Impacts of Industries on the Environmental and Socio-economic condition of the surrounding communities a case of Gelan Town, Tullu Guracha Industrial area

By:-Tadele Getachew

A Thesis Submitted to

Department of Architectural

School of Civil Engineering & Architecture

Presented in Partial Fulfillment of the Requirement for the Degree of Master's in Urban Planning and Design Office of the Graduate Studies

Adama Science and Technology University

Adama

June, 2021

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Declaration

I Tadele Getachew registration number Pge 18948/11 do here by declared that this thesis is my original work and that is not submitted partially or in full by any other person for an award of degree in any other university.

Name of participant Tadele Getachew Signature _____Date _____

This thesis has been submitted for examination with my approval as University supervisor.

Name of advisor Dr: Yared Girma Signature _____ Date _____

APPROVAL

The under signed certify that they have read and here by recommended to the Adama Science and Technology University to accept the research submitted by Tadele Getachew and entitled “Impacts of industries on the environment and socio economic condition of the surrounding communities in the case of Galan town, Tullu Guracha Industrial area” In partial fulfillment of the requirements for the award of master’s degree in Urban planning and Design

Name of supervisor:-_____Signature _____ Date_____

Name of internal examiner:-_____Signature _____Date _____

Name of external examiner:-_____Signature _____Date _____

Name of head of department:-_____Signature _____Date _____

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I would like to acknowledge my wife, Derartu Shibiru, who has scarified herself for my success with in the scratch. She had devoted a lot in praying for my success and assisted me in my endeavor.

ABSTRACT

The main objective of the study was to assess the impacts of industries on the environmental and socio economic condition of the surrounding communities in Gelan Town, Tulu Guracha Industrial area. The primary data was obtained from 92 randomly selected respondents by using questionnaires and interview from municipality official's while the secondary data obtained from published and unpublished sources. To analysis the collected data both the quantitative and qualitative data analysis method were employed. Based on the result of the study different impacts that the industries have on the environment and the social-economic condition of the surrounding communities has identified. Based on the result of the study water pollution, noise and vibration, air pollution and waste disposal has identified as the main impact that the industries have on the environment. Moreover industries degraded the flora and fauna of the surrounding area and its ecosystem service, the landscape aesthetic values and quality of local environment. The industries have also some social and economic impacts on the communities and the surrounding areas including loss of agricultural lands, reduction of food crop production, unemployment, and health and safety impacts. Moreover, pressure on social and health infrastructure, crime, conflicts, and housing problems are the major among the impact that the industries have on socio economic condition of the area. Based on the result of the study to overcome the impacts that the industries have both on the environmental and socioeconomic condition of the study. the study recommended that different measures should be taken by town administration to reduce the ill impact of industrial area such as, awareness creation, and educating and giving train for investors how to reduce environmental and socioeconomic problems Finally, all stake holders at various levels to be equipped with full information about these problem mention here above and had to give especial attention and the industries critically establish unique means and strategies to follow-up and ascertain:

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SRS	Systematic random sampling
ADLI	Agricultural Led to Industrialization
CSA	Central Statistics Agency
CJC	Competitiveness and Job Creation
CRGE	Climate Resilient Green Economy
CO_2	Carbon dioxide
EIA	Environmental Impact Assessment
EI	Environmental Impact Assessment
SEA	Strategic Environmental Assessment
EA	Environmental Assessment
EPE	Environmental Policy of Ethiopia
FDI	Foreign direct investment
FDRE	Federal Democratic Republic of Ethiopia
GoE	Government of Ethiopia
GTP	Growth and Transformation Plan
GIS	Geographic Information System
GDP	Gross Domestic Product
HHs	households
He	hectares
IP	Industrial Park
IDA	International Development Association
IP	Industry Park
IZ	Industry zone
LULC	land use land cover
OUPI	Oromia Urban Planning Institute
ORAAMP	Office for the Revision of the Addis Ababa Master PlanProc Proclamation
PPE	Personal protective equipment
SEA	Socioeconomic Assessment
SEIA	Socioeconomic Impact Assessment
SEI	Socioeconomic Impact

CHAPTER ONE

1. Introduction

This thesis is written for a study that has been conducted in Gelan town of Oromia Regional State, Ethiopia for the partial fulfillment of the requirements the Degree of Master's in Urban Planning and Design at Adama Science and Technology University. The study aimed at analyzing the impacts of industries on the environmental and socioeconomic condition of the surrounding community and providing appropriate strategies Impact of industry is socially, politically and economically growing problem in Ethiopia. Due to the inappropriate expansion of industries, the rate of industrialization, urbanization and population growth are high. Thus, today it is common to see improper quarrying, reclaiming of wetland and open spaces for other development, improper waste management and pollution (water, soil, air and sound) in the towns including Gelan. In Gelan town as a result of industrial expansion environmental degradation is increasing from time to time. In the town special around the industrial area which is known as TulluGuracha solid and liquid waste discharged from the industries effects humans, natural flora, air, soil, water sources, and valuable materials. As a resident of Gelan town, the researcher was aware of several aspects of this general situation. Therefore, these things motivate the researcher to better understand the existing situation by carrying out more comprehensive investigations on Tulu Guracha Industrial area and propose different alternatives that help as to overcome the problem.

To this effect, this chapter deals with background of the study, statement of the problem, objectives of the study, research questions, scope of the study, significance of the study, limitation of the study and description of the study area.

1.1Background of the study

Urbanization, industrialization and development are concomitant processes. However, it is difficult to say what exactly the cause of what is. There are two major views regarding the cause and consequence between urbanization and industrialization. The first view argues that industrialization is a cause for urbanization. It begins by narrating how agricultural village grows into urban Centre through industrial growth. Industrialization causes urbanization by providing better opportunities to work in the urban areas. Better employment situation, better wages and charms of city life attracted people to move towards cities and urbanization started.

The existing tendency of industrialization and urbanization in developing countries has an enormous impact on natural and man-made environments. Pollution sources increase with the development of cities and cause contamination of air, water, and soil. And Unprecedented growing rates of global human population and urban development make tremendous stress on local, regional, and global air and water

quality. A necessity to better understanding of the factors that mediate the interactions between urbanization and variations of environmental quality exists.

The key environmental components are represented by air, water, and soil. (Kumie, Abera and Ali, Ahmed(2005). The main sources of pollutions emanate from agricultural activities, industrial effluents, municipal wastes, domestic wastes, fuel wood burning and vehicle emissions. Environmental Policy of Ethiopia stipulates that "environmental and social costs (or benefits foregone or lost) that may result through damage to resources or the environment as a result of degradation or pollution shall be incorporated into public and private sector planning and accounting, and decisions shall be based on minimizing and covering these costs." Ethiopia's environmental problem is mainly a result of the Malthusian theory, which espouses that uncontrolled population growth leads to over use of environmental resources such that, it leads to unsustainable development and poverty.(FDRE and CRGE, 2011)

The past decade has also seen all major trends of environmental degradation accelerate, for example, greenhouse gas emissions, deforestation, and loss of biodiversity. Such patterns of environmental damage have been driven by increased economic activity, to which foreign direct investment (FDI) is an increasingly significant contributor. Flows of natural resource-based commodities and investments are predicted to continue to rise faster than economic output. It is therefore critical to understand the environmental effects of FDI and identify appropriate responses (Mabey and McNally, 1998).

The development of Gelan industrial area and their spread has changed the socio-economic face and vitality. However, as opposed to positive contributions to the province's socio-economic development, the development of industrial zones still contains unintended impacts: employment, income and living standards of workers in industrial zones are still difficult and unsustainable. The hot development of the infrastructure system inside and outside the industrial area's has disrupted the life of a part of the population, threatened the social order, environmental pollution, etc.

Regarding to the Tulu Guracha within allowed framework, must be equipped with mechanisms, policies, strategies and suggestions to develop the industrial areas, with an aim to serve the provincial socio-economic development goals in the upcoming period.

Therefore, Tulu Guracha industrial areas needs to research, analyze, conduct comprehensively systematic assessment of impacts of industries socio economic and on the environmental condition of the community and compatibility of land use planning with the surrounding land use assessment toward the impacts of industrial area on the province's socio-economic development in the past to make the adjustment in policies, strategies and appropriate solutions for industrial areas in a synchronous manner. In direction of

fast and sustainable development and successfully implement the provincial socio economic development strategy in the future.

1.2 Statement of the problem

Gelan has been an area to which industrial establishments from the city of Addis Ababa always expanding since the foundation of the city. The people of the area were under pressure to give way to the expanding industry has resulted environmental and socio economic problems. These social and environmental problems give rise to many problems in the town areas.

The proposed research areas are known to have some of the most fertile farmlands in Ethiopia. The land is mainly used to grow teff (Eragrostistef) and wheat of high quality and quantity for household use and sale on the local, regional and national market. Urban residents including those in Addis Ababa depend on the cereals produced in this Ethiopian grain basket‘. Preliminary data obtained from the Akaki District Agricultural Department (DAO, 2013), where the study sites are situated, shows that rapid investment inflow and the subsequent transformation of agricultural lands for investment uses in the urban fringe, reduced cultivated land by 11.4% and crop production by 18.3% between the 2005/06-2009/10 harvesting seasons (Dadi, et al., 2015, 2016). Equally, the total hectares of cultivated land that grow teff and wheat crops (stable food crops) shrank by about 26.3% in the same period (Dadi, et al., 2015, 2016). Decline in the size of cultivated land and total production implies not only the reduction of farmland holdings and production but also a decline in traditional farming jobs, leading to household food insecurity and vulnerability.

The development of Gelan industry also puts negative impacts on the ecological environment, thereby affecting the lives and health of local people and problems on health and safety of people working in the IZ due to inhalation, exposure to hazardous substances, injuries and accidents from machinery, traffic accident, increase in respiratory and eye diseases, HIV and STDs that results from population agglomeration.

The process of operation and development of industry zones is showing signs of inadequacy related to air pollution, noise, water and waste pollution. In the Tullu Guracha Industrial areas the major sources of water pollutions derive from the industrial discharges and municipal wastes. Residential waste, industrial discharges and Human waste are often disposed to nearby surface water bodies and Disposal site near to residential areas. These pollutions have posed serious threats health problems, to the study area.

The impacts of industry areas are the cause of social, economic, and environmental problem to the Gelan Town, especially Tullu Guracha industrial areas. The impacts of the above mentioned problems motivated the researchers to conduct this study. The study is planned to assess impacts of industry on the socioeconomic and on the environment condition of the community surrounding Tullu Guracha industrial

area and compatibility of land use plan and to propose effective solution which overcome the challenges and promote sustainable development of the industrial areas in Galan town.

1.3 Objectives of the study

1.3.1 General Objective

The general objective of the study is to investigate the impacts of industries on the environment and socio economic condition of the community and to propose effective solution on how to overcome the challenges in Gelan Town.

1.3.2 Specific Objectives

i. To assess the impacts of industries on the environment,

ii. To assess the impacts of industries on socioeconomic condition of the community

iii. To examine industries land use planning compatibility with the surrounding land uses,

iv. To proposes effective solution which overcome the challenges and promote sustainable development of the industrial areas in Gelan town.

1.4 Research Questions

To achieve the above stated objectives, the following research questions were stated:

1. What are the impacts that the industries have on environment?
2. What is the impact that the industries have on socioeconomic condition of the community?
3. Is the planed industries site is compatible with the surrounding land use?
4. What are the best solutions to overcome the challenges and promote sustainable development of industrial area?

1.5 Scope of the Study

Thematically, this study conducted to assess the impacts of industries on the socio economic and on the environmental condition of the community and to propose effective solution on how to overcome the challenges. Spatially this study has focused in Gelan town, Tulu Guracha industrial area. The decision to limit this research to Gelan was solely based on the scale of the development of the manufacturing industries taking place in and around this town. The town is specifically selected to serve as the national and regional economic development corridors to host the establishment of manufacturing industries. The location of the town along the only railway line and highways connecting Addis Ababa with Djibouti, adequate and cheap labor, promising underground water reserve, etc. are among the most important assets the government used to promote the establishment of manufacturing industries in these areas. On this

basis, the decision to identify the Tulu Guracha kebeles included in the study was made based on the level of industrialization and farmland expropriations

1.6 Significance of the study

This study is to assess the impacts of industries on the environment and socio economic condition of the community in Tulu Guracha kebele, Gelan Town located in Oromia regional state. This study contributes the basic concept of land use compatibility analysis of land use planning at local level or town level. Even if, the strategic plan prepared for the town it will need amendment, revision or site selection for new developments the study use as base line.

1.7 Organization of the Thesis

The thesis consists of five chapters the first chapter contains introduction part which includes background of the study, statement of the problem, objective of the study, significance of the study, delimitation of the study, and description of the study area. The second chapter contains review of related literature the third chapter explains about the methodology that the researcher employs to extract information and methods through which data analyzed. Chapter four deals with result and discussion interpretation that consists introduction, environmental and socioeconomic impact and compatibility of land use, result or findings, interpretation and discussion. Finally chapter five consists of conclusion and recommendation.

1.8 Limitations of the Study

Doing research on a specific subject matter is always a subjective enterprise, from the visualization of a research problem through the selected research methods and the identification of certain relationships between different variables. This makes it important to take a step back and consider how to improve the research design, which I did during the preparation and the fieldwork phases. Some of the most important limitations encountered during the whole processes of this study include difficulties to obtain information that is considered as sensitive by the local officials, for instance, expropriated land size, issues related to compensation money, etc. Moreover, obtaining accurate, up-to-date and complete data on the total size of farming households whose farmlands where expropriated, the number and origin of investors and their proposed project type, land use types (i.e. for residence, industry, business, etc.) was a big challenge due to poor, inefficient and insufficient data management systems (i.e. storage and retrieval) and lack of willingness to disclose these data. In order to address the problem, I was forced to visit multiple line offices (local to regional bureau levels) in order to generate information that is more reliable.

1.9 Operational Definition

Environment: Are the physical, biological, social, economic, cultural, historical and political factors that surround human beings. It includes both the natural and built environments. It also includes human health and welfare.

Environmental impacts: can be defined as the good or bad biophysical consequences in a receptor (people, plants, and materials) after a change in exposure to a stressor (chemical, physical and/or biological agents; types and levels of pollutant emissions or habitat alterations). Impacts are generally characterized in terms of human health, human welfare, environmental resources, and global systems impacts.

Environmental Impact Assessment: is a method of identifying and analyzing the potential impacts of a project on the environment, with the view of ensuring environmentally sustainable development. In this regard, sustainable development can be achieved only through taking into consideration social, economic and environmental situations.

Environmental Management System: Is the means of ensuring effective implementation of an environmental management plan or procedures and compliance with environmental policy objectives and targets?

Socio economic: is defined as a measure of one's combined economic and social status and tends to be positively associated with better health. This entry focuses on the three common measures of socioeconomic status; education, income, and occupation.

Compatible land use: means the use that is compatible with other adjoining uses. It can be defined as existing or committed land use or activity that can co-habit with a neighboring use or activity without creating or experiencing one or more off site adverse effect.

Impact: is any change to the environment or its component that may affect human health or safety, biophysical conditions, or cultural heritage, other physical structure with positive or negative consequences.

Monitoring: Are the repetitive and continuing observations, measurements and evaluation of changes that relate to the proposed activity. It can help to follow changes over a period of time to assess the efficiency of control measures.

Pollution: can be defined as any action or condition interrupting on land, air or water, which is detrimental to health, sanitation or the public interest.

1.10 Description of the study area

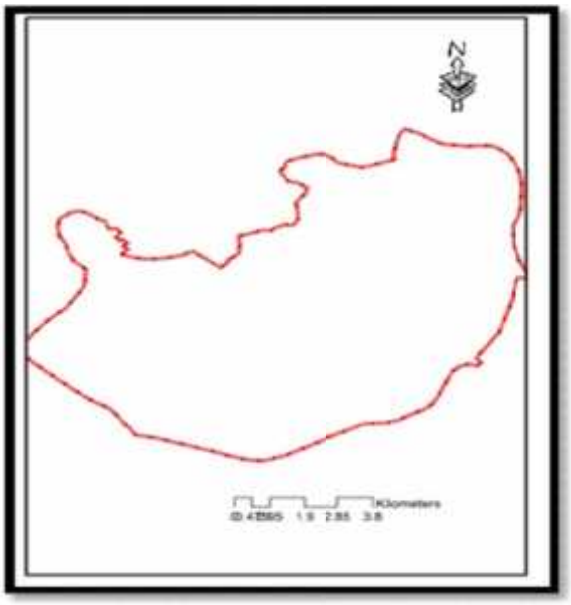
Gelan is located in Special Zone surrounding Finfine located at 25 km away from Addis Ababa in South-East direction or between 70 12'- 9014'N Latitudes and 38032' – 39032' E Longitudes. According to the current structural plan, the total area of the Town is 9.068 km2 (9068.72) hectares. The Town of Gelan in the East direction, bordered by Dukem city where the railway and the highway cross each other. In the North East by Kora Mariam church, in the North by Wedesso Mountain and Abay Silto farmers 'Kebele' (Oromia Urban Planning Institute, 2007).

Figure 1. 1 Ethiopia Map

Source: base map of Galan town surveyed by OUPI, 2016

Figure 1. 2 Oromia map

Figure 1. 3 Map of Galan Town



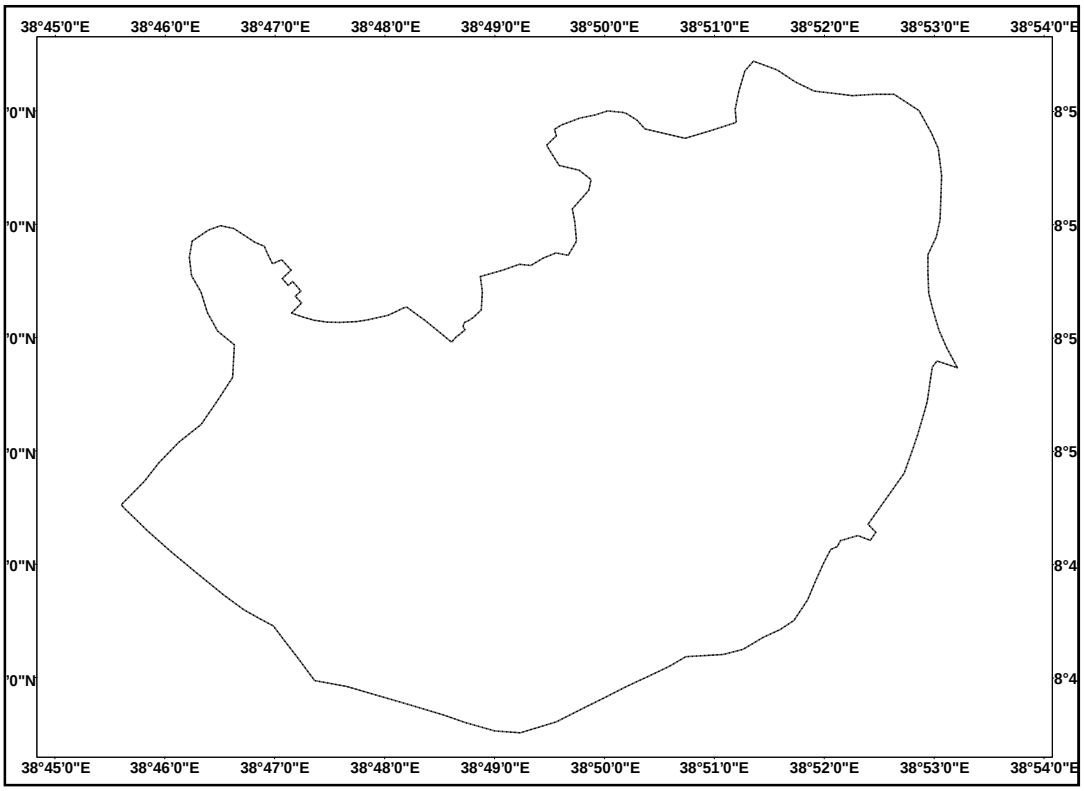
Source base map of Gelan town surveyed by OUPI, 2016

Area: The planning boundary of Galan town which is delimited by the town administration in 2016 indicates that Galan town has 9068.35 hectares which will serve for the coming ten years planning period (2027). The central and northern dominated by quarries; the western and south western are by underground water potential and the surrounding outskirt is dominated by agricultural land uses and has the characteristics of rural styles of living. Beside there are, plateaus and stream banks which are not suitable for distributing areas of the town for different land use categories.

The future expansion of Galan town is mainly to the western direction because of better plain land and suitable topography compared to other parts of the town as well as the growth direction of Finfine.

Shape: The shape of a given town can be assessed by using different compactness indices such as Length-Breadth ratio, Compaction index, Elongation ratio and Circularity ratio which helps to know whether a certain town has a compact morphology in its shape which further affects the cost for infrastructure development and the level of incorporating fertile agricultural land. Compact urban shapes are advantageous in this regard.

Figure 1. 4 Shape map of Galan Town



Source: Base map of Galan town, 2016

This study uses Length- Breadth ratio (L-B) ratio to analyze the shape of Galan town.

$$(L\text{- }B)\text{ ratio} = \frac{\text{Length of long axis of an area}}{\text{Length of short axis of an area}}$$

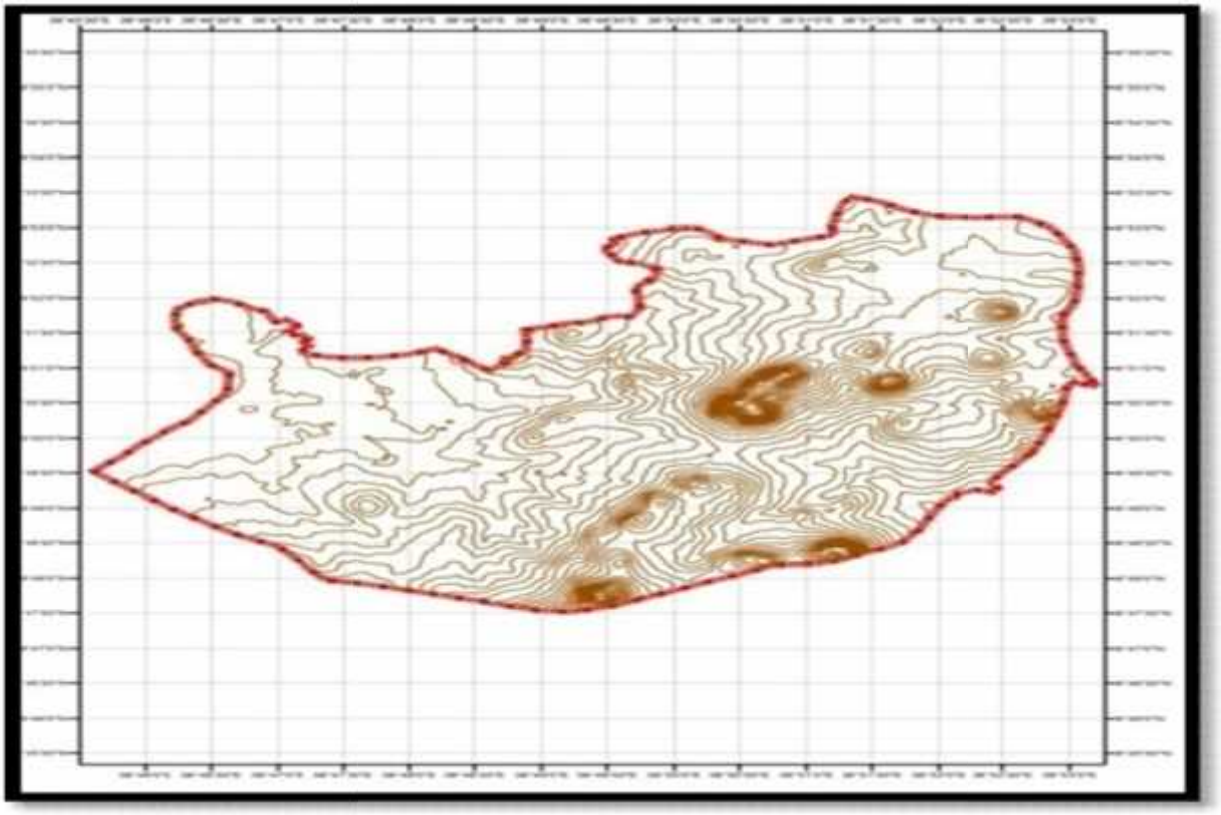
A line joining the farthest points of Galan town on the boundary in a straight line is around 11.5 km whereas the Short axis is the longest line perpendicular to the long axis between two other points on the boundary is about 9.5 km. therefore, the length-breadth ration of Galan town is about 1.2 which means the town has a close to compact shape which is good to provide infrastructure throughout the town.

1.11 Topography and Slope

Topography: topography is very important to identify areas suitable for proposing land for different land use categories. In this regard, the topography of Galan town is known to have rugged terrain nature landscape. The highest point of Galan town is about 2373 m above sea level which is situated in the central part of the town on Gara Bushu hills whereas the lowest one is about 2051m above sea level located in the western age of the town.

Preparing landscape design on Gara Bushu hills provide Galan town an additional beauty which in turn attracts people to prefer the town for industrial, social and residential destination.

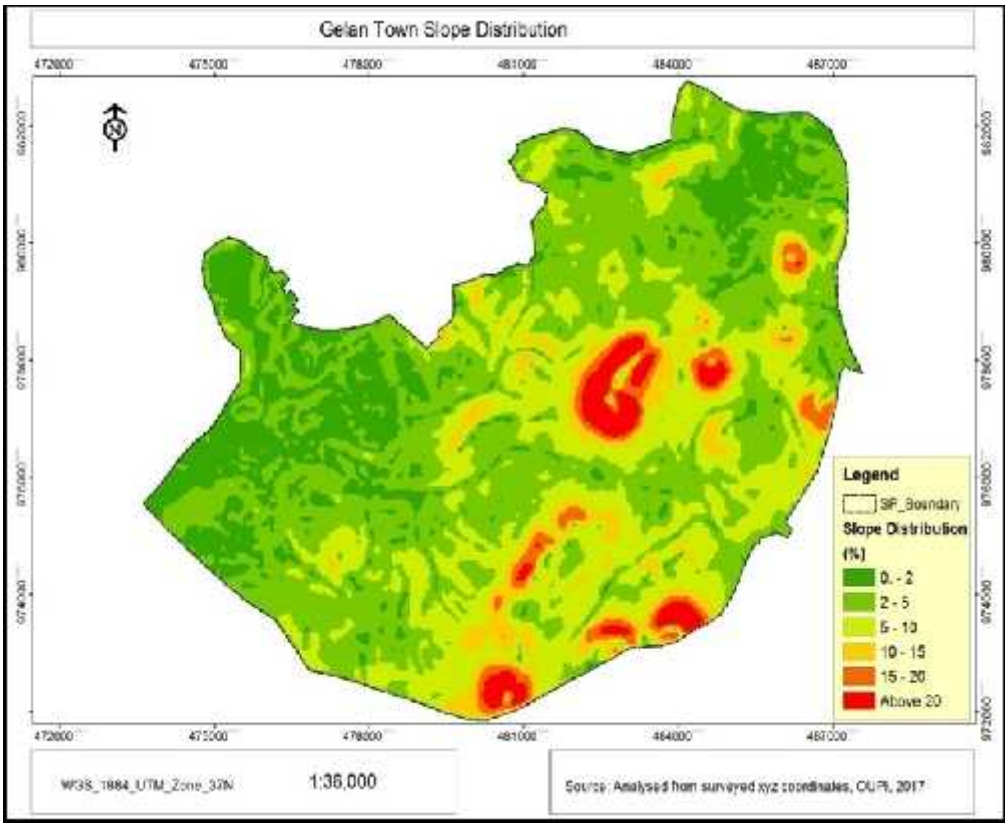
Figure 1. 5 contour map of Galan town



Source: base map of Galan town surveyed by OUPI, 2016

Slope: During plan preparation of a town, it is important to consider slope analysis which can be obtained from “x” “y” ‘z” data. Slope analysis gives clear view of the landscape of the town and where to allocate or propose space for different land use categories. The following map shows detail information on slope distribution of Galan town

Figure 1. 6 slope distribution of Gelan Town



Source: base map of Galan town surveyed by OUPI, 2016

CHAPTER TWO

2. Literature Review

2.1 Industrial Environment

Industrial production is important for economic growth and employment opportunities. But it can also cause health problems and long term environmental impact. Poor people, among them women and children, work under hazardous and polluted conditions and are subject to increased threats to their safety and health. There are means to reduce the adverse effects of industrial activities by promoting clean technology and worker health and safety.

Industry in the developing countries can vary in size and technology from a one man roadside workshop to huge industrial enterprises, such as oil refineries. Sometimes certain industries are concentrated in a specific area of a city by tradition, for example, the tanneries in Dhaka. The companies there are small but numerous, which results in considerable water pollution and waste problems.

Cities have important role on global development. Cities are complex human systems and serve as magnets for people, enterprise and culture (Singh, 2014). Cities in the developing countries are growing rapidly and become the engines of the region's economic development or motor engine of growth (Harris, 1988). Most of the developments are in the form of urban sprawl at the periphery of the urban areas (Ginsburg et al., 1991). Based on Yeh (2002), these urban sprawls have led to a lot of environmental and transport problems and the loss of valuable agricultural land as well. Wirth (1938) defined the city as a permanent settlement with large population size, high population density and social heterogeneity. There are several urban issues that usually occurred in the big cities, such as: urban sprawl; climate change and air pollution; urban waste management; water supply; inadequate energy; public health problems; pressure on natural habitats and so on (UNEP, 2004). Singh (2014) mentioned that in traditional concept, the city is defined as a catalyst of economic growth. But recently the cities and urban development challenges not only focus on economic growth but also express concern about unsustainable development and its negative impacts of rapid urban development such as urban sprawl, deteriorating inner-city infrastructure, traffic congestion, environmental degradation and so on.

Environmental problems have attracted the attention of people of the world for the last (2-3) decades. People are now becoming increasingly conscious of variety of these environmental problems. Generally speaking environmental problems can be classified in to three parts. These includes the problem arising and associated with poverty and under development, the problems those arising as negative effects of the very process of development and the problems related with manmade pollution (ORAAMP, 2010).

As to ORAAMP 2010, population growth, industrialization and urbanization are the three main causes of environmental problems. This is due to the introduction of undesirable materials into physical

environment like soil, water and air may that in turn interfere with human health, the quality of life and nature. If these problems are not well considered at urban plan preparation and implementation, it may be farther intensified even beyond their immediate vicinity. Thus, bearing these environmental problems into consideration the study focuses on approaches of existing land use in the study town.

Gelan is one of the towns of Oromia Special Zone Surrounding Finfine. In here the rate of industrialization, urbanization and population growth are high. Thus, today it is common to see improper quarrying, reclaiming of wetland and open spaces for other development, improper waste management and pollution (land, soil, air and sound) in the town. Hence environmental degradation is increasing from time to time. As the situation getting worst and worst, need great attention. This is due to the fact that environmental degradation may affect the recreational, aesthetical, ecological, economic and social values of the natural environment. Taking such environmental problems in to consideration, the study evaluates major causes of environmental problems, impacts of problems on integrated and sustainable developments in the town.

2.1.1 Industrial Development in Less Developed Countries

Recently, less developed countries have been categorized into three groups according to their level of industrialization (Balchin, Isaac & Chen 2000).

- *Maturing industrializing countries*, such as Singapore, Hong Kong, South Korea and Taiwan, are experiencing an age of high mass consumption. The majority of the workforce is employed in the industrial sector and only a small proportion of the workforce remains employed in agricultural activity.

- *Contemporary industrializing countries*, such as Columbia, Turkey, Indonesia, Thailand, and India. These countries still have the majority of their workforce employed in the agriculture sector but emergent industrial activity linked to global markets is slowly transforming the character of their economies.

- *Emerging industrializing countries*, such as Vietnam, have started to increase industrial output but are still not attracting major overseas investment in export-oriented industries.

These three groups, although different, share similar experiences in the inception of industrial development. The location of this activity was typically located in primary gateway cities, such as in the principal ports where infrastructure and markets were comparatively well developed (Balchin, Isaac & Chen 2000). For example in Surabaya- Indonesia, the city has functioned as a focus for transport and communications networks since the 17th century (Dick, Fox & Mackie 1993). This has helped to connect hinterland areas as major providers of agricultural goods, with the port city as a point from which to distribute products to wider markets.

Pre-industrial cities in LDCs have shown a land use pattern with a traditional focus on religious or government buildings (Balchin, Isaac & Chen 2000). However, the cities have evolved to encompass wide ranging industrial activity focused on the ports, with central cores comprising local bazaars with densely developed commercial uses. The evolution of the pre-industrial city into an industrial city has generated increasing urbanization pressures. The economic growth and prosperity of the city has been a major force in determining the migration of people from rural areas to the cities. Most industrial cities in the LDC are experiencing rapid growth of urban areas following economic restructuring into industrial activity (van Geenhuizen&Nijkamp 1995). Balchin (2000, p.2) believes that the process of urbanization follows the same process as economic growth. High levels of urbanization are associated with high levels of industrialization that further raises the level of economic growth. This economic growth has seen a massive labour shift from agriculture into industry (Mills & Hamilton 1989). Mills & Hamilton (1989 p.405) explain this shift as a parallel process to economic growth. With low levels of economic growth, most income is spent on food, orientating the workforce towards the agricultural sector. However, with higher levels of economic growth, there are demand shifts from food to manufactured products and services, fuelled by the workers relatively higher wages (Balchin, Isaac & Chen 2000).

Industrialization absorbs a large number of workers in the industrial sector, in both skilled and unskilled occupations. Urbanization is a likely consequence of industrialization in order to meet the needs of employers and employees. In the 1960s, almost 50% of urban residents in LDC were migrants attracted to jobs in industry (Williamson 1995). According to Turnham (1990), there are two types of migrants: temporary migrants who come to seek employment in the informal sector, and permanent migrants who are seeking jobs in the formal sector but who temporarily may accept work in the informal sector, or be unemployed.

An increasing population attracted to urban employment will produce the possibility of uncontrolled urban expansion, and a greater demand for urban infrastructure and urban land (Balchin, Isaac & Chen 2000). The problem can be analyzed from two different perspectives: the first is the perspective of development planning and the second is the capacity of government to manage urban change. These perspectives help to highlight the problems caused by industrial development.

As seen in India and other LDC cities, planning for industrial development has been adapted from developed countries in Western Europe and North America. According to McAuslan (1985), many LDC cities are over ambitious in adopting planning systems from Western cities. He argues that the urban resources, administrative systems, political philosophy, and bureaucracies in LDCs are different to those in developed cities. For example he considered that industrial zoning in India and Zimbabwe has distorted the land market, causing inflated land values close to industrial areas (McAuslan 1985). Poor migrants

from rural areas cannot afford these land prices, nor can they afford the daily transportation cost of living further away from the industrial zone.

De Soto (1989) believes that these sorts of imbalances between workers' demands and land supply reflect the economic and political capacity of countries to deliver growth. He sees the problem as being derived from the incapacity of the state to satisfy the basic needs of urban growth. Legal systems in LDCs seem designed to support particular groups through legal access to information, money and public infrastructure. Not all residents can obtain this access and this inhibits the transformation from an informal to a formal economy. In brief, industrial development in LDCs is facing problems in adapting to the demands of urbanization. Currently, control of urban land and equal access to legal status is a major problem in many LDCs.

2.2 The Impact of Industrial Development

Industrial development in LDCs is currently facing major problems related to the process of urbanization. The capacity of the city to provide services to a growing population will decide the success of industrial development. Social, economic, and environmental concerns are major consequences of industrialization (Humphreys 1991). The impacts can be seen in many areas, such as: land price increases, population increases, environmental degradation and the breakdown of traditional family units. To understand the impact of industry on urban land, it is important to consider the power of industrial activity to reshape the city based on urban land economics.

2.2.1Urban land economics

Since industrial activities in LDC cities have been developed, economic conditions, population, land use, and the size of the urban area has continually changed (Balchin, Isaac & Chen 2000). Urban growth not only changes urban land use, but also the intensity of that use.

In order to understand land use change, it is important to analyze the process of urban change. There are three stages of urban change: population growth, manufacturing development, and commercial needs (StandbackJr& Knight 1976). Firstly, people come to occupy land leading to urban growth. Secondly, the concentration of workers may be capitalized upon by manufacturing activity. Thirdly, commercial employment grows in response to the wages circulating in the community. These processes have occurred in most developed and less developed countries. Labor supply is a locational factor that may attract industrial activity (Hayter 1997). While the industrial activity matures, this attracts a commercial sector to service the growing local population.

Manufacturing activity can also cause land values to rise where a fixed supply of serviced land faces increasing demands (Balchin, Isaac & Chen 2000). The nearer the location to the center of urban

activities, such as an industrial estate, the greater the land value and demand for complementary commercial uses.

According to Evans (1985), commercial use is a high value urban land use that has responded to decentralized manufacturing. Remote manufacturing activity creates the demand for nearby workers, leading to development of adjacent residential suburbs. To minimize transport cost to the city center, retailing and commercial uses have developed around manufacturing areas.

The location of any commercial activities is based on an assessment of profitability or utility (Balchin, Isaac & Chen 2000). Patterns of urban land use reflect the competition between supply and demand for sites. Where urban land supply is fixed or restricted; it is relatively slow to react to the dynamics of land use demand. Retail activity looks to maximize demand by locating as close as possible to consumers and to other retailers supplying commodities and services, but as far as possible away from its direct competitors (Stahl 1987).

In brief, population growth, the initiation of a modern manufacturing sector, and commercial development are three primary characteristics of urban change. These three sectors link with each other to reshape the city. The government as a main provider of urban infrastructure attempts to balance the needs, demand and supply of these three sectors.

2.2.2 Servicing workers

In terms of land value, manufacturing activity has the potential to increase land especially in those areas with high accessibility to the industrial estate. These areas are demanded by retail commercial and residential activity, which for the most part supply the needs or support the needs of the industrial workers. This linkage has become part of the production system (Hayter 1997).

According to Fredriksson and Lindmark (Hayter 1997), the production system is a set of linkages of materials, goods, services and information that are integrated to produce a particular final demand within and among firms. Commercial activities directly and indirectly support the production system. Direct relations include the contribution of goods or services to assist in the production of a final product. This includes retailers, wholesalers, financial organizations, and business services (Hayter 1997). Indirect relations refer to commercial activities that focus on servicing the wider urban and residential growth that has been attracted to the industrial districts. As land values are determined by land accessibility, patterns of commercial uses can be seen to follow main roads (Balchin, Isaac & Chen 2000). Rapid urban growth has also placed great pressure on other government services and amenities, such as housing, water, electricity, education, health and other social services (Midgley 1982). As stated previously, industrial development, as a prime motor of urban growth, reshapes the city, and plays a major part in determining the housing needs and services of the urban population (Kivell 1993). In many LDC cities, such as

Pakistan, India, Indonesia, Thailand, Nigeria, and Guinea, the urban land market is controlled by government (Amitabh 1997). The government has full authority over the land market, including service provision in areas surrounding manufacturing sites.

2.3 History of Industrial Development in Indonesia

Indonesia is located to the south and east of mainland Asia and north and west of Australia (Forbes 2000). It has almost 13,700 islands that are spread across 5,100 sq km. It has a total land area of 1,904,443 sq km (as seen on the picture below).

The 1990 census showed that Indonesia's population was 179,194,223, showing an annual increase of almost 2% from the previous census in 1980. Sixty percent of the total population occupies the island of Java, which accounts for less than 7% of the total land area (Silas 1993). Indonesia is now the fourth most populous country in the world, after China, India, and the US.

2.3.1 Industrial Problems and Issues in Indonesia

Industrial development in Indonesia is developed under a comprehensive planning system designed to support Indonesia's goal of economic development and community strength. Industrial planning operates under an established policy hierarchy from national, provincial, down to a local level. The plans prepared at a national and provincial level are policy oriented, providing guidelines for local industrial development.

At the local level, industrial planning includes two levels of policy and land use guidance. Industrial planning policy at the local level is generated from the provincial level, and both levels are under the control of the same government agency. However the allocation of industrial land use is determined by local government, based on the industrial policies of local and provincial government.

Industrial planning in Indonesia faces all of the problems faced by other LDC countries. Despite the influence and priority given to industrial activity by the government it still only employs 10% of the total workforce (The-Library-of-Congress 1992a). The incapability of the government to extend job opportunities in a modern industrial sector has weakened the power of industrialization in Indonesia. This can be attributed to the focus on large-scale modern industrial activity and the failure to give greater attention to the existence of smaller industrial activity, as part of the network of economic growth. Industrial policy at a provincial and local level is searching for a balance between modern industry and traditional industry, by encouraging the linkage between the two activities. The government appears to find it difficult to control small scale industrial activity due to the transience and variety of the sector. Since it is difficult for the government to regulate small industry, these linkages are often difficult to determine and limits the ability of the local planning system to respond to their needs.

In summary, industrial planning in Indonesia is looking for a balance between modern industry and a smaller traditional industrial sector. This goal is frustrated by local regulations and policies that may act to inhibit industrial growth, diversification and employment.

2.4 Environmental Harm of Industrial Firms' Operations: A Socio-Ecological Problem in Bangladesh

Bangladesh is a South-Asian developing country and one of the most vulnerable countries to climate change in the world, with an extremely fragile natural environment. According to the People's Report on the Bangladesh Environment, serious degradation of the three components of the natural environment air, water, and soil has resulted in adverse consequences for the economy. The dumping of untreated industrial effluents is mostly responsible for the degradation of the natural environment in many areas of Bangladesh. Nishat, Shammin, Faisal, and Junaid showed that on average, the incidence of illness among people living in Hazaribagh (Dhaka) is 16 percent, which is higher than those living in the control area. Adjoining residential areas are also badly and widely affected by the bad smell that emanates from the Hazaribagh Tanneries. The per capita health cost has increased while the price of land has fallen by seven to eight percent in the Hazaribagh area due to pollution from the Tanneries. Toxic water from the nearby dyeing factories has destroyed the 'IRRI' crop in a vast area in Ashulia near the capital. Four factories of Bangladesh

Dyeing Mills located at Dhaka have been polluting the natural environment by emitting toxic waste into nearby bodies of water. Such huge harmful impacts have imposed large costs on both society and the economy in other areas outside of Dhaka in Bangladesh. To name but a few examples: Sylhet Pulp and Paper Mills (SPPM) pollutes the 'Surma', 'Kalni', and 'Kushiara' rivers; the effluents from the Natural Gas Fertilizer Factory (NGFF), Sylhet, damages paddy fields and kills the fish; gaseous ammonia from the Urea Fertilizer Factory Ltd. (UFFL), Ghorashal, has proven hazardous to workers' mucous membranes among other physical complaints; ammonia from the JamunaFertiliser Factory (JFF) at Jamalpur damages crops, trees, livestock, poultry, and fish; effluents from textile mills in Tangail SadarUpazila pollutes the Louhajang river; untreated liquid waste from dyeing industries in Konabari, Gazipur, poses a serious threat to the environment; effluents, from dyeing factories in Bhaluka Upazila, in Mymensingh, pollutes rivers and canals; and liquid waste from a dyeing factory pollutes the Shitalakhya river in Narayanganj . It is clearly evident that the environmental harm from industrial firms' operations is greatly responsible for the environmental degradation in this South-Asian developing country, namely, Bangladesh. Our study site is in the Chittagong division, home to the largest seaport in the country and important industrial concentration. Thanks to the higher rate of industrialization and seaport-based economic activities, the GDP of Chittagong is approximately four times higher than the average national

GDP by city population. Chittagong contributes 21% of the national GDP and has 5.18% (9 million) of national population. The following map/Figure 1 shows the area of Chittagong in Bangladesh.

2.5 Urban Development, Private Investment and the Environment: Linkages

Understanding environmental impacts of developments that result from activities and developments in urban fringe areas requires an examination of the general linkages that exist between urban growth, private sector investment advancements and the environment. Literature shows that researchers usually focus on urbanization and the environment nexus or just simply the linkage between foreign directed investment and the environment alone. However, looking into the nexus between the three aspects is more important to understand the pressure put on the natural environment both by urbanization and the related growth in investment activities, particularly in areas surrounding cities which are receiving zone of new developments and burdens.

From demographic point of view, urban growth involves the increase of proportion of population living in 'urban areas' of a country and urbanization is a process through which people congregate and live in places categorized as urban. In the broader sense urbanization is a vast process of development or increasing activities of people in areas known as 'urban' reflecting the structural changes in physical, socio-economic, demographic and cultural factors of human life.

Urbanization, industrialization and development are concomitant processes. However, it is difficult to say what exactly the cause of what is. There are two major views regarding the cause and consequence between urbanization and industrialization. The first view argues that industrialization is a cause for urbanization. It begins by narrating how agricultural village grows into urban Centre through industrial growth. Industrialization causes urbanization by providing better opportunities to work in the urban areas. Better employment situation, better wages and charms of city life attracted people to move towards cities and urbanization started. According to this argument, this is the reason why the more developed countries which started urbanization in the 19th century are the most urbanized countries today. The less developed countries did not experience industrialization and remained less urbanized due to the impact of colonization.

It was only in the second half of the 20th century when they became independent that less developed countries started building infrastructure providing various services to their population and the developing industries. Then they started urbanizing. On the other hand, another point of argument is that cities to promote development and industrialization. The reasons are associated with high density of population, economy of scale, culture that promotes creativity and innovation and frees individuals from traditional institutions, greater participation in global processes, better transportation and communication facilities, better infrastructure. Therefore, either way there is strong linkage between urbanization and the growth

industrialization and investment in the sector. This relationship can also be explained through the fact that investments in general and industrial investments in particular prefer to locate either in urban areas or at least in closer proximity to urban Centre's for the benefit of different advantages like infrastructures and market access.

2.6 Urbanization and pollution

Urbanization is on the rise in Ethiopia. So is its related pollution. Addis Ababa is one of the emerging cities in Africa. Its population has been increasing from time to time, mainly due to immigration. The same is true to other big cities in the country; such as Adama, Bahir Dar, Mekele, Hawassa, and Dire Dawa. On the contrary, the waste management system is either very old or does not properly function. The major problems in solid waste management's in urban centers encompass the poor infrastructure, lack of properly designed collection route system and time schedule; lack of proper collection and emptying containers, insufficient truck and poor maintenance, unacceptable condition of the final dumpsite, and the absence of waste reduction, recycling and composting (cited in Fikreyesus et al., 2011: 12)

The environmental impacts of urbanization in Ethiopia include the negative health consequences of crowding and increased exposure to concentrated waste, unsustainable resource consumption and settlement on environmentally fragile land. Urbanization does not have only local environmental impacts, but, it also has a large 'ecological footprint' beyond its immediate vicinity. Intensive and extensive exploitation of natural resources to support the urban economy include use of high amounts of energy resources (including fuel wood), quarrying and excavation of sand, gravel and other building materials on large scales, and over extraction and inefficient delivery and use of water. These contribute to degradation of the natural support systems and irreversible damage and loss of critical ecosystem functions, such as the hydrological cycle, carbon cycle and biological diversity in areas both near and far from the urban centers using the resources. In addition, conflicts can arise with rural users over access to such limited resources. Other effects can be felt further, such as pollution of waterways, long-range air pollution that have impacts on human health as well as on vegetation and soils at considerable distances (Edwards, 2010). There are also challenges coming from the producers of solid waste at all socio-economic levels as well as the industries and service producers.

2.6.1 Industry Pollution in Ethiopia

Industrialization has a direct relationship with the increment of pollution. Ethiopia has for long pursued an overarching development strategy entitled Agricultural Led to Industrialization (ADLI), ADLI, which aspires to make a transfer from agrarian economy to industrialization. In this regard, the state has placed its potential to establish different manufacturing and processing industries throughout the country,

particularly around Addis Ababa, the capital city of Ethiopia. In 2001, according to Ethiopia's Central Statistics Agency, CSA, report, there were more than 105, 8326 manufacturing industries operating in Addis Ababa (cited in Tegegn, 2012). These industrialization processes in some instances, however, resulted in polluting the environment; mainly water bodies. These pollutants primarily change the water quality characteristics, like acidity, salinity, temperature and turbidity. In major cities of Ethiopia, particularly in Addis Ababa, industrial pollutions have been affecting the water quality. Scholars note that over 90% of untreated industrial wastes are discharged into water bodies (Zerayakob and Zeru, 1999; Mohammed, 2002; EPA, 2005; Tamiru et al., 2005) cited in Tegegn, 2012:2). Food processing industries on the other hand, often damp their waste on open land surfaces (Tegegn, 2012:23). Industries are often not interested in participating in safe waste disposal activities, as the monitoring and evaluation capacity of the city administrations are usually at infancy. During the Interview it was mentioned that the Addis Ababa environmental protection office has taken measures to address this gloomy problem. It has provided awareness creation platforms to the private sector and the district officials, so as to protect, manage and alleviate environmental pollutions.

2.6.2 Environmental Impact Assessment in Ethiopia

In the past the environment failed to feature in holistic manner in the development endeavors of the country, since project evaluation and decision-making mechanisms were unwarrantedly made to focus on short-term technical feasibility and economic benefits. For this reason, past development practices fell short of anticipating, eliminating or mitigating potential environmental problems early in the planning process. This state of play resulted, among others, in situation where the country is plagued with seriously degraded environment. Further development along this line has to be cut short, as efforts in reversing the damage to the environment at a later time is usually costly or even irreversible.

In order to ensure sustainable development, it is essential to integrate environmental concerns into development activities, programs, policies, etc. Environmental Impact Assessment as one of environmental management tools facilitates the inclusion of principles of sustainable development aspiration well in advance.

The EA procedural guideline series aim at in particular towards:

- ensuring the implementation of the EPE and compliance of EA related legal and technical requirements,
- providing a consistent and good practice approach to EA administration in Ethiopia,
- assisting proponents and consultants in carrying out their environmental assessment related tasks,
- assisting Interested and Affected Parties, especially communities in realizing their environmental rights and roles,

- assisting Environmental Protection Organs, Competent and Licensing agencies in discharging their roles and responsibilities, and
- Establishing partnership and networking among and between key stakeholders in EA administration.

2.6.3 Impacts on the Environment and the Community in the Fringe of Addis Ababa city

Land–use change is arguably the most pervasive socioeconomic force driving changes and degradation of ecosystems. Deforestation, urban development, agriculture, and other human activities have substantially altered the Earth's landscape. Such disturbance of the land affects important ecosystem processes and services, which can have wide–ranging and long–term consequences

Urban development has been linked to many environmental problems, including air pollution, water pollution, and loss of wildlife habitat. Urban runoff often contains nutrients, sediment and toxic contaminants, and can cause not only water pollution but also large variation in stream flow and temperatures.

Farmland provides open space and valuable habitat for many wildlife species. However, intensive agriculture has potentially severe ecosystem consequences. For example, it has long been recognized that agricultural land use and practices can cause water pollution and the effect is influenced by government policies. Runoff from agricultural lands is a leading source of water pollution both in inland and coastal waters. Conversions of wetlands to crop production and irrigation water diversions have brought many wildlife species to the verge of extinction.

Forests provide many ecosystem services. They support biodiversity, providing critical habitat for wildlife, remove carbon dioxide from the atmosphere, intercept precipitation, slow down surface runoff, and reduce soil erosion and flooding. These important ecosystem services will be reduced or destroyed when forests are converted to agriculture or urban development. For example, deforestation, along with urban sprawl, agriculture, and other human activities, has substantially altered and fragmented the Earth's vegetative cover. Such disturbance can change the global atmospheric concentration of carbon dioxide, the principal heat–trapping gas, as well as affect local, regional, and global climate by changing the energy balance on Earth's surface (Marland et al. 2003).

Cities impose high environmental impacts on wider regions beyond their physical and jurisdictional limits both by drawing from the resources necessary to support their inhabitants and economic activities and by transferring pollution and wastes. There is high inflow of investment and relatively high concentration of industries in the SZOSF. As many of these growing industries are being established may be without introducing proper environmental impact management system into their production processes and taking environmental considerations into account, lots of environmental pollution problems are thought to

originate from them. Hence, wastewater discharges to rivers, polluted air emissions and soil pollution are commonly visible environmental problems in the fringe of Addis Ababa city.

2.7 Socioeconomic Impacts

Land is one of three major factors of production in classical economics (along with labor and capital) and an essential input for housing and food production. Thus, land use is the backbone of agricultural economies and it provides substantial economic and social benefits. Land use change is necessary and essential for economic development and social progress.

Land use change, however, does not come without costs .Conversion of farmland and forests to urban development reduces the amount of lands available for food and timber production. Soil erosion, salinization, desertification, and other soil degradations associated with intensive agriculture and deforestation reduce the quality of land resources and future agricultural productivity (Lubowski et al. 2006).

Urbanization presents many challenges for farmers on the urban fringe. Conflicts with nonfarm neighbors and vandalism, such as destruction of crops and damage to farm equipment, are major concerns of farmers at the urban fringe (Lisansky, 1986). Neighboring farmers often cooperate in production activities, including equipment sharing, land renting, custom work, and irrigation system development. These benefits will disappear when neighboring farms are converted to development. Farmers may no longer be able to benefit from information sharing and formal and informal business relationships among neighboring farms. Urbanization may also cause the "impermanence syndrome" (i.e., a lack of confidence in the stability and long–run profitability of farming), leading to a reduction in investment in new technology or machinery, or idling of farmland (Lopez, Adelaja, and Andrews, 1988).

2.8 Environmental Proclamations and Laws of Ethiopia and the Oromia Region

Until 1997, Ethiopia did not have a comprehensive environment policy. The Environmental Policy of Ethiopia was issued in 1997 to provide overall guidance in the conservation and Sustainable utilization of the country's environmental resources in general. The overall objective of the environmental policy is to promote the sustainable social and economic development of the country through, *inter alia*, sustainable management and utilization of the natural resources of the country. By Proclamation No. 9/1995 the Ethiopian Environmental Protection Authority has created an environmental policy, as well as legal and regulatory reforms to manage its environmental and natural resources.

The overall aim of the Environmental Protection Authority (EPA) 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, man-made and cultural resources and the environment without compromising the ability of the future generations to meet their own needs" (EPA 2010).

Environmental Protection Authority (EPA) is given huge mandate to manage, protect, conserve and sustain the environment and the natural resources of the country. However, the EPA's conceptual framework is too comprehensive and too general, not systematically formulated to meet the strategic management process it is mandated for. On the other hand, in its objective, the EPA does not include strategies for rigorous implementation, monitoring or evaluation.

According to Asayehegn (*n.d*), unlike the EPA, environmental Impact Assessment (EIA) has very specific vision and mission statements where its vision is to *"…see a clean and healthy environment by eliminating or, when possible minimizing pollutants at their sources"*. Its mission statement is to enforce the Pollution Control Proclamation (PCP) and related laws in order to eliminate or minimize pollutants that are generated from industries, agricultural activities, service rendering organizations and urban areas and enhance the health and wellbeing of the citizens (EPA, 2006 cities in Asayehegn). At least on paper, the EIA has procedural guidelines as prerequisites for the approval of new development activities and projects in any sector. EIA is basically designed to identify both potential positive and negative impacts of projects in advance. It is an instrument designed to facilitate identification of potential impacts and the development of mitigation measures to reduce adverse significant impacts and foster sustainable development (EIA Guidelines 2000).

In the Constitution of the FDRE, there are some articles which deal with environmental rights of the community and responsibilities of the government organs. However, there are communities like those living in the fringe of Finfine city whose environmental rights are invaded due to weak implementation and lack of enforcement of environmental laws by the government bodies and respective organs (Environmental laws and proclamations of the Federal Democratic Republic of Ethiopia including environmental rights and objectives are attached in appendix section of this thesis).

In Ethiopia it is not only the laws and proclamations that are available but also there is an environment council chaired by the Prime Minister who usually is found speaking about such measures as 'polluter pay', 'criminal liability for polluters' and so on in front of the national and international community. But the council's initiative lacks practicality like the smart laws and proclamations do. In line with the federal law, the Oromia Regional State established an organ in the region that organizes and manages data of land administration, use and environmental protection. The Oromia Region now has its Proclamation No. 147/2009 *"A proclamation to provide for the establishment of Oromia Bureau of Land and Environmental Protection- OBLEP"* (MagalataOromia 2009). Thus, in accordance with Article 49(3) (a) of the Proclamation No. 46/2001 of the Amended Constitution of the National Regional State of Oromia, the OBLEP is given a mandate to regulate and follow-up that any development body shall conduct EIA

prior to project implementation. This office is also given the task of preparing environmental standards and makes them available for use; and regulates its implementation. The OBLEP is also authorized to regulate the disposal of different pollutants and waste materials from factories, cities not to pollute the environment and take or cause to be taken proper action if it caused any danger.

The Special Zone of Oromia Surrounding Finfine has its office which is devoted to accomplish the same assignment mentioned above at zone level. Though it is not properly working due to lack of follow up and lack of awareness regarding how EIA is really important; districts are also having their respective land and environmental protection offices. It seems that the presence of the office building alone does not guarantee for environmental conservation as I have never seen any work being done by the environmental protection team during my field survey .There is clear ambiguity of what to do and how to do things, one of the reasons being the fact that it is not environmental professionals who are leading the offices rather it is those people who only have political affiliation to the ruling party than the technical knowhow regarding the monitoring and evaluation of environmental impacts of the on-going development projects on the environment .

On the other hand, huge investments like the Eastern Industrial Park of Chinese Company in Oromia Special Zone, near Dukam town, for example, do not have any SEZ legal, regulatory and institutional framework. It is without this prerequisite that the industrial park is established six years back and in operation now. It is realized that there is no publicly available social and environmental impact assessment for the project that is carried out on 300 hectares of land by displacing thousands of farm households from the area. In the near future there will be a historic environmental destruction that will happen due to this industrial zone if no kind of environmental precaution is reviewed and corrected.

In general, even if environmental laws and proclamations are prescribed for Oromia region and duties and responsibilities are clearly set for the experts at different levels of administration, implementation and enforcement of the laws and proclamations is at dismal.

CHAPTER THREE

3. Methodology

3.1 Research Design

The study was carried out by using a mixed method approach (i.e. qualitative and quantitative). A quantitative approach has captured substantial measurable and countable impacts of industries environmental and socio economic condition of surrounding the study area, a qualitative approach helps to explore in-depth and comprehensive processes‘ of a household‘s behavioral traits; such as perceptions, attitudes, practices and reactions to social, economic and physical environment of their surroundings.

3.1.1 Sampling Techniques and Sample Size

The researcher took only one Kebele from the four Kebele of the town: there are Gelan, Tulu Guracha, Caffe Tuma and Merino, which is Kebele Tulu Guracha due to high occurrence of the problem on the socio economic and environment of the community surrounding. The Tullu Guracha kebeles were selected based on the presence of a large number of investments in the manufacturing industry in general and of textile industries that discharge liquid effluents in particular. A kebeles is the smallest administrative unit of local government in Ethiopia, similar to a ward, a neighborhood, or a localized and delimited group of people. Tulu Guracha kebele has 120 HHs. To determine the sample size from the total respondent the following equation has used in this study:-

$$n = \frac{z^2 * \sigma^2 * N}{(N-1)\, e^2 + z^2 * \sigma^2_p}$$

Where: -

n = size of sample.

N = size of population.

..e = acceptable error (the precision).

σ_p = standard deviation of population

z = standard variety at a given confidence level.

In this formula, the following assumptions were made: the size of the population is 120, the standard error (acceptable error) is 0.05, the standard deviation of the population is 0.5, and the value of standard variant at 95% confidence interval (z) is 1.96. Thus, actual sample size was calculated as follows:

$$n= \frac{(1.96)^2*(0.5)^2*120}{(120-1)(0.05)^2 + (1.96)^2*(0.5)^2}$$

$$= 91.6\sim92$$

Accordingly(92)sample informants out of 120 household were distributed to the Tulu Guracha kebele,which was interviewed using systematic random sampling (SRS) methods..Additionally 28 purposively selected Municipal officials and 6 kebele chairs mans, who have direct concern with the subject under the study, were interviewed.

3.2 Types and Sources of Data

In order to achieve the stated objectives both primary and secondary data was used. Primary data was obtained from key information interview from municipality office workers and from other indigenous people of the town and questionnaires from selected respondent's employer. Secondary data was collect from various written materials, published and unpublished books, reports and from internet.

The participants were selected based on the number of years lived in the kebele and their role within kebeles. Additionally, expert interviews with land use land administration and experts in the environmental protection units at levels of urban administration in the study towns were conducted.

3.2.1 Methods of Data Collection

There is a different collection tools that was used in this study. The primary data was collected by questionnaires, which was distributing to sample respondents. In addition to the questionnaire data that was obtained by through interview and questionnaires'' with municipality officials and some indigenous people**.**

3.2.2 Instruments of Data Collection

1. Questionnaire

Close and open-ended questions were given to the selected investment sectors or factories of the town, investment office and municipality. The advantage of using questionnaire as data collection tool is because of its arranged structure that to guide the researcher in collecting data from different sources.

2. Field Observation

First hand data on the field was collected by direct observation on the impacts of industries on the environmental and socio economic condition of the surrounding area and related process in the study area. Observation was taken by physical inspection, reconnaissance, taking sketches of the existing problem areas and photographing.

Here existing natural and manmade effects and to identify compatible of land use the surrounding of the study area, existing infrastructure and utilities, quarrying operation, and their impacts on the environment and socio economy were considered as major observable variables. In addition to the field observation, field survey was employed to collect spatial data impacts of industries on the environmental and socio economic condition of the surrounding area. Generally, most of the required data for the analysis of this research was gathered through this instrument.

3. Document Review

Necessary documents of the selected town were reviewed in order to get the necessary information with regard to the impacts of industries on the environmental and socio economic condition of the surrounding in the study area. Moreover, extra information was collected from relevant books, journals and other literature materials.

3.2.3 Procedure of Data Collection

The checklist questionnaires were prepared and presented to the selected respondents in a face-to-situation. This was done at the most convenient time available to them to interview the purposely selected respondents. Sufficient time was also allotted in order to help the respondents give sufficient and complete response. Besides, personal observation, field observation and focus group discussion were administered by the researcher himself to explore the actual situation of environment.

3.2.4 Ethical Consideration in the Field Work

During gathering information from different concerned bodies the researcher were show positive approach at any time for the respondents. The respondents asked question given by (answer) different things according to the need of the researcher. The respondents are giving clear information to the researcher asked question. The respondents are does not showed unethical behaviors.

3.3 Methods of Data Analysis

Data analyzed was presented mainly in descriptive and quantitative approach. Qualitative approach is also employed in extent. Tables, maps, graphs and charts should use for presentation of data. Photo graphs and figures would incorporate to the research work to support and ascertain the actual situation on the real ground. Relevant computer software, like photo shop, illustrator, SPSS, excels, etc. with sufficient verbal description will be part of presentation techniques.

CHAPTER FOUR

4. Result and Discussion

In this chapter based on the general and specific objective of the study, the collected data is presented, and analyzed in orderly and organized way. Although the results and discussion of data collected regarding the impacts of industries on the environment and socio economic condition of the surrounding community are discussed in five sections. In section one the major impacts of industries on the environment are identified. In second section the major impacts of industries on socioeconomic condition are identified. In the third section the land use planning compatibility with the surrounding land uses are discussed. In the last section are intervention of the government response in order to reduce impacts of industries on the environment and socioeconomic condition are discussed, finally proposes effective solution which overcome the challenges and promote sustainable development of the industrial areas in Galan town are identified and results of findings is discussed and interpreted based on findings in the form of tables, graphs, tabular and plate form so as to reach to access the ill impacts of industries on the environment and socio economic condition of the surrounding community

4.1 Background of the respondent

4.1.1 Response rate

For this study 92 questionnaires were distributed. All the questionnaires were completed and returned. Additionally 28 responsible Municipal officials and 6 kebele chair mans, who have direct concern with the subject under the study, were interviewed. To triangulate the responses focused group discussion were employed among informally settled households to strengthen the reliability of the study.

4.1.2 Socio economic and Demographic characteristics of the Respondents

This section deals with demographic characteristics such as age, sex, educational status, income, gender composition, occupational status and duration of the stay of the respondents in the study area of the respondents.

Table 4. 1 socioeconomic and demographic Characteristics of sample households

No	Question	Variable	Frequency	Percentage (%)
1	Gender	Male	58	63.1
		Female	34	36.9
2	Education level	Illiterate	18	19.5
		Elementary	16	17.3
		High school	29	31.5
		Diploma	8	8.7
		BA/BSC and above	21	22.8
3	Marital status	Married	54	58.9
		Single	17	18.4
		Divorced	8	8.6
		Widowed	13	14.1
4	Employment	Self employed	23	25
		Farmer	27	29.3
		Gov't	36	39.1
		Unemployed	6	6.5
5	Age	20-30	18	19.5
		31-40	23	25
		41-50	27	29.3
		51-60	17	18.5
		>60	7	7.6
6	Income	< 1000	13	14.3
		1001-2500	25	27.1
		2501-4000	32	34.7
		4001-5500	13	14.1
		Above5500	9	9.7

7	Family size	1-4	69	75
		5-8	23	25
		9-10	-	-
		Above 10	-	-
8	religion	Orthodox	39	42.4
		Muslim	13	14.1
		Protestant	35	38
		Others	5	5.4

Source: - Survey data from household, October, 2021

4.1.3 Age Category of the Respondents

As presented in the table 4.1 above, 19.5% of the respondents were in the age category of 20- 30 years. Respondents within 31-40 years age category account 25% of the respondents. Whereas, respondents with age category of 41- 50 and 51-60 account 29.3 and 18.5% of the total respondents respectively. The rest which were under the age category of greater than 60 year accounts, 7.6% in their number. This age category of the respondents shows that majority of the house hold heads of the industrial area settlers

4.1.4 Gender Composition of the Respondents

From the above table 4.1 the majority 63.1% of the household heads in industrial area settlers are male headed and 36.9% are female headed households. This indicates that majority of the informal settlers households heads in the informal settlers are male. Additions both female and male are participating in informal settlers. Similarly to this; according to Kiyingi (1994), sex refers to not only women and men but also to socially defined roles of each sex and their relationships. Gender issues, therefore, as a part of development approach puts people at the Centre and ensures their participation in their entire development process including settlements and environmental management.

4.1.5 Employment Condition of Respondents

From Table 4.1 above shows that 23(25 %) of the respondents were self-employed, 36(39.1%) were government employed, 27(29.3%) were farmers and the rest 6(6.5 %) were unemployed.

Table 4. 2: Respondents which have participated in the Data Collection

Respondents	Questionnaire		Grand total
	Sex		
	Male	Female	
Farmers	16	11	27
Government officials	19	17	36
Unemployed	4	2	6
Private	16	7	23
Grand total	55	37	92

Source: Field Survey Results, 2021

4.2 Impacts of industry on the Environment

The changes in environmental conditions lead to impacts on the social and economic functions on the environment, such as the provision of adequate conditions for health, resources availability and biodiversity. The development of Tullu Guracha industrial area also puts negative impacts on the ecological environment, thereby affecting the lives and health of local people. The process of operation and development of IZ's showing signs of inadequacy related to air pollution, noise pollution, water pollution and waste disposal. The higher the occupancy rate of industry is the more enterprises and companies in the investment are. As a result the population of workers from other places is more and more crowed. Living environment pollution caused by sewage and waste is increasing, polluting soil environment, inhibiting the growth and development of plants and animals, affecting crop and livestock productivity. Besides, the negative aspects such as noise, toxic substances discharged into the environment, etc. also affect the living environment of local people. Therefore, the analytical results from field data and industrial area indicate that most of the surveyed say that living environment pollution is a negative impact due to the development of industries. The impacts the industries have on the environmental condition of Tullu Guracha area in particular and Gelan town in general has described briefly below:-

4.2.1 Water pollution

A detailed analysis of the environmental impacts of industrialization revealed that industries set up before the foundation of the Town since 1999 E.C included mostly textiles, manufacturing and distilleries that were water intensive and had a higher pollution potential, exerting enormous pressure on the environment. The indiscriminate discharge of industrial effluent along with municipal solid waste disposal is the principal source for surface water contamination.

Water pollution has become a serious environmental pollution throughout the country. “No water in nature is absolutely clean” (Tegegn, 2012:1). The droplets of rain interact with solid dissolved salts and aerosols in the air before it reaches the ground and joins the surface water (Ibid.). Both anthropogenic and natural factors are responsible for the pollution of water.

According to the information of households survey and key informants industrial areas the major sources of water pollutions derive from the industrial discharges and municipal wastes. Residential waste, industrial discharges and Human waste are often disposed to nearby surface water bodies and disposal site near to residential areas. These pollutions have posed serious threats health problems, to the urbanites

4.2.2 Water scarcity

Information obtained from the water and energy offices in Gelan indicates that potable water supply coverage is less than 72% and that households obtain their water from different sources: Groundwater, boreholes, public tap water, and the premises of some investors and springs in some village areas. Here were water supply shortages in the town. There were a lot of industries and hotel services in this area. Because of this reason, the water consumption and demand has been increasing from time to time. Tullu Guracha industrial area, having access to potable water does not necessarily mean that these households are connected to a public water pipeline system in their compounds or at least close to their residences.

In some parts of Gelan town, Tullu Guracha investors have constructed groundwater wells for industrial purposes, and at times, they allow residents who live close to the premise to tap these resources (figure: 4:1).based, information obtained from field observation water from these sources is tedious and access is restricted. Wells remain closed during daytime working hours, between 8.00 a.m. to 5:30 p.m., and before and after residents have to wait in long queues to obtain a jerry cane of water every 2 or 3 days. Households who live close to the urban centers travel longer distances in order to fetch water from public taps, for which they have to pay. Others buy water from private water traders. Particularly poorer households and those who reside in areas that are rural have to rely on surface water from nearby rivers or streams which is often contaminated by effluents from industries, textile industries in particular

Figure 4. 1 Inadequate water supplies

Source: own photography (2021)

4.2.3 Air pollution

According to the informant from the Gelan Transport Authority and field observation, the number and age of cars in the Tullu Guracha area has been increasing due to industry services (old bus) and after foundation of industrial zone in the past years. This has a direct increase on the greenhouse gas emissions mainly CO_2. The increased emissions are driven first by higher emissions from freight transport and also by higher emissions from passenger transport, Traffic-related air pollutions result in chronic respiratory diseases such as asthma and bronchitis.

Industrial emission is another source of air pollution, albeit at insignificant level. Based on the Environmental Pollution Control Proclamation 300/2002 two standards are prepared: industrial emission standards and ambient environment standards. However, based on the information obtained from the key informants most of the industries have not met these basic standards. Even though the proclamation enumerates the necessary mechanisms to address industrial pollution (such as polluter pays principles, polluter cleans up, and in grave pollution scenarios, the closure or relocation of industrial sites) these can hardly be implemented. As compared to other industrial related pollution, the CO_2 emission from the industry is at meager amount.

Figure 4. 2 Air pollution due to the industries

Source: own photographs (2021)

4.2.4 Noise Pollution and Vibration

Noise which is expressed as unpleasant and unwanted sound and often measured in dimensionless unit, decibel which is a measure of loudness can emanate from the different sources of noise such as modes of transportation (like road and rail transportation), industrial operations which release sounds of engines and machines, cutting, sawing, welding and many other repair and maintenances woks in garages and warehouse, construction activities, etc.

During field visit and information obtaining from informant's noise pollution was affected on interference with man's communication, hearing damage as well as physiological and psychological changes. Continuous exposure to noise affects the functioning of various systems of the body like hypertension, insomnia (sleeplessness), gastrointestinal, behavioral, emotional changes affecting the health and safety of the workers and nearby residents.

4.2.5 Waste Disposal

Based on the information obtained from the key informant interview and filed observation all solid wastes generated in the industrial areas are not stored in standardized/authorized Municipal containers. Most of the industries store solid wastes either within their own compounds Using simple containers or dispose haphazardly into open spaces and bushes, along streets sides, gullies, drainage canals, railway sides, etc.

The volume of some discharged effluents was so high that they block local people‘s walkways. Some of them were discharged without even using decolorizes in order to remove different dyes used during the processes of dying or bleaching of fibers and/oryarns or effluents with high turbidity level level (See Figure 4:3) that was discharged from NOYA, DH-GEDA and ALMHADI textile industries respectively.

During field visit, it is observed indiscriminate disposal of solid wastes are onto vacant land, which is located near DH Geda, and local residents. Such indiscriminate disposal of solid wastes create unattractive urban scenery and it is potentially causes of health problems since solid wastes make offensive smell, attract disease vectors and pests (flies, mosquitoes and rodents) and pollute both surface and ground water bodies . Besides, solid wastes block drainage canals, culverts and natural water ways(See the plate 4:3). As a result, the municipality has to work to curb the adverse effect of improper solid waste storage. Observe the figure below.

Figure 4. 3 improper disposal of solid waste

Source: own photography (2021)

4.3 Impacts of Industries on the Natural Environment

Industry areas do not have only local environmental impacts but also large so-called 'ecological footprints' (WWF 2000). In their immediate vicinity, cities have a variety of impacts: conversion of agricultural or forest land for urban uses and infrastructure, reclaiming of wetlands, quarrying and excavation of sand, gravel and building materials in large quantities and, in some regions, deforestation to meet fuel demand. The use of biomass fuel also causes indoor and outdoor air pollution.

4.3.1 Degradation of flora and fauna

The interviewers stated that, originally, the study area was known to harbor various wild animals including: Spotted/ hyenas, common jackal, mongoose, vervet monkey, mole rat, civet, wild cut etc. But today these animals are not commonly seen in the area. These may resulted from the absence of parks, reserves and sanctuaries, and uncontrolled industrialization brought changes in habitat structure reserved areas for wild life conservation in the study area. According to some dwellers, now a day wild animals like hyena, rabbit, pig and fox are rarely found in the study area, mainly around the boundaries of Akaki Worada.

As per the information from the households, the area has been inhabited and utilized for a long time. As an area with a known history of farming for a long period of time, human interference with previously existing flora and fauna has made the area devoid of both vegetation cover and wildlife. However, there are some patches eucalyptus trees, Albida, and Acacia, True man tree. In areas very close to the villages. Natural vegetation is to a great extent diminished due to encroachment and clearance for agricultural purposes. There is no any significant grassland since much of the land is used for crop production. There is no any designated sensitive area.

4.4 Impacts of industry on the socio economic condition

The industrialization of the world changed the manner in which people lived and the way societies interact in a variety of ways including quality of life, economic power, and political repercussions. The landscape of the world morphed from a primarily agrarian culture to mechanical. The new industrialization required people to re-think the cultural norms and challenge the government to adapt to the new way of life as well. Industrialization changed society from agrarian to mechanical, meaning the majority of sustainable jobs moved to larger cities. This created several problems for the working class. Living conditions during the early phases of industrialization were poor. Cities, unable to handle the influx of workers, hastily erected poorly constructed and crowded apartment buildings or other residences. The workers often lived close to the factories and were surrounded by pollution more often than not. The work was also dangerous with little government oversight in new industries. Workers,

having yet to form unions, had little bargaining power with managers leaving the workers vulnerable to unsafe conditions.

In consequence, the substantial conversion of farmland into “industrial land” negatively affects local people not only through the loss of their farmland but also through the lack of promised employment opportunities and improved infrastructure that might have otherwise offset their losses in the agricultural sector. In relation to employment opportunities, high labor migration coupled with labor selection turned against the chances of getting opportunities for the local people where the level of human capital development is very low and with no specific skill acquired by most of the unemployed people except activities related to farming. As a result, those households who heavily rely upon farming activities, on their own land or on the land of others by working as farm laborers, often have more difficulties in taking care of their families when agricultural land conversion takes place and agricultural land holdings decline. In short, although non-agricultural activities are considered positively related to higher income and sustainable livelihoods, the success of non-agricultural trajectories depends upon the households’ “starting position.” It is no given that people, especially the poor, can actually take advantage of new employment opportunities outside the agricultural sector. The impacts that the industries have on the socioeconomic condition of Tullu Guracha kebele has been described below:-

4.5. Impacts of industry on to the Social infrastructure

4.5.1 Pressure on social and health infrastructure

Migrant labour could be attracted to the study area. This increase in population of the area could put pressure on the already deficient infrastructure. This could lead to overcrowding with potential for increase in communicable diseases like respiratory tract infections and skin diseases.

Concerning health institution of Gelan town the Tullu Guracha industrial area has no health center, drug store, clinic and only have one heaths post in the study kebele No health institution is owned by NGO or FBO. Because of the health center is far from the industrial area. In relation to availability of health center in the locality have not adequate health care’s within the industrial area.

Table 4. 3: Distribution of health institution in Tullu Guracha kebele

No	Health institution type	Number and ownership			
		Total	Government	private	NGO*FBO
1	Health center	-	-	-	_
2	Health post	1	1	-	-
4	clinics	_	_	_	_
5	Drug store	-	_	-	_
Total		1	1	_	_

Source: - Galan town administration health office, 2021

From the above table 4:3 it can be deduced that the involvement of the private investors in the provision of health care services is significant and encouraging, especially for middle and high income groups of people. But, due attention should be given to make available health care services for the majority of low income groups in the health institutions owned by government by reasonable price. Yet, there is no any hospital in this town.

4.5.2 Impacts on health and safety

According to the information obtaining from interview and informants industrial activities can negatively affect occupational health and safety. Lack of appropriate training and awareness of general facility design and operation of industries is the major cause. It can also be manifested by physical hazard (accidents), chemical, biological, radiological hazards. Hazards related to inappropriate utilization or lack of personal protective equipment (PPE), safety and machinery and equipment utilization manuals and lack of knowledge of special hazard environments and their monitoring are common in industrial activities of mainly in Tulu Guracha industrial area.

As chemicals emit fumes, mist, vapors or dust during storage and handling any worker may be exposed to these airborne pollutants in any part of the workplace. Chemicals in liquid and gaseous form also affect the immediate neighborhoods, when released into drains or removed from the workplace by exhaust blowers and chimneys.

COVID-19 is a new virus and not enough is known yet about how it affects children, youth, or pregnant women. The possibility, however, for people of any age to be infected and transmit the virus, although older people and/or those with pre-existing medical conditions seem more likely

to develop serious illnesses. Early detection and containment is essential to prevent and/or delay an overwhelming demand for health care services from an already fragile health system.

Unhealthy workers may be less productive, miss work too often and make potentially costly mistakes. Some of industries like Textile effluent often contain odorous waste. Strong smells can damage the quality of life around the textile site and may reduce or destroy community support for further production or expansion. Controlling odor through improved waste treatment techniques, or even recycling, can improve community relations and may reduce costs.

Gelan town health office mentioned the high environmental pollution seeing that air, water and environment pollution created by industries as the major cause for diseases in the town. This problem is directly related to the existence of outsized number of industries in this town, and, moreover, due to lack of control on those industries wastage treatment by concerned body. Diseases in the town were calculated for based on data obtained from Galan town health center for 2020 G.C the following table presents the top ten diseases in this town.

Table 4. 4 ten top diseases in Tullu Guracha(2021)

Rank	Diagnosis type	Patients Number	Percentage
1	AURTI	2128	26.2
2	Diarrhea (non blood)	1414	17.4
3	Trauma (injury, fracture etc.)	1029	12.7
4	Acute febrile illness	1566	10.1
5	Dyspepsia	702	8.7
6	UTI	519	640
7	Musculoskeletal system disease	364	4.5
8	Diarrhea (with blood)	355	4.4
9	Helminthiasis	318	3.9
10	Skin infection	295	3.6
total		15451	100

Source: - Gelan town administration health office, 2021

As a result, on those industries are freely releasing their waste (both solid and liquid waste) on the local community, hence created high health crisis for local community. Factors like poor environmental sanitation and personal hygiene, shortage of public and household toilets. Poor sewerages and waste

disposal management, absence of proper waste disposal site and inappropriate use of latrine added to the aforementioned factor, contributed much for the prevalence of those diseases. Shortage of clean drinking water is also mentioned as the outstanding factor for that matter. Prevalence of health risk behavior practice like drug abusing, alcoholism and multi sexual partnership also contributed much for this situation.

4.6 Impacts of industry on the Physical infrastructure

4.6.1 Traffic congestion

Traffic congestion around IA area is a situation on road networks when physical uses of road by vehicles increases. It occurs when road network are no longer capable to Increasing growing population in Gelan town Rapidly growing population migration facing an unexpected congestion on road. Better facilities like-communication system, medical facilities, educational institution leads to heavy traffic. Improper accommodating the volume of movements that used by them and it is characterized by slow speed, long trip timing and high vehicular queuing. Planning of Gelan is one of the early city within Oromia regional government and many of industry is taken before establishing Gela town since 1997 , so proper planning were not done that time and in modern time growing urbanization leads to more worst.

According to the informant from the Gelan Transport Authority and field observation, The community of the surrounding industrial area has no accusable road in the locality and there is no access transport during morning and evening time while others have some streets which is not comfortable are neighborhoods are poor access road network.

Figure 4. 4 Traffic congestion

Source: own photography (2021)

4.6.2 Informal settlement

Due to the Tullu Guracha industrial area informal settlements have huge impact on the growth of Gelan town. Informal settlement create urban sprawl in the city, substandard housing, expansion of unplanned urban area, and poor basic infrastructure and service. Many of informal settlers expand at the peripheries' of the town and construct the house illegally with substandard construction materials. Majority of them construct house from mud and wood at night time.

As the information from the households the negative impacts of informal settlement have on environment includes deforestation of forest in the surrounding peripheries and rural areas, loss of fertile agricultural land, pollution of air to the study are the major impacts of informal settlement in the town. Although the problem of solid and liquid waste is more sever in informal settlement areas. Due to the lack of established collection points, piles of garbage are scattered in and around residential area which leads to environmental pollution and health problems

The result of finding indicates that almost all informal settlers in the study are not pay tax to the municipality. Because most of the plot sizes are large causing the municipality or the local government; to lose huge amount of revenue, underutilization of land, occupiers do not pay tax. Also the other impacts of Informal settlement create urban sprawl in the city, substandard housing, expansion of unplanned urban area, and poor basic infrastructure and service.

Figure 4. 5 informal settlements

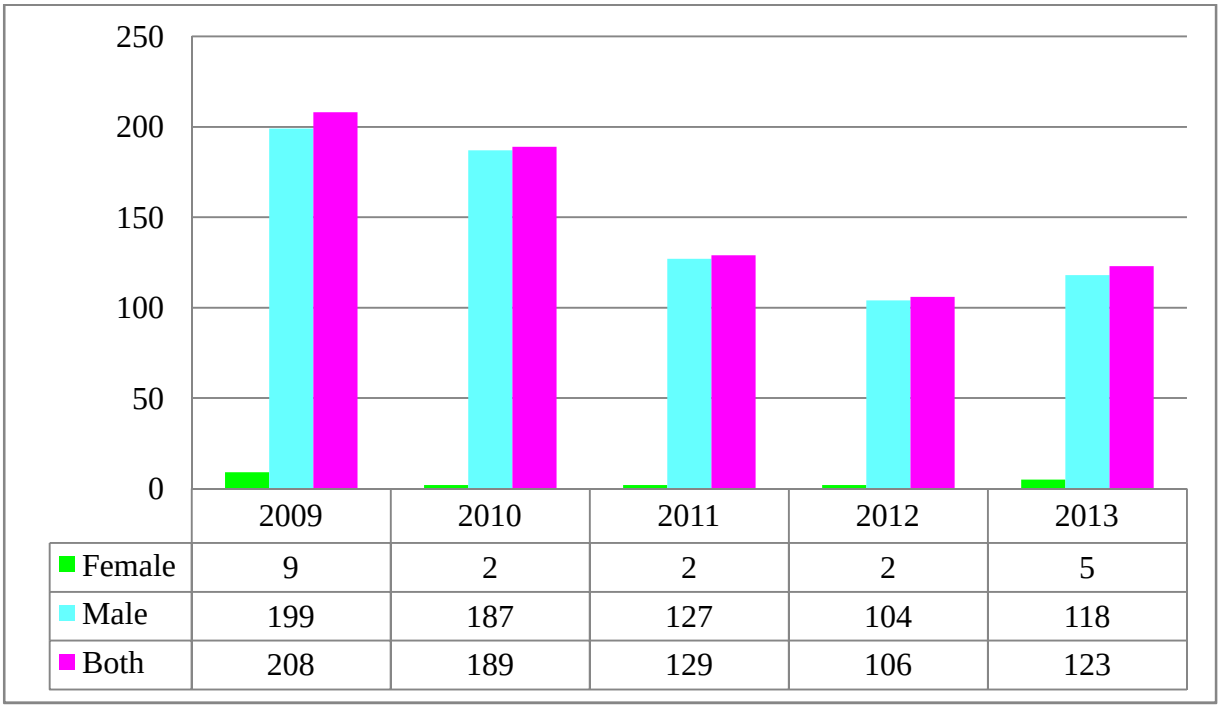
Source: own photography (2021)

4.6.3 Crime and conflicts

Labor issues are always a source of friction between companies and communities and also among community members. The agitation could be either due to requests for a certain number of workers that could not be met or sharing the labor slots in the community

Gelan town administration police affair lists the existence different socio economical problem in the area as the major cause of crime prevalence in Gelan town, Tullu Gurachakebele. Unemployment is the major crime cause is the kebele. Apart from this, lack of enough recreational facility in the kebele forces many people especially youth classes, for drug addiction and in turn to crime activity. Chewing chat at a day and drinking alcohols a night is the common life style for many youngsters found in Tullu Gurachakebele and made them to be addicted. The following graph presents crime prevalence in the kebele accordingly.

Figure 4. 6 Trend in reported crime case and criminal population number (2009 E.C -2013 E.C)



	2009	2010	2011	2012	2013
Female	9	2	2	2	5
Male	199	187	127	104	118
Both	208	189	129	106	123

Source: Galan town administration police affairs, 2013E.C

The graph sketched above shows the fact that in the past five consequent study periods, the crime prevalence trend showed continues decreasing and it showed the slight increasing only in the year 2009. Concerning criminal population or the people accused of committing different crime act, the information gathered from Gelan town police affairs revealed that there were 755 person accused of criminal in the above mentioned four years. In most cases male counterparts are

deadly involved in serious crime acts than female counterparts. This data is also further discloses that among total peoples, who have committed different crimes in above mentioned years, 735 (97.3) criminals were male and the remaining 20(2.7%) criminals were females.

When criminal's population distribution across brood age category is seen, from total criminals the majority of them (48.7%) were those who existed in the age group 19-30 years old, and another (20.2%) criminals are existed in 31-50 age group. The remaining criminal population was young inmates who existed between 16 and 18 years old accounts for 9.7 % of total criminal numbers.

4.7 Economic Impacts of the Industries

4.7.1 Impacts on Land Acquisition and Loss of Income Generation

The massive conversion of land use change for industrialization, residential and infrastructure construction has caused a sharp reduction of the cultivated farmland size that in turn negatively affected the total crop production in the studied area and per households. The study results clearly shows that large scale appropriation of agricultural lands has led to complex and diverse socio-economic impacts directly on their livelihoods through insufficient production of crop required to feed their family and meet other basic needs. In connection with this, the processes of land conversion were also exacerbated by the excessive demands for housing expansion as industrialization often acted as a stimulus in attracting more people (i.e. labor and those who need better infrastructure) to the areas

Land acquisition for industrial and horticultural development indicates that commercialization of land, the production of export items at the expense of loss of high quality agricultural land which in the short term reduces the amount of food crops production for local consumption. This situation will definitely be one of the major reasons for the future environmental degradation and food insecurity that the local population are facing and expected to face. When a parcel of land is converted to urban use, there are impacts that arise from increasing the urban land surface cover, and there are impacts that arise from decreasing the amount of whatever cover was pre-existing.

The change in the farmland holding size is more in the studied area. Of the food crops cultivated in these areas, teff and wheat are most affected by the land conversions. As the result of these reductions, farmers who once used to supply surplus food crops, mainly teff, to the urban residents has become unable to meet their own yearlong food requirements for their family.

Land is the main asset and source of livelihood for the industries affected population. Farming is the most important activity and unlike other areas where some marginal land is found in between, almost all the land (~360.3ha) allotted permanently for the industry has been used as a good agricultural land. Since the industries affected populations have of the productive land initially owned by the households, the impact on the general livelihoods of the industries affected population is considerable and it is the main social and economic impact for the farmers.

4.7.2 Landholding before Industrialization and urbanization

Pertaining to land holding of farmers of Gelan town Tullu Guracha IA's large residential plot size owned by the farmers of Galan town. This ranges from 200m^2 to 2000m^2. This is because of large family size of the farmers and farming practiced in the gardens of the respective farmers. Most farmers grow vegetables and high value cash crops within their compounds because of relatively high fertility of soil.

In addition to crop farming, the economy of quite a large number of the households is supported by the possession of a good number of livestock which include oxen used for ploughing, cows for reproduction and milking and pack animals used for transporting themselves and their produces. The average size of farmland and grazing land of farmers within the Galan town surrounding Tullu Guracha dwellers ranges from 0.5 hectares to 6 hectares. The size of individual farmer's plot land is associated with the family size of farmers.

Table 4.5 Land holding of farmers before industrialization, urbanization and infrastructure has expanded in 1997 E.C

The household farmland size:	Size of farm land and grazing land				Total {%}
	0-1.5hect	1.5-3hect	3-4.5hect	Above 5hect	
Land holding of farmers before industrialization, urbanization and infrastructure	14[15%]	31[33.7%]	24[26%]	23[25%]	92[100%]

Source: field survey (2021)

In 2012/13, the land holding size of the farming households were further reduced to half the size of the farmland they owned prior to the start of the processes of industrialization in their localities

Table 4. 6 the household farmland size early industrialization (2013 E.C)

The household farmland size:	Size of farm land and grazing land				Total {%}
	0-1.5hect	1.5-3hect	3-4.5hect	Above 5hect	
In 2013E.C	36[39.1%]	41[44.5%]	10[10.8%]	5[5.4%]	92[100%]

Source: field survey (2021)

In line with the general conversion of agricultural land into other land uses, the farmland size per household decreased in the case study area.

4.7.3The effects of industrialization on agricultural activities

4.7.3.1 Effects on the Cultivated Land Area and Crop Production

The livelihood in the study area is predominantly agrarian and rural. It is based on mixed farming with a predominance of cereal farming with little area left for grazing. The livestock economy is largely based on crop residue, straws after harvests and the very little available grazing land. As per the data from the offices, key informants as well as the IA Affected Populations themselves, the area is known for its good potential in agricultural production especially cereal based. It is known for its production of one of the best varieties of teff (very important stable food in Ethiopia) known as ‘manga Teff’. Other annual crops such as wheat, chickpeas, lentils, and different types of beans are also grown based on established rotation of crops.

In this study quantify the total area of agricultural land in the Gelan Municipality kebeles on the outskirts of Tullu Guracha and explain the effects of land conversion on the sizes of cultivated land, crop production The figure below shows the total area of aggregated cultivated land and the proportions of the area covered by various important crops between2011, 2012 and 2013.

Table 4. 7 the total Area (in ha) and output (in quintals) in the town for 20011 -2013

No.	Crop type	2011		2012		2013	
		Area (ha)	Prod (Qt)	Area (ha)	Prod (Qt)	Area (ha)	Prod (Qt)
1	Cereal Total	219	3255	205	3714.5	195.5	4174.5
2	Pulses Total	94.5	1574.5	90.5	1665.5	85	1754.8
	Total						

Source: Galan town agricultural office

As it is given in the table 4.7trend of crop productivity in the town is increasing by 14% and 5.8% and around 460 and 91 quintals/hectare for cereal and pulses respectively. But the hectare of land of the town is decreasing 5%even-though the productivity is increasing. The amount of production obtained in the town is not enough to satisfy the needs of the society, this is happened due to all farmers do not use similar agricultural input and technology. To solve the problems, and increase the productivity of agriculture in the town the supply of improved variety has to be Constant with good supply of inputs. Even though the crop land is decreasing trend in the past three years the productivity of the crop is increasing trend according to data obtained from town.

4.7.4 Compensation types and the determination of compensation amounts

The arrangement of compensation payments for landholders or other individuals whose property or landholdings are to be confiscated is generally important in all land conversion schemes. This is well stated in the Federal Constitution of Ethiopia, Article 40 (8). According to this article, the expropriation of landholdings or private properties in Ethiopia should take place only after the compensation payment is made in advance to the lost/damaged or properties on the confiscated landholdings.

According to Article 7 and 8 of Proclamation no. 455/2005, there are two cases when an individual is entitled to claim compensation payments. These are a) compensation to be paid for lost/damaged/confiscated property and b) compensation for displacement (i.e. provided that expropriations involve evictions). Compensation for the earlier will be paid if individual‘s or a

group of individuals 'landholdings is (are) being expropriated (Article 7 (1) and for his/her protection or improvements he/she made on the land against likely degradation. Compensation amounts for this part are calculated based on the —value of capital and labor expended by the landholder on the land‖ (Article 7 (4) of Proclamation no. 455/2005). Compensation for the later will only be paid if the expropriation of 128 landholders does also involve permanent displacement of the landholder from his/her original place of residence (Article 8 (1)).

The first step in the valuation of the lost/damaged properties on the converted land as well as for the land to be confiscated is to carry out field identification of the types of properties on the land and taking field measurements. According to Proclamation no. 455/2005, the field identification and recordings of the property types on the land is carried out by a certified private or public institution or an individual consultant (Article 9 (1); or by a committee of five experts designated by the woreda or urban administration (Article 10 (1). An independent yet certified private or public consultant sounds more logical than a team of committees assigned by their manager to ensure impartiality. Yet, information obtained from farmers and focal persons in the urban administration shows that, the latter has been in charge of property valuation and taking measurements of farmland size in the field. In the context of this study it was not possible to get access to reliable information related to the compensation amounts paid to farmers in the study area.

However, interviewed farmers were asked if they had received compensation payments or not for their farmlands. According to the findings (see Table 4.2), the majority of respondents affected by land conversion had already received compensation payments at the time of the study. Accordingly, 80 (86.9%) of the interviewed farmers in the study kebeles in TulluGuracha had collected their compensation money

Table 4. 8 Payments of compensation or the expropriated/lost properties

Studied*Kebele*	Are you paid compensation for your land or property on the converted farmland?		Total (100%)
	yes	no	
TulluGuracha	80 [86.9]	12 [13.04]	92[100]
Total	80 [86.9]	12 [13.04]	92(100)

Source: Survey data, 2021

Based on the survey result shown in Table 4:12, 80(86.9%) of the study kebeles in TulluGuracha had collected their compensation money. The amount of compensation money paid to the affected farmers was not uniform throughout the past period. At the start of the industrial development in this area in 2004 and 2005, the prices set to calculate compensation payments for converted land were very low: around 2.10 birr/m^2 farmland size (i.e. ~0.1US$8) plus compensation for lost income based on the average annual income secured during the five years preceding the expropriation of the land'(Proclamation no. 455/2005). With regard to calculating the average annual income of the affected farmers, the farmers themselves were not consulted in the process. Instead, valuation teams based their assessment on their estimations of the average annual income of the farmer from the land. Between 2005 and 2010, the number of investment applicants and the magnitude of land conversion increased strongly in the study areas. Therefore, most of the households affected had received compensation payments when the land conversion rate was very low (~0.1US$/$m^2$). However, following strong complaints from farmers affected on one hand and criticism by different media outlets, the amount of compensation payments for land rose over time. In 2011/12 around 18 birr/m^2 were paid.

According to the recent Proclamation no. 1161/2011 the prices set to calculate compensation payments for converted land were: 111.52 birr/m^2 farmland size plus _compensation for lost income based on the average annual income secured during the ten years preceding the expropriation of the land'(Proclamation no. 1161/2011).

The amount of compensation money for loss of farmland and grazing area ranges from four thousands (4,000) to three million (3,000,000) birr. But the largest proportion of compensation

for farmers is between four hundred thousand (400,000) and one million (1,000,000) birr. Those Farmers who already received large amount of compensation money have started businesses but in disaggregated manner because of absence of training and lack of knowledge to carry out their investment activities.

As part of the process involved in the determination of the compensation amount, four important points were found as the cause of grievances between those involved in the expropriation of landholdings and the local beneficiaries. These are the price set per m2 of converted farmland (i.e. the terms used to calculate compensation amounts), the accuracy of the field measurements and the limited role farmers play in the entire phases of property valuation and the determination of compensation amounts.

4.7.4.1 Resettlement of Farmers

In addition to the previously incorporated farmland and grazing land; due to the investment which took place recently, this obviously affects the livelihoods of the specified farming community which is entirely dependent on agricultural. The bottom line for the socio economic impact is the amount of money paid per square meter of land in the name of compensation; and years which is much less than and the term compensation by itself which doesn't mean lively hood restoration of the re-settlers. But recently additional compensation in resettlement in kind is 500m^2 for families, invests on their own land and 140m^2 for members of child's above 18 years.

Table 4. 9 Replacement of Land in Tullu Guracha farmers

no	category	purpose	No. of farmers	Area(m^2)	total area(m^2)
1	Farmers(families)	residential	210	500	105,000
2	Each members of families above 18 years	residential	840	140	117600
3	investments	industry	32	8,000	256,000

***Source*:** From Gelan town land administration and land use (2021)

Replacement of Land in Tullu Guracha farmers are allotted of land to the investment is based on the type of investments and ranges between 2,000m2 to 20000m2 and the residence is based on the standards

4.7.5 Land Use Compatibility the surrounding industrial area

Land use is the spatial distribution of city functions – its residential areas, its industrial, commercial and retail business district and a space set aside for institutional and leisure time function, it is a functional term which corresponds to the description of areas in terms of their socio-economic purposes. I.e. areas used for residential, industrial, or commercial purposes, for farming or forestry, for recreational or conversion purposes etc.

Tullu Guracha industrial area required a large hectare of land. The plots of land required for this purpose would be permanently transformed by the investment of different categories of industries, manufacturing, textile, garages and warehouses, etc. This permanently transforms the former agricultural land under a rural land use setting to an Industrial with a completely different and modern land use. The extent and impact on the land use change can be easily understood when one looks into the land use categories recommended by the strategic plan in the demarcated area.

4.7.6 Major purpose of agricultural land conversions in the study areas

This section intends to assess some of the major drivers or purposes for which the converted agricultural lands were used in the study areas. To this end, the informants were asked to explain the purpose for which their farmland was used for after conversion. Table 4:10 presents some of the major drivers of land conversions from the compiled data.

Table 4. 10 Purposes of agricultural land conversions

Purpose of agricultural land conversation	Frequency{f}	Percent{%}
Industrial	50	54.3
Residential	19	20.6
Commercial	12	13
Infrastructure	11	12
total	92	100

Source: Gelan land use and land administration office (2021)

In Table 4:10, the overwhelming majority of the informants, 50(54.3%) in Gelan surround Tullu Guracha have indicated that, their farmland was converted and used for the establishment of industries. On the other hand, around 19 (20.6%) and 12(13%) in Tullu Guracha and also indicated that their farmland was used for residential and commercial expansion.11 (12%) of the converted farmland was used for infrastructures. In general, close to 92(100%) of the informants had indicated that, their agricultural lands were converted and used for industrial and residential uses.

A. Industrial on the main road is not compatible

Land conversion is both a cause and an effect of environmental changes common both in the urban areas, especially in the fringe areas where new developments are affecting the existing land cover, and in the Tullu Guracha industrial area where commercial lands are being transformed to industrial uses around the main roads to Dukam. Although investment in the town had started when Gelan was a small village, it is currently widespread throughout the town in unmanageable manner even performed in the middle of the town. In other saying, industry expands equivalently as the town expands. It affects the physical beauty or urban design of the town as well as causing danger against the residents found in surrounding. So the location of the IA is now incompatible with the adjoining land uses.

Figure 4. 7 Incompatibilities of industries on the main road

Source: own photography (2021)

B. Industrial on the main road before the establishment of Gelan town

According to information obtained from Gelan town Land use and Land Administration investments before the township status was given to Gelan town surrounding Tullu Guracha. These investments got land for investment office of the former Akaki district in which the present Gelan is located. All investments except Mesfin Industrial Engineering are located along Addis Ababa-Adama highway. Even Mesfin Industrial Engineering is located at a distance not more than 200 meters from the highway. In fact, Mesfin Industrial Engineering is located along the Addis Ababa-Djibouti railway to have the location advantage of importing bulk inputs by the use of the rail way in the past.

Table 4. 11 Sample investment sectors before the establishment of Gelan surrounding Tullu Guracha Industrial area

No	Factory	Established in	Area(ha)
1	Trackon Trading	2005	-
2	KOSPI	1997	7.6
3	DH. Geda	2006	5
4	Ada'al industrial	2006	1.7
5	Dot Pencil Plc	2004	5.3
6	NOVA Star garment factory	2004	3.3
7	Mesfin Indus. Engineering	2001	3.1

Source: Gelan town Land use and Land Administration

As it is shown in table 4:15, investments before the establishment of Gelan town in Tullu Guracha industrial area have large blocks. The minimum block size of these investments is 1.7 hectares (Adaa'al industrial Plc) while the largest is 7.6 hectares (Kombolcha Steel Products Industry, KOSPI) as data is computed from the topographic map of Gelan town. These large blocks of investments create problem of accessibility to land uses at the back. This is further aggravated by large block size of recreational land uses along highway the majority of which were established before township status of Gelan town, Tullu Gurracha industrial area.

The recreational land uses of Gelan that are found along highway include RAMSA, Atlas Resort Center, Gelan and the woodlands. They have large areas. RAMSA has an area of 2 hectares

while Atlas Resort Center, Gelan and the woodlands, respectively, have an area of 5, 0.5, and 4 hectares

C. Quarry sites are not compatible

As most of the quarry sites are located at the foot of scattered mountain picks in the project town, where the raw materials are easily accessible, the Mountains are changing in to artificial caves, ponds, and cliffs. These are going to be a manmade barrier between the town and its rural hinterlands. Moreover, the safety of the workers at the quarry site is not in a good condition, most of the time the workers are vulnerable to rock slide and machine cut that results loss of life or hand-cap and injury. There are also problem of water ponds in the quarry which is creating conductive environment for breading of insects. Thus, necessary conservation measures should be made on the quarried areas and the law and regulation of quarrying activities should be implemented for the future carrier. So the location of the quarries is now incompatible with the adjoining land uses. These quarrying were extracted for different construction purpose. The quarry sites were owned by private and government companies. However, these quarrying processes have a lot of problem to the society and to the environment. These problems were identified during field work and from the societies living there as follow;

- Air pollution from dust of the quarry (have effects on the health of the society living there close to the quarry site)
- Sound pollution from explosions and machines (crasher and excavators)
- Quarry Site selection problems (quarry sites close to houses)
- No environmental impact assessment studies have been conducted before quarrying license was issued
- formation of new cliffs, depressions and gullies as observed during field observation
- formation of poorly drained areas and artificial ponds (observed in some quarry sites)
- aggravation of soil erosion
- Damaging land that can be used for other purposes etc.

Figure 4. 8 Incompatibilities of Quarry sites

Source: own photography (2021)

CHAPTER FIVE

5. Conclusions and Recommendations

5.1 Conclusions

In this study, the researcher focused on the impacts of industries on the environmental and socioeconomic condition of the communities. The most important thing is to ensure, in as much as possible, that potential negative impacts of the Tullu Guracha Industrial area are identified a feasibility study in order to develop enhancement and mitigation strategies. The IZ should be carried out without creating much adverse impacts on the biophysical and socioeconomic environment. It is an unavoidable conclusion that industrial area as big as an investment will not come without some significant negative impacts.

It is a foregone conclusion that an industry as big as the establishment of an IZ will not come without some significant negative impacts. As such, the assessment of environmental impacts made has identified activities that are likely to give rise to significant adverse impacts and one should work for ways and means of avoiding or minimizing the anticipated negative impacts by amending the design, operational processes or technologies applied; there by ensuring the environmental sustainability of the industries

The negative impacts are mainly related to pollution (air, water, and noise), waste deposal, degradation of fauna and flora, loss of farm land, as well as the potential for the spread of communicable diseases, safety and health problems of employees and traffic accidents and injuries. Hence, the assessment made and the mitigation measures recommended have to be developed further and policies, strategies and laws that are designed to support sustainable development.

5.2 Recommendation

The Ethiopian government has put in place a number of policies, strategies and laws that are designed to support sustainable development. The EIA procedures should be applied to plans according to the EIA proclamation No: 299/ 2002.The Strategic Environmental Assessment (SEA) has been introduced recently to supplement the EIA, but, there is no SEA proclamation or guidelines on SEA in place to reinforce the actions. Currently, the main objective of the Environmental Policy of Ethiopia is to prevent the pollution of land, air and water in the most cost-effective way so that the cost of effective preventive intervention would not exceed the benefits. In order to mitigate the adverse of pollution impacts of the various wastes generated, there is a need to implement both preventive and curative mitigation measures. The aim of the preventive mitigation measures is generally to minimize the generation of wastes at source and it will be implemented during the production operation phases,

In accordance with Article 55(1) of the Constitution of the Federal Democratic Republic of Ethiopia, the environmental pollution control proclamation highlight that the protection of the environment, in general,

and the safeguarding of human health and wellbeing, as well as the maintaining of the biota and the aesthetic value of nature, in particular, are the duty and responsibility of all. However, it appropriate to eliminate or, when not possible, to mitigate pollution as an undesirable consequence of social and economic development activities.

The Ethiopian government continues to make efforts to mainstream environmental issues in development processes. In Woredas preparations and implementation of environmental management plans is on-going, including the scaling up of the protection and conservation practices (water, forestry) though community participation. Although progress has been made and environmental issues are stated as priority in many policies, there is lack of implementation, and enforcement needs to be strengthened. Increasing economic growth and attaining middle-income country status by 2025 might result in improvements for some environmental problems but might increase pressure on some resources (such as water an energy) and increase emissions of some pollutants, typically those linked with urban traffic, transport and industrial production.

Based on the findings obtained in this study, the researcher proposed the following suggestion:

- In terms of living environment, most of the impacts are controlled and limited in and around the industry area. The key negative impacts such as emission of gas and dust, deterioration of water quality, generation of noise and vibration are expected. However, implementation of appropriate mitigation and management plan, such as to spray water to bare areas for dust prevention and to avoid the incentive operation of the construction machinery for prevention of emission gas, noise and vibration during construction phase, and to provide the commuter bus by tenants and to comply with the tentative target value of effluent water flowing out of the wastewater treatment plant by tenants including the project proponent during operation phase, will minimize these impacts.
- In terms of health and safety, some impacts on occupational/community health and safety and increase in number of accidents are expected. However, implementation of appropriate mitigation and management plan, such as to manage working conditions during the construction work and to provide security and maintain safety prevention measures during construction/operation phase will minimize these impacts.
- Adequate planning and resources has to be assigned for urban waste management services. As stands now the urban waste management systems are way behind the pace of urbanization and rapid population growth. Budgeting for urban waste management should be allocated.
- In consideration of the result of the EIA study for the Project, the Environmental Management Plans (EMPs) including adequate mitigation measures to reduce the negative impacts and

Environmental Monitoring Plan (EMoP) are proposed for each phase of the Project: pre-construction phase, construction/closing phase, and operation phase. It was confirmed that the environmental, social and health impacts of the Project were assessed and the Environmental Management Plan was formulated properly. In the process of EIA, opportunity of public involvement was ensured and comments from the public, TSMC and MONREC were reflected into the final EIA Report. Thus the EIA was completed in accordance with the requirements of the EIA Procedure properly in case that project proponent will follow EMP accordingly.

- Expansion of Gelan Towm Tullu Guracha industrial area brings a number of problems of housing, infrastructure, services and loss of agricultural land and vegetation. These problems require immediate attention of the urban planners, decision and administrators.
- A sustainable urban transport in the town requires strengthening various features of the system including mobility, accessibility, affordability, social equity, efficiency, safety, security, convenience, low carbon, comfort, and people- and environment-friendliness.
- Minimizing environment pollution, through strong control and management of industrial waste through different mechanism
- Creating Proper environment sanitation and waste management system, by proposing for waste disposal sites and public toilet, as well as by Increasing the household latrine coverage
- Industrial emission is another source of outdoor pollution in the study area, albeit at insignificant level. Based on the Environmental Pollution Control Proclamation 300/2002 two standards are prepared: industrial emission standards and ambient environment standards. However, most of the industries have not met these basic standards (Interview). Even though the proclamation enumerates the necessary mechanisms to address industrial pollution (such as polluter pays principles, polluter cleans up, and in grave pollution scenarios, the closure or relocation of industrial sites) these can hardly be implemented. As compared to other industrial related pollution, the CO_2 emission from the industry is at meager amount

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ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY SCHOOL OF CIVIL ENGINEERING AND ARCHITECTUREDEPARTEMENT OF ARCHITECTURE AND URBAN PLANNING

Questioners for Households

Questioner ID pge:-18948/11

This questioner is prepared to collect data for research undertaken on "Assessing the impacts of industries on the environment and socio economic condition of the communities in Gelan town", in partial fulfillment of the requirements for the award of MSc Degree. The aim of the questionnaire is to collect information on socio-economy of the household living in Gelan town and the impact the the industries have on the environment of the town and the surrounding. I would like to promise you that the whole information given by the respondent is used for academic purpose only. Hence, considering the purpose of the questioner respondents are kindly requested to cooperate with the researcher in giving the necessary information. I would like to thanks you for your cooperation.

Instruction

Please put (X) on the box for the answers you choose or fill your answer on space provided.

Part I: - Background Information

1. Age A. 20-30 B. 31-40 C. 41-50 D. 51-60 E. above 60

2. Sex A. Male B. Female

3. Educational status

A. Illiterate B. Elementary C. Secondary

D. College diploma F. Degree &above

4. Marital statuses

A. Married B. Unmarried

C. Widowed D. Divorced

5. Religion

A. Orthodox B. Protestant C. Muslim D. others

6. Ethnicity

A. Oromo B. Amara C. Tigre D. wolayitaF.other_____

7. Family size of the households?

A. 1-4 B. 5- 8 C. 9-10 D. above 10

8. Monthly income in birr A. <1000 B.1001-2500

C. 2501-40000 C. 4001-5500 D. above 5500

9. Types of job.

A. Private B. Government C. Unemployed D. Farmers

Part II: - Interview Questions focused on the socioeconomic condition

1. At which year, did you settle in this kebele?

_____ E.C

2. How did you settle in this kebele?

A) Inherited

B) By purchasing from farmers

C) Purchase from previous settlers

3. How much is the total area of your land before the industries, residential areas and infrastructure has expanded in to your kebele?

A. below 0. 5ha B. 0.5-1ha C.1- 1.5ha D.1.5-2ha

E. 2-3ha f. above 3ha

4. Who measured the size of your land?

_____

5. Does the size of your land decreased currently? A. Yes B. No

6. If you answer for question number 4 is yes, what are the major factors for its decrement?

A. Converted to industrial areas

B. Urban housing expansion

C. I gave it to my family member

D. Infrastructure development

E. other, specify, ----------

7. If you answer for question number 4 is yes, how many hectare of land is converted to Industrial areas ----------

Housing expansion_____

Infrastructure development_____ and other_____

8. Have you compensated for your property when it was taken by industries found around your areas?

A. Yes B. No

9. If you answer for question number 8 is no, what is the main reason for not getting compensation?

_____

10. If you answer for question number 8 is yes, for how many hectares of land did you get compensation?

_____

11. Do you explain the situation of compensation payment? That is:

A) Compensation in cash?

_____

B) Compensation in kind?

_____

12. Does the compensation is enough to improve your livelihood? Yes _____ No

_____

13. If you answer for question number 12 is no, what is the reason?

_____

14. What was the amount of compensation given for the property found on M2?

_____

15. Does compensation amount was higher than value of your land and properties on it?

A. Yes B. No

16. If you answer for question number 15 is no, what is the reason?

_____

17 If you answer for question number 15 is yes, how?

_____

18. What did you do with the compensation money?

_____

19. What are the major crops that you produce in the last ten years?

_____

20. Where do you usually sell your products?

_____

21. In what types of economic activities are you involved during off farm period?

_____

22. If your farmland was totally taken by industry, what was the total area of land given to you for residential house construction?

_____

23. What are the advantages that you have get due to the establishment of the industrial areas in your locality? _____

24. Does the industries found around your locality create job opportunity for your family member? A. Yes B. No

25. If you answer for question number 24 is yes, what type of job opportunity is it?

A. Daily laborer

B. Foreman

C. professional work

D. Compound keeper

E. other specify _____

26. How much is the average monthly income for unskilled household member employed in industry? (In birr)

A. <1000 B. 1000-1500 C. 1500-200 D. 2000-2500 E. >2,500

27. Does your families work in the industries face problems that affect their health conditions?

A. Yes B. No

28. If you answer for question number 27 is yes ‘, what kind of problem? _____

29. What are the negative impacts that the industries found in your locality have in your socioeconomic condition? _____

30. What are the positive impacts that the industries found in your locality have in your socioeconomic condition? _____

31. What measures should be taken by the government to overcome the negative impacts and enhance the positive impacts of the industries? _____

Part III: - Interview Questions focused on Environmental condition

1. How do rate the air pollution in your locality due to the industries? Do you think, there is air pollution due to the industries?

A. Strongly agree

B. Agree

C. Not sure

D. Disagree

E. Strongly disagree

2. How do rate the degradation of flora and fauna in your locality due to the industries? Do you think, there is degradation of flora and fauna due to the industries?

A. Strongly agree

B. Agree

C. Not sure

D. Disagree

E. Strongly disagree

3. How do rate the waste pollution in your locality due to the industries? Do you think, there is solid and liquid waste pollution due to the industries?

A. Strongly agree

B. Agree

C. Not sure

D. Disagree

E. Strongly disagree

4. Does the industries found in you locality pollute your water sources such as rivers and streams found around your locality? Yes B. No

5. If your answer for question number 5 yes, what are the problem occurred on human health occurred in your locality due to the pollution of the water?

A. Skin disease

B. Diarrhea and stomach related disease

C. Waterborne disease

D. Other specify _____

6. If your answer for question number 5 yes, what are the problem occurred on animal health in your locality due to the pollution of the water? _____

7. What measures are taken by the government to overcome the environmental problems occurred in your locality because of the industries? _____

8. Any other comment?

_____

_____

_____

_____

Questioners for Government officials

1. Your work position? _____

2. Level of education? _____

3. What type of methods is used to take land from the farmers if the town administration needs land for industrial areas?

A. By paying compensation in cash

B. compensation in kind or as replacement of land

C. In both forms

D. If other _____

4. Do you think the compensation given by the municipality is enough to improve the living standard of the farmers? A. Yes B. No

5. If you answer for question number 4 is no, what is the reason?

_____

6. What kind of support is given by the municipality to improve the living standard of the community who are displaces from their land due to the expansion of industrial area?_____

7. How many hectare of land is give for industrial areas in your kebele?

_____

8. Do you think the industries found in this kebele improve the socioeconomic status of the community? A. Yes B. No

9. If you answer for question number 8 is yes ‘, explain how expansion of industrial area prove the socioeconomic status of the community? _____

10. What do you think are the positive and negative impacts that the industries have on the socioeconomic status of the community?_____

11. Do you think the industries found in this kebele have environmental impact assessment document? A. Yes B. No

12. If you answer for question number 11 is No, what is the reason for not have environmental impact assessment? _____

13. Do you think the industries found in this kebele are complying with the environmental standards found in the country?

_____

14. Please specify the impacts of industries on the natural environment?

_____

15. Please specify how industries affect the sanitation of the surrounding environment?

_____

16. Based on your understanding, what are the major environmental problems occurred in the kebele due to the expansion of the industries? _____

17. Do you think the industries found in this kebele have polluted the water resources in your kebele? A. Yes B. No

18. If you answer for question number 17 is yes, how and what problems are occurred on the human and animal health due to pollution? _____

19. Do you think the industries found in this kebele have degraded the flora & fauna found in this Kebele? A. Yes B. No

20. If you answer for question number 19 is yes, how? _____

21. How is the compatibility of the industries with the nearby land uses?

a. The factory is surrounded with residential hocuses

b. The factory us engulfed by other factories

c. The factory is surrounded by recreational areas

d. The factory is surrounded by commercial areas

e. The factory is surrounded by social services

f. Please specify if other _____

22. Do you have any comment on how to improve the compatibility of industrial areas with the with the nearby land uses? _____

23. What measures are taken by the government to overcome the environmental and socioeconomic problems occurred due to industrial expansion? _____