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COLLEGE OF LAW AND GOVERNANCE STUDIES

SCHOOL OF LAW

ENVIRONMENTAL POLLUTION OF THE LEATHER INDUSTRY:

A CASE OF MODJO CITY ADMINISTRATION

BY

MEHRET MILKESO GELETO

JUNE 2021

ADDIS ABABA, ETHIOPIA

**ADDIS ABABA UNIVERSITY
COLLEGE OF LAW AND GOVERNANCE STUDIES
SCHOOL OF LAW
LL.M PROGRAMME IN URBAN PROPERTY AND LAND LAW**

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A CASE OF MODJO CITY ADMINISTRATION**

BY

MEHRET MILKESO GELETO

**A RESEARCH PAPER SUBMITTED FOR THE PARTIAL FULFILMENT
OF THE REQUIREMENTS OF MASTERS OF LAW DEGREE (LL.M)**

ADVISOR: MEKETE BEKELE (ASSOC. PROFESSOR OF LAW)

JUNE 2021

ADDIS ABABA, ETHIOPIA

Plagiarism

I, **Mehret Milkeso Geleto**, hereby declare that the thesis entitled “**Environmental Pollution of the Leather Industry**” is my original work and that it has not been submitted for any degree or examination in any other university or colleges. I also pledge that all sources used in any form are duly acknowledged.

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Dedication

This Paper is dedicated to:- Ethiopian Armed Forces members who lost their lives at the Northern Command and Ethiopian Physicians who lost their lives due to Covid-19 pandemic to rescue their nation.

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Abbreviation and Acronyms

BOD	Bio-Chemical Oxygen
COD	Chemical Oxygen Demand
TDS	Total Dissolved Solids
EEIA	Environmental Impact Assessment of Ethiopia
EEPC	Environmental pollution control of Ethiopia
LIDI	Leather Industry Development Institute
UNIDO	United Nation Development Organization
WCED	World Commission for Environment and Development
EPA	Environmental Protection Authority
ETPs	Effluent Treatment Plant
MoTI	Ministry of Trade and Industry
QSAE	Quality and Standards Authority of Ethiopia
UNEP	United Nation Environmental Program
ELIA	Ethiopian Leather Industry Association
LLPI	Leather and Leather Product Institute
GTP	Growth and Transformation Plan
NIS	National Institute of Standards
PDC	Product Development Center
EPA	Ethiopian Privatization Agency
UNDP	United Nation Development Program
TLDI	Textile and Leather Development Institute
LLPI	Leather and Leather Products Industry
LLPTI	Leather and Leather Products Training Institute

Abstract

The main objective of the study is to examine the environmental pollution of the leather industry through environmental protection laws in order to control environment and mitigate pollution. The methodology employed here is doctrinal based on interview with the government officials' environment, forest and climate change authority, technologist expertise and ordinary crews as well as, community members. A leather manufacturing industry is quite indispensable and one of the key toolkits for mitigating unskilled man power, to advance socioeconomic development through generating hard currency and adding value to export and import. Though, hazardous waste substances extraction and toxic waste effluents released from the tanning and leather industry results a tremendous socioeconomic crisis on the society living in the industry vicinity and impacted the environment, human health and biodiversity. Due to toxic chemicals extraction from the leather industries peoples living in the Modjo city and surroundings areas are claiming for damage caused by the industries. It is because of poor sewerage waste and failure of hazardous solid waste control and enforcement of environmental protection legislation. Hence, the author has tried to elaborate adverse impact of environmental pollution into soil productivity and water quality in light of environmental protection and control legislations.

Keywords; Environmental Pollution of leather industry, Toxic substances/ hazardous chemical, Environment protection, prevention of industrial Pollution

CHAPTER ONE

INTRODUCTION

This chapter contains the background of the study, statement of the problem, research objectives, research questions, methodology, chapters' arrangement and data collection, limitation of the study, review of literatures, significance of the study as well as ethical consideration.

1.1. Background of the Study

It is known that Ethiopia is in an embryonic level of industrialization. As a result, it is very appropriate to explore Ethiopia's situation before the industrialization indicatives. This would help us to extensively explore disadvantage and advantage of the leather industry. It will also attempt to see the role of the leather and leather product manufacturing industry in bringing up the national socioeconomic growth and its adverse impact on the environment and human health etc. On the other side, it accommodates to describe the accomplishment of leather industry flow of tanning process in respect of the national, international and regional environmental protection legislations, protocols and conventions adopted by government of Ethiopia in order to mitigate pollution and protect the environment. Finally, the toxic wastewater effluents, obnoxious stink and solid waste with hazardous substances discharged from the leather industries is also part of the study in light of laws.

Accordingly, Ethiopia is one of the poverty-stricken and the second most populous nation in the African continent next to Nigeria and the twelfth in the world.¹ Its economy is based on quite primitive and subsistent agricultural system. Agricultural economic system accounts for 50 percent of the GDP whereas 85 per cent of the population are still agrarian and derive their livelihood mainly from agriculture and related activities for a long period of time.² It shows that the agriculture is stagnant owing to several factors. For instance, uneven growth, limited manufacturing industries, lack of strong and organized public service delivery sector and political check and balance are very known main problems.

¹ Jan Grumiller and Werner Raza, 'the Ethiopian Leather and Leather Products Sector: An Assessment of Export Potentials to Europe and Austria. Vienna, March 2019.

² ZG Alemu, K Oosthuizen & HD Van Schalkwyk, Agrekon, (March 2003) 'Contribution of Agriculture in the Ethiopian Economy: 'a Time-Varying Parameter Approach' Vol 42, No 1. See p.1.

Additionally, lack of another driving economic force, successful industrialization, laggard technological transfer, skilled manpower and economic incapacity are the major problems observed in the last 6 to 7 and half consecutive decades.³ Tilmann argues that the major development challenges are underdeveloped private sector, political disruption in relation to social turmoil and limited competitiveness that hampered the developments of manufacturing industries, creation of job and the burgeoning of the export system that negatively influenced growth and development through lowering foreign direct investment, tourism and export. These are some of the major factors are a grim reality that was threatening socioeconomic growth, expansion of industrialization, sustainable development and livelihood of the country in general.⁴

Though, since early 2000s or over the last two and half consecutive decades it's fact that Ethiopia has demonstrated remarkable achievements in the areas of the diverse infrastructures and devoted a high share of its budget to pro-poor programs and investment through setting quite indispensable policies and strategies on the diverse issues. As a result, industrial policy and strategy⁵ and environmental policy are the major policies back on the development and growth agenda.⁶ In addition, legal instrument regarding environmental protection and control is also other achievement by government. The major objective for which the environmental protection legislations were enacted is that to predict and manage the environmental adverse impact and protect environmental right enshrined in the constitution and associated treaties to adverse environmental impacts. Further, to protect society and environment against harmful effects, to safeguard of human health of current and future generation and maintain the biotic and aesthetic value of nature whereas, it is appropriate to mitigate pollution as an undesirable consequence of the socio-economic development activities.⁷ Hence, due to high range of livestock availability, labor intensity and large export potential through an active state driven a leather and leather product manufacturing sector is one of key government priority scheme back on the development agenda.⁸ Hence, leather manufacturing industry takes the lion's share. It has significant segment

³ Tilmann Altenburg, *Industrial Policy in Ethiopia*/Bonn: DIE, 2010, - Discussion Paper ISBN978-3-88985-477-3.

⁴ *Ibid.*

⁵ FDRE Ministry of Industry, *Ethiopian Industrial Development Strategy*, August 1994. (Amharic Version) published by Ministry of Information, press and Audio Visual Division.

⁶ FDRE Environmental Policy, April, 1997.

⁷ FDRE Environmental Pollution Control proclamation No, 300/2002, *Negarit Gazeta* 9th year No 12 See preamble

⁸ Jan Grumiller (n-1).

for the country in realizing growth, generate hard currency and alleviate huge number of the unskilled and amateurish man power.

Consequently, according to data source from Leather Industry Development Institute of Ethiopia; there are about 34 leather manufacturing industries in the country.⁹ Among these about 48% of the existing leather industries in Ethiopia are operating in Oromiya Region.¹⁰ Most of them are in Modjo city with about sixteen (16) leather manufacturing industries in producing finished and semi-finished leather by using raw material nearby water supply and manpower generated from along leather processing tradition in the area.¹¹ Fourteen (14) of them are in operation for domestic and international market by using by-product (animals) skin and hides such as, goat, sheep and cattle.¹²

However, despite the socioeconomic growth and development of the leather industries; Modjo city is going through bizarre and threatened with environmental pollution due to hazardous materials and toxic substances released from the leather industry. The environmental pollution is one of the bottlenecks to the successful socioeconomic activities achievement of Modjo city. The main problems are the harmful chemical substances sewerage wastes or hazardous heavy metals, obnoxious smell and toxic waste substances released from the leather industries known by aggravating pollution that caused harm to human health, safety and the environment. Especially, they are detrimental to health of the vulnerable group of the society, such as children, elders and women dwelling in the study vicinity.

The main purpose of the study is to examine the extent of implementation of environmental laws in controlling, preserving the environment and regulating environmental pollution by leather industries. Further, the role of the institutional framework through implement and monitor the environment law against the leather industries wastewater and toxic chemical shall also be examined.

⁹ FDRE, Leather Industry Development Institute of Ethiopia, June, 2020 Report.

¹⁰ *Ibid.*

¹¹ *Ibid.*

¹² *Ibid.*

1.2. Study Area

In the Oromiya Regional State there are about 21 zonal and 20 grades (A) mega cities administration. Modjo is one of the mega cities located in the east of Oromiya which has five entries and bordering with Bishoftu and Dukem city, in the north, Adama city in the east and Lume woreda in the south. Modjo city named after nearby Modjo River and part of east shoa zonal administration, 80 kilometers south of Addis Ababa, 10 kilometers north east Adama and 33 kilometer west of Bishoftu. Modjo is one of the well-known train stations and dry port of the Ethiopia has played vivid role in easing the flow of import and export of goods and services. Modjo city has a huge livestock breeding center, crop production such as;-Tef, wheat, sorghum, maize and barley. Not only these but also various vegetables and fruits including but not limited to garlic, potato, apple, papaya and strawberry¹³.

¹³https://en.wikipedia.org/wiki/Modjo,_Ethiopia. accessed March 27,2021

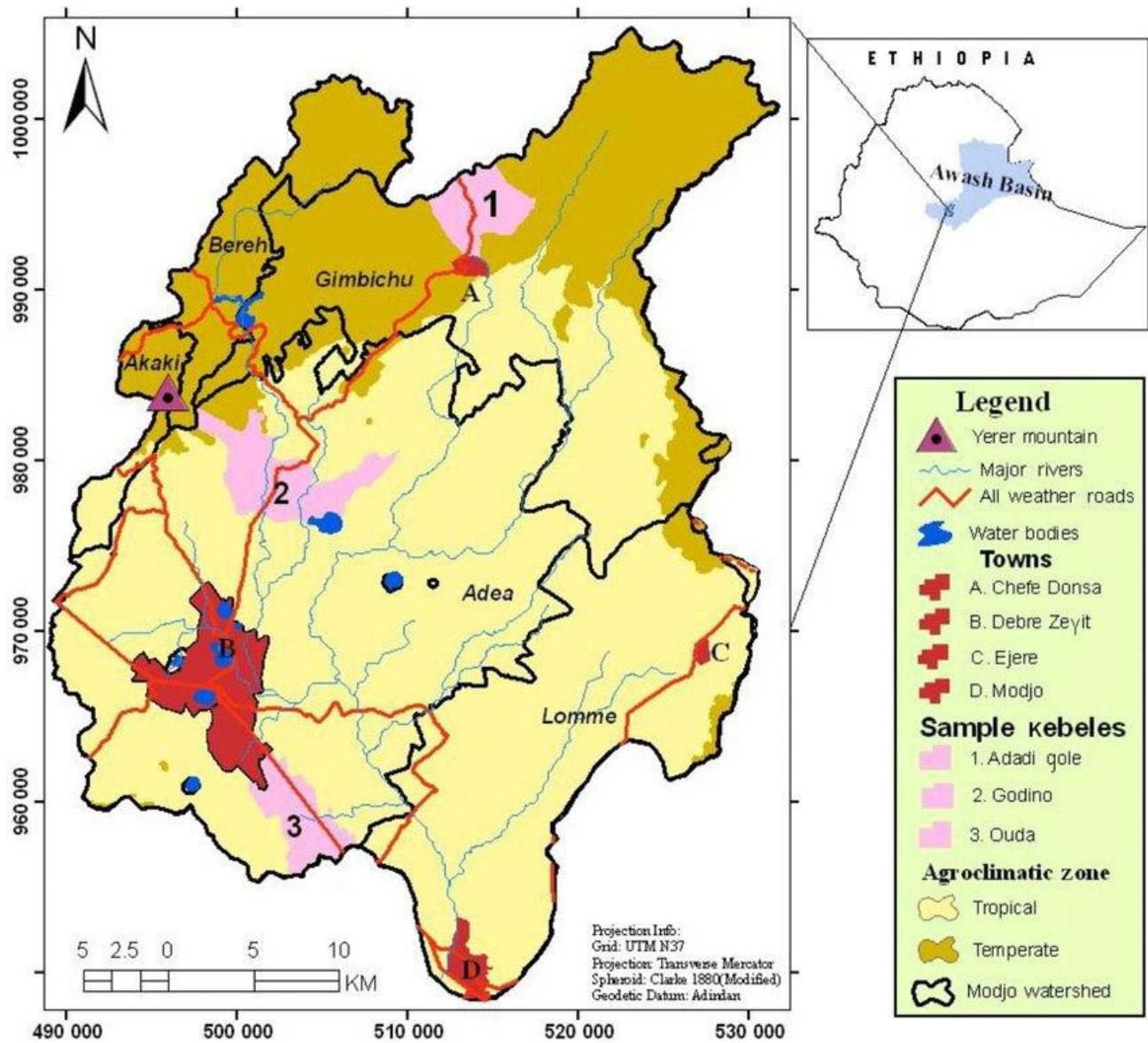


Figure 1.1. Study Area

1.3.Statement of the Problem

Historically, Modjo city leather and tanning industries is known for producing wide range of leather products for a national and international market since 1965 and till now.¹⁴ Relatively it is believed that the leather product industry had benefited the government and society living in the town and per-urban vicinities by creating job opportunity and buying raw material from the community used for manufacturing leather and leather related product, introducing new technology of tanning to the vicinities, hard currency and import-export value chain, paying taxes and participating in building some of the most important infrastructures such as, schools, health posts and roads.

Even if, the leather manufacturing industry by its nature have sequential processes which consist of different types of the mechanical and chemicals stages to convert the raw materials or by-product.¹⁵ First, the preparatory stage is help for preservation, tanning stage is to convert protein of raw skin and hide in to a stable unputrifiable substances and the last stage is crusting which consist of thinning, retaining and lubricating¹⁶. Primarily, the raw material used for leather industries are mostly by- product of animal meat or animal skin and hides such as, bovines, calf, goat and sheep (shoat) and so on¹⁷. Based on this fact during all stages or process of production leather industries commonly use different types of materials such as, huge amount of water, chemicals composition of chromium as Cr_2O_3 , and sulphur dioxide to produce finished and semi-finished leather and leather related product. During this chemical transformation industries generate high quantities of by-product and wastes than those of finished leather¹⁸. As a result, huge amount of untreated and unwanted toxic waste effluent and hazardous substances released from the leather industry become a source of environmental pollution results adverse impact on surrounding Modjo River and water course, soil, environment and human health directly or indirectly. Hence, the study designed to thoroughly examine leather industry process in view subject of environmental protection laws and to examine the measure taken by the regulatory institution of environmental protection against pollution by leather industries.

¹⁴ *Ibid.*

¹⁵ MSc. Eng. Stanislaw Famielec, Prof. PhD. Krystyna Wieczorek- Ciurawa, Faculty of Chemical Engineering and Technology, Crow University of Technology(2011). Waste from Leather Industry, Threats to the Environment p.2.

¹⁶ *Ibid.*

¹⁷ *Ibid.*

¹⁸ *Ibid.*

1.4. Objective of the Study

Overall, the research is designed to examine environmental pollution of leather industries regulation and measures taken by the regulatory institutions through implementing legislations and standards.

1.4.1. General Objectives

The general objective of the study would be the assessment of the environmental pollution of leather industries on air, water, soil and human based on the environmental protection laws.

1.4.2. The specific objective of the study are;-

- ✓ To examine the friendliness of leather processing industries with the environmental law.
- ✓ To examine the legal implementation of the environment.
- ✓ To identify lacunas or gaps of law that hinders for implementation.
- ✓ To elaborate institutional strength in order to take measures.
- ✓ To examine leather industries hazardous chemical wastewater treatment process in respect of environmental protection standard or laws.

1.5. Research Question

The research questions will be attempted to answer the following critical and basic questions based on the two sub-sections which are framed with dominant main and specific issues:

1.5.1. Main Research Question

The level of implementation, practice and regulatory institutions efforts in respect of environmental protection and controlling pollution which results from high amounts of deleterious materials released from the leather industry.

1.5.2. Specific Research Questions

1. Does the leather processing industry comply with environmental protection law and standard?
2. What does the environment, forest and climate change authority do or take as a measure with respect to environmental protection standard against toxic and hazardous waste substance of the leather processing?

3. Does the leather processing meet permissible standards limit to produce leather product?
4. What are the standards of limit values for the emissions and discharges into water and air of leather industries emit?
5. The compliance levels or friendliness of leather industries with the environmental law?

1.6. Literature Review

The pivotal literature concerned with the environmental pollution of leather industries and related subject matters are duly discussed and reviewed. Basically, experimental findings of the water quality and soil, the usage of the chemicals in leather processing, law and implementation concerning of the environment protection from any various harmful or adverse impacts have been skimmed. This may be differing from place to place in its extent of practice and implementation protection and controlling techniques of legislations. However, there are well-known national and international studies done in relation to leather industry pollution and environmental rights and environmental impact on surrounding areas and human health.

There are also environmental trends that threaten to radically alter the planet, that threaten the lives of many species upon it, including the human species. Each year about 6 million hectares of productive dry land turns into worthless desert.¹⁹ Over three decades, this would amount to an area roughly as large as Saudi Arabia. More than 11 million hectares of forests are destroyed yearly, and this, over three decades, would equal an area about the size of India²⁰. Much of this forest is converted to low-grade farmland unable to support the farmers who settle it²¹. In Europe, acid precipitation kills forests and lakes and damages the artistic and architectural heritage of nations; it may have acidified vast tracts of soil beyond reasonable hope of repair.²² The burning of fossil fuel puts into the atmosphere carbon dioxide, which is causing gradual global warming.²³

Hunegnaw Abeba, on his thesis, leather industry and environmental challenges, had discussed about the issues in relation to environmental pollution and human health, impact by the tanneries

¹⁹ The World Commission on Environment and Development(WCED)Report Oslo, 20 March 1987(The Brundtland Report). See p. 20.

²⁰ *Ibid.*

²¹ *Ibid.*

²² *Ibid.*

²³ *Ibid.*

wastewater effluents on human health, surrounding water and biotic.²⁴ The tanning industries generate huge amounts of liquid and solid wastes and emit obnoxious or bad smell caused by the degradation of protein skin and generation of gases like that of, NH₃, H₂S and CO₂ by notifying Chrome tanning is the most commonly used in the world and Ethiopia as well.²⁵ Moreover, rather than thoroughly explained the causes for the tanning industries pollution and impact as well as, remedies why that pollution of the tanning industries affecting human health.²⁶ On the other hand, he had analyzed management and characteristics of tanneries wastewater in terms of physical, chemical and biological composition with the interrelated parameters. Characteristics of waste water in a sense of tanning process shedding huge amount of water particularly to wet operation.²⁷

Meanwhile, the characteristics of the wastewater tanneries based on the following three key scenarios. First, effluents emanating from the beam-house, second, effluents emanating from the tan yard, and the last one is post tanning operation which mean soaking effluents.²⁸

In subsequent, H.Ozgunay and others have examined the characterization of leather industry wastes. They have evaluated that the leather industry has been commonly associated with high pollution due to the obnoxious smell, organic wastes and high water consumption caused during traditional manufacturing processes and different forms of waste in quality and quantity which emerge during the process of hides and skins in to leathers in thousands of leather factories from primitive to modern all around the world have negative impacts on the environment.²⁹

On other hand, the solid wastes generated from different types of leather producing tanneries like garment, shoe upper and sole.³⁰ In addition to this it had been discussed that the waste generated from each types of leather and process have different characteristics with high amounts of the raw hides are disposed to the environment by leather factories without turning them in to good

²⁴ Hunegnaw Abeba, A Thesis on Leather industry and environmental challenge, February, 2015, Addis Ababa University School of Graduate Studies. See p. 27

²⁵ *Ibid.*

²⁶ *Ibid.*

²⁷ *Ibid.*, p. 28-29.

²⁸ *Ibid.*

²⁹ H.Ozgunay, S.Colak, M.M.Mutlu, F.Akyuz, Characterization of the leather industry waste. Polish J. of Environ.Stud.Vol.16, No.6 (2007) 867-873. See p. 1-2.

³⁰ *Ibid.*

use.³¹ In this respect, the authors have tried to discuss about the wastes generated from leather industry throughout the world and its impact, level of wastes per tons and their toxic chemicals reaction in general.³² However, it has no clues about remediation behind to virtually all this problems as a result to mitigate obnoxious or bad smell and harmful damage on the environment and human socio-economic life.³³

In subsequent, the other is an article published in Bulletin of the Chemical Society of Ethiopia by Abraha Gebrekidan, Gebrekidan Gebresellasie and Afework Muluget in 2009. The article's analyzes the environmental impacts of Sheba tannery effluents on the surrounding water bodies'.³⁴ The main scenarios of this study is mostly about chemical hazardous waste substance used in the manufacturing and tanning process and their negative impacts and experimental findings and results which is level of toxic effluents and impacts of tanning industry on environmental.³⁵ Moreover, according to the authors, the amounts of the chromium salts used in the tanning process covers 90% to produce flexible leather, better water resistance and high shrinkage temperature which is about 30% remains in the tanning liquor.³⁶ On the other hand, their experimental finding and results have shown that the hazardous waste effluents and emit on the surrounding water bodies from tanning industry has impacted the environment due to week treatment process of the tannery. However, even though their contribution appreciable there is no answer or clearly disclosed for why the treatment process of the tannery is so week and one of the crucial question to be answered.

In subsequent, there is a dissertation by Tsegai Berhane, on industrial pollution control and management in Ethiopia: A case study on Almeda textile factory and Sheba leather industry.³⁷ The study had concentrated merely on legal and organizational framework of the environmental in terms of the regulation and pollution control of toxic chemicals and other hazardous emit from

³¹ *Ibid*,

³² *Ibid*,

³³ *Ibid*,

³⁴ Abraha Gebrekidan, Gebrekidan Gebresellasie and Afework Muluget, Chemistry Department, Mekele University, Article in Bulletin of the chemistry society of Ethiopia, August 2009. p. 2.

³⁵ *Ibid*.

³⁶ *Ibid*.

³⁷ Tsegai Berhane, industry Pollution Control and Management. A case study on Almeda textile factory and Sheba leather industry, June, 2015. See p.45.

leather industries as a result of making conducive environment and environmental friendly industry for a society and he criticized that about there is a poor law enforcement.³⁸

Subsequently, the other issue is dissertation by Jostoin Lohr Hauge, African Industrialization policy in an era of expanding global value chains: the case of Ethiopia's textile and leather industries.³⁹ This dissertation is analyzed and discussed more of about industrial policy challenges and success critical look in Africa continent rising narration. Mainly, the study have narrated and analyzed very well about the Ethiopia's industrialization trajectory and GVC-oriented industrial policies in the textile and leather industries. It is because of three main reasons which are Ethiopia has been fastest growing economy for a decade now without dependent on natural resources, unlike many other fast-growing African economies. Second, Ethiopia government considers industrial policy as one of the most important facets of its economic development agenda as evidenced by its commitment to industrialization in its 5-year development plans by its explicit emulation of East Asian industrialization experiences.

Third, global value chains (GVC) participation plays an integral role in Ethiopia's industrialization drive. It has separated in to two important parts. The first part discussed about the economic growth, industrialization and industrial policy in Ethiopia and the second moves on to the importance of GVCs to Ethiopia's industrialization process. The study skimming throughout the different socio-economic and political aspects during the last two decades through appreciating the persistent dedication and resulted achievements by FDRE/Meles Zenewi administration in order to formulate basic and critical state led-industrial development plan and strategy, put a growth targeting for the industrial sector as well as, industrial policy in the view of East Asian industrialization experiences. Particularly, in the case of issue related with the Ethiopia's global value chains (GVC) participation and industrial policies in the leather industries.⁴⁰

Accordingly, the study has tried to answer why does the Ethiopian government want to develop the textile and leather industries in the country? According to the growth and transformation plan II, Ethiopia's national development plan in 2015, one of the six prioritized manufacturing

³⁸ *Ibid.*

³⁹ Jostein Lohr Hauge, Corpus Christi College, African industrial policy in an era of expanding global value chains: the case of Ethiopia's textile and leather industries, July 2017. See p. 135.

⁴⁰ *Ibid.*, p.153

industries, leather and textile is among the paramount.⁴¹ This because of bring in more export earnings than any of the other manufacturing industries, promoting economic activities that generate foreign currency or to easy foreign exchange scarcity and high labour intensity.⁴² Furthermore, the other significant issue is that the author narrated extensively about the Ethiopia's global value chain or GVC-oriented firms in the leather industry.⁴³ According to the author the most important part that the government played is incentives for domestic and expatriate or foreign investors in providing land for free, duty free services and allocating credits from local known banks like DBE and CBE.⁴⁴

This shows that the government commitment in renewing or develop leather and leather product industries at the same time to enhance socio-economic development and curb bondage of poverty in general. Eventually, the author had discussed scientifically very well the role of Ethiopia's industrial policy plays in foreign direct investment, income tax; mitigate high labour intensity, global value chains. Moreover, technology transfer the main facilitator of growth and development as well as putting Ethiopia is one of in the developing map and changed facets. As the same time, there are some bottlenecks and challenges had been raised especially like lack of skill of domestic crews, workforce culture, domestically available inputs, the quantity and quality of raw materials like hides, skin and cotton doesn't meet international requirements as well as, high labour turnover in footwear and leather apparel industries.

1.7. Significance of the Study

The research mostly emphasizes on discussing and determining the status of regulatory authorities in terms of implementing the law. In one hand, investigate the leather industries producing flow in sense of the environment friendly and in respect of permissible limit standard. On the other hand, if there is lacunas or gap in legislation, poor toxic or hazardous waste effluents treatment and lack of strong assessment or management. In doing these the following results will be expected. It will helps the government to research and work on the constraints in reformulating and reenacting the controlling mechanism and protecting policies, strategies and legal framework of the environmental issues, in sense of making conducive and environmental

⁴¹ *Ibid.*

⁴² *Ibid.*

⁴³ *Ibid*, p. 159

⁴⁴ *Ibid*, p. 190

friend industry. Furthermore, it can be an input for the policy makers, non-governmental organization, practitioners and other research organization which works on the identified lacunas and constraints as a result of remediation provide.

1.8. Scope of the Study

The environmental pollution of the leather industry study is taking place in the Modjo city administration in various environmental and related issues. Basically, toxic wastewater substances are released into water, soil and the environment from leather industries. Most of the urban dwellers are facing growing environmental pollution problems. However, the study thematically undertake on two of the leather and leather product industry as well as, laboratory experiment sample to demonstrate and identify level of pollution of water and soil, human health in general.

1.9. Limitation of the study

There are several challenges in relation to conducting the study. Particularly, due to the covid-19 contagion at the first place moving somewhere for the purpose of any socio-economic or assume doing something time by itself create devastating or unnerved sentiment in this calamitous period of the epidemic. Because, even when the government officials, crews, residents and workers of leather industry know that you come from Addis Ababa, understood one thing from their facial expression that they are not willing to talk to you totally. Overall, in Modjo city administration, mostly societies filled with full of fear because of the epidemic. The government service deliver sectors have been lockdown totally. Moreover, while conducting the research I faced barricades especially the followings are some of the fundamental and critical.

- Due to pre-election campaign, it was difficult to have an interview face to face with concerned organ or a group of society.
- The most important city officials who have been working on the area of environment and related with environmental protection, pollution control and environmental impact assessment and other concerned are deployed for the national pre-election campaign,

- Most of the leather industries crews or workers are not on their regular duties due to covid-19 pandemic re-spread, so it was difficult to interview them to get detail info about the environmental pollution.

1.10. Methodology of the Research

In conducting this research the researcher used qualitative method that containing doctrinal. Two of polluting leather industries Modjo tannery and Kolba tannery factory are identified for sample.

1.10.1. Data Collection and Sample

I use both primary and secondary data collection. Primary data like that of an interview by using structural questionnaires with key concerned organs of any government offices, residents and field observatory on separated industries and Kebele's. Moreover, in case of the secondary data source there will be legislations, instruments, journals, books, publication, and other important materials.

1.11. Arrangement of the Chapters

This thesis is organized in to five main chapters. The first part of the thesis contains introductory, statement of the problem, objectives of the study, methodology, significance of the study, literature review, ethical consideration, and limitations of the study as well as, scope of the study. The second chapter of the study focuses on the theoretical background policy and spotlight of the legal framework and institutional framework as well as international and national instruments concerned with the environmental pollution, environmental conservation and protection, impact assessment and right to environment in view of national and international aspects. The third chapter narrates and discusses about the source and types of environmental pollution, level of the pollution of water and soil by leather industries, the amount of the toxic and contaminated hazardous waste effluents releasing in to the water per year in tons and definition of leather industry in developing. The fourth chapter is about the experimental finding and results of the water and soil caused by leather industry. The fifth chapter is summary of finding, conclusion and recommendation.

1.12. Ethical Consideration

The main goal and purpose of the study has disclosed to the concerned organs from any sections. Based on this fact, author has done the study as per the willingness or consent of stakeholders and participants of all direction. The underlying issue as mentioned above in the importance of the study is to show the government where the lacunas or gap in the implementation of legislations and for researchers. Meanwhile, some important stated info's would be confidential not to inform for any one of third person or without individuals full consent or willing. Hence, the author has conducted the study by taking all necessary ethical consideration in causable sense.

CHAPTER TWO

THE POLICY, INSTITUTIONAL AND LEGAL FRAMEWORK FOR ENVIRONMENTAL PROTECTION IN THE LEATHER INDUSTRY

2.1. Introduction

The main purpose of this chapter is to discuss and analyze the subject matter of environmental protection and control laws. Basically, it narrates and investigates the environmental protection policy and the issues within the policy to adopt legislation and organizational structure of environmental control and protect issues in giving proper support, persistent and sustainable utilization of the environment and natural resource towards sustainable industrialization process. On the other hand, the role of Environment, Forest and Climate Change Authorities has to be examining to prevent the leather industry's pollution.

2.2. General Overview of Environmental Policy

Environmental resources are the pivotal things that play vital role through enhancing growth and development. According to the Conservation Strategy of Ethiopia (CSE, 1995) environmental policy was initiated in early 1989s. The environmental policy came in to force in 1997⁴⁵. It is to achieve the Plan for Accelerated and Sustainable Development to End Poverty (PASDEP). The notion of the environmental policy is enshrined in the constitution which provides for the clean and healthy environment and sustainable development.⁴⁶

Basically, the policy narrates and skimming the significance of natural resources and their contribution which are land, water, forest, and trees as well as, other forms of biodiversity in relation to environmental protection towards meeting the basic needs and GDP growth in general.⁴⁷ It is divided into five separate sections. Particularly, it has specific objectives, key guiding principles and sectoral and cross sectoral environmental policies which has general

⁴⁵ *Ibid*, Environ. Policy (n-6)

⁴⁶ FDRE Constitution, 1995, article 44(1), 44(2), 43 and 92, proclamation No. 1, Negarit Gazeta, 1st year, No.1.

⁴⁷ *Ibid*, Environ. Policy (n-6) see, section. I.1.1 p. 2.

topics and thirty two important sections.⁴⁸ It encompasses different prominent environmental and pertaining subject matter that have pivotal national objectives.⁴⁹

As a result, the first section of the policy deals with need for a policy and resource base,⁵⁰ second it is about policy guides, goal and objective⁵¹, the third is sectoral environmental policies⁵² and fourth is about cross-sectoral environmental policies⁵³ as well as the fifth deals about the policy implementation.⁵⁴ The main objectives of this policy are to improve the quality life of the people through reliable and sustainable development of natural and cultural resources.⁵⁵ The deterioration of land, water, forests and others are in a low level and exacerbated from time to time, accelerated soil erosion caused annual loss in grain production, soil resources loss and loss of agricultural production and weakness of the management are the basic and critical problems⁵⁶; the need for a policy has several objectives and goals.

The constitution of Ethiopia has recognized as a prerequisite environmental sustainability for enduring socioeconomic developmental success and environment to harmonize the broad direction and guide the sustainable development.⁵⁷ Overall, the environmental policy is aims at enhancing the health and quality of life of all Ethiopians and promoting sustainable social and economic development through the administration and use of natural, human-made and cultural resources and development as a whole to enable present and future generations to meet their needs.⁵⁸ The policy seek the following critical issues; ensuring that the biological diversity is preserved, ecological processes and life support are sustained, ensure that benefits from the exploitation of non-renewable natural resources are extended can be managed, minimize their negative impact of their exploitation on the use and management of natural resources; identify

⁴⁸ *Ibid.*

⁴⁹ *Ibid.*

⁵⁰ *Ibid*, section II, 2.1 p. 3.

⁵¹ *Ibid*, p. 4.

⁵² *Ibid*, section III. 3.1, p.7.

⁵³ *Ibid*, section IV.4.1, p.20.

⁵⁴ *Ibid*, section V.5.1, p.27.

⁵⁵ *Ibid*, section, II. 2.1 p.5.

⁵⁶ *Ibid.*

⁵⁷ *Ibid*, (n-46) of the FDRE Constitution and article 86(4).

⁵⁸ *Ibid*, Environ. Policy (n-6) see section, II.2.1 P.4.

and develop natural resources that are underutilized by finding new technologies and/or intensify existing uses which are not widely applied;⁵⁹

incorporate full economic, social, and environmental costs and benefits of natural resources development in to the planning, implementing and accounting processes by a comprehensive valuation of the environment and services it provides as well as, by considering the social and environmental costs and benefits which cannot currently be measured in monetary terms; improve the environment of human settlements to satisfy the physical, social, economic cultural and other needs of their inhabitants on a sustainable basis; prevent the pollution of land, air, and water in the most cost effective preventive ways;⁶⁰ Conserve, develop, sustainability manage and support Ethiopia's rich and diverse cultural heritage; ensure the empowerment and participation of the people and their organization at all levels in environmental management activities;⁶¹ Finally, raise public awareness and promote understanding of the essential linkages between environment and development.⁶²

The implementations of cross-sectoral and sectoral environmental policy are a lot of issues listed out under the policy. Each and every government sector has been delegated to execute the environment issues and actively engage in mitigating environmental pollution in order to protect the environment and ensure environmental health hazards in all activities. Furthermore, the policy has duly discussed and described concerning about the management of hazardous waste substances, air pollution and climate change, toxic waste compounds and pollution from industrial waste.⁶³ This means that environmental protection issue is not merely one sectoral responsibility. All governments sectors, especially agricultural, manufacturing industries like the tanning and leather industry, health, irrigation project sectors; etc. should prepare their own environmental preservation and management plan.

Because, they are dominant sectors contribute high amount of GDP economy in the country.⁶⁴ Moreover, industrial activities are accounting for about 2/3 of the manufacturing value added.⁶⁵

⁵⁹ *Ibid.*

⁶⁰ *Ibid.*

⁶¹ *Ibid.*

⁶² *Ibid.*

⁶³ *Ibid.*, see, section III. 3.8.

⁶⁴ *Ibid.*

⁶⁵ LIDI, (n-9)

Among these the leather and footwear industries contribute 10.7% of gross value production for the country⁶⁶. This resulted in high water and soil pollution in the area where industrial activities are concentrated like in Modjo city administration.

2.3. Definition of the Leather Processing Industry and Its Effects on Environment

Indeed, the leather industry has its own definition of the chemistry terminology. But, commonly the leather industry known by quite old manufacturing sector producing wide range of materials like leather footwear, bags, and leather garments; etc.⁶⁷ It has played its part through advancing socio economic development. According to data analysis, leather and leather product contributes on average is about 6-8 percent of the gross value product of all manufacturing industries and contribute about 6 per cent to national GDP.⁶⁸ On the other hand, it creates job opportunity for about 41,730 employees and 6 percent of share from manufacturing GDP.⁶⁹ It is one of the potential sectors that could play a vital role in achieving long-run policy goals and transforming the country's development condition to a higher stage by increasing the foreign currency earning of the country, expanding employment opportunities and attracting foreign direct investment.⁷⁰

However, leather manufacturing processing is much known by high amount of toxic waste sewerage substance and hazardous waste chemical released from industries. Because of this the environment has become incessantly deteriorated from time to time due to many socio-economic movements of the human beings.⁷¹ Leather manufacturing industries are causing a lot of damage to the environment, water, soil and other biodiversity.⁷² Leather manufacturing industry involves various operations and consume huge amount of water including chemicals to operate which results in generation of large waste effluents. Obnoxious smell and emission chromium and

⁶⁶ *Ibid.*

⁶⁷ N.M.Sivaram, Debabrata Bariki, in energy from Toxic Organic Waste for Heat and Power Generation, 2019 See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/330053682> Accessed March 25, 2021.

⁶⁸ Ethiopian Chamber of Commerce and Sectoral Association (ECCSA) December 2019.

⁶⁹ LIDI (n-9)

⁷⁰ *Ibid*, p. 3.

⁷¹ Karanam Sai Bhavya, Raji P, Jenifer Selvarani, Antony V Samrot, Pazhayakath Thevarkattil Mohamed Javad, Appalaraju, V.V.S.S. Leather Processing, its effects on environment and alternatives of chrome Tanning, International Journal of Advanced Research in Engineering and Technology (IJARET), Volume. 10 issued 6, November-December 2019, pp. 69-78, Article ID: IJARET-10-06-009. See, p. 69.

⁷² *Ibid.*

sulfate ions that leading to increase in biological oxygen, chemical, dissolved demand; etc.⁷³ Therefore, leather manufacturing industry is recognized as one of the paramount polluting industries due to its huge amount of hazardous solid waste compound and toxic waste effluents.⁷⁴

Nowadays, cities are prone to pollution by municipal or industries solid or liquid wastes. Water and soil pollution are seriously growing and threatening the socio-economic activities of the society living in the vicinity. It is because various industrial chemicals and contaminated containers have been stored either as unwanted and obsolete chemicals as well as, poor sanitation, weak waste disposal and segregation system. Moreover, pollution by the leather manufacturing industries is exacerbating due to poor treatment and reaches at the worrisome stage. Throughout the major mega cities in the country less than half of the solid waste released is collected and the remaining increases urban turbidity.⁷⁵

2.4. Environmental Pollution by leather industry

2.4.1. Environment and Pollution

Before scrutinizing and apprehending thoroughly about the adverse impacts of the environment, in the first place recognize the notion of the environment is fundamental issue. Hence, the term Environment is a little bit widespread, complex. It doesn't have a common definition. Due to its broadness impossible to mention each definition of the environment discusses by anyone. As a result, the researcher has elaborated some of the indispensable definitions of the environment in a short ways. Environment might affect the natural, social and cultural life of a certain society be it, positive or negative and directly or indirectly. From this or other crucial and basic perspective defining the environment is becoming unlike.

FDRE environmental legislation defined environment is the totality of all materials whether in their natural state or modified or changed by human, their external spaces and interactions which affected their quality or quantity and the welfare of human or other living beings, including but

⁷³ *Ibid.* p.74.

⁷⁴ *Ibid.*

⁷⁵ The Federal Democratic Republic of Ethiopia Environmental Protection Authority, GEF Portfolio Identification Document, December 2011. See pp.5.

not restricted to, land, atmosphere, weather and climate, water, living things, sound, odor, taste, social factors, and aesthetics.⁷⁶

Hence, environmental pollution is the introduction by man directly or indirectly of substances or energy into the environment resulting in such deleterious effects of harm to living resources, hazardous to human health, hindrance to marine activities including fishing, impairment of quality for use of seawater and reduction of amenities.⁷⁷ Hence, pollution is caused by different socioeconomic development activities which are done by human beings without considering environmental impact on human and animal; etc.⁷⁸. Further, some third world countries don't take into consideration environmental protection and control within their long and short-term plan rather its quite recent phenomena. Pollution can be happen due to several perspective of pollutants which are, persistent pollutants is which remain consistent in the environment for a long period of time without any change in its original form are called persistent pollutants.⁷⁹ For instance, industrial activities like pesticides, nuclear wastes and plastics etc.⁸⁰. The other is non-persistent pollutants is pollutants that opposite of persistent pollutants and break down in the simple form.⁸¹

FDRE environmental pollution control legislations defined pollution as means of any condition which is hazardous or potentially hazardous to human health, safety, or welfare or to living things created by altering any physical, radioactive, thermal, chemical and biological or other property of any part of the environment in contravention of any condition and restriction made under this Proclamation or under any other relevant law.⁸² Pollution is changed situation created by intervention of pollutant which is potentially hazardous to the environment.⁸³ The Ethiopian prevention of the industrial pollution regulation refers pollution means any condition which is hazardous or potentially hazardous to human health, safety or welfare or to living things created by altering any physical, radioactive, thermal chemical, biological or other property of any part

⁷⁶ *Ibid*, See Environ. Pollution Control (n-7) article, 12.

⁷⁷ P.C Blocker & M.H Maranowski, " survey quality of refinery in Western European" (1971) 25 Petroleum Review

⁷⁸ IR.Mahyuddin Bin Ramli En Mohd Fadzil Bin Mohd Idris Environmental Pollution-Effects On National Development School of Housing Building and Planning, Universiti Sains Malaysia, 11800 PENANG p.1

⁷⁹ Quasif Ansari, Zubair Ehsani, and Abhishek Ajay Sinh, Environmental Pollution: Introduction, Causes & Types. www.Gradeup.com, See preamble page. Accessed 4/26/2021.

⁸⁰ *Ibid*.

⁸¹ *Ibid*.

⁸² *Ibid*, See, Environmental pollution control (n-7) art. 6.

⁸³ *Ibid*.

of the environment in contravention of any condition. Limitation made under this regulation, the relevant environmental standard or under any other relevant law.⁸⁴

Further, in his article, Roy M. Harrison has defined pollution in a simpler way. It is the increase of the contaminant level such as, toxic waste substances and hazardous wastes disposal, obnoxious odor, haze and sewage etc⁸⁵.

Due to these and other perspectives environmental pollution is considered as a one of the most serious problems facing human beings and other life forms on our planet everywhere in the world. It affects biodiversity, ecosystems, and human health worldwide by contaminating soil, biotic, aesthetic and air in general. Environmental pollution issues are attracting the attention of the government and all organs concern for its severe and dangerous long-term consequences.

It has different characteristics mainly in developing countries, like Ethiopia's lack of stable or inconsistency of the institutional framework, rules and regulation, government concern about preservation of the environment and natural resource are among the major contributing factors for the pollution problem. In fact, this is not a mere problem of third world countries. Following the WWII, industrialized countries like Japan and some parts middle Asia even had expanded different industries without much awareness of the negative impacts industries on the environment, water and land or soil.⁸⁶ Nowadays the industrialized countries have strong rules and regulations which are stricter than developing countries.⁸⁷

2.4. Pollution of Leather Industry and Its wastes (sludge) Characterizations

Giving a simple comprehensive definition of the term pollution by the leather industry is difficult as it is the case with the definition of environmental pollution; changes across time and culture of tanning and the technology used in response to new scientific understanding as well. Regarding pollution by leather industries are known by producing separate kinds of leather and leather related goods or products commonly in the world.

⁸⁴ Regulation No, 159/2008, Prevention of industrial pollution, Nagerit Gazeta, No, 15th year, No.14 See, pp.2 article(6)

⁸⁵ Roy M. Harrison: Pollution Causes, Effects & Control, The Royal Society of Chemistry, 1990. See page 9.

⁸⁶ *Ibid*, see WCED (n-19) p.226.

⁸⁷ *Ibid*.

They engage the usage of by-product meat like animal skin and hides. In the flow of leather processing industries are consume huge amount of the water for several steps and chemical chromium oxide are discharged during the entire tanning process to convert the raw materials in to finished and in order to get flexible, wet and high durable leather goods and product.⁸⁸ In this regard, the characterization of the sludge (waste) generated or released varies depending the raw materials and technology used. Due to leather manufacturing industries processing takes place or comprises of series of operations in three stages. Wastes (sludge) released from these industries footnote problem. At each stage are harmful to the environment and adverse impact on prompt health human hazardous, loss of soil productivity and so on.⁸⁹

- Hence, different forms of wastes emerge during the transformation of hide and skins into the leather industries have negative influence on the human health, animal, soil and water surface.⁹⁰ Meanwhile, according to data from several studies associated with leather and leather processing industries, approximately, 200kg of leather is manufactured from 1 tone of wet-salted hide which constitutes about 20% of rawhide weight and more than 600 kg of solid waste is generated during the transformation of rawhide into the leather.⁹¹ On the other hand, besides the 30-35m³, waste water disposed to the environment during the processing of every 1 ton of rawhide in the world leather industry history.⁹²

In turn, in spite of this fact, there are unwanted materials that not capable of recycle and lost its utility in the process of subjecting animal hides and skins to physical and chemical sequential process which results that hazardous waste (sludge) effluent substances and toxic solid wastes substances that has to be expected to release from tanning and leather processing industries.⁹³ Hence, following all these and other perspectives of tanning process, it leads to influence the environment, human health and biodiversity in general negatively by producing huge amount of contamination of hazardous and toxic chemical substances, such as chromium oxide, synthetic tannins, oils, resins, biocides and detergent.⁹⁴ Therefore, the leather processing industry has been

⁸⁸ *Ibid* (n-67) Sivaram, et al, P. 57

⁸⁹ K. koppiahraj, S. Bathrinath, S. Saravanasankar, Leather Waste Management Scenario in Developed and Developing Nations, see page 2.

⁹⁰ H.Ozgunay, et al (n-29)

⁹¹ *Ibid.*

⁹² *Ibid.*

⁹³ *Ibid.*

⁹⁴ *Ibid.*

commonly related with high environmental pollution due to its toxic and hazardous wastes substances from harmful chemical content like tanned, not tanned and from dyed or finished leather as well as bad stinks produced during their putrefaction, organic waste and high water consumption caused during the manufacturing process have harmful effects on the environment, human and animal health as well as on local plant flora and fauna.⁹⁵ The leather manufacturing process is going through different physical and chemical variations in order to discharge finished leather products and wastes released with separate characteristics according to the process steps at which it emanated.⁹⁶

2.5. Legal and Institutional Frameworks of Environmental Protection and Control

2.5.1. General Overview of legal frameworks

Industrialized countries like, China, the Republic of Korea and Indonesia, can be typical example for industrial expansion.⁹⁷ It has significant part in socioeconomic and development construction in these countries. Industrialization is often crucial for economic growth and for long-run poverty decrease.⁹⁸ Hence, after industrialization expanded out in different industrialized or developed countries the world got much more awareness of its adverse impact into the environment, water, soil, human and animal health, etc. As a result, one of the measure took by those developed countries is formulation of environmental and management policy, legislations and conventions against different industries pollution, nuclear pollution, depletion of ozone, radioactive pollution and so on. Indeed, environmental pollution and pollutants issues are becoming national and international community concern.

Nowadays, Ethiopia is going through the strange and unfamiliar environmental patterns. The main factor for aggravated pollution are that unintended industrial expansion and development at certain mega cities of the country without proper expansion and management plan that adversely effects on socioeconomic activities. Meaning Environmental protection and prevention of industrial pollution were not recognized as part of socioeconomic and developmental scheme in

⁹⁵ *Ibid.*

⁹⁶ *Ibid*, p. 7.

⁹⁷ Matleen Kriivila, Industrial Development and Economic growth: Implications for poverty reductions and income inequality. United Nation, Department Social and Economic Affairs, Industrial Development for the 21st Century: Sustainable Development Perspective. New York 2017. See page 303.

⁹⁸ *Ibid*, p. 307.

Ethiopia. On the other hand, the environment was not a serious development agenda in Ethiopia. Because, socioeconomic and developmental practices have not anticipated eliminated potential environmental problems in early scheme or planning.⁹⁹

Historically there were some attempts in the thirteenth century concerning the environment; the Fetha Negest had rules of the environment and associated to environmental subject matter.¹⁰⁰ Full-fledged environmental and natural resource control and conservation legislations have been introduced in 2002 both at federal and regional level. Hence, pollution control legislation is a result of aforementioned problems.¹⁰¹ Though, presently there are various enactments of the national and regional legislations in line with international laws, conventions and protocols of an environmental protection and conservation in the country for better effective environmental protection and management in order to ensure the environment friendly industries, sustainable growth and development.¹⁰² It is found to be crucial to harmonize environmental concerns into the country socioeconomic and developmental activities.

Some of the relevant legal documents and organizational structures of environmental protection and efforts concerning prevention of industrial pollution both at federal and regional level have been discussed. This would be in sense of their scope of limitation, implementation, attainability and responsiveness. Moreover, the role they have play to mitigate environmental pollution, level of the institutional capacity to achieve national and international environmental protection principles objectives. Hence, the following are the key and critical environmental protection and pollution control legislations that have been heralded by the Ethiopian Government in line with international decrees.

⁹⁹ Federal Democratic Republic Of Ethiopia, Environmental Impact Assessment Guideline Document May 200, Addis Ababa. See page 11.

¹⁰⁰ Mellese Damtie, Legal and Institutional Issues for the Environment in Ethiopia in 2008, Ethiopian Environment Review No1, 2010.P. 22.

¹⁰¹ *Ibid.*

¹⁰² *Ibid.*

2.5.2. National Legal Frameworks

1. Environmental Pollution Control Legislations

Ethiopia is one of the countries that have adopted environmental pollution control legislations and other related essential standards, protocols and conventions for conservation and protection of the environment and natural resources against any of the chemicals hazardous waste effluent substances and toxic solid waste substances. Basically, the proclamation emphasizes the control of pollution, management of hazardous waste, chemical and radioactive substances as well as, safeguarding human and animal health and maintaining of the biota and the aesthetic value of nature are pivotal duties and responsibility mentioned in the legislations.¹⁰³ It is appropriate mechanism that helps to eliminate or when not possible to alleviate pollution as an unwanted result or socioeconomic development activities in respect of international environmental right, environmental laws, principles and conventions.¹⁰⁴

Furthermore, it empowers former environmental protection agencies (now, Environment, Forest and Climate Change Authorities) to allocate environmental authorities with the power and responsibilities of the environment protection against industrial and other pollutions.¹⁰⁵ It's through enforcing environmental standard and associated supply which belongs to the environmental protection.¹⁰⁶ The main objectives environmental pollution control law are described in the following proper pattern in order to hazardous waste effluents, toxic chemicals or substances emanating from their manufacturing process;¹⁰⁷

- ❖ First, the control of pollution and empowerment of the regulatory institutions in order to take precautionary measures is a fundamental and decisive objective of this legislation decrees that Ethiopia bounded by it;
- ❖ For instance, no person shall pollute or cause any other person to pollute the environment by violating the relevant environmental standard.¹⁰⁸ The regulatory authority or delegated organ of the government are empowered in order to take appropriate administrative measure on manufacturing industries which are found in any field of activity which are

¹⁰³ *Ibid* (n-7) of Environmental Pollution Control Law.

¹⁰⁴ *Ibid*.

¹⁰⁵ *Ibid*. art.2.

¹⁰⁶ *Ibid*.

¹⁰⁷ *Ibid*, art.3.

¹⁰⁸ *Ibid*, art.3 (1) (3).

likely to cause pollution or any other environmentally in releasing hazardous substances and toxic waste substances commits crime or offence in violation of the law and release any pollutant to the environment.¹⁰⁹

In addition, the government regulatory authority has been empowered up to closure or relocation of any enterprises which are found participating in activities posing a risk to human health and to the environment; etc.¹¹⁰. Second, it is interrelated with the management of hazardous solid and effluents waste material, chemical as well as radioactive substances. It mainly focuses on the license given to anyone or enterprises from the environmental authority to generate, keep, store, transport and dispose hazardous wastes.¹¹¹ Moreover, the precautionary step take by any person, industry engaged in the collection, recycling, transportation and treatment or disposal of any hazardous waste shall take appropriate precaution to prevent any damage to the environment or to human health or wellbeing.¹¹²

2. Environmental Impact Assessment (EIA) Legislation

Among the heralded environmental protection instrument; environmental impact assessment is one of the key materials which have been adopted in line with the principles of the international agreement, protocols. It provides for procedure to ensure effective environmental assessment and management practice in Ethiopia for all parties involved in the process.¹¹³ It is the mechanism of identifying and evaluating in order to move forward every effect be it positive or negative which result from the implementation of proposed project or public instrument. From its establishment point of view the relevance of the environmental impact assessment is tremendous. But, there are four underlying issues that can magnify its indispensability. Hence, the purposes of the legislation are listed as follows.¹¹⁴

- To predict and manage the environmental effects which a proposed development activity as a result of its design sitting, construction, operation, or an ongoing one as a result of its modification or termination, entails and thus helps to bring about intended development;

¹⁰⁹ *Ibid*, art.3 (2).

¹¹⁰ *Ibid*, art.3 (5).

¹¹¹ *Ibid*, art.4 (1).

¹¹² *Ibid*, art.4 (2).

¹¹³ FDRE Proclamation No. 299/2002, Environmental Impact Assessment, Nagerit Gazeta, 9th year No. 11, see Preamble.

¹¹⁴ *Ibid*.

- It can provides an effective means of harmonizing and integrating environmental, economic, cultural and social considerations into a decision making process in a manner that promotes reliable and sustainable development;
- whereas, the implementation of the environmental right and objective enshrined in the constitution would be fostered by the prediction and management of likely adverse environmental impacts and maximization of their socioeconomic benefits;
- Environmental impact assessment serves to bring about administrative transparency and accountability, as well as to involve the public and, in particular, communities in the planning of and decision taking on developments which may affect them and its environment.

The project subject to environmental impact risk assessment has been identified and listed out under environmental impact assessment directive. Hence, tanning and leather manufacturing industries are one of the projects subject to environmental impact assessment in the directive.

3. Prevention of Industrial Pollution Legislation

Industrial pollution is a type of pollution which may be interlinked or originated from industry due to their use of chemical and mechanical process of operation and which are commonly known sources of pollution in the world and in Ethiopia as well.¹¹⁵ Industrial flow of the process is the main cause of pollution to water and; soil and has been identified as a major contributor to species extinction and global warming.¹¹⁶ Presently, new industrial technology offer the potential for slowing the dangerously rapid consumption of finite resources; it also entails high risk including new form of pollution in order to affect socioeconomic growth on the environment.¹¹⁷

Industrial pollution can impact socioeconomic development activities and harm the environment and natural resources directly or indirectly. Nowadays, environmental protection, human health, climate change, soil erosion, land degradation, water impurity and the value nature of biotic and aesthetic are becoming one of the paramount global concerns of all the industrialized, developing and third world countries. Hazardous solid waste substances and toxic effluent wastes emit from

¹¹⁵Adhvaitha. A *Osmania University, Hyderabad, India Journal of Pollution Effects &Control a short Note on Industrial Pollution See page.1 Short Communication.

¹¹⁶ *Ibid.*

¹¹⁷ *Ibid*, WCED (n-19) p.23.

the leather industry is commonly known problem everywhere in the world. Thus, most of countries in the world had endeavored to conserve the environment and protect against pollution through formulate and ratifying diverse legislations, protocols, conventions and declarations to prevent climate change and industries toxic waste substances and hazardous waste effluents that could challenge and impact the life of human and animal health, soil and water; etc.

As a result, the Ethiopian government has established environmental protection institution which is working at both federal and regions. The key responsibility vested on the Environment, Forest and Climate Change Authority is that to protect the environment and natural resource, effective and efficient management of the environment from the harmful damages.¹¹⁸ Moreover, to ensure environment compliance industrial activity with the limit value standard.¹¹⁹ The government concerned about the significance of the environment and its problems on human health, socioeconomic, development and natural resource; etc. The industrial pollution prevention decree and standard for the discharge of effluents into the water bodies, sewage system and the environment quality standards is to specify the ambient of the environment quality and give the allowable amounts of emission for stationary and mobile air pollution sources are some of the key objectives of this regulation. Standards can be applied for the soil or be disposed of on or in it,¹²⁰ environmental impact assessment guideline and guideline to environmental and social management plan as well as other international conventions ratified by the government in order to protect and monitor environmental harm that could make the endeavors of social, economic and development counter-productive.¹²¹

Further, it is to regulate pollution from leather manufacturing industries that release unwanted substances like hazardous solid waste effluent and toxic waste substances that result deleterious to human health, environment, soil and water, biotic and aesthetic.¹²² Accordingly, the prevention of industrial pollution directive listed out the industrial sector; it shall be apply to leather and leather product manufacturing industries.¹²³ Hence, the main purposes for which these industrial pollution prevention legislations enacted are that to implement and control

¹¹⁸ *Ibid* see, Environ. Pollution Control (n-7) art.2 and art.14.

¹¹⁹ *Ibid*, art.8 (a).

¹²⁰ *Ibid*, art.6 (a, b, c).

¹²¹ *Ibid*. preamble

¹²² *Ibid*, see, Industrial Pollution Regulation (n-84) art.4.

¹²³ Art.3.

manufacturing industries as per the general obligations and mandate given to the government regulatory institutions illustrated in the legislations.¹²⁴ To mention some; the followings are the most important general obligations;

- ✓ A factory subject to this Regulation shall prevent or, if that is not possible, shall minimize the generation of every pollutant to an amount not exceeding the limit set by the relevant environmental standard and disposal of it in an environmentally sound manner;
- ✓ Even factory shall have the obligation to handle equipment, inputs and products in a manner that prevents damage to the environment and to human and animal health;
- ✓ Every factory shall notify the competent environmental organ any potentially pollutant, input or product under its possession;
- ✓ If any factory loses a potentially pollutant, inputs or product it shall immediately notify the competent environmental organ;
- ✓ Even if a factory is not subject to the provisions of this regulation, the competent environmental organ may require it to take appropriate measures in order to take eliminate any risk that might emanate from its operation; and
- ✓ The competent environmental organ shall issue a written order to a factory that it believes will entail substantial damage by transgressing the limit set by the environmental standard to take measures to remove the risk.

4. Scope of Hazardous Waste Management and Disposal Control Law

Hazardous waste is among one of the main environmental problems in our country whereas, it is important to prevent and control problem of the environmental pollution caused by the mismanagement and disposal of the hazardous wastes.¹²⁵ It creating a system to control the generation, storage, treatment, recycling, transportation, disposal and movement of hazardous wastes is of paramount importance to prevent harm to human and animal health as well as the environmental due to the mismanagement of hazardous waste.¹²⁶ The law has main objectives which are to create a system for the environmentally sound management and disposal of

¹²⁴ *Ibid.*

¹²⁵ FDRE proclamation No. 1090/2018. Hazardous Waste Management and Disposal Control, Nagerit Gazeta year 24th No. 58.

¹²⁶ *Ibid.*

hazardous waste and prevent the damage to the human or animal health, the environment, biodiversity and property due to the mismanagement of hazardous waste.¹²⁷

5. The Ambient Environment Standards Guideline

The former FDRE Environmental Protection Authority (now, Environment, Forest Climate Change Commission) empowered to preserve and control the environment, ecosystems and biodiversity in general.¹²⁸ The guideline ambient environmental quality standard is also presented based on sufficient national, regional and international baseline information standards to the fulfillment of mandate to control industrial pollution, to manage flow of manufacturing industries in a sound manner and environment friendly and to ensure wellbeing of current and future generation of the country.¹²⁹ The ambient guideline for environmental standards for Ethiopia encompasses or falls on the following indispensable and key issues; which are,¹³⁰

- ✓ Guideline environmental quality standards
- ✓ Water quality standards (surface water)
- ✓ Soil and groundwater quality standards.
- ✓ Noise Standards.

The main purpose is to evaluate environment, soil and water related effects of contamination and to pose an appropriate remediation and protective measures if contamination is found significant risk on human and the environment.¹³¹ The guideline ambient environmental standards prioritize the parameters of the pollutants based on their long and short-term exposure effects on human and animals health; etc.¹³². Hence, the criteria for water, environment and soil quality have been established to be used in risk assessment in relation to their usage. It is stated that the level at which it is relevant to prevent all contacts. When we come to application in relation to soil use it has three categories;¹³³

- Very sensitive area like home with gardens, playgrounds and allotments this shows no considered risks from exposure to contamination.

¹²⁷ *Ibid.*

¹²⁸ Guideline Ambient Environment Standards For Ethiopia; Prepared under the Ecologically Sustainable Industrial Development (ESID) Project US/ETH/99/068/ETHIOPIA August 2003 Addis Ababa, By The Environmental Protection Authority and The United Nations Industrial Development Organization. See preamble p. 3.

¹²⁹ *Ibid.*

¹³⁰ *Ibid.* p. 6.

¹³¹ *Ibid.*

¹³² *Ibid.*

¹³³ *Ibid.* p. 99.

- Sensitive areas are like parks whereas
- Non sensitive industrial area.

5. International and Regional Convention of the Environmental Standard for Industrial Pollution Prevention Accepted by the Ethiopia

The FDRE Government has given due attention and adequately understood advantage of the leather manufacturing industry in order to boost the rate of socio economic development. Hence, Ethiopia is one of the countries that had accepted environmental standard for industrial pollution control which is adopted based on the country specific baseline data and information in the present circumstances of the country.¹³⁴

The main purpose of the standards is to prevent significant industrial pollution by indicating standards and pollution allowable limit beyond which the environment wouldn't tolerate.¹³⁵ It is presented in four parts.¹³⁶ First, it is about guidance on interpretation of this document on standards, second, standards for specified industrial sector, third, standards for all other industrial gaseous emissions and standards for noise limits. Accordingly, there are eight major sectors in which most of industrial activities fall.¹³⁷ Hence, tanning and the production of leather goods is one of the paramount sectors which played relevant part contribute socioeconomic development growth in the country. Therefore, allowable limit standard for tanning and leather manufacturing industries has been set out based on the following aspect of emission to the water and air;¹³⁸

¹³⁴ FDRE Environment, Forest and Climate Change Commission (2000) The Environmental Standards for Industrial Pollution Control in Ethiopia. p.2.

¹³⁵ *Ibid.*

¹³⁶ *Ibid.*

¹³⁷ *Ibid*, see, environ. Standard (n-128).

¹³⁸ *Ibid*, p.7.

Limit Values for Discharges to Water

Parameter	Limit Value
Temperature	40 °C
pH	6-9
BOD _{5at 20C}	90% removal or 200mg/l, whichever is less
COD	500 mg/l
Suspended solids	50 mg/l
Total ammonia (as N)	30 mg/l
Total nitrogen (as N)	80% removal or 60% mg/l, whichever is less
Total phosphorus (as P)	80% removal or 10 mg/l, whichever is less
Oils, fats, and grease	15 mg/l
Mineral oils at oil trap or interceptors	20% mg/l
Chromium (as total Cr)	2 mg/l
Chromium (as Cr VI)	0.1 mg/l
Chlorides (as Cl)	1000 mg/l
Sulphides (as S)	1 mg/l
Phenols	1 mg/l
Limit Values for Emission to Air	
Parameter	Limit Value
Total particulates	50 mg/Nm ³
Volatile organic carbons	75 g/m ² product produced
Total hydrogen sulphide, sulphides and mercaptans (as S)	5 ppm v/v
Ammonia	40 ppm v/v
Acid vapours (as HCl)	30 mg/Nm ³

Furthermore, part three of this standard has described standards for all other industrial effluents. The parameter and emission limit value of effluents released from all industries discharged into inland waters has been set out. Due to huge amount of discharged toxic wastewater material and hazardous substance used in the leather manufacturing industries shall share¹³⁹. Not only these but also, in addition to national environmental control legislations; the government is also a

¹³⁹ *Ibid*, p. 22

member to a numerous of regional and international conventions on the environment as per art, 9 (4) of FDRE constitution.

As a result, the principle for environmental sound management of the hazardous waste regional and international conventions on the control of the trans-boundary activities of hazardous wastes is one of the critical and substantial adopted instruments.¹⁴⁰ The scope of the convention is a global and encompasses the areas under national jurisdiction of the contacting parties namely land and marine or air spaces over which parties exercise regulatory and administrative responsibility in accordance with international law in regard to the protection of the human health or the environment.¹⁴¹ Moreover, the Bamako convention also on the ban of the import in to Africa and control trans-boundary movements and managements of hazardous wastes within Africa was adopted.¹⁴²

2.6. Oromiya Regional Administration Level Legislations

The Oromiya Region has adopted only two crucial legislations in line with the federal government concerning the environment. These are: environmental impact assessment and environmental pollution control laws. The main purpose of environmental pollution control of the region is that to protect and control the environment against any governmental and non-governmental activities not to pollute and affect the environment and socio economic activities of the society.¹⁴³ On the other hand, it is helpful to identify, predict and manage environmental impact and providing an effective means of harmonizing environment with eco-system, integrating environment with culture and social instrument into decision making for sustainable and reliable development.¹⁴⁴

¹⁴⁰ Proclamation No.192/2000 To Ratify the Basel Convention on the Control of the Trans-boundary Movements of Hazardous Wastes and their Disposal, Nagerita Gazeta 6th year, No.20. See page.3. See (preamble).

¹⁴¹ Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal on 22 March 1989.

¹⁴² Proclamation No. 355/2003 to provide the ratification of Bamako Convention, Nagerit Gazeta 9th year, No 76 (Preamble).

¹⁴³ Proclamation No. 177/2012, Oromiya regional state environmental pollution control See (preamble)

¹⁴⁴ proclamation No.176/2012, Oromiya regional state environmental impact Assessment, See(preamble)

2.7. Institutional Framework for Prevention of the Industrial Pollution and Environmental Protection.

1. Federal Level Institutions

The Government has established tremendous legal materials of rules and regulations to assist assure reliable and sustainable development of natural resources, to enhance productivity and environmental protection in all aspects. The environmental protection regulatory agencies are one of the government sectors established at the federal, nine regional states and two cities administration levels. The importance of this regulatory authority is described clearly in the establishment of the legislation.¹⁴⁵ Whereas, assigning responsibility to separate organization for environmental development and management activities on the one hand, and environmental protection, regulations and monitoring on the other is instrumental for the sustainable use of environmental resource, thereby avoiding possible conflicts of interests and duplication of efforts; whereas, it is become necessary to establish a system that foster coordinated but differentiated responsibilities among environmental protection agencies at federal and regional levels.¹⁴⁶ The federal environmental, forest and climate change commission has a separate many powers and responsibilities.¹⁴⁷

The scope of these powers and responsibilities virtually all are about the formulation and amendment of the policy, strategy, legislation and preparation of management guidelines, in order to protect and conserve the environment. This would be leading us to discuss the implementation of the environmental protection and control of rules and regulations. I tried to investigate and skim through all of the stated subject matters. But, due to the notion of environmental protection and control is extensive; the author of this work is trying to focus on the areas of subject matters pertaining to prevention of industrial pollution and organizational level and circumstances of environmental protection agencies at different levels in the country.

Hence, the policy and strategy issues stated in the legislation are the ones to ensure that environmental protection objectives enshrined in the constitution and basic international and

¹⁴⁵ FDRE Proclamation No. 295/2002, Definition Establishment of Environmental Protections Organs, Negarit Gazeta 9th year No, 7 Preamble and article 14.

¹⁴⁶ *Ibid.*

¹⁴⁷ FDRE Proclamation no. 1097/2018, Definition of Power and Duties of the Executive Organs of the Federal Democratic Republic of Ethiopia, Nagerit Gazeta 25th No. 8 article 32(3).

regional principles/convention set out in the environmental policy are realized,¹⁴⁸ to assure environmental standards implementation and their compliance with society in collaboration with the competent organs,¹⁴⁹ and also to propose disincentives measure to discourage practices that hamper the sustainable use of natural resources or the prevention of environmental degradation or pollution.¹⁵⁰ Furthermore, regulatory institutions are which currently on their duty with the regards to the leather and leather product industry are three; which are leather industry development institute, leather and textile industry development center and leather and leather product technology institute.

2. Regional Level Institutional Frameworks

On the other hand, when we come towards the regional states institutional framework; there are environmental protection regulatory authorities in all of the relevant regional state administration in the country. However, there are certain differences from the region to region; in terms of their names and scope of their powers and responsibilities, institutional and legal framework structures. Though, they are the same or common by their nature of establishment objectives and goal given to them in order to protect and conserve environment and natural resources as well as prevent internal industrial pollution on human health, animal, flora and fauna in general. As a result, almost all of the regional states have their own environmental protection and conservation authority powers and responsibility establishment legislations. Virtually all of the regional environmental protection regulatory authority's powers and responsibilities are adopted in with the federal legislations and they operate in line with the federal powers and responsibility.¹⁵¹

2.1. Oromiya Regional State Administration Institutional Framework Level

The Oromiya regional state is one of the regions that had adopted and organized its legal and institutional framework of environmental, forest protection and climate change authority at separate regional vicinities. Based on the power and responsibilities given to the Oromiya Environment, Forest and Climate Change Authorities has established it's institutions in the 22 zones, 20 mega cities and 336 woreda level of region to protect environment and control

¹⁴⁸ *Ibid*, art.6 (1).

¹⁴⁹ *Ibid*, art.6 (7).

¹⁵⁰ *Ibid*, art.6 (12).

¹⁵¹ *Ibid*, art.15.

pollution.¹⁵² Accordingly, the authority has established a directorate that focuses on the environmental law implementation monitoring which monitor and follow the industries based on allowable limit set standards. The legal and administrative measures on industries are also the other critical power given to authority to take appropriate steps on the manufacturing industries that violate the laws and found to be beyond the set standard allowable limit.¹⁵³

Furthermore, the authority has established the environmental laboratory center at Burayu city administration in order to discharge its responsibilities in sense of protect the environment and control pollution and to ensure that the quality and standards of wastes from the industries by sampling at spot when necessary.¹⁵⁴ Furthermore, the main purpose of this laboratory center is to provide technical support to the regional environmental protection regulatory authorities found in the regional and to other delegated government sectoral organs.

¹⁵² Proclamation No. 213/2011 Definition Re-establishment of the Duties and Powers of the Executive Organs of the Regional State of Oromiya See art.37.

¹⁵³ *Ibid*, Art.16.

¹⁵⁴ Interview with Ato Sintayewu Befikadu, Director of Environmental Protection Legislations Implementation at Oromiya Region Environment, Forest and Climate Change Authority, March 25, 2021.

CHAPTER THREE

SOURCES OF ENVIRONMENTAL POLLUTANTS AND STEPS INVOLVED IN TANNING AND LEATHER INDUSTRIES

3.1. Introduction

This chapter examines numerous issues regarding sources of environmental pollutants, steps of processing and types of environmental pollution caused by the leather industry. It thoroughly identifies the extent of impact and effect on sectors such as water, soil, and the environment due to toxic waste substances and hazardous waste effluents released from leather industry. On the other hand, to examine and analyzes the leather manufacturing processing flow of their operation in respect of law or not in Modjo city. Which means that to evaluate leather manufacturing processing based on the permissible limited standards or not. Particularly, in terms of liquid and solid waste substance released into the water, environment, soil, human and biodiversity, etc.

3.2. General Overview of Source of Environmental pollutants

The industrial activity which emit hazardous chemical substances and toxic substances such as, chrome, Sulphur dioxide, nitrogen oxides, carbon monoxide and various volatile organic compounds, fly ash and other suspended particles are the major much known pollution problem. Industrial pollution has today reached serious level in the cities of several industrial and newly industrialized countries in the world due to several causes. Most of the developing countries which in some cases are by now the worlds have most polluted urban areas due to several reasons.¹⁵⁵ Hence, the pollution has always a source or where it comes from and that is where the pollution is emitted into the environment, water and soil.¹⁵⁶ The pollution may come in various forms of gas, liquid and solid¹⁵⁷. Tremendous kinds of the consultancy researches and scenarios have been carried out; to mention sources of an environmental pollution from various perspectives and disciplines at the separate time so far. Mainly, an environmental pollution is categorized in a range of directions. It lies on two principal sources; which are point sources

¹⁵⁵ *Ibid*, See, WCED (n-19).

¹⁵⁶ Www. Open Learn Works, The Open University, 22 March 2016. See page 4 of the study session 7 pollution: Types, Sources and Characteristics. Accessed 4/28/2021, 6:13 local time.

¹⁵⁷ *Ibid*.

which are identifiable points or place which are directly associated with the waste effluent substances released from diverse industrial activities and whereas, non-point sources is known as a diffuse pollution for instance, floodwater.¹⁵⁸ However, there are activities of the socioeconomic development which are towards pollution that are commonly falls under the aforementioned listed out categories of the pollution in the world. To describe some:-

- ✓ Pollution by industrial activities, such as construction, textile and tanning and leather processing etc.
- ✓ Noise pollution and
- ✓ Pollution by Transportation
- ✓ Domestic Pollution
- ✓ Agriculture pollution like fertilizer

A number of industrial processes may produce high polluting liquid and solid wastes. But also, among the most polluting sources of industries; the researcher shall embark (focus) on the leather manufacturing processing industry is becoming the pivotal source of environmental pollution by producing and generating a variety of highly hazardous solid waste substances and toxic liquid waste substances that are directly or indirectly discharged into the environment, water, soil, and impact human and animal health.¹⁵⁹ As a result, environment, water and soil are under increasing pressure and at alarming stage from the toxic waste effluents and hazardous chemical waste (sludge) substances generated or extracted from the leather manufacturing industries. Because of this leather industry is predictable as a one of the main pollutants. It is rapidly rising from time to time in the Modjo city administration.¹⁶⁰ Because of this the rates of injuries on human health and on the environment have increased bringing respiratory complaint and some of which are potentially fatal. Substantially, nowadays this case reaches to the level of worrisome and exacerbating from day to day.¹⁶¹

¹⁵⁸ *Ibid.*

¹⁵⁹ *Ibid*, p. 8.

¹⁶⁰ United Nation Industrial Development Organization, US/RAS/92/120, Regional Programme for Pollution Control in the Tanning Industry in South-East Asia, 9 August 2000. See page.3.

¹⁶¹ *Ibid*, see, WCED (n-19).

3.3. Sectors affected by the Leather processing and Steps of leather processing

There are various processes step involved in the leather making process. However, the following three types are much known and indispensable in the country.¹⁶²

- Soaking. In the first step involvement soaking takes first place in tanning, in order to treat raw skins and salted skins with huge amount of water to make the dry skin free and soft. Mainly, it helps to remove unwanted materials such as, blood, soil dung and salt and rehydrate the dry skin.
- Liming is the second steps which involve the removal of unwanted material such as hair that are not transferred to the leather.
- Deliming, bating, degreasing, tanning and fixing

Nowadays, the leather industrial activities change the natural flow of substance and environmental patterns. It introduces strange and unfamiliar environmentally unfriendly toxic substances and hazardous chemical substances into the environment, water, soil, flora and fauna and on human health. Because of environmental pollution of leather manufacturing processing are at increasing stage in the Modjo; it result several unseen and seen sector that would cause by composition of contaminated solid waste substances and liquid waste substance emanated from the leather industry. But, mainly the water, soil, environment and human health are a main sector that has been directly or indirectly adversely impact. Though, the researcher have discussed pollution load of water and soil its regulation in the following proper manner in sense of laws.

3.3.1. Water Pollution

Water is an essential thing for the survival of all human beings and living things. One of the main challenges of water quality is industrial expansion and unwanted hazardous material and effluents. Water quality degradation due to pollution by leather industries waste substances has become considered as a key challenge. The Modjo city leather manufacturing industry consumes huge amount of water to produce finished and semi-finished leather good. They discharge unrecyclable inorganic materials or wastewater substances into soil, water and the environment that diminish water and soil quality become large scale environmental concern due to high

¹⁶² *Ibid*, see, Karanam Sai Bhavya, et al (n-71) p.4.

toxicity level of substances emanated from the leather industry.¹⁶³ Furthermore, among mineral numerous tanning processing materials four of tannings processes, the chrome tanning method is the one which extensively used in the leather industry in the Modjo tanneries factory because of its unique characters that gives to the leather product is highlighted for discussion as follows.¹⁶⁴ Which are, mineral tanning, tawing, chrome tanning and vegetable tanning. However, my focus is on the chrome tanning methods which is much known and commonly used tanning process in the Modjo city leather processing industry.

3.3.2. Soil Pollution

Soil is a very basic and essential for most of plant and animals life as a growth substrate for their continual growth as well as for human being to produce vegetable and other important plant.¹⁶⁵ In many ways the productivity and quality of the soil is deteriorating from time to time. The substance of life in the soil is also harmfully affected by the presence of deleterious substances or contaminants of the toxic and hazardous form of contaminants which results waste sewages emanated from leather industries. As a result, leather industries located at the Modjo city are the principal sources of heavy metal contamination into soil.¹⁶⁶ This contaminated soil release severe impact on plants and imposed high risks to human health.

¹⁶³ Geremew Liknaw Tadessie and Tekalign Kasa Guya (2017) Impacts of Tannery Effluents on Environments and Human Health: A Review Article. www.iiste.org, Advance in Life Science and Technology ISSN2224-7181(paper) ISSN2225-062X (Online) Vol.54. See page.5

¹⁶⁴ *Ibid.*

¹⁶⁵ *Ibid.*

¹⁶⁶ Interview with industrial engineer at leather industry at Modjo, my interviewee is not willing to cite his name due to security)

CHAPTER FOUR

ANALYZES OF THE DISCUSSION AND FINDING

4.1. Introduction

This chapter provides the fact of the legislation and institutional framework of an environmental protection that works against environmental pollution by industrial activities and related matters; which have been core issue through conducting this study. By doing so, this chapter analyses the leather manufacturing industry processing in respect of environmental protection legislation and standards of the national and international law.

4.2 General Overview of the Discussion

Leather industries can be considered as one of the pivotal and indispensable sector boost the development rate of the foreign hard currency, create job opportunities and socioeconomic development activities in the country. Though, the leather industry by their nature are prone to adverse impact and severe pollution intensive as a result of the bad stink, toxic chemical and deleterious substances. During the leather processing it involves various operations to convert by-product raw hides and skin into chemical and mechanical reactions that expelled out in processing. Moreover, it has severe adverse impacts on an environmental as a result of they generate hazardous effluents substances. Because, each of leather processing activities have huge potential to pollute the environment, human and animal health as a result of deleterious sewage emit from leather industries.

These are major factors which made them different from other environmental pollutants as a result of generate inorganic chemicals and synthetic chemicals such as chloride, tannins, chromium, sulphate and sulphides deleterious substances contamination of water, soil and environment, human health as well. Hence, the discussion would be based on finding through interviews author made with concerned government, non-government organs and community members in terms of social acceptance of the leather processing industries, implementation of laws and institutional capacity to take proper steps. Ultimately, environmental protection law achieves their objective of ensuring sustainable development and environmental friendliness of the industrial activities? As a result, the author has discusses the following proper issues.

4.3. Wastewater (Sludge) and Water Treatment Process

Water is one of the indispensable and a key material which used for by-product meat, skin and hide leather processing. In an interview held with an industrial engineer in the Modjo city conducted during the fieldwork author was informed that each of leather processing industries use about 100m³ of water per day and emits 80m³. As a result, huge amount of the wastewater released as a waste from leather industries.¹⁶⁷ This is contrary to the purpose of water resource management legislation to ensure that the water resources of Ethiopia are protected and utilized for the social economic benefits.¹⁶⁸ Wastewater is one of the environmental influences related with the solid waste difficulties.

An analysis of interview conducted during field work with one of the main cabinet members in the Oromiya Region mentioned that the Oromiya Environmental Protection Authority (OEPA); yearly evaluations and environmental audit reports show that the water quality is highly exposed to pollution and degradation because of the leather industries discharge their unwanted hazardous effluents directly to the Modjo river water course.¹⁶⁹ Due to this reason the community is forced to resort to the consumption (use) of ground water.¹⁷⁰ Further, the wastewater drainage lines that allow flow of the raw leather wastewater effluents which are not properly functional in most of leather processing industries.¹⁷¹

Especially, Farid, Kolba, George Shoe and Blue Nile tannery factory are some of the major tanning industry which is known by releasing high amount of the deleterious chemical substances and toxic substances into water and environment.¹⁷² Because of this the pipe blockage is unsorted deleterious solid waste substance that could directly adverse impacted and polluted the Modjo water resource.¹⁷³ According to him, the wastewater effluent released from leather industry evaluation was undertaken based on collected sample effluent treatment plant on the existing conditions of the leather industries as per the criteria set by Ethiopian Environmental

¹⁶⁷ Interview with Ato Belay Gemechu, industrial engineer at Environment, Forest and Climate Change Authority, Modjo, March 25, 2021.

¹⁶⁸ FDRE Proclamation No.197/2000, 'Water Resource Management' Negarit Gazeta 6th year, No. 25 See preamble

¹⁶⁹ Interview with Oromiya Environment, Forest and Climate Change Authority (Higher Officials Adviser) name undefined due to personal, March, 25 2021.

¹⁷⁰ *Ibid.*

¹⁷¹ *Ibid.*

¹⁷² *Ibid.*

¹⁷³ *Ibid.*

Standard (ISO) 2008 on wastewater for the leather industries.¹⁷⁴ On spot pollutant parameter released to environment, water and soil is not standardized devices and against gaseous ambient environmental limit standard.¹⁷⁵

The wastewater process to purify wastewater and to reduce organic materials, solid, nutrients and other pollutant treatment plant is not installed.¹⁷⁶ The effluent released from the beam house liming, bating, and water from fleshing and excruciating machines contains high chrome.¹⁷⁷ The leather industries did not segregate the chrome liquor and collects in a tank and solid waste and it has no chrome recovery.¹⁷⁸ The other major problem raised by community living in the project vicinity is about bad smell by leather industry, which is affected air quality and socio economic activities due to lack of regulating sources of the noxious stink.¹⁷⁹ Accordingly, when we see the effluent level as per the emission limit standard set to air and water course; the total dissolved solid contents/TDS of the sewerage water is very high which is, 300mg/L- contrary to the standard 50mg/l due to lack of salt discharged into the soak liquor increases the TDT solid contents.¹⁸⁰ Some of the leather industries compatibility with the environment is not as per the industrial pollution prevention standards. In this regard, the leather manufacturing industries take first stage in polluting the environment at Modjo city.

4.4. Adverse Effects of Pollution on Human Health and Health Cases Record

As mentioned, in an interview with separate physicians from private and public hospitals in the city during fieldwork just to know and ensure that if there is health cases record because of deleterious chemical substances and toxic effluent substances emitted from the leather industry. Accordingly, Dr. Elias Bekele is one of the well-known physicians and Medical Doctor at Sema Sembet hospital noted that there are numerous cases regarding hexavalent chromium for prolonged time and most of the cases are the same. Mainly, they faced several cases which associated with cancers, respiratory tract, permanent eye irritation and damage. Due to this reason there are 5(five) cases at hand. According to him, skin problems such as, allergies,

¹⁷⁴ *Ibid.*

¹⁷⁵ *Ibid.*

¹⁷⁶ *Ibid.*

¹⁷⁷ *Ibid.*

¹⁷⁸ *Ibid.*

¹⁷⁹ *Ibid.*

¹⁸⁰ *Ibid.*

dryness and skin rash, growth problem, reproductive disorder; discoloration and teeth erosion are very common and known cases in the hospital.

Further, Dr. Dawit Mekonen noted that he recalls that only two cases which are directly related with chemical burn.¹⁸¹ He assumes that it is directly due to lack of proper hazardous chemical substances storage and most of crews have no adequate personal safety protection equipment for prevention of exposure to chemical substances. He added that, there was one death record due to the chemical burn. Moreover, due to lack of the solid waste disposal landfill obnoxious stink is another big problem especially adverse impact on healthy lives of the vulnerable societies living in the study vicinity. The leather industries did not remove and collect timely their solid wastes substances which is in contradiction of the objective of the solid waste management legislation that to enhance at all levels capacities to prevent the possible adverse impacts while creating economically and socially beneficial assets out of solid waste.¹⁸²

According to; Dr. Beyene Derero, most of the time the problem we have faced and registered health case that he remember is related with the leather industry are mainly a problem due to lack of equipment safety protection for prevention of chemical substances like appropriate gloves, ear plugs, socking-no shoes¹⁸³. He further stated that the other problem is associated with lack of first aid health clinic center in the leather industries in case of severe damage. The problem is directly in contradiction to the principle of occupational safety and health described in the legislation that company shall provide workers with protective equipment, clothing and other materials and instrument them of their use.¹⁸⁴ Meaning every tanning industry shall take proper measure to ensure that their crews are appropriately notified about the hazardous of occupation and necessary safety measure to avoid accident and damage to human health.¹⁸⁵ Furthermore, shall establish an occupational safety and health committee determined by the Minister.¹⁸⁶ Therefore, the researcher observed that the tanning industries did not give due attention for their crews occupational safety and working environment that needs serious attention.

¹⁸¹ Interview with Dr. Dawit Mekonen, Surgeon Doctor at Sema Sembet Hospital Modjo March, 27 2021.

¹⁸² FDRE Proclamation No. 513/2007, Solid Waste Management, Nagerit Gazeta, 13th year ,No. 13, art.3.

¹⁸³ Interview with Dr. Beyene Deraro, Medical Doctor, Director at Modjo city Health Post March, 29 2012.

¹⁸⁴ FDRE Proclamation No. 1156/2019, Labour proclamation, Negarit Gazeta 25th year, No.89.see art. 92.

¹⁸⁵ *Ibid*, Art, 1, 2, 3, 6, 7 and 8.

¹⁸⁶ *Ibid*.

4.5. Environmental Friendliness of Leather Processing Industry

As stated in the 1997 of environmental policy; the key objective of this Policy of the 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 natural, human-made and cultural 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 needs¹⁸⁷. Hence, wastewater emanated from leather industry is a major waste generated beyond permissible limit standard which is adversely impacting health life and socio economic activities. The segregation and disposal method of the wastewater presently being followed of the industry is very poor and the wastewater is directly discharge into the Modjo water courses without doing wastewater laboratory test.

Further, the absence of chrome recovery made environmental impact and pollution on environment. As aforementioned results and findings in respect of leather processing; due to huge amount of deleterious wastewater and toxic substance released from leather industries results adverse impact on environment, soil, water, and human health against national and international law and limit standards. Over all, due to this fact it is not possible to say there is no environmentally friendliness of leather industries in the city at all.

4.6. Scope of Legal Implementation and Taken Measures

Indeed, there are numerous reasons that can aggravate pollution in the town in relation to leather processing industries. As mentioned above more or less the effort done by the government to take proper correctional measures on certain leather processing industries due to hazardous chemical sewage and toxic effluent release by the industries.

In an interview with one of the senior experts and Environmental Disaster Risk Management Team Leader at Modjo city Environment, Forest and Climate Change Office during field work (Yohanes Dinku) he said that the office mission are mainly to ensure that sustainable development and environmental protection and control tasks against pollution of leather

¹⁸⁷ *Ibid*, environ. Policy (n-6) section.1.

industries not to affect socio economic and development activities of the society through enforcing the law in this regard.¹⁸⁸

According to him, currently there are 12 leather industries in operation. The leather industries didn't use the advanced technology tanning method. Because of its highly expensive material, they frequently use quite old tanning process which is the chrome tanning method, because it is low cost, high speed, considered produce effective and efficient leather product and helps them to get high durability, wet and resistance shrinking leather product or goods. This, in turn the chrome tanning results contaminated wastes (sludge).

Yohanis added that the owners of the leather industries don't want to prone to spend much more many for chrome recovery plant and to use advanced tanning technology. He further noted that due to the leather industry use chrome tanning method which is very traditional it is known that in the process of chemical and mechanical reaction to convert by-product raw hides and skins into the finished leather goods which are consume toxic chemical substances. Bad smell is also other problem of leather industry which aggravating pollution problem on human health especially vulnerable society because of deleterious substances, untanned hide/skin wastes released during the putrefaction.¹⁸⁹ In turn, extract huge amount of untreated salty wastewater into the environment, soil and water. Injuries to animals have also reached at a worrisome stage.¹⁹⁰ Due to water pollution by contaminated chromium salt consume huge amount of water while resulted skin color change and finally they die.¹⁹¹ Yohanis said that the main reason for this is that the industries import and use outdated technology.

Additionally, they do not care for personal adequate safety equipment for prevention of exposure to chemical agents and no proper awareness creation for their crews as well as lack of proper hazardous waste disposal mechanism is poor. The wastewater released from leather industry affected the plant and other vegetables production growth by producing phytotoxic effects and high accumulation of heavy metals. For instance, about 65% wheat production is lost. Due to

¹⁸⁸ Interview with Ato Yohanis Dinku, Environmental Disaster Risk Management Team Leader at Modjo city administration Environment, Forest and Climate Change Authority, March, 27, 2021.

¹⁸⁹ *Ibid.*

¹⁹⁰ *Ibid.*

¹⁹¹ *Ibid.*

water pollution the government plans to produce wheat to ensure domestic consumption through water laden irrigation from the leather industry edge water course.¹⁹²

According to Yohanis, the government plan to produce wheat was unsuccessful at Modjo city this year because of the water is totally polluted and unsafe to drink.¹⁹³ According to Yohanis, the Modjo city administration leather industries have big problems with regard to wastewater treatment plant due to lack of tertiary level treatment plant. Regarding wastewater treatment some have primary level treatment and some of the other has secondary treatment plant. But, most importantly they don't have the tertiary level treatment plant.¹⁹⁴ This is only exist in the Modjo Tannery S.C has employed tertiary level and installed treatment plant to reduce residual COD load and constituents of previous treatment stage with very minimum requirement.¹⁹⁵ In an interview with crews in one of leather industries conducted during fieldwork described that in a time when the government officials visit the industry for monitoring and evaluation; they all call each other to be ready.¹⁹⁶ They observed that this kind of practice has been many time and forced them to predict there is bad practice of corruption among some of government officials and industry's owners'.¹⁹⁷

In a legal analysis conducted during field work in Modjo city, the author informed that the institution have tried to take proper diverse measures at various time and based on legislation that are written warning until closure the industry that release hazardous substances.¹⁹⁸ The major steps will be taken by the authority when the leather industries found to be discharge directly or indirectly hazardous materials in solid and liquid forms that are believed to be deleterious to human safety and environment beyond the limit standard.

Furthermore, if they found to be breach permissible laws of wastes emission to air and water and industries pollute the environment violating the set standards.¹⁹⁹ The authority has been took

¹⁹² *Ibid.*

¹⁹³ *Ibid*

¹⁹⁴ *Ibid.*

¹⁹⁵ *Ibid.*

¹⁹⁶ Interview with Leather Industries crews at Kolba Tannery Factory, no name due to security purpose, March 25, 20212.

¹⁹⁷ *Ibid.*

¹⁹⁸ Interview with Ato Kasahun Dagno, Legal experts at Environment, Forest and Climate Change of the Modjo city administration, March, 27, 2021

¹⁹⁹ *Ibid.*

necessary steps by using different methods.²⁰⁰ But, most of the time it doesn't favor to go to court rather than warning on industries that haven't starts timely and not willing to take correctional tasks given by the relevant inspectors of the environment.²⁰¹ Kasehun said that the warning is based on the extent of the offence commits by the industries at the different times. According to him, the Environment, Forest and Climate Change Authority don't favor to go to the court.²⁰² Because, warning by it would be enough. It can be reaching until closure the industries as per authority given to the Environment, Forest and Climate Change Authority.²⁰³ Though, there are times when the industries themselves sue the environment, forest and climate change authority if they are dissatisfied with the given warning.²⁰⁴ As a result, the environment, forest and climate change authority had been sued by the Kolba tanning factory in 2011E.C.²⁰⁵

After the long debate on the issues the court has decided for the inspector office.²⁰⁶ Hence, based on took step by the environmental protection authority presently the Kolba leather manufacturing industry is one of the ISO, 14000, 2008 certified companies in the Modjo city operating as per the set limit standards.²⁰⁷ The rest have no any ISO certificate.²⁰⁸ Relatively it is believed that leather industries are discharging pollutants and fails to manage their hazardous waste materials and toxic substances that are against the legislation.²⁰⁹ The socioeconomic activities of the industries are impacted the society wellbeing adversely.²¹⁰ Further, they did not implement their responsibility to keep environment and human health.

According to Ato Kasehun the authority office has taken massive measure on those industry that have violated in release hazardous chemical material and wastewater substances directly into the water course by transgressing the limit value emission to air and water that has been set.²¹¹ The taken measures have different characteristics depending up on the extent of offence commits by

²⁰⁰ *Ibid.*

²⁰¹ *Ibid.*

²⁰² *Ibid.*

²⁰³ *Ibid.*

²⁰⁴ *Ibid.*

²⁰⁵ *Ibid.*

²⁰⁶ Court case: Ref, No. 54689. Plaintiff; Kolba Tannery factory Vs Defendant, Environment, Forest and Climate Change Authority of Modjo City Administration. Date of Decision given, June, 2011E.C.

²⁰⁷ *Ibid* (n-196) Kasehun.

²⁰⁸ *Ibid.*

²⁰⁹ *Ibid.*

²¹⁰ *Ibid.*

²¹¹ *Ibid.*

the industries. Basically, some of the industries left by giving written order (warning) alone and for some others it took until closure. Hence, there are about five tanning industries have been warned until closure and the rest are back on the processing after them correctional measures. Overall, some of the most important measure took by Oromiya Environment, Forest and Climate Change Authority and Modjo city administration (EFCCO) are listed out in the following proper manner.

No	Name of the Leather industries	Types of taken measures or warning			Reason	The measure taken by		Current Level Tanneries factory
		Oral warning	Written warning	Taken Measure		Court	Admini stration	
1	Zinzang leather factory			closed	Damage on crews due to lack of proper chemical storage		✓	Totally closed
2	Friendship leather factory			closed	Import secondhand material and caused damage on human health		✓	Totally closed
3	East Africa Tannery Factory			Closed	Due to lack of wastewater treatment plant	It was suspended due to the court lack of awareness and concern on environmental protection	✓	Totally closed
4	Hora Tannery factory			Closed	Due to lack of wastewater treatment plant and chemical storage		✓	Totally closed
5	Kolba Tannery Factory			Opened after take correction measure	Not willing to take correction measure of hazardous wastewater treatment plant and damage on human health	Court		Now opened with taken correctional measure and produce only wet leather productions
6	HFDE Tannery Factory			Totally closed	The reason is unknown.		✓	Totally closed
7	Blue Nile Tannery Factory			Totally closed	Due to lack of proper chemical storage		✓	Totally closed

According to Sintayewu Befikadu there are three major problems with all leather industries.²¹²

Frist, environmental impact assessment done by the leather industries have no scientific base line data assessment, except the theoretical narration. Which means that there are no parameter that

²¹² *Ibid*, Sintayew (n-170)

includes physical environment, biological environment and socio economic environment before the establishment of industries is not exist. Second, they use very outdated technology. Third, most of leather industries didn't have proper wastewater treatment plant and chrome recovery, including inorganic hazardous solid waste disposal landfill which is contrary to the principles of waste management standards specifying the level allowed and method to be used in the generation, handling, storage, treatment and disposal of the various types of waste, as per the law of environmental pollution control (art.6).

Sintayewu added that the other problem is related with government sector relationships. The collaboration among the government sectors is also other quite weak and serious problem observed that hindered in enforcing and implementing the law.²¹³ Lack of sufficient environmental laboratory center and skilled man power on the area of environment and pertaining disciplines are some of the observed pivotal problems.²¹⁴ There is no support and subsidize for leather processing by providing proper facilities as per stated in the laws.²¹⁵ The other quite critical issue raised by the interviewee is that virtually the entire leather industries high amount of money received loan from the Development Bank of Ethiopia.²¹⁶

The Environment, Forest and Climate Change Authority has fear that to enforce them that they may escape from the country like Turkish investors who had been fled without pay the loan.²¹⁷ Not only has this but also even they don't have maintenance spare part center in case machines disability.²¹⁸ Meanwhile, but due to Covid-19 plague some of the leather industries have stopped the processing and minimized their workers. Because of this reason the production rate of leather goods is now low.²¹⁹ As a result, the hazardous materials and toxic substances released from the leather industries are reduced.²²⁰ Similarly, environmental pollution level is also abridged (Sintayew concluded).

²¹³ *Ibid.*

²¹⁴ *Ibid.*

²¹⁵ *Ibid.*

²¹⁶ *Ibid.*

²¹⁷ *Ibid.*

²¹⁸ *Ibid.*

²¹⁹ *Ibid.*

²²⁰ *Ibid.*

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Conclusion

Leather industries in Modjo city use high amount of in commensurate water resource and use highly outdated technology like chrome tanning method to convert by-product (animals) skin and hide into chemical and physical reaction.

In this regard, the study identifies the hazardous waste substances and toxic chemicals released from leather industries that has been changed the pattern or characterization of the ecosystem, environment and impact water course and soil quality. The unwanted and unrecyclable materials like the hazardous chemicals and toxic effluent substances released from the leather industries are discharged directly into the water resources and environment without appropriate treatment. As a result, water resource is contaminated and this change had results adverse impact on animal and the society welfare. Some of the known diseases due to polluted wastewater released from the leather industries are cancer, kidney, breathing problem, stomach pain have been the registered as the health cases in Modjo city. Furthermore, the soil is also has exposed to degradation. It has leading society to serious the problem of reduction of soil production and growth plant.

In case of the legal implementation there are huge lacunas through enforcing an overarching environmental policy and legislations that are establishes a goal for the sustainable management and protection of the environment are not adequately implemented. It is observed that leather industries are processing in contradiction with the environmental protection laws and beyond permissible limit standards and they aren't friendliness and complied with the environment. Because of this reason some of the leather industries have closed, and some others are warned till closure. In case of institutional framework there are some of the undeniable necessary efforts and measures took by the Environment, Forest and Climate Change Authority of the Oromiya Region on the leather industries that have directly discharged chemical substances into water resource beyond the threshold standard and violate the law.

The major step taken by the Environment, Forest and Climate Change Authority covers warning until closure leather industry through creating some awareness on an environmental protection and control rules and regulations, monitoring and evaluations for concerned organs industries. By doing so, more or less there was some achievement and work have been registered in protecting and controlling the environment through implementing environmental laws against pollution. Though, it is observed that there are huge weaknesses in enforcing environmental laws still now.

In case of hazardous waste management and disposal control is still one of the big problems and weakness in enforcing hazardous waste management and disposal control legislation in Modjo city. The industries dump their wastes everywhere due to lack of proper landfill and beyond the limit allowed for tanning and leather waste reduction measure. Further, monitor and evaluation implementation of convenient waste management process by the regional Environment, Forest and Climate Change Authority is quite weak. As a result, it poses an adverse impact on the environment due to the likely of the waste to pollute soil and water. Industries are contrary to the principle of the waste management specified standards the level allowed the methods to be used in the generation, handling, storage, treatment and disposal. This result reduction soil productivity and water quality. Therefore, the environment is not protected in a meaningful ways.

In case of the emission value limit discharge to water and air; industries are processing beyond the principle and standard. It is observed that some of the industries didn't use the best available techniques that prevent the generation and discharge of industrial sewages into the environment. It shows that the principle and standard issued for industrial pollution prevention and control environment in Ethiopia is not thoroughly implemented. Overall, the industries didn't use of low waste and less hazardous substance technology that can be recyclable or reusable. The industries emission limit values for discharges to the water are not similar with issued standard.

5.2. Recommendation

The following recommendations are made for mitigation of environmental pollution by the leather industries.

- 1) In the country, Ethiopia industrial activities are take place without proper planning that has so own adverse impact on the project achievement to attain growth need. Hence, the Environment, Forest and Climate Change Commission should work on planning issue. Mainly, the leather industrial expansion, controlling mechanism of liquid waste substance and solid waste substances disposal plan. On the other hand, establish highly toxic and hazardous chemical, chrome and chemical compound recovery plants. Unless otherwise, the contamination of water and soil caused by hazardous wastes release from leather industries will double the rate of damage on human health, environment, animal and biodiversity.
- 2) The other critical and decisive thing is that most of the leather industries use outmoded technology of tanning to produce leather goods. Due to chemical storage and control is very poor results harmful damage on industry crews and socioeconomic activities. Hence, it is directly due to lack of the government strong commitment and attention in order to enforce the legislation as per permissible set limit standard. As a result, the Environment, Forest and Climate Change Authority of Oromiya Regional State shall be pay cautious attention on the area of environmental protect and control law enforcement in order to mitigate pollution and protect the environment.
- 3) The environmental protection issue is not burden of one sector alone. In this regard, there are huge gap among the government sector in order to protect the environment and mitigate pollution and no collaboration at all. Further, there is also lack of awareness within the society. There should be awareness creation for a group of society living in the industry vicinity and to government sectors by Environment, Forest and Climate Change Authority/Commission in order to mitigate pollution and protect sustainable management of the environment is highly wanted.

- 4) The industries have huge problem in relation to manage their hazardous waste substance. Though, this waste management issue is a responsibility of relevant environmental organ in order to ensure safe environment. The environmental protection authority shall be preparing hazardous waste disposal landfill in collaboration with concerned organs.
- 5) The crews in the leather industries are suffering from chemical burn due to lack of occupational safety and health equipment and hazardous chemical prevention training. There should be proper chemical storage and training given for crews working with chemical by industries themselves and the Environment, Forest and Climate Change Authority of Oromiya Region should monitor and work on crews' occupation safety and equipment issue.

Bibliography

1. Federal and Regional Laws

Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal (1989), Addis Ababa.

Basel Convention on the Control of the Trans-boundary, Proclamation No.192/2000

Environmental Standards for Industrial Pollution Control in Ethiopia (2000) by Former FDRE Environmental Protection Authority (Environment, Forest and Climate Change Commission).

FDRE (2002) Environmental Pollution Control No, 300/, Nagerit Gazeta 9th year No.12

FDRE (2002) Environmental Impact Assessment proclamation, No.299, Nagerit Gazeta, 9th year No.11, Addis Ababa.

FDRE, Constitution (1995) Nagerit Gazeta 1st year, No.1.

FDRE (2018).Hazardous Waste Management and Disposal Control Proclamation No. 1090, Nagerit Gazeta, year 24th No. 58.

FRDE (2000) Movements of Hazardous Wastes and their Disposal Proclamation No.192, Nagerit Gazeta 6th year, No. 20.

FDRE (2003) Ratification of Bamako Convention Proclamation No. 355, Nagerit Gazeta 9th year, No.76, Addis Ababa.

FDRE (2002) Definition Establishment of Environmental Protections Organs Proclamation No. 295, Nagerit Gazeta 9th year, No.7 Addis Ababa.

FDRE (2000) Water Resource Management Proclamation No.197, Nagerit Gazeta 6th year, No.25, Addis Ababa.

FDRE (2008) Regulation to provide for the prevention of industrial pollution, No, 159, Nagerit Gazeta 15th year, No. 14.

Guideline Ambient Environment Standards for Ethiopia, Prepared under the Ecologically Sustainable Industrial Development (ESID) Project US/ETH/99/068/ETHIOPIA August 2003 Addis Ababa, By the Environmental Protection Authority and the United Nations Industrial Development Organization.

Oromia Region State (2012) Environmental Pollution Control Proclamation No. 177.

Oromia Region State, (2012).Environmental Impact Assessment Proclamation No.176.

Oromia Regional State, (2011) Definition Re-establishment of the Duties and Powers of the Executive Organs Proclamation No. 213.

2. Articles and Journals

Altenburg Tilmann (2010) Industrial Policy in Ethiopia, discussion paper.

Alemu ZG, et al, (2003). Contribution of Agriculture in the Ethiopian Economy: A Time-Varying Parameter Approach. Vol. 42, No. 1.

Abraha Gebrekidan, et al, (2009). Chemistry Department, Mekele University, Article in Bulletin of the chemistry society of Ethiopia.

A, Adhvaitha. Osmania University, Hyderabad, India. Journal of Pollution Effects &Control a short Note on Industrial Pollution.

Blocker C, et al, (1971) survey quality of refinery in Western European.

IR.Mahyuddin Bin Ramli En.Mohd. Fadzil Bin Mohd. Idris Environmental Pollution-Effects on National Development School of Housing Building and Planning Universiti Sains Malaysia, 11800 PENANG.

Geremew L., et al, (2017). Impacts of Tannery Effluents on Environments and Human Health: A Review Article.

Grumiller Jan, et al (2019).The Ethiopian Leather and Leather products Sector: An Assessment of Export Potentials to Europe and Austria.

Koppiahraj, K, et al (2019).Leather Waste Management Scenario in Developed and Developing Nations.

Mellese Damtie (2010). Legal and Institutional Issues for the Environment in Ethiopia Environment Review No1.

Ozgunay H., et al (2007).Characterization of leather industry wastes. Polish J. of Environ.Stud.Vol.16, No.6 867-873.

Roy M. Harrison (1990). Pollution Causes, Effects & Control, the Royal Society of Chemistry,

Stanislaw Famielec MSc. Eng, et al (2011).Faculty of Chemical Engineering and Technology, Crow University of Technology. Waste from Leather Industry. Waste from Leather Industry, Threats to the Environment.

Siva ram N.M, et al (2019). In energy from Toxic Organic Waste for Heat and Power Generation

Sai Bhavya, Karanam, et al (2019). Leather Processing, its effects on environment and alternatives of chrome Tanning, International Journal of Advanced Research in Engineering and Technology (IJARET), Volume. 10 issued 6, November-December Article ID: IJARET-10-06-009.

The United Nation Industrial Development Organization (2000).US/RAS/92/120, Regional Programme for Pollution Control in the Tanning Industry in South-East Asia.

3. Reports

Ethiopian Leather and Leather Product Sectors (2019): An assessment of export potential to Europe and Austria. Research Report. Vienna,

FDRE Chamber of Commerce and Sectoral Association (2019) FDRE Ethiopian Development Research Institute (2016).

FDRE Environmental Policy (1997) Environmental Protection Authority, in collaboration with the Ministry of Economic Development and Cooperation Bureau.

FDRE Environmental Policy (1997) .

FDRE, Environmental Protection Authority (2011), GEF Portfolio Identification Document.

FDRE Environmental Impact Assessment Guideline Document (2000), Addis Ababa.

FDRE Industrial Policy of Ethiopia (2002).

FDRE Leather Industry Development Institute (2020) Report.

FDRE Ministry of Industry (1994) Industrial development Strategy.

MoFED (2010) Growth and Transformation Plan I and II, 2010/11-2014/1, Addis Ababa, Ethiopia.

The United Nation Industrial Development Organization, UNIDO (2005) Cost of tanned waste treatment 15th session of the leather and leather products industry panel Leon, Mexico.

The World Commission on Environment and Development (WCED) Report Oslo, 20 March 1987(The Brundtland Report).

4. Thesis

Hunegnaw Abeba (2015). A Thesis on Leather industry and environmental challenge, Addis Ababa University, MSc.

Jostein Løhr Hauge (2017). Corpus Christi College, African industrial policy in an era of expanding global value chains: the case of Ethiopia's textile and leather industries. Cambridge University, PhD Thesis.

Tsegai Berhane (2015), industry pollution control and management. A case study on Almeda textile factory and Sheba leather industry, The University of Warwick, PhD Thesis.

5. Cases

Kolba Tannery factory v Environment, Forest and Climate Change Authority, Modjo City Administration, Ref, No. 54689/2011.

6. Website

Ansari Quasif, et al, Environmental Pollution: Introduction, www.Gradeup.com,

[www. Open Learn Works](http://www.OpenLearnWorks.com), The Open University, 22 March 2016. Accessed 4/28/2021.

[https://en.wikipedia.org/wiki/Mojo, Ethiopia](https://en.wikipedia.org/wiki/Mojo,_Ethiopia). Accessed March 27, 2021

Appendix I

Interview Guidelines

1. Please fill the following your bio.
2. Age
3. Sex
4. Marital status. Single Married
5. Educational background
6-12 Certificates Diploma
Degree, MA or LLM PhD Specialist
- 6 Employment Background
Civil servant
Government Officials
Private business owner or other
1. Did you know that there are legislations to protect and control the environment, prevention of industrial pollution control? If yes what are they? If no why? Reason out your cause under here.
2. How do you see the implementation of environmental protection Legislation?
3. Do you think that there is an environmental pollution? If yes tell me the sources of pollution in your town
4. Is there any administrative, civil and criminal measure taken by organization? If yes on which organization?
5. Is there any registered damage on human health by leather industries hazardous waste substances?
6. Do the leather manufacturing industries treat the sludge released from them?
7. What are the identified problems based on the assessment and evaluation takes by internal and external examiner?
8. Do you think there is a lacunas between the environmental protection laws? If yes, define it.
9. What about the organizational structure of environmental protection authority and leather industry?

10. Do you think that leather manufacturing industries have proper EIA?
11. Does the society have complains on the leather manufacturing industries hazardous and toxic substances like bad smell and other causes? If yes, how do you treat complains?
12. What are the identified societies complains regarding leather industries?
13. What is the measure you took to redress the damages?
14. Do you have ISO certification?
15. Do you think that a wastes from the leather industry polluting the soil, water and human and animal health?
16. What are the critical and fundamental challenges you faced from the leather processing industries?
17. How do you explain the level of water quality in the Modjo town?
18. Do you think that societies are deserved to drink the water edge to the leather industry? If so how?
19. Is there problem with the soil and water due to the leather industry? If so, how?

Part: 2. Interviewee questions for a communities living around the leather industries

1. Do you the leather industry impact your socio-economic activities? How?
2. Did you get a chance to bring your question for concerned organ of the government? If so what was the response?
3. Is there any variation of lose productivity of the soil and water quality while, the leather industries expanded?
4. Have you benefited from the leather industries?

Part I: Interviewee question for the government organs and other stakeholders

1. Is there any problem or challenge in controlling environmental pollution due to the hazardous waste sewerage substances and toxic chemical waste compounds?
2. Do you think that those environmental protection legislations are efficient in controlling and curbing environmental pollution problem of the leather industries?
3. Do you think that there are the leather processing industries that have no EIA and not certified?
4. Do you conduct the EIA early?
5. Do you think these are implemented properly

6. Do you think that the environmental protection laws have lacunas? If so what are the gaps you have identifies?
7. What are the measures your regulatory authority could take regarding environmental pollution by the leather industries?
8. How do you explain the measure taken by relevant authority?
9. Do you believe all leather manufacturing industries are environment friendly or conducive for all human and nonhuman or animals' health?
10. Do you have comment on the organizational framework of environmental protection regulatory authority?

Part II, Interviewee guide line question designed to investigate the legal related subjects.

1. Do you think that the leather industry has impact your socio-economic activities? If so how?
2. Did you get a chance to bring or claim your question for concerned organ of the government? If so what was the response?
3. Is there any variation of lose productivity of the soil and water quality while, the leather industries expanded?
4. Have you benefited from the leather industries?

Part III, Interviewee question for the government organs and other stakeholders

1. Is there any problem or challenge in controlling environmental pollution due to the hazardous waste sewerage substances and toxic chemical waste compounds?
2. Do you think that those environmental protection legislations are efficient in controlling and curbing environmental pollution problem of the leather industries?
3. Do you think that there are the leather processing industries that have no EIA and not certified?
4. Did you conduct the EIA early?
5. Do you think that the environmental protection laws have lacunas? If so what are the gaps you have identifies?
6. What are the measures your regulatory authority could take regarding environmental pollution by the leather industries?
7. How do you explain the measure taken by relevant authority?

8. Do you believe all leather manufacturing industries are environment friendly or conducive for all human and nonhuman or animals' health?
9. Do you have comment on the organizational framework of environmental protection regulatory authority?

Part: 3. Interview question designed to the know health problem. Question for Sama Sembet hospital and health post crews

1. Do you think there is human health impact or influence by leather industries?
2. Do you have registered societies health case in relation to impact or influence leather processing industries?
3. Do you have identified pollution problem related with leather processing industries?
4. What is your feedback to restore the problem related human and animal health?

Appendix-II
A Interview groups.
List of interview respondents

No	Name of Respondent	Position	Place	Day of interviews
1.	Dr. Elias Bekele	Sema sembet Medical Doctor	Modjo	March, 28 2021
2.	Dr. Dawit Mekonen	Sema sembet Medical Doctor	Modjo	March, 28 2021
3.	Dr. Beyene Darero	Medical director Modjo health center	Modjo	March, 28 2021
4.	Yohanes Dinku	Environmental disaster risk management team leader (EPO)	Modjo	March, 29 2021
5.	Sintayewu Befikadu	Environmental law implementation director(OEPA	A.A	March, 27 2021
6.	Tatek Lemma	Environmental Impact Assessment and policy implementation team leader	A.A	March, 23 2021
7.	Kasehun Dagno	Legal Expert (EPA)	Modjo	March, 27 2021
8.	Tadele Nagesa	Laboratory expert	Burayu	March, 25, 2021
9.	Dangnechew shiferew	(LIDI) Director	A.A	March,26, 2021
10.	Wondwosen Tadesse	(EECCC) Environmental Law Expert	A.A	March, 26, 2021
11.	Sintayewu Befikadu	(EECCC) Environmental Protection prevention team leader	A.A	March, 25 2021
12.	No name	Higher Official	A.A	March,25 2021
13.	Yonaten Tesfahun	(LIDI) best practice and environmental protection expert	A.A	March, 26, 2021
14.	Dr. Fekedu Fufa	Environmental engineering Assistant Professor at Jimma University	A.A	March, 30 2021
15.	Megersa Ijara	Community elder and member	Modjo	April, 27 2021