mainly made up by dissolved salts (chloride and sulphate), the removal of which has not been found out yet, unless the bearing of extremely high costs. Even the very sophisticated and expensive Italian treatment plants are unable to solve the problem of dissolved salts. Therefore, the limit of allowed quantity of such salts in the effluents has been increased or derogations to the national law were allowed.

Both key respondents for MoI and LIDI acknowledge that after the CREGE, there is more emphasis at least on setting the environmental issues. The key respondent form MoI mentioned that government is starting building Industry zones recognizing the current unplanned and scattered factories platform is difficult for controlling environmental pollution and other inefficiencies. The government is developed the Bole Lemi Industry zone. This indicates the

beginning of streamlining of environmental issues by the government in practical terms. However, there is urgency to realize the feasibility studies in to projects.

Concerning about the presence of sludge disposal site of Waliya Leather And Leather Product Factory 92% agree its presence, 68% of the respondents disagree the site is free of another environmental threat. This implies that the unsafe damping of solid by the tannery which is in line with the observation made during the field visit. This problem is also shared by other tanneries, the solid waste (from production and sludge from ETP) management practices in most tanneries are not a good experience because most wastes are dumped on open areas , buried into a pit that are not well-constructed and managed and burnt dry solid wastes in open air inside the compound(LIDI,2018).

CHAPTER FIVE

5. SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.1 Summary of Findings

The goal of the study is s to explore leather industry and environmental challenges in Addis Ababa in case of Waliya Leather and Leather Products Plc. out of 217 total distributed questioners 17 were not returned back. The response rate comes up with 92% which is acceptable to continue the analysis. In the analysis part, demographic analysis and descriptive analysis were conducted. Regarding demographic job position of respondents, educational back ground, sex and work experience of respondents were addressed while in descriptive conception of environmental sustainability, implementation of environmental standards and regulations and challenges of the Waliya Leather and Leather Products Factory were discussed.

From 200 respondents 88 were female and the 112 were male, regarding the educational level of respondents, 43 respondents are up to grade 10, 122 are TVET graduates/Diploma, while35 respondents are BA/BSC Degree while experience of the respondent, 56.5% of theme have less than 5 years, 29.5 % have 5 to 10 Years, and 14 % have above ten year experience

In the descriptive analysis it is found that different stakeholders have different conception about leather industry and environmental sustainability i.e., MoI, ELIA, and LIDI advocates a balanced approach between the growths of this industry environmental sustainability. On the other hand Waliya Leather and Leather Products Factory villagers have more concerns on the impact of the Factory and other industries in their vicinity. Most Waliya Leather and Leather Products Factory workers agree on the importance of application of environmental guidelines and standards by the tannery; however, it is found that they have wrong conception about water .Most of Waliya Leather and Leather Products Factory workers think that water could not be a problem in the future and there is because their factory have cheap ground water source for the time being.

Environmental policy, regulations and standards are not properly implemented by Waliya Leather and Leather Products Factory due to lack of cost effective mechanism of treating its waste, financial constraint and skill in running Common Effluent Treatment Plant. Using Environmental treatment plant by Waliya Leather and Leather Products Factory has its additional

cost of production , this cost coupled with the less competitiveness nature of the tannery in the internal market results in discharging waste water without treating adequately to the environment. The mind set of Waliya Leather and Leather Products Factory management towards protecting the environment is based on afraid of penalty not willingly to protect the environment.

In addition to this there are considerable amount of workers who are not comfortable with the safety measures in Waliya Leather and Leather Products Factory .Though there are some attempts by the tannery such as preparing separate chemical wear hose, it is found that there are significant number of employees who do not take training about environment protection and safety.

The coordination between different stakeholders in the implementation of Environmental standards to the leather industry is weak due to different priorities and focus of different stakeholders. For instance, the MoI gives more focus to the export targets, less mainstreaming of environmental issues especially before the formulation of CRGES; whereas environmental institutions MoEF and Addis Ababa city government Akaki kality sub city have great concern on the environment issues but lack of bringing innovative solution.

5.2 Conclusion

To conclude the leather industry is one of the leading manufacturing sectors for Ethiopia. This sector has its own potential challenges and it has great impact on the community. To get the fruitiest of the sector potential impacts should be managed. Waliya leather and leather products factor has significant impact on the surrounding community as well as in the works themselves, due to this the concerned body should manage the problem and the following

- Impact on land ,Air and waste management system
- Wastage of water
- Limited financial resource and trained People
- Community negative perception for sector.
- In addition to this there are considerable amount of workers who are not comfortable with the safety measures in factory.

- ❖ Affect serious Health problem untouchable disease (Lung cancer, leukemia and skin disease etc.) and ecosystem quality.
- ❖ Exposed more chemicals.

To sum up, in leather industry due to the use of different chemicals during leather processing produces wastes in solid, liquid and gaseous form. Exposure to different chemicals is the main cause of soil pollution, atmospheric pollution, water pollution and air pollution. Likewise in Waliya Leather and Leather Products factory were not free from such impact.

5.2. Recommendations

Based on the conclusion, the following recommendations are made by the researchers for Waliya Leather and Leather Product Factory managers, policy makers and other stake holders.

There are different constrains which makes Ethiopian tanneries less competitive in the international market. Hence, the government should apply more measures which help to decrease their production and logistics costs, also support should be provided in marketing. This will incentivize to apply environmental standards and guide lines.

Waliya Leather and Leather Product Factory managers have to use participatory approaches in dealing with the environmental protection problem caused by the factory around villagers.

The development of EIPs is should be a strategy for green-Industrialization of the Ethiopia; this could be also translated to the establishment of Eco-leather Industry parks. Industrial parks which have complete infrastructure including CETP helps tanneries in decreasing cost of effluent treatment. The government should support Waliya Leather and Leather Product Factory and other tanneries by making practical immediately its plan for establishing leather industry complex in an industry zone. This will allow in minimizing the waste treatment cost at the same minimizing environmental pollution. Hence the government should relocate specially the beam house section of Waliya Leather and Leather Product Factory and other tanneries to the park.

To summarize recommendation:

- Implement tools for more sustainability tannery.
- Use Flesh green hides instead of limed hides.

- Reduce the quantities of salt used for preservation. When salted skins are used as raw material, preterit the skins with salt elimination methods
- Use only trivalent chrome when required for tanning.

- Reuse wastewaters for washing—for example, by recycling lime wash water to the soaking stage. Reuse treated wastewaters in the process to the extent feasible (for example, in soaking and pickling)
- Top management shall define the organization‘s environmental policy.
- The Industry shall establish and maintain (a) procedures to define the environmental aspects of its activity, products or services that it can control over which it can expect to have an influence, in order to determine those which have or can have significant impacts on the environment.
- Participate corporate social responsibility.
- The Industry shall identify training needs. It shall require that all personnel, whose work may create a significant impact upon the environment, have received appropriate training.

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DEPRTMENT OF MANAGEMENT

ABH Compass Addis Ababa

Questioners Filled by Waliya Leather and Leather Products Plc. employees

Dear Respondents!

I am a postgraduate student of the above mentioned institution. I am currently undertaking a research project on impact assessment Leather Industry on Environmental in Addis Ababa in Case of Waliya Leather And Leather Products Plc. Please recall that you are selected as a possible participant because you are an employee of this organization. Your participation in the study is completely voluntary.

The research work is for academic purpose only. Any information obtained in connection with this study will remain strictly confidential.

The questionnaire will take approximately 15-20 minutes of your time. Your honest and true opinion will be valuable for this research. Thank you in advance for your assistance.

For any problem during or after the compilation of the questionnaires' you can contact me in the following address.

Tadesse Abebe

email-tadesseabebe@yahoo.com

Mobile: 0911806963

Instruction I– Please circle or put ‘tick’ mark in your choice

Demographic information

1. Job position:

A. production and quality manager’s b. Effluent treatment plant manager

c. Tannery process shift leader d. Supervisors, operators, workers others

2. Education back ground

A. less than Grade 10

b. TVT /Diploma

c. BA/BSC Degree

d. MA and above

3. Work Experience

a. Less than 5 year’s

B. 5 to 10 Years

C. above ten

4. Sex

A .Female b. Male

I. questions about Conception of environmental sustainability

1. What do you think is the main reason of installing ETP in the tannery?

a. To protect the environment

b. To secure tannery penalty

c. I don't understand

2. Do you exactly know the source of water the tannery uses for production process?

a. Rain water

b. Ground water

c. Municipal water

d. I am not sure___

3. Have you ever thought of water scarcity sometime in the future used for industrial (tannery) production?

a. YES b. NO

4. Do you feel comfortable with the odor from the tannery?

a. Not comfortable

b. strongly not comfortable

c. Not affecting them

4.1 If No, did you ever projected to other community and strive to solve the problem?

a. yes b. no

If yes, comment----------

II. Implementation of Environmental standards and regulations.

1 .Is Waliya Leather and Leather Products Plc. applies Environmental guide lines to the leather Industry?

a. Strongly agrees c. Agree d. Disagree

b. strongly disagrees e. I don't have any Idea

2. What kind of treatment plant your tannery Installed

a. Primary b. Secondary

c. Tertiary d. Have no any treatment plant

2.1 If you have Treatment plant, is it working properly?

a. Yes b. No .I do not know

3. How is the wastewater discharged in the tannery you are working?

a. Directly to the soil b. directly to the river nearby

C. to the river through the treatment plant

4. Is there any sludge disposal site you know post tannery processing?

a. Yes b. No

4.1 If yes, is that site free of another environmental threat?

A. yes b. No

5. Is there any scheduled awareness creation program on waste water management issues in the tannery? a. Yes b. No

6. Do you know kinds of chemicals used in tannery production processes dissolved in water?

a. Yes b. No

2. Can you tell the most toxic chemical composing the wastewater in the tannery?

a. Yes b. No

7. What tannery production stage you think requires modifications to minimize wastewater generation? _____

8. Where are the tannery chemical stored?

a. in separate store away from the tannery b. in the processing area in the tannery.

c. There is no defined organized chemical store I know.

9. Is the tannery chemical weighing materials checked and standardized for accuracy?

a. Frequently b. Sometimes c. Not at all

10. Do you think appropriate on job training given to the tannery chemical workers concerning safety and recipe optimization?

a. Agrees b. Disagrees

11. How is about the adequacy of chemical recipe monitoring system installment in the tannery?

a. Efficient b. satisfactory inadequate

12. Is the water used for tannery processing pre-treated?

a. yes b. no

13. If No, what affect it has on machinery performance and efficiency?

_____

_____

14. Is water left running between production stages? a. Yes b. No

15. Is fresh water used in every new bath? a. Yes b. No

16. Have you ever seen water reuse and recycling in any tannery production processes?

a. Yes b. No

17. Are hides pre-cleaned before they are washed? 1. Yes___ 2. No____

18. Which production processes are most prone to mistakes and wasted products in water utilization?

_____

19. Which production processes are easier to modify with respect to wastewater generation?

_____

20. Is there any safety measure in place and significant commitment from the management to improve health condition?

a. Yes b. No

21. How often are workers exposed to chemicals dissolved in water?

a. Frequently b. Sometimes c. Not at all

22. Is the tannery structure well installed to let efficient wastewater outflow under the floor?

a. Yes b. No c. I don't have an idea

23. Can you imagine the contamination level of the river passing by the tannery you are working?

_____

_____

24. If you think it is polluted, whatever the level, what is your personal effort to protect the environment_____

III: Questions Related To Challenges of the Industry

1. What is/ are the main challenge/s in using waste treatment plant by your tannery?

a. Finance c. knowledge to use the treatment plant

b. both a &c d. other than these

2. If you choose other than this Pleas mention any other challenge

_____

_____

_____

IV. Future Recommendations

Please make possible recommendations to implement cost effective mechanism in using effective treatment plants by Waliya Leather and Leather Products Plc.

_____

_____

_____

_____

Thank you in advance!

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Informants Interview Questionnaire Guideline

Dear the interviewed!

I am Tadesse Abebe postgraduate student of the above mentioned institution and I am currently undertaking a research project on impact assessment Leather Industry on Environment in Addis Ababa in Case of Waliya Leather And Leather Products Plc. Please recall that you are selected as a possible participant because you are the closest stakeholder of the study and your participation is completely voluntary.

The research work is for academic purpose only. Any information obtained in connection with this study will remain strictly confidential.

The interview will take approximately 20 minutes of your time. Your honest and true opinion will be valuable for this research. Thank you in advance for your assistance.

A. Ministry of Industry/MOI/-Industry Zones and Environment Directorate.

1. What are the key issues with respect to industrial /environmental/ policy executions and implementation status?

2. Understanding related to quality industrial/ tannery/products and services in relation to global market requirements and standards.

3. Compliance with current global perception on pollution prevention and effective natural resource management.

4. How is the implementation of the program on the best available technology/BAT/ transfer and retention accomplishments in Ethiopia tanneries?

5. Is there organized and structured effluent/wastewater /management system installed to assure efficiency and production process integration in tanneries?

6. How are the sectorial and institutional government's bodies integrated to execute policies, regulations and legislations?

7. Is there any wastewater treatment plant performance monitoring and empowerment system in cooperation with non- governmental development organizations?

8. Commitments towards EIA and Environmental Audit issues.

9. Justification why industries/tanneries/ are let to establish plants along river courses.

10. Capacity building in relation to tannery wastewater management accomplished so far if any.

11. Future plan of Ministry of Industry (MoI) for Minimizing Environmental pollution by Tanneries

B. Leather Industry Development Institute/LIDI/- Environment protection Directorate

1. Role of the Institute for Environment protection.

2. What is your perception on sustainable development issues in relation to waste management in general and wastewater management in particular?

3. The Emphasis of LIDI in implementing environmental policy to leather Industry

4. The current statute of Ethiopian tanneries in using effective treatment plant, and Waliya Leather and Leather Products Plc. Tannery specifically.

5. Challenges and opportunities of working with private tanneries and sectorial government bodies with respect to environmental protection, mitigation options and Baste Available Technology (BAT) Transfer institutional performances.

6. Recommend best possible mechanisms and Incentive schemes for Tanneries in using effective waste treatment plants

C. Focused Group Discussion (FDG) with Dow stream villagers of Waliya Leather And Leather Products Plc.

1. Place _____ 2.Group leader Code_____

3. FGD Identification number _____ 4.Name of the FGD Facilitator _____sign_____

5. Name of supervisor _____sign _____6.Date of Interview _____

7. Discussion started at ____: ____hrs. 8. Discussion finished at ___: ____hrs. (fill at the end)

- **composition of a FGD participatory groups**
  - ✓ Participant total number_____ List of Discussants

	Participant name	Religion	Sex	Marital status	Age	Education Level
1			F			
2			M			
3			F			
4			M			
5			M			

Discussion Point

1. How Waliya Leather and Leather Products Plc. Tannery affects your Environment?

2. Did you participate in discussions conducted with other parties concerning environmental pollution/river pollution/?

3. What is your understanding about the right of living in a clean environment?

4. As a community did you face unresolved challenges related to the wastewater?

5. What do you think is your own role other than different parties in creating quality life?

6. Your perception about tannery?

7. How do you describe tannery in terms of environment and development?

Thank you in advance!